Payments, Processors, & FinTech

If Software Is Eating the World…
Payments Is Taking a Bite

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Equity Research | Americas

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Payments, Processors, & FinTech
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Payments, Processors, & FinTech coverage overview

Networks, merchant acquirers, bank tech, B2B-related, digital lending, and money transfer

Global payments networks

mastercard

VISA

Merchant acquirers (including MSP, PSP, etc.) and bank technology providers

FIS

fiserv.

globalpayments

jack henry & ASSOCIATES INC.

PayPal

Square

adyen

lightspeed

nuvei Payment Technology Network

REPAY Realtime Electronic Payments

Shift4 PAYMENTS

Digital lending

ROCKET

B2B-related businesses and payments networks

FLEETCOR

VERRA MOBILITY Safe. Smart. Connected.

wex

Money transfer (international remittances)

intermex INTERNATIONAL MONEY EXPRESS

WesternUnion WU

Note: MA and V are co-covered with Moshe Orenbuch, ADYEN is co-covered with Charles Brennen, and RKT is co-covered with Moshe Orenbuch and Douglas Harter.

Credit Suisse Payments Innovation Event Series
Selection of Recent reports

- Stripe – Payment Facilitation and Beyond…The Next Frontier in SaaS Monetization
- Introduction to Railsbank and modern Banking-as-a-Service (BaaS)
- Introduction to Ingo Money and the push-payments opportunity
- Introduction to Infinicept, a provider agnostic enabler at the intersection of software + payments
- Discussion on the BaaS opportunity with Synctera & Coastal Community Bank
- Introduction to Global Processing Services (GPS)
- Cross-Border Payments with FXC Intelligence
- Introduction to TouchBistro, an all-in-one integrated restaurant POS provider
- Intersection of Software + Payments Panel Discussion
- Open Banking Panel (11:FS & FDATA Global)
- Introduction to Finlync
- Introduction to Rapyd, a FinTech-as-a-Service company
- Fireside chat with Finastra, a leading financial software company
- Neo/challenger banks-focused: Chime, Current, Dave, Novo; Atomic, Neobank Panel (Dave, Varo, Revolut, & Atomic)

Payments, Processors, & FinTech recent reports
Links to our recent company-specific reports

- GPN, FIS, & FISV: Detailed sub-segment monthly exit rate & progression analysis builds
- FIS & GPN: Initial thoughts on reports suggesting merger talks; Accretion-dilution analysis
- RKT: Updating estimates for recent mortgage industry forecast increases
- ADYEN: Updates heading into FY21
- FISV: Additional thoughts following investor day; Acceptance segment mix analysis update
- FOUR: Additional thoughts on Shift4; potential for M&A and/or further share gains ahead
- SQ: Pay with Cash App; first signs of new offering via Cash by Cash App-enabled beta
- SQ: Cash App Lead discussion key takeaways
- SQ: Seller & Cash App ecosystem product-level detail
- NVEI: Thoughts on Nuvei's favorable positioning within global eCommerce & omnichannel acquiring
- PYPL: Pay With Venmo deep dive
- PYPL: True TAM update and eCommerce acceleration
- Cash App vs. Venmo monetization and strategy deep dive

Payments, Processors, & FinTech company reports

Links to our detailed company-specific reports

- Visa (V): Expanding moats of the 4-party model -- Co-covered with Moshe Orenbuch
- Mastercard (MA): Expanding moats of the 4-party model -- Co-covered with Moshe Orenbuch
- PayPal (PYPL): The best way to win a fight…Is not to get into a fight
- Square (SQ): Square stands apart; ecosystem scaling
- Fidelity National Information Services (FIS): Accelerating at scale
- Fiserv (FISV): Scale begets scale
- Global Payments (GPN): In all the right swim lanes
- Adyen (ADYEN): Leading on all fronts -- Co-covered with Charles Brennan
- Rocket Companies (RKT): Best-in-class technology platform driving a leadership position in the mortgage industry -- Co-covered with Moshe Orenbuch and Douglas Harter
- FleetCor Technologies (FLT): King of the Cross-Sell
- Jack Henry & Associates (JKHY): High-quality business with secular & idiosyncratic growth drivers
- Western Union (WU): The traditional money remittance power
- Nuvei (NVEI): Attractively positioned to benefit from global digital payments tailwinds
- Lightspeed POS (LSPD): Operating at the intersection of software and financial services
- WEX (WEX): Operating in attractive FinTech swim lanes
- Shift4 Payments (FOUR): Integrated payments player with idiosyncratic drivers over the medium term
- Repay (RPAY): Integrated payments platform serving niche (but expanding) verticals
- Verra Mobility (VRRM): Market leader in tolling payments processing and traffic safety solutions
- International Money Express (IMXI): Focused competitor gaining share in important remittance corridors

Payments, Processors, & FinTech coverage & ratings

13 Outperform, 5 Neutral, 1 Underperform

Ticker	Company Name	Market Cap ($b)	CS Rating	Stock Price	CS Target	Brief take on stock
V	**Visa**	$487	OP	$201	$255	US contactless rollout likely to benefit V to a greater extent vs. MA (due to mix); Emphasis on attracting new payments flows onto both card and non-card rails (Visa Direct + Earthport, efforts in both cross-border and B2B, pending acquistion of Plaid)
MA	**Mastercard**	$331	OP	$329	$380	Higher exposure to faster growth international markets; Acquisitions (Vocalink, Transfast, Nets, Transactis, Finicity) support multi-rail approach, B2B (Mastercard Track), and bill-pay (Mastercard Bill Pay Exchange); Maestro card conversions
PYPL	**PayPal**	$296	OP	$248	$215	Share gainer & eCommerce pure-play with a long list of nascent areas of upside (i.e., Braintree becoming more global, Venmo flipping to EPS boost [Pay With Venmo, Credit Card rollout], partnerships [MELI, Uber], bill-pay, China, iZettle, Honey)
SQ	**Square**	$113	OP	$217	$210	Intersection of software + payments, "3x recycling"; Cash App adoption accelerating in 2020 via stimulus related Direct Deposit, and a desire for mobile banking amid health risks; Seller ecosystem transition upmarket and to omnichannel offerings accelerated, setting up GPV recovery
FIS	**Fidelity National Information Services**	$80	OP	$128	$160	Expectation for accelerating topline in medium term, rare; ~45% of merchant acquiring in global eComm & ISV; Two deals worth of revenue synergies in 2020; Longer-term in-store expansion in new countries; Defensive banking and capital markets segments defensive/recurring revenue
FISV	**Fiserv**	$73	OP	$107	$135	Acceptance segment should benefit from an improving mix toward its four “crown jewel” businesses: Clover, ISV (CardConnect), eCommerce, and International; medium-term guidance (2022-2023) suggests a runway ahead for +7-9% internal revenue growth and +15-20% EPS growth
GPN	**Global Payments**	$56	OP	$185	$215	Highest relative exposure to the fastest growing channels (owned & partnered software, global eCommerce/Omni channel with local support in 33 markets); Leading credit issuer processor via TSYS; Potential for more bank/JV partnerships
ADYEN-NL	**Adyen**	€ 58	OP	€ 1,875	€ 2,283	Differentiated global single platform with large eCommerce exposure (88% FY19 volumes) and clear share gainer within this swimlane offering supperior runway for growth
RKT	**Rocket Companies**	$46	NEUTRAL	$23	$27	First mover to a fully online mortgage platform and share gainer (~5% in 2018 to ~10% CSe by 2022E) within a large TAM (~$2-3tr US mortgage market), with leadership supported by its tech platform (enabling its partner network) and industry-leading recapture rates
FLT	**FleetCor Technologies**	$22	NEUTRAL	$261	$240	Fuel, Corporate Payments, Lodging, & Tolls all recurring revenue, high margin, network effects, similar distribution; Best at cross-sell & accretive M&A ("Beyond Fuel latest example); Historically a LDD organic ex-FX topline grower
JKHY	**Jack Henry & Associates**	$12	NEUTRAL	$153	$175	Highly resilient financial model with ~85%+ recurring revenue from LT contracts enabled by sticky customer relationship, but we're mindful of the consolidation among customer base and neobanks pressuring incremental account additions and transactions for core providers longer term
WU	**Western Union**	$9.5	UP	$23	$22	Valuation at a meaningful premium to historical averages, dividend yield (~3%) at low end of range, yet supportive of stock; Competition from traditional & FinTechs, many of which enabled by Visa Direct; Platform/asset value & online white labelling supportive of value
WEX	**WEX**	$9.0	NEUTRAL	$197	$205	Bullish on the underlying businesses (including potential for accretive M&A ahead), but valuation and expectations for organic deceleration beginning Q2 2020 (lapping of Chevron and Shell); More defensive revenue streams in Healthcare and Corporate (ex-Travel) segments
LSPD	**Lightspeed POS**	$7.7	OP	$69	$70	Intersection of software + payments/financial services servcing complex merchants (large global TAM from ~8mm SMBs), with continued penetration of Lightspeed Payments the key growth driver for revenue and gross profit given its higher net take rate of the PayFac model
NVEI-TSE	**Nuvei**	$8.4	OP	$59	$45	Part of a smaller group of companies with nearly global omnichannel capabilities, operating in relatively attractive swim lanes (~70% eCommerce/CNP) with exposure to niche verticals (e.g. online gambling, gaming, regulated FX trading) and a willingness to customize offerings
FOUR	**Shift4 Payments**	$5.9	OP	$70	$66	An integrated payments pure play with a two-pronged growth algorithm driven by ~$185b (2019A) gateway volume conversion opportunity and ~900-1000bps margin expansion expected from 2019-2022E (with a portion already realized in 2020 via acquisition cost synergies)
VRRM	**Verra Mobility**	$2.3	OP	$14	$14	Positive on the moats and sustained mid-single digit+ growth (guidance Government +2-4%, Commercial +6-8%, + boost via M&A, Europe, and new initiatives); Awaiting full rollout of Western Europe Commercial opportunity (where pilot programs began in Spring 2020)
RPAY	**Repay**	$1.9	OP	$24	$28	Integrated payments in niche lending verticals; Increasing debit penetration in core verticals, adding verticals, new merchants & ISV partners as drivers (organic ~mid-teens + M&A, e.g., B2B and Healthcare)
IMXI	**International Money Express**	$0.6	NEUTRAL	$15	$18	Operates within a large TAM, share gainer, and numerous nascent initiatives (Africa, Canada, white labeling with Latin American banks, GPR cards); Mexico & Guatemala concentration (volatile data/end-market), two of strongest corridors globally (US-MEX largest corridor globally)

Source: Company reports, FactSet, Credit Suisse estimates

Payments, Processors, & FinTech coverage overview
Top pick: Global Payments (GPN) stable large-cap recovery story

Top Pick	Rationale	Catalyst Path
Global Payments	▪ Highest relative exposure to the fastest growing channels (2019E) of the large cap merchant acquirers: 1) ~40% owned & partnered software growing ~10-14% organic ex-COVID; 2) ~20% global eCommerce & omnichannel growing ~15+ ex-COVID; and 3) ~20-25% International growing ~10%+ ex-COVID. ▪ Platform emphasis on technology enabled payments and SMB, alongside a subset of multi-nationals benefiting from on-the-ground support in ~38 markets. ▪ Greater bounce back in meaningfully depressed verticals (e.g., in-store gaming, outdoor events, medical & dental, education & campus solutions, etc.). ▪ Leading credit issuer processor with dominant share in the US, UK, Ireland, Canada, and China (~MSD+% growth vs. industry +3%); TAM expansion via AWS partnership (smaller issuers & FinTechs).	▪ Potential return to tech-enabled M&A (although more challenging today) ▪ New partners and client wins, including via AWS on TSYS side of business ▪ Vaccination progress ▪ Market shift toward GARP vs. longer duration assets

Added Highlights	Rationale	Catalyst Path
PayPal	▪ Near pure-play on eCommerce, with a ~$5tr "True TAM" inclusive of global eCommerce, eTravel, eFood delivery, eTicketing, ride-sharing, streaming, etc. – supports persistence of growth and annual compounding. ▪ Rare large cap with prospects for ~20% revenue growth and mid-20%s EPS growth medium term (ex-eBay impacts near-term). ▪ Potential areas of upside (long list of "call options"): QR Code in-store, Cryptocurrency trading & transactions (lower cost of funds), Business Profiles, Pay With Venmo, Bill-pay (Paymentus), Braintree (local acquiring, APM/LPM, omni), iZettle (further offline omnichannel opportunity), new marketplace signings, emerging markets investments (Uber, MercardoLibre, GoPay), engagement (Pay with Rewards), Honey, and M&A.	▪ Venmo-related (Pay with Venmo, Venmo Credit Card, Honey integration, direct deposit usage, International expansion, etc.) ▪ Pay in 4 BNPL later data points ▪ Braintree becomes more global ▪ Cryptocurrency trading & transactions ▪ Investor day
Visa	▪ While bullish on both of the global networks (V & MA), we continue to have a slight preference for Visa given expectations for stabilization in European share (post the September 2018 VisaNet migration), outsized (vs. MA) benefits from US contactless (supportive of transactions & yields), increased mix of value added service (driven by higher levels of eCommerce and other card-not-present transactions), high levels of renewals completed over past ~2 years (~55% of book vs. ~40% expected, suggesting stabilization in FY 2022). ▪ Further, cross-border mix now re-based (heavier in eCommerce, which is faster growth and less cyclical vs. being ~2/3rds travel pre-COVID). We see potential upside to this potential revenue source over the coming year(s) in part due to the low travel base (mix) but also due to the leisure travel tilt. ▪ Valuation gap (attractive vs. MA, but also vs. pre-COVID levels, despite lower interest rates and an improved cross-border mix [now more eCommerce vs. travel pre-COVID]).	▪ Cross-border (leisure focus) travel recovery ▪ US stimulus into DDA accounts ▪ Vaccination progress ▪ Intra-quarter volume updates ▪ Progress in US contactless (transactions and yield benefit)

Source: Company reports, FactSet, Credit Suisse estimates

Payments, Processors, & FinTech coverage overview

Additional highlighted Outperform rated stocks

Added Highlights	Rationale	Catalyst Path
Square	▪ Intersection of software & payments, with two ecosystems (Seller & Cash App) having the ability to launch and quickly scale new products (e.g., launched Cash Card late 2017, already at ~$650mm in annual run rate revenue as of 4Q20E). ▪ Continued Cash App user base mix shift toward Cash Card users and payroll direct deposit accounts, alongside sustainably lower CAC levels driven by P2P (and Boost, Bitcoin, stock investing, etc.). ▪ Seller ecosystem transitioning further upmarket (sales personnel investment planned) and to eComm & omnichannel offerings (attracting larger than expected 2020 new cohort). ▪ We expect SMB digital banking to be an increasingly important theme for Square in 2021 (Square Card for business and associated bill-pay/AP capabilities, additional treasury services, alongside existing payroll and software offerings); aligned with ecosystem and fast access to funds themes.	▪ Bolstering SMB digital banking offering ▪ Direct deposit traction within Cash App user base (i.e., via Credit Karma, marketing efforts, Boost network expansion, etc.) ▪ Further progress in expanding eCommerce & omnichannel platform ▪ US stimulus driving "shot on goal" direct deposit accounts
FIS	▪ Prospects for +7-9% organic topline (total company), with the 2021 setup including numerous 2019-2020 wins (across all segments, highlighted by top 100 bank additions) and the maturation of revenue synergies (should exit 2020 at ~$200mm, heading to ~$550mm by year-end 2022), further fueled by high incremental margins and cost synergies. ▪ "Staple-ish" and majority recurring (largely SaaS billing structure) Banking and Capital Markets segments provide a stable base (combined for ~70% of revenues), with the Banking segment having the potential to reach ~HSD revenue growth at some point in FY 2021 (i.e., supported by top 100 bank and other large client wins). Continued wins (remaining ~2/3rd of top 100 US banks) and cross-selling (lending modules) provide a pathway for persistent growth into FY 2022 & FY 2023 for the core banking business. ▪ Worldpay business with high exposure to eCommerce & integrated payments (~half of acquiring business pre-COVID), alongside prospects for a narrowing (and reversal) of the gap between volumes and revenues (i.e., recovery of SMB, travel, transaction size reduction, etc.).	▪ Continued Banking client wins in the top 100 US bank opportunity (a TAM less addressable to Fiserv and others) ▪ Progress in more nascent omnichannel merchant opportunity (ex-core markets, such as Brazil, India, etc.) ▪ Potential M&A (either large scale with GPN and/or bolt-on acquisitions leveraging FIS' distribution prowess)
Lightspeed	▪ Lightspeed is operating within what we believe will be one of the most important themes within our coverage over the coming ~5-10 years – the intersection of software and financial services. ▪ Lightspeed is not only capable of enabling complex merchants to run their businesses, but also in embedding and powering additional ecosystem- and monetization-enhancing financial services such as payments, instant payouts, lending (Lightspeed Capital powered by Stripe), card issuing, banking & treasury services, and much more (e.g., potential for payroll, AP automation, insurance).	▪ Payments business penetration ▪ Expansion of Lightspeed Payments into new geographies ▪ ARPU expansion via payments, capital (lending), and additional financial services offerings yet to be launched (e.g., instant payouts)

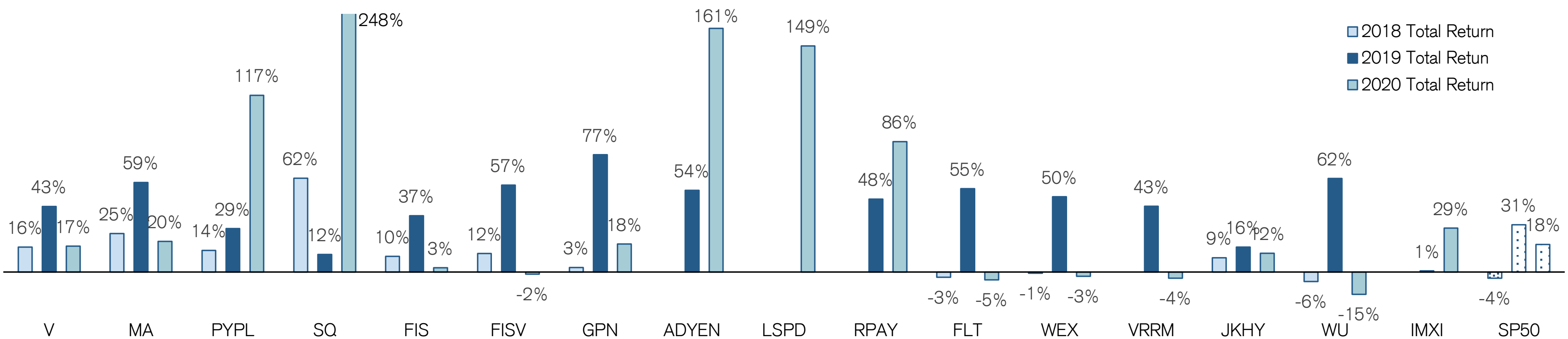
Source: Company reports, FactSet, Credit Suisse estimates

2020 recap…

COVID-19, continued M&A, IPOs & SPACs, FinTech scaling

2020 saw COVID-19 behavior change (forcing factor), continued M&A, numerous IPOs & SPACs bring more companies public, along side continued scaling of FinTechs platforms

COVID-19 forcing factors	▪ eCommerce & omnichannel payments, alongside in-store contactless (via both contactless cards and digital wallet offerings) took center stage as business and consumers that may have lagged behind in adopting these technologies were forced to implement. ▪ Neobanks brought on large cohorts of customers, as their digital onboarding thrived during times when accesses sing bank branches was either more challenging and/or less desired.
Numerous IPOs (traditional & SPAC)	▪ Multiple payments IPOs including FOUR, RKT, NCNO, NVEI, BIGC, and others, alongside notable companies that become public via SPAC including BTRS, KPLT, PAYA, PSFE, etc.
Notable M&A	▪ Large scale combinations such as Worldline-Ingenico and Nexi-Nets, both in Europe. Additionally, numerous bolt-on acquisitions such as 3dCart (acquired by FOUR), eNett and Optal (acquired by WEX), Finicity (acquired by Mastercard), Paystack (acquired by Stripe), Kabbage (acquired by AXP), Smart2Pay & Base Commerce (acquired by NVEI), AFEX (acquired by FleetCor), Virtus Partners (acquired by FIS), and others.
Premier private FinTechs scale their platforms	▪ Financing rounds and increasing valuations, including Stripe ~$36b, Chime ~$14.5b, Checkout.com (~$15b, early 2021), Marqeta ~$4.3b, Robinhood ~$11.2b, NuBank (raised an additional ~$300mm), Transferwise (~$5b), Remitly (~$1.5b), Klarna (~$10.6b), Current (~$750mm), Better.com (~$4b), Global Processing Services (strategic investment from Visa), Tipalti (~$2b+), Greenlight (~$1.2b), Finix (raised an additional ~$30mm), Blend (~$3.3b), MineralTree (raised an additional $50mm), Airwallex (~$1.8b), and many more



…and expectations into 2021

COVID-19 forcing factors continue to emphasize digital distribution and scale

Some of our expectations for 2021 are for a continued emphasis on M&A (consolidation due to increasing importance of eComm & omnichannel, software-distribution, and local acquiring on a global basis), embedded finance & BaaS platforms taking center stage, Neobanks continuing to scale, and increasing efforts/partnerships by BigTech in FinTech

Continued consolidation within the merchant acquiring segment	▪ Share loss of the ~150-200 sub-scale merchant acquirers that are more local/regional/bank-based due to increasing complexity (merchant demands, global local acquiring, regulation, etc.). ▪ Potential return to acquisitions for GPN, FIS, & FISV during with an emphasis on merchant acquiring (fastest growing sub-segment, ex-COVID) and FinTech platforms (leveraging distribution reach).
eComm & Omni and Software-platform-led Payments	▪ We continue to believe eCommerce & omnichannel and software/platform-led payments are the two swimlanes that will drive the vast majority of the growth within our sector (with an even greater concentration post-COVID). ▪ Key beneficiaries in our coverage universe include PYPL, SQ, GPN, NVEI, ADYEN.
Embedded finance & BaaS platforms take center stage	▪ Continued expansion of software platforms beyond payments (e.g., Stripe continues to lead in enabling software platforms to embed financial services "beyond payments" such as issuing, loans, digital bank accounts, payouts, etc. – all via its broader commerce enablement platform). ▪ Integrated payments increasingly becomes a single prong within a broader financial services distribution effort for software platforms (e.g., LSPD within our coverage universe).
Neobanks gaining share (accounts, transactions, increased primary account status, additional cross-selling)	▪ We expect Neobanks to continue scaling (emphasis on payroll direct deposit), after impressive growth with 8 of the top Neobanks in the US increasing their user bases by ~35mm up +32% YTD through Q3 2020 (CSe). ▪ Expect further rollout of cross-selling and monetization strategies (e.g., secured credit cards, credit cards, other personal lending, insurance, tax preparation, high yield savings accounts, and more).
Increasing focus from and partnerships with BigTech	▪ We expect follow through in 2021 predicated on partnerships and efforts initiated during 2020 (e.g., Google Pay expanding, including the launch of Google Plex checking accounts alongside 11 traditional bank partners, etc.); to that point, we expect a meaningful increase in the number of partner banks enabled to support FinTechs (via platforms such as Synctera and others). ▪ Further examples we expect to scale include: Facebook Shops, Instagram Shopping, WhatsApp Payments, etc. (noting PayPal is a key partner to Facebook's platforms), while we continue to monitor any further moves by Amazon.

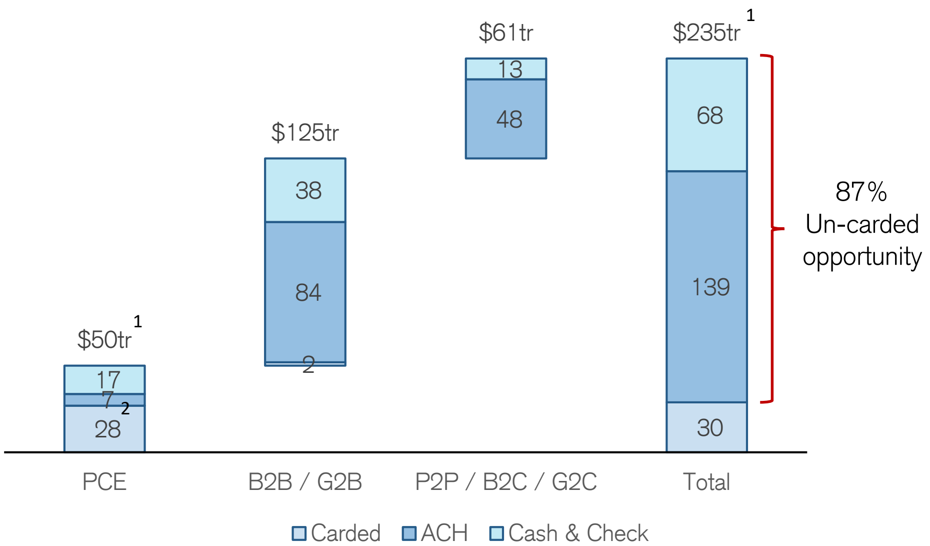
Source: Company reports, A.T. Kearny, Credit Suisse estimates.

Global payments volume TAM is bigger than global GDP

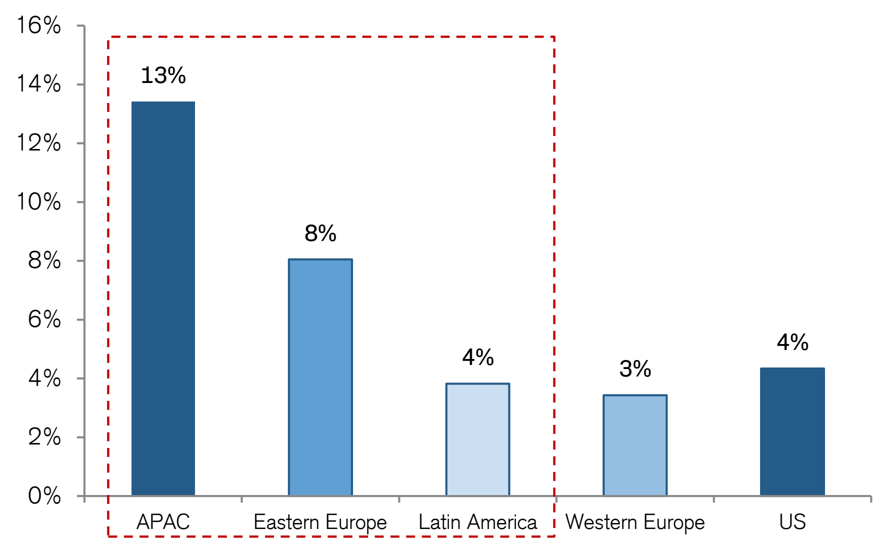
First ingredient to an investment thesis…

- Entire coverage universe is in some way exposed to secular trends toward digitization of payments.
- Global payments volume (~$240tr) is bigger than global GDP (~$85tr) because multiple payments are made for the same level of output or production.
- While a meaningful opportunity remains in the US and Europe, faster-growth markets are in Asia-Pacific, Latin America, and parts of Central / Eastern Europe.

Global payments TAM (total addressable market), across carded, ACH, and cash & check totals to ~$240tr, with only ~13% carded



Total card volume (Visa, Mastercard, and numerous local schemes) are expected to deliver ~3-13% CAGRs (2019-2024E), with APAC and Eastern Europe as faster-growth geographies

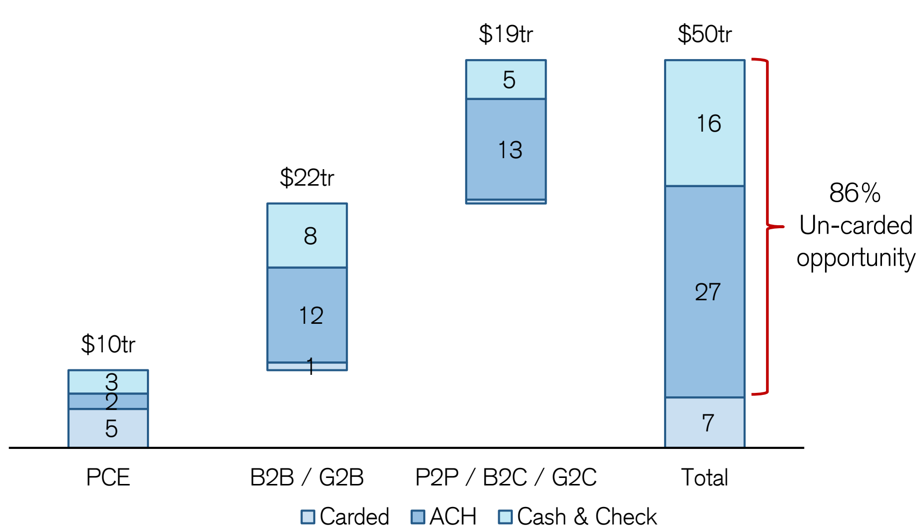


Source: Mastercard, Euromonitor, Credit Suisse estimates
(1) Includes $12T of non-purchase consumption; (2) Includes $13T of non-PCE card purchases in China

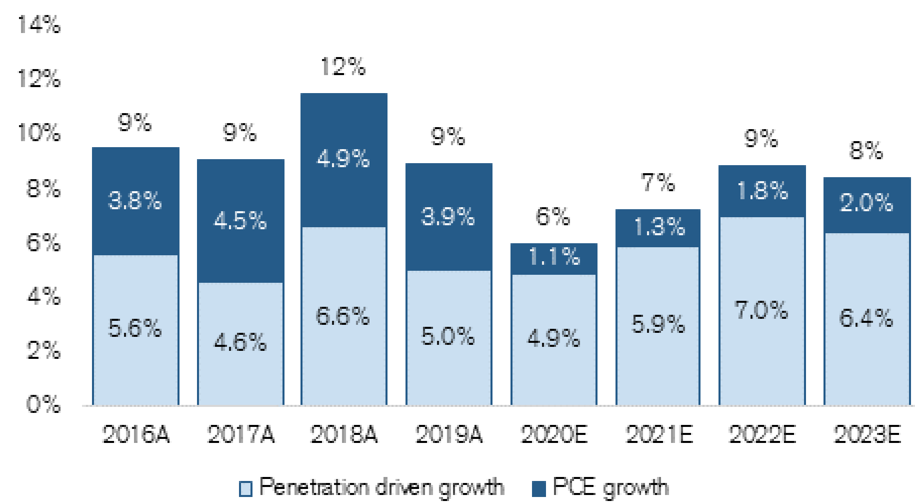
US Payments addressable market
Large TAM driven by PCE growth + cash-to-card conversion

- Our industry model (card volumes/penetration vs. adjusted PCE + cash-to-card penetration) suggests continued HSD volume growth should persist through at least 2023.
- We model V & MA US volumes combining for ~59% of adjusted PCE by 2023E (vs. ~49% today).
- Our confidence is driven by nascent TAM-expansive payment flows beyond traditional consumer-to-business retail payments (i.e., beyond PCE), particularly push-to-card (priced to attract interchange-sensitive payment flows) and B2B.

The US payments market has a large TAM, estimated at ~$50tr in volumes when viewed in its entirety (PCE, B2B, G2B, P2P, B2C, and G2C), with ~50%+ of consumer payments penetrated and ~5% of B2B



Our industry model is built based on a combination of US PCE growth + cash-to-card penetration increases; we note that V & MA combined represent ~70-80% of US volumes



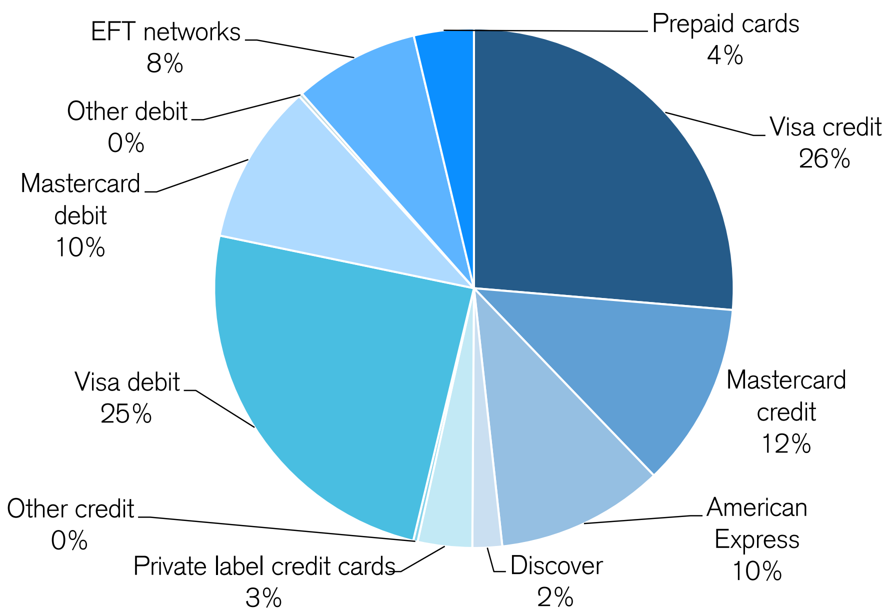
Source: Company reports, Mastercard, FactSet, the BLOOMBERG PROFESSIONAL™ service, Euromonitor, Credit Suisse estimates. There are rounding differences in both B2B and P2P bars in US TAM graph

US Payments market revenue pools

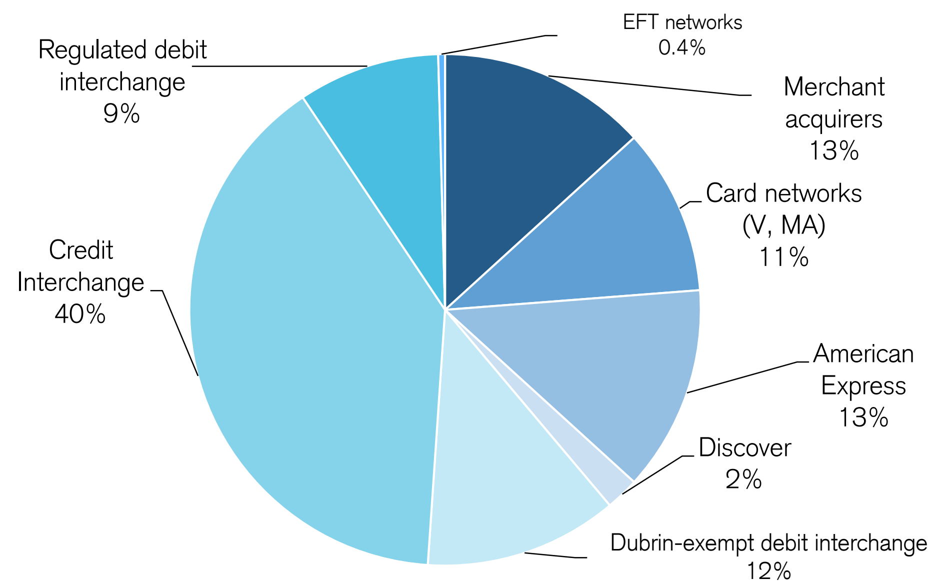
Merchant discount rate components (opportunity for acquirers, networks, & issuers)

- US payment card volumes are approaching $8tr in total, with the vast majority touching Visa and/or Mastercard networks.
- Visa and Mastercard are not the largest revenue beneficiaries though – banks are (the card issuers themselves), with card issuers earning interchange on each transaction equivalent to ~130bps on average (vs. Visa and Mastercard earning network yields that come to roughly ~26bps).
- Additional revenue opportunities include software, working capital, payroll, issuer processing, security, loyalty, etc.

Visa and Mastercard-branded card make up more than 70% of all US payments volumes (credit, debit, pre-paid)…



…but card issuing banks (which earn interchange) earn the majority of revenue made on a given transaction (excluding interest income)



Source: Company reports, The Nilson Report (2019 US Purchase Volume from The Nilson Report, except for prepaid cards for which 2019E is CSe), The Federal Reserve, Credit Suisse estimates, EFT networks exclude Interlink and Maestro

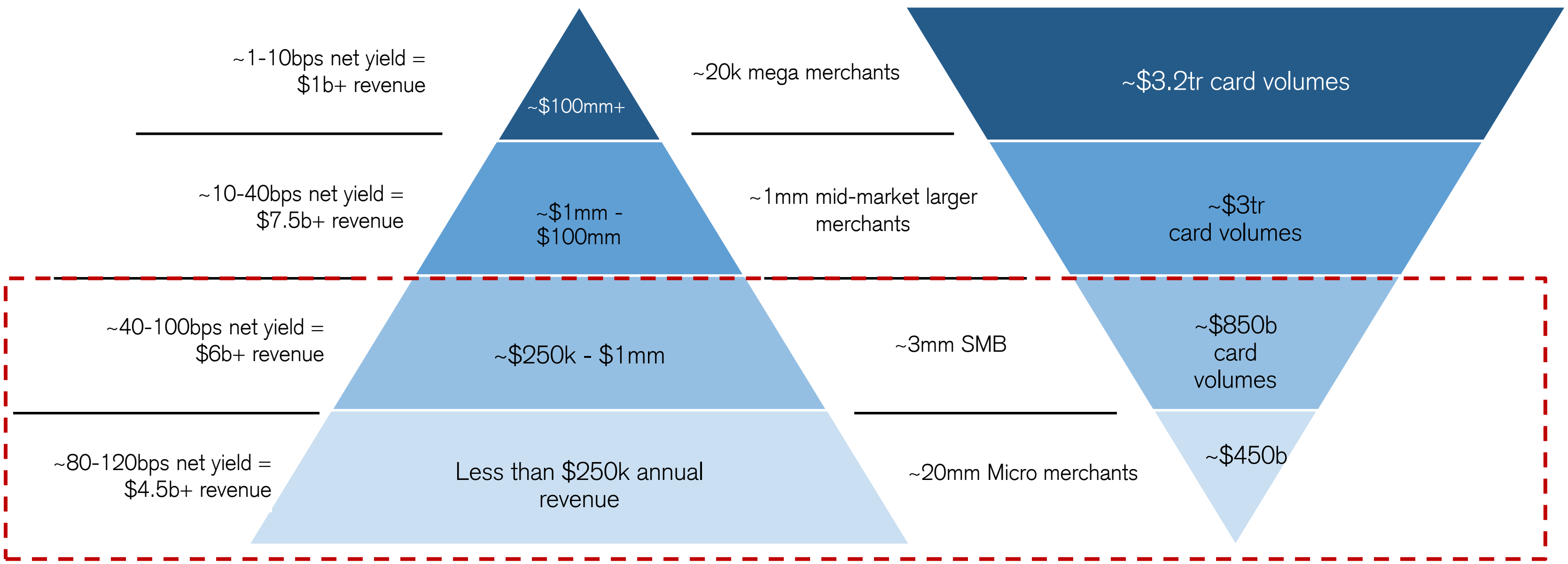
Merchant Acquiring: SMB is where the money is at

SMB segment ~17% of volumes, but ~55% of revenue in US market

- Often operate with bundled pricing models, with simple, rack-rate pricing (e.g., 2.6% + $0.10 for Square), which when combined with scale and interchange optimization, can result in net revenue yields ~40-140bps (vs. low-single-digit yields for large merchants)
- Less likely to be commoditized with bundling of vertical software embedded into operations (e.g., Square recently increased price)
- SMB merchant attrition is higher; ~20% of micro merchants fail per year[1] vs. LSD for larger merchants
- Opportunity to expand beyond payments (e.g., capital/cash advances, website design, CRM/marketing tools, payroll, etc.)

~$7.5tr in US card volumes (2019A), of which ~$1.3tr is from SMB and micro merchants, which despite making up just ~17% of volumes, account for ~55% of the acquiring/processing revenue opportunity

"…First of all, we stick to our knitting and we focus really on SMBs in a given country. So as good a company as Amazon is, we're not interested in Amazon, right? So for us to be a commoditized provider…no contracts, 30-day outs, no minimums, no service, low fee. Why is that interesting?"
– Jeffrey Sloan, CEO, GPN (May 15, 2019)



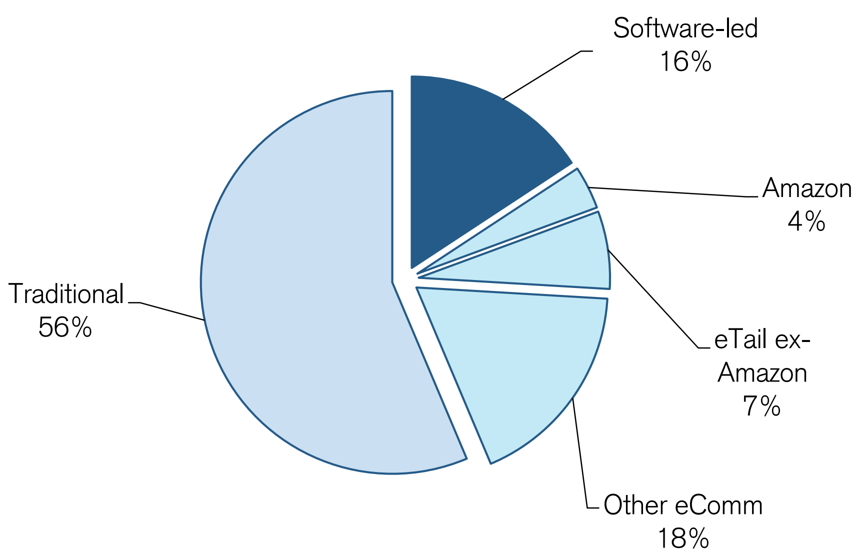
Source: [1]Small Business Administration, Company reports, Square, US Census, Credit Suisse estimates, US General Purpose Card Volume from The Nilson Report for 2018 base, and 2019E represents Credit Suisse estimates

Merchant Acquiring: Software & eCommerce fast-growth channels

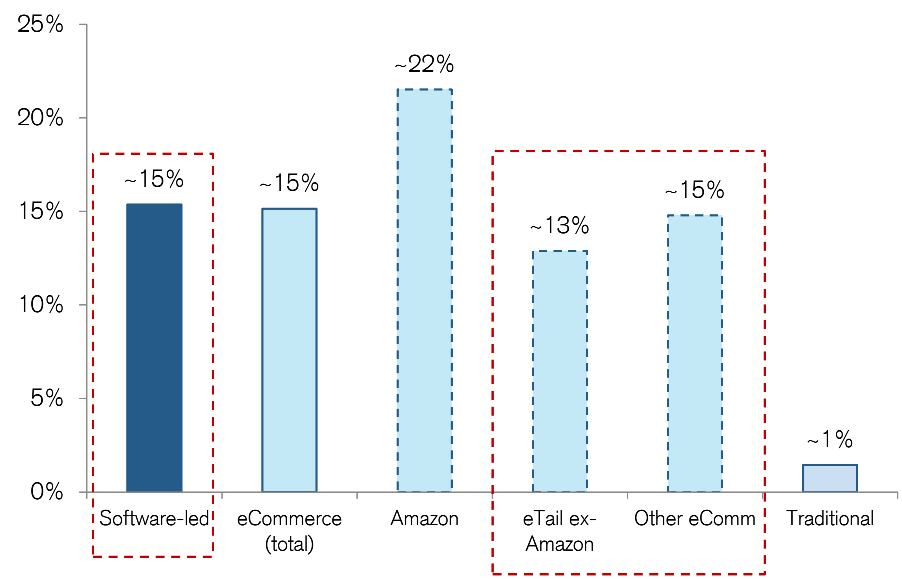
Want exposure to companies positioned to deliver tech-enabled payments

- Technology-enabled payments (software-led and eCommerce-related channels) is not a new trend, but it remains a powerful one, with software-led channels and eCommerce ex-Amazon growing ~2x+ the overall market (and meaningfully faster than traditional in-store payments).
- Share gainers will be payment providers with the best exposure to these channels (own the technology to serve, with business mix skewed toward these faster-growth swim lanes, along with the scale and resources required to keep up with increasing complexity and competition).
- Amazon makes up ~35% of US retail eCommerce (and ~55%+ of growth), a portion of payments that is less addressable for the majority of payments companies and with the lowest unit economics for acquirers – for this reason, we separate the remaining portion of eCommerce, which we define as eTail ex-Amazon (i.e., retail eCommerce for SMB and non-Amazon merchants) and other online commerce (e.g., eFood delivery, ride-sharing, online travel, etc.).
- Further, a large portion of the remaining eCommerce volume runs through marketplaces (~50% of eCommerce globally) and multi-national companies (e.g., Uber, Netflix), placing additional emphasis on global & cross-border eCommerce & omnichannel capabilities for merchant acquirers.

We estimate that US payments volumes are still ~2/3rds traditional, with ~15-20% software-led (SMB-focused) and ~30% eCommerce-related (across Amazon and other non-Amazon online channels)



Software-led payments (~2x+ industry growth rates) and eCommerce as the most attractive verticals in the US market – 2019-2023E CAGRs below



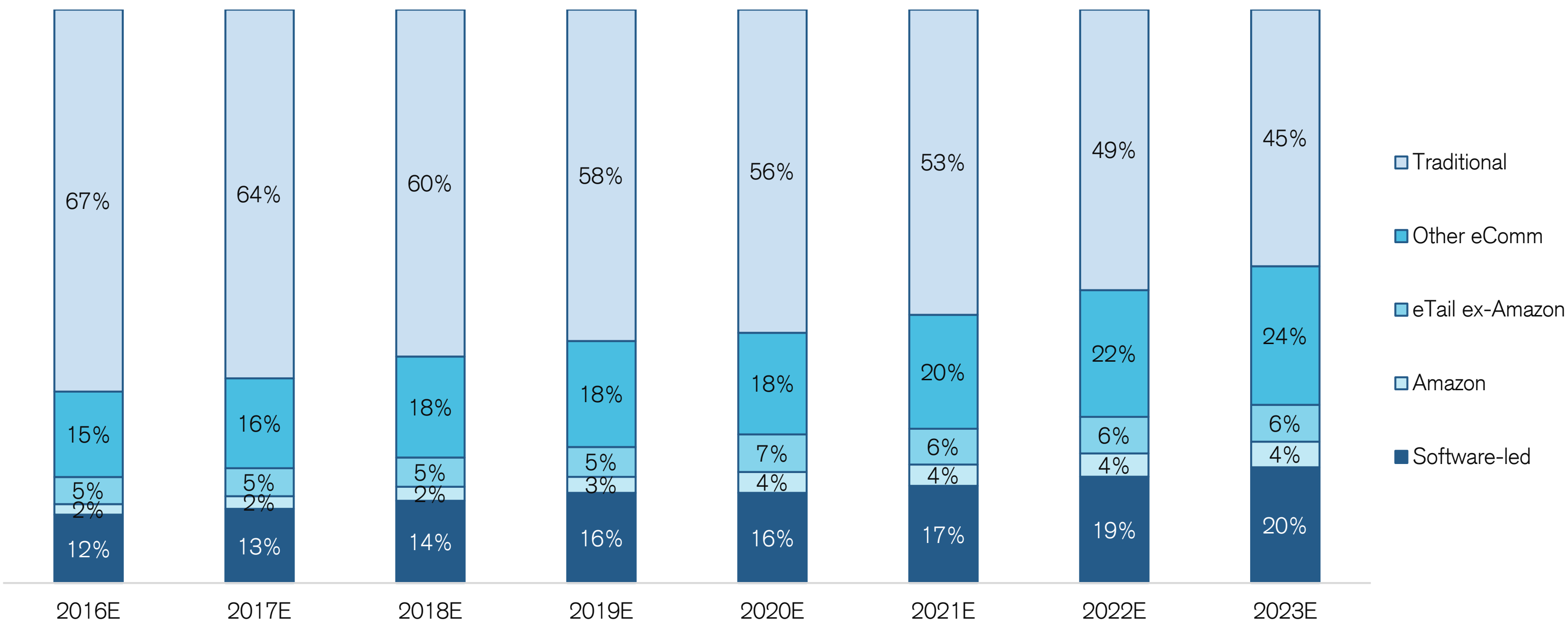
Source: Company reports, US General Purpose Card Volume from The Nilson Report for 2018 base, and 2019E represents Credit Suisse estimates, BCG, AZ Payments, eMarketer, 2019 Federal Reserve Payments Study; Software-led defined as integrated payments sold through owned or partnered software platforms typically to small or medium-sized businesses.

Merchant Acquiring: Software & eCommerce fast-growth channels

Most attractive swim lanes in the US are Software-led & eComm ex-Amazon

- We expect the majority of all growth in the US payments market will accrue to Software-led and eCommerce channels (we note the increasing importance of omnichannel capabilities capturing this growth).
- We forecast traditional payments (i.e., brick on counter and/or large merchant contracted separately) to cede ~10% share by 2023E (off a more normalized 2019 base), with more than half benefiting software-led channels (i.e., owned software-led platforms like Square and ISV-partnered integrated payments; gaining ~4%, going from ~16% to 20% share) and the remainder going to eCommerce payments channels (gaining ~6%, going from ~22% to ~28%).

Our US payments market estimates suggest that traditional payments, which still make up the vast majority of all volumes, will cede share to software-led channels (i.e., owned & ISV-partnered) and eCommerce (including digitized payments outside retail)



Source: Company reports, The Nilson Report, BCG, AZ Payments, eMarketer, Credit Suisse estimates

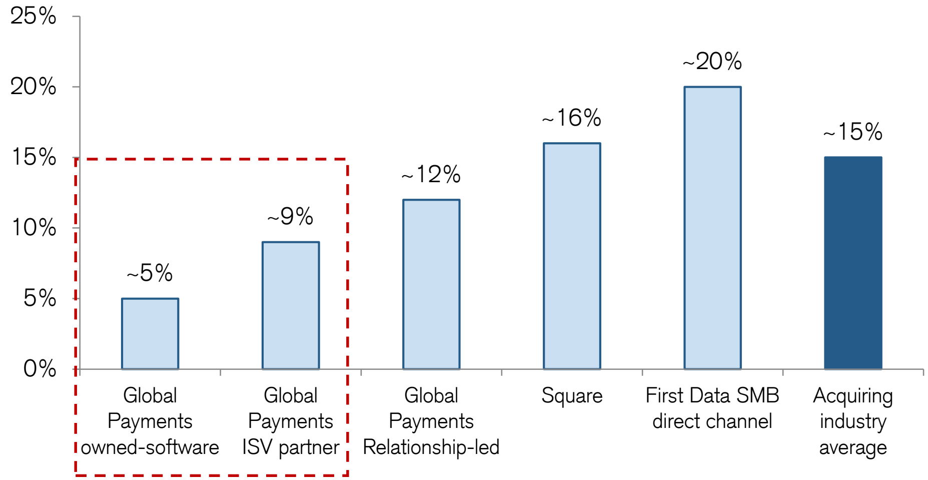
Merchant Acquiring: Software-led in two flavors – owned and partnered
Both support SMB access, cross-selling opportunities, and reduced attrition

- Results in a highly recurring revenue streams with reduced attrition, and the potential for higher margins (i.e., distribution leverage – "acquire the merchant once, sell the merchant many times", including additional ancillary products and services such as working capital loans, payroll processing, invoicing, etc.).
- Payments and software companies often strive to work with the same underlying merchants (SMB and mid-market, higher net revenue yields vs. larger merchants).
- Makes sense for payments and software to work together given payments data is valuable for decision making and planning (customer preferences, inventory planning, cash flow management), making the offering less commoditized.

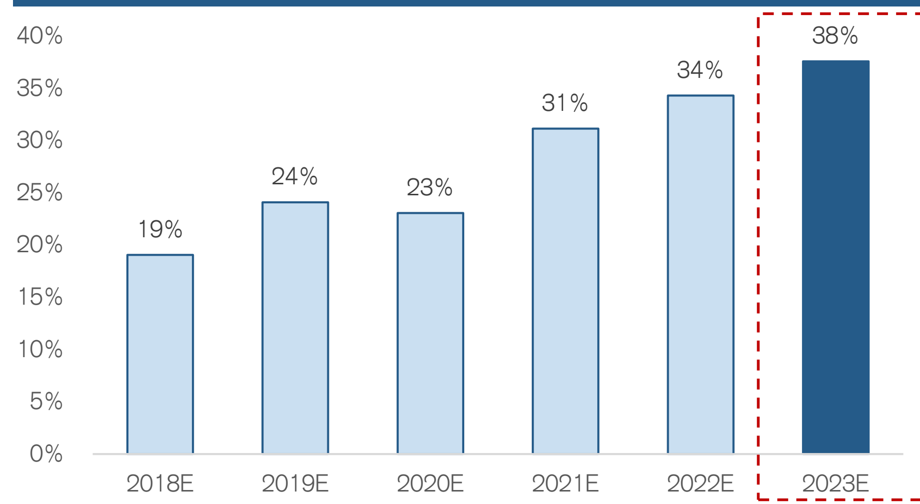
"…as we drive deeper into software & more integrated, the attrition fundamentals…are significantly better…once you're tied into the underlying software environment…it's hard to see people leaving…but I think to say those channels are in the single digits is probably a good estimate of where we see attrition rates in the sort of integrated and sort of the owned software markets."

– Cameron Bready, CFO (currently COO), Global Payments (March 2018)

Platforms that combine payments + software (both owned and ISV partnered approaches) benefit from meaningfully reduced attrition, particularly impressive given SMB skew of these channels



We estimate ~40% of Square's Seller revenue will come from additional seller services (e.g., Capital, payroll, Instant Deposit, Business debit, additional paid software, online store, etc.) by 2023E



Source: Company reports, Credit Suisse estimates

Merchant Acquiring: eCommerce & Omnichannel drive share gains

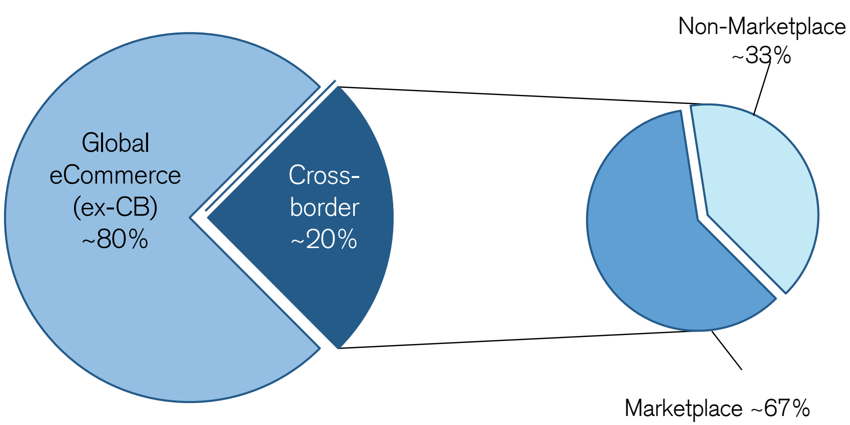
Increasing consolidation of relationships around fewer (~3-5) scaled platforms

- We expect larger merchants (including marketplaces) to increasingly consolidate their payments relationships around fewer globally-scaled platforms that can provide local acquiring both online and in-store across the majority of the merchant's geographic footprint.
- Share gaining platforms will allow for a single (or few) integration(s) to access local acquiring and consumer experiences (including local payments methods, both card and non-card), leading to higher authorization rates, increased conversion, and reduced costs (interchange, network fees, fraud).

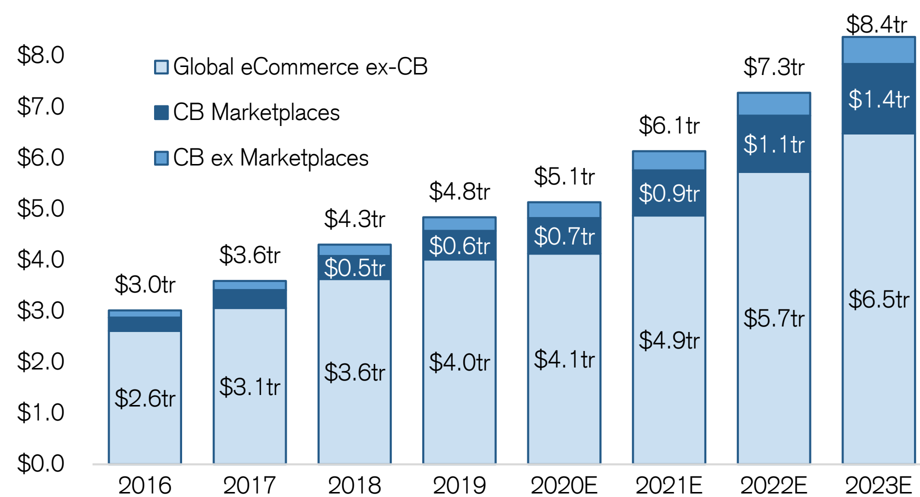
"…It's not unusual for a large global retailer to be managing 30 to 60 and sometimes 100-plus contracts and partners…It is not unusual for a large international company to be eliminating potentially dozens of different partners and integrate one implementation across all of those regions with one set of contracts and one solution…"

– Brian Dammeir Head of Product, Adyen (April 2019)

Global eCommerce is about ~80% domestic and ~20% cross-border; within cross-border, ~2/3rds are done via Marketplaces (and a meaningful portion of the remainder is via larger multi-national merchants)



Global eCommerce is a fast-growth swim lane (~15% CAGR 2019-2023E), with the cross-border component growing ~23%+ (with an even faster-growth sub-component, cross-border on Marketplaces, is growing ~25%)



Source: Company reports, Worldpay, eMarketer, Forrester Research, Zion Market Research, Credit Suisse estimates

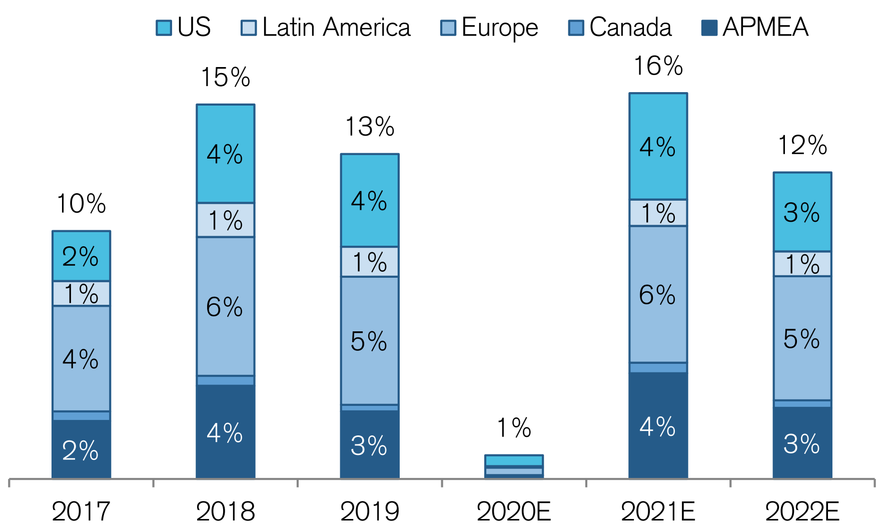
Merchant Acquiring: International exposure supports growth

Faster-growing underlying markets with lower penetration

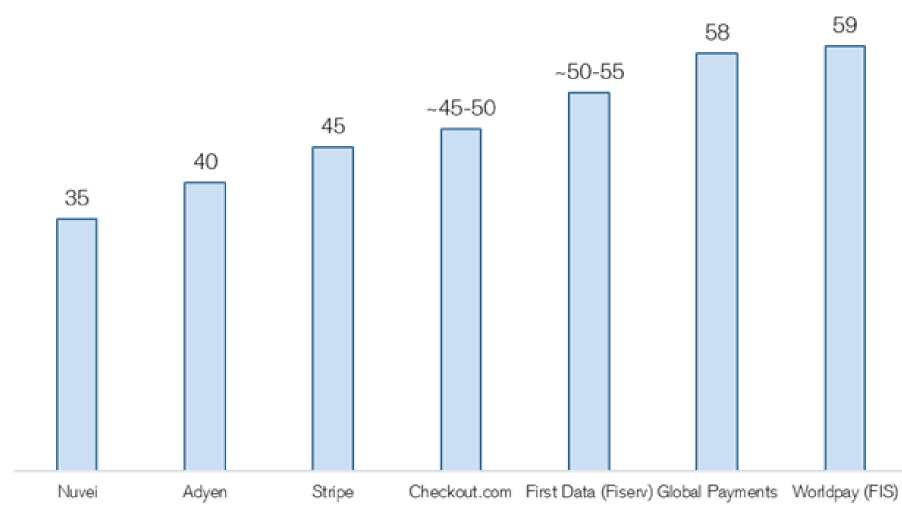
- Faster-growth international markets, often in earlier stages of the secular cash-to-card conversion (e.g. APAC, Latin America, and Central / Eastern Europe).
- Processing in-store payments for domestic merchants requires local acquiring capabilities (owned or sponsored licensing), local support staff, local knowledge, relationships with regulators, local payments methods, local language, etc.
- The ability to handle both in-store and eCommerce (omnichannel) is a differentiator, better positioning acquirers to win multi-national merchant contracts (e.g., Global Payments won Citi for global eCommerce & omnichannel for Citi's multinational banking clients on this basis).

> *"…We expect continued growth and expansion into faster-growth markets. Most of our peers are in just a handful of geographies, just 1 geography, or are brand-new entrants into just a couple of markets. We should also think…about…the nature of how we compete globally…we provide a unified, seamless managerial operating in technology environment worldwide. Many of our competitors have multiple platforms - we do not. …"*
>
> – Jeffrey Sloan, CEO, Global Payments
> (March 2018)

Illustrative of the benefits of gaining exposure to faster-growth geographies; Mastercard is expected to have ~75% of its growth driven by international markets in 2021E and 2022E



There are only a select few companies with global eCommerce and omnichannel local acquiring capabilities (number of local acquiring markets shown below; list is not exhaustive, but demonstrative)



Source: Company reports, Credit Suisse estimates

Merchant Acquiring: Channel and business mix matter

Estimated revenue exposure within merchant acquiring business segments

Provider	Software-led	eCommerce / CNP	SMB	International	Comment/Description
Adyen	< 10%	~85-90%	Low	~30-35% (ex-EU)	Near pure-paly EU-based enterprise eCommerce acquirer with a single unified omnichannel acquiring platform and a modern-built tech stack. In many "higher-risk" verticals prefers to act in gateway only capacity (i.e., Airlines). More International than numbers suggest (accounting by HQ).
Global Payments	~40%	~20%	~80%	~20-25%	Owned (e.g., AdvancedMD) and partnered (Global Payments Integrated) approach to software, along with a leading global eComm & Omnichannel business processing in-store domestic, with local support in ~38 markets.
FIS (Worldpay)	~20%	~25%	~60-65%	~15%+	Includes a leading global eCommerce acquiring businesses, along with a leading integrated payments offering (Mercury); Revenue recognition based on home country of merchant (similar to Adyen), understating International.
Fiserv (First Data)	~15-20%	~18%	~65%	~24%	Software-led includes both Clover iPOS offering and ISV/integrated payments business (CardConnect & BluePay), which has a slight degree of overlap; SMB relationships are via Clover, Partner Solutions (ISV, agent, ISO), referral partners (bank and non-bank), and JV alliances.
Nuvei	~10-25%	~65-75%	~35-45%	~50-55% (ex-US)	eCommerce / CNP focused (transformed via 2019 acquisition of SafeCharge – an EU-based 100% eCommerce acquirer), with volume mix of ~40% US, ~45% EU, ~10% Canada, and remaining in Latam / APAC; prominent in online gaming and regulated financial services verticals.
PayPal	~1-2%	~98-99%	~65-70%	~47%	Pure-play eCommerce, although QR code & iZettle represent offline expansion potential); As of 2015, large merchant mix was ~46% of volume (we assume an increase, and factor in P2P volume, pricing, and OVAS revenue). PayPal & Venmo (branded) and Braintree (unbranded).
Repay	~100%	~0%*	>60%	~1%	Pure-play integrated payments, with ~½ volumes integrated with ISV partners and ½ directly into merchant systems; Top 10 clients account for ~30% of revenue; Majority of payments made online or via phone, although we categorize as software-led vs. eCommerce.
Shift4	~100%	~15-20%	~60-75%	0%	Pure-play integrated payments, with 100% distribution via VAR and ISV partners, prominent in restaurant and hotel / hospitality verticals, attempting to execute strategy to acquire payments gateways / owned POS software providers to bring volume over to full-stack acquiring platform.
Square	~95%+	~1-3%	~90%	~5%	Horizontal software, with select vertical-specific solutions; Assumes ~1/2 of Mid-Market sellers are SMB (by volume), remainder are larger (e.g., Shake Shack, Washington Nationals, Blue Bottle, etc.).

Source: Company reports, Credit Suisse estimates; Percentages are estimates (not precise, disclosed figures) of revenue mix within acquiring businesses for GPN, FISV, & FIS and based on Credit Suisse definitions of the categories, acknowledging a degree of overlap and blurring among various channels

Merchant Acquiring: If these platforms gain share, who will lose it?

Hundreds of sub-scale, country/regional, and local bank-owned acquirers

Rank	Acquirer	Country	Transactions (mil.)	Rank	Acquirer	Country	Transactions (mil.)	Rank	Acquirer	Country	Transactions (mil.)
1	First Data	Group	44,092	51	Sadad Informatics	Iran	1,291	101	Electronic Payments	US	245
2	FIS (Worldpay)	Group	36,715	52	UniCredit Group	Italy	1,277	102	National Bank	Greece	241
3	Chase	Group	29,409	53	StoneCo	Brazil	1,264	103	Promsvyazbank	Russia	240
4	Sberbank	Group	20,610	54	Aeon Financial Service	Japan	1,153	104	Piraeus Bank	Greece	235
5	Global Payments	Group	16,188	55	Raiffeisen Bank Group	Austria	1,142	105	Nedbank	South Africa	229
6	China UMS	China	13,800	56	Lloyds Bank Cardnet MS	UK	1,112	106	QNB Finansbank	Turkey	221
7	Bank of America	Group	9,094	57	Yapi Kredi Bank	Turkey	1,088	107	Alpha Bank	Greece	219
8	Barclays	Group	8,400	58	T. Isbank	Turkey	1,012	108	Clearent	US	219
9	Cielo	Group	7,194	59	Gazprombank	Russia	933	109	Borgun	Iceland	218
10	Elavon	Group	6,854	60	Banco de Sabadell	Spain	911	110	Mashreq Bank	UAE	215
11	Behpardakht Mellat	Iran	5,680	61	PrivatBank	Ukraine	910	111	HDFC	India	213
12	BC Card	South Korea	5,505	62	Desjardins (Monetico)	Canada	901	112	T.C Ziraat Bankasi	Turkey	209
13	Rede	Brazil	4,892	63	Paysafe	US	884	113	Card Complete	Austria	204
14	Saman e-Pay	Iran	4,823	64	Pasargad Electronic Payment	Iran	857	114	Denizbank	Turkey	203
15	Wells Fargo	US	4,697	65	Credit Saison	Japan	785	115	Kasikornbank	Thailand	202
16	Nets	Denmark	4,416	66	Akl						201
17	Moneris Solutions	Canada	4,008	67	Ma						193
18	Worldline	France	4,005	68	Firs						189
19	Credit Agricole	France	3,938	69	Ha						186
20	Credit Mutuel	France	3,865	70	Ba						176
21	Parsian E-Commerce	Iran	3,797	71	La						171
22	Asan Pardakht Persian	Iran	3,689	72	Pri						170
23	KB Kookmin	South Korea	3,635	73	Ba						168
24	EVO	Group	3,610	74	BA						162
25	Swedbank	Sweden	3,246	75	SB						156
26	JCB	Japan	3,021	76	Uni						151
27	Adyen	Netherlands	3,014	77	Me						149
28	Payone	Germany	2,495	78	Ba						149
29	ANZ	Group	2,452	79	No						147
30	Iran Kish Credit Card	Iran	2,369	80	CS						141
31	BPCE	France	2,263	81	Shi						136
32	VTB Bank	Russia	2,243	82	Niu						134
33	BNP Paribas	France	2,136	83	Eve						125
34	Westpac	Australia	2,103	84	Re						122
35	Commonwealth	Australia	1,934	85	Sta						120
36	Transbank	Chile	1,859	86	Tin						119
37	Citi Merchant Services	US	1,796	87	Tru						118
38	Societe Generale	France	1,747	88	Russian Standard Bank	Russia	354	138	BankCard Services	US	118
39	Nexi Payments	Italy	1,738	89	CTBC	Taiwan	353	139	Millennium BCP	Portugal	117
40	Samsung Card	South Korea	1,727	90	Vero	Brazil	327	140	CardNet	Dominican Republic	112
41	Santander	Group	1,683	91	Network International	UAE [1]	324	141	United Merchant Services	US	111
42	Intesa Sanpaolo	Italy	1,677	92	PNC Merchant Services	US	311	142	VisaNet	Guatemala	108
43	Hyundai Card	South Korea	1,657	93	T. Halk Bankasi	Turkey	310	143	Axis Bank	India	100
44	PagSeguro	Brazil	1,575	94	First American Payment System	US	302	144	Epicor Software	US	99
45	Mitsubishi UFJ Nicos	Japan	1,566	95	SABB	Saudi Arabia	298	145	Riyad Bank	Saudi Arabia	98
46	TD Merchant Solutions	Group	1,487	96	Swiss Post	Switzerland	272	146	Diners Club	Ecuador	93
47	National Australia Bank	Australia	1,419	97	SEB Group	Estonia	260	147	Banco Inbursa	Mexico	92
48	BBVA	Group	1,373	98	Vakifbank	Turkey	258	148	Privredna Banka	Croatia	91
49	Prisma Medios de Pago	Argentina	1,321	99	Al Rajhi Bank	Saudi Arabia	248	149	CMI	Morocco	90
50	Garanti Bank	Turkey	1,306	100	Valitor	Iceland	248	150	Procesos de Medios de Pago	Peru	88

Merchant acquirers (and MSP, PSP, etc.) outside The Nilson Group's global top 25 handle ~25% of transactions in 2019 and a higher percentage of revenue (larger merchants are more likely to work with larger merchant acquirers)

And while there are numerous share gainers outside of the largest acquirers (e.g., those operating in a sub-segment or niche with vertical expertise have a unique technology or distribution relationship), we expect an increasing trend toward consolidation via both organic share gains and M&A

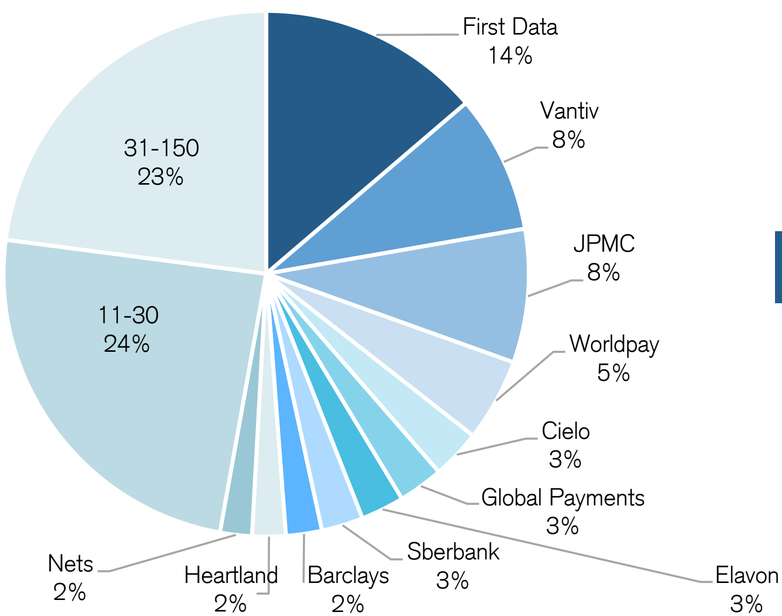
Source: The Nilson Report, First Data estimates include JV proportionate share of transactions (BAMS, Wells Fargo, Citi, Santander, BBVA, PNC, Cardnet), Credit Suisse research estimates

Merchant Acquiring: Share remains fragmented

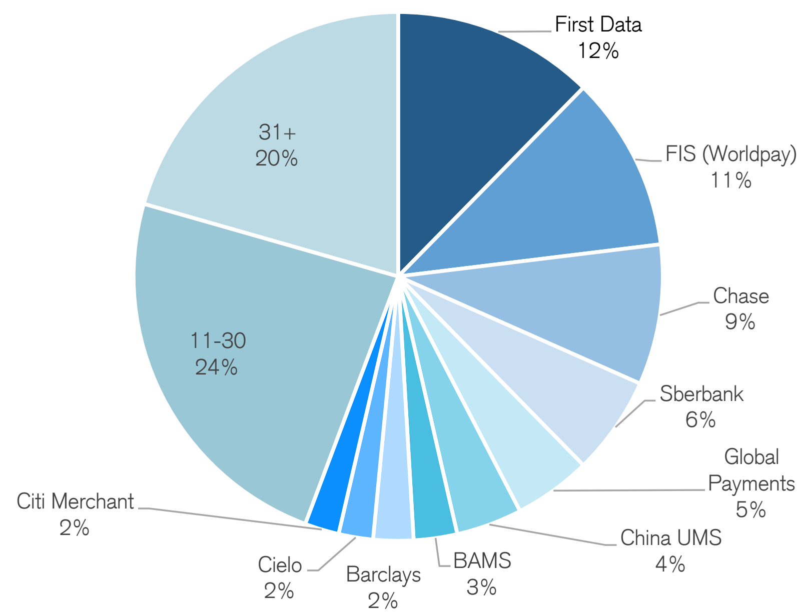
Combination of M&A and organic share gains will drive further consolidation

- Share remains fragmented beyond the top five, with no others exceeding ~4% - many of which are regional or bank-owned (which we expect to struggle to keep pace with innovation and merchant needs relative to well-capitalized, globally-scaled platforms).
- As a result, we expect a combination of M&A and organic share gains (due to scale, increased need to invest in technology, innovation, etc.) for globally-scaled acquirers; from 2015 to 2019, the top five acquirers gained ~500bps in acquiring share (by transactions).
- We expect the three recently merged, scaled platforms (Fiserv-First Data, FIS-Worldpay, Global Payments-TSYS), all with annual free cash flow in the $3-5b+ range, to resume acquisitions with an emphasis on merchant acquiring, the fastest growing part of their businesses.

2015 Merchant acquiring share (by transactions), top five with ~38% share



2019 Merchant acquiring share (by transactions), top five with ~43% share



Source: The Nilson Report, First Data estimates include JV proportionate share of transactions (BAMS, Wells Fargo, Citi, Santander, BBVA, PNC, Cardnet), Credit Suisse research estimates

Networks: New sources of volume supportive of 10%+ until at least 2023E

Street underestimates growth persistence and power of compounding

- We quantify the potential impact (illustrative in sensitizing volume CAGR from small portions of penetration) of five nascent drivers of US card payments (push-to-card and B2B - beyond PCE - along with contactless, bill-pay, and underbanked additions to the card ecosystem) to determine their contribution to incremental growth.
- Industry incentives are designed to drive adoption providing economic benefits for issuers (interchange, incentives), networks (network fees), and consumers and business (rewards, speed, convenience, data) vs. cash, check, & ACH.
- Based on our illustrative (and likely conservative) estimates, these five drivers alone could add ~250bps to US industry growth (2019-2023E CAGR), lifting an expectation for high-single-digit trajectory into a more substantiated low-double-digit CAGR; implies less onus on PCE growth and traditional cash-to-card conversion baked into estimates.

New source of volume	TAM	Illustrative incremental card penetration (2023E)	Implied volume addition	Implied addition to 2019-2023E CAGR
Push-to-card	~$7.7tr	~5%	$386b	130bps
B2B	~$22tr	~1%	$220b	70bps
Contactless	~$3.0tr	~3%	$90b	30bps
Bill-pay	~$2.5tr	~2%	$50b	20bps
Un-banked & under-banked	~$369b	~4%	$16b	10bps
Total				**~250bps**

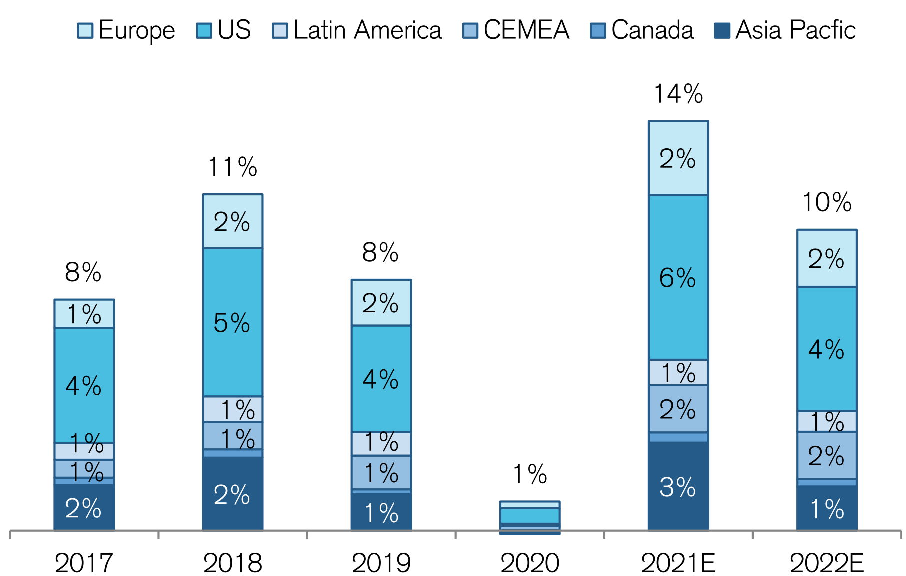
Source: Company reports, Visa, Aite, A.T. Kearney, FDIC, Mastercard, Credit Suisse estimates

Networks: Regional exposures a key driver of growth

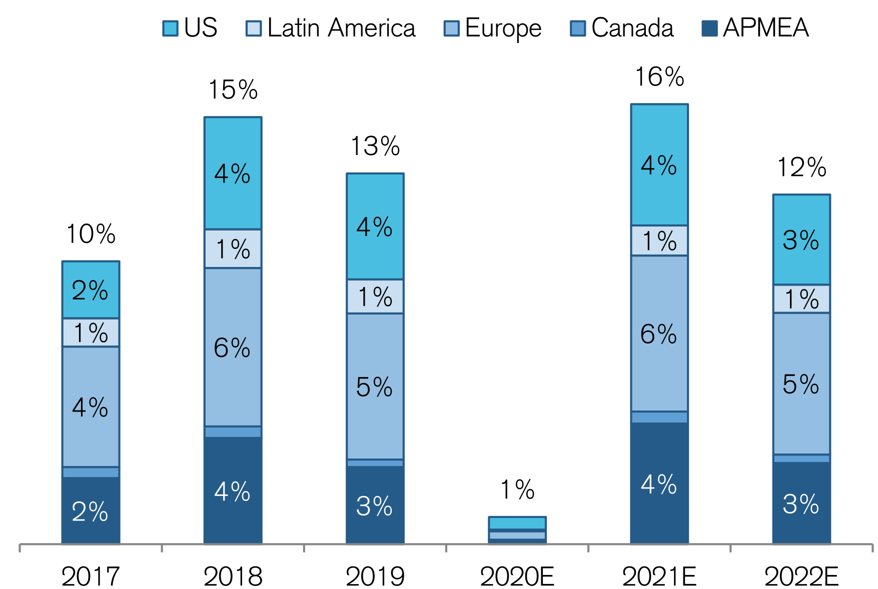
Mastercard's volume growth premium & secular exposure to growth markets

- Regional mix and greater exposure to faster-growth geographies (i.e., more nascent cash-to-card) has been a contributor to Mastercard's recent outgrowth relative to Visa (volume-wise).
- Visa has a larger US mix, and its European business is weighted toward the UK (more mature card market, Brexit, etc.).
- Mastercard benefits from its greater international mix, along with slight share gains, first-mover advantage with FinTechs (though Visa has since improved significantly), and continued Maestro card conversion (not included in reported volumes).

Visa's volume growth has been driven by its leading US business, and we forecast ~600bps of its ~14% growth in 2021E to be US-sourced



Mastercard's growth has been somewhat more balanced (and higher overall), with meaningful contribution from the US, Europe, and APMEA

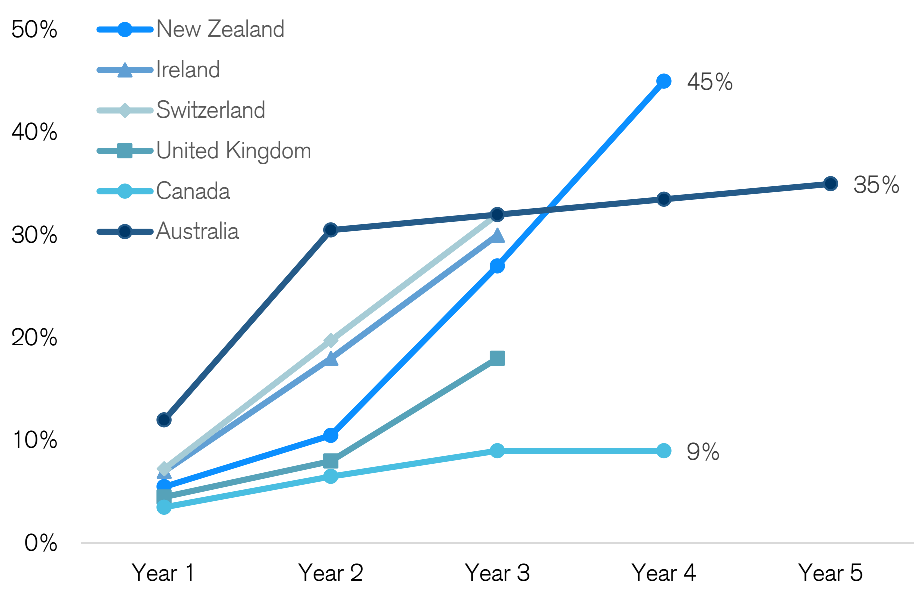


Networks: Contactless rollout in the US

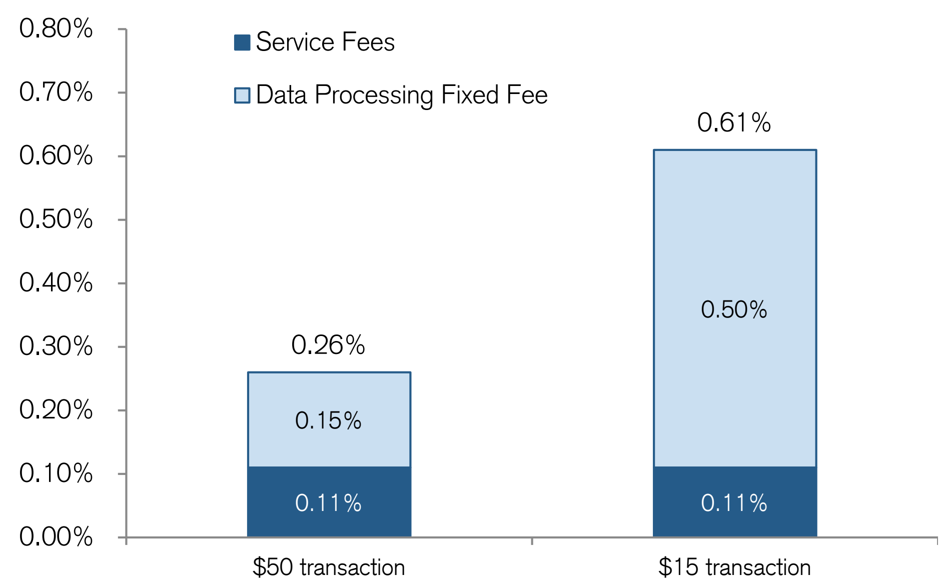
Near-term transaction growth driver and longer-term yield opportunity

- Driver of transaction growth in mature markets with high card penetration, helping to replace cash usage on small-ticket items - forecasts suggest ~50% of contactless penetration in the US by 2021 (where Visa alone expects contactless cards to increase from ~100mm in 2019 to ~300mm in 2020).
- Potential for ~$90b in incremental volumes by 2023E (~30bps additive to V/MA combined 2019-2023E CAGR), although more meaningful on a revenue basis given higher net yields (bps of volume) at steady state.
- We believe contactless (for the portion with a lower average ticket size) yields have potential to be ~2x+ that of an average sized transaction (i.e., a cents per transaction data processing fee spread over a lower ticket); although we expect V/MA will pay away the majority of this premium opportunity in the near term (~2-3 years) to incentivize the issuance and usage of contactless cards (i.e., rebates to both issuers and acquirers).

Markets similar to the US (e.g., Australia, UK) with high card penetration have seen meaningful adoption 3-4 years (percentage increase in face-to-face transactions per card, years 1-5 post rollout)



Illustratively, net yield opportunity in a steady state for contactless transactions has the potential to be ~2x+ that of a traditional, larger ticket size transaction (although still ~3-5 years away)



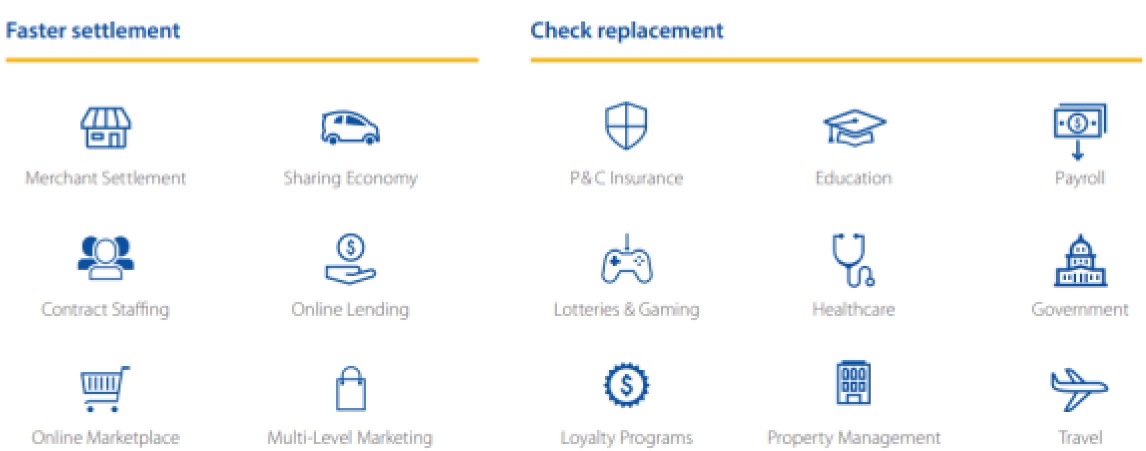
Source: Company reports, Credit Suisse estimates; Note that estimate yield is based on Visa-reported company-wide averages across credit and debit; A.T. Kearny; Note: Issuing contactless cards is more expensive for issuers (~$5 vs. ~$3 per card for EMV enabled) and could impact speed of rollout.

Networks: Push-to-card opening up new payment flows

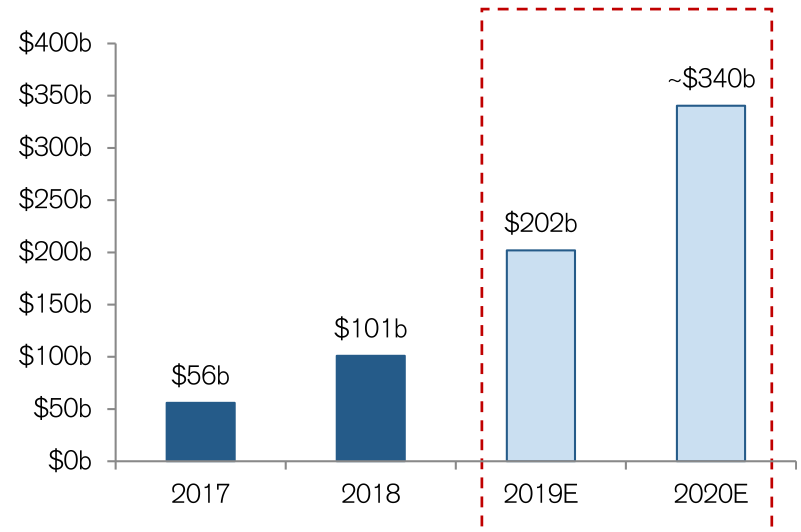
Visa Direct and Mastercard Send

- Push-to-card is both offensive (priced to expand card-able TAM into larger, interchange-sensitive payments) & defensive (race to scale before modern/fast ACH rails gain ubiquity), resulting in increased carded velocity of those same PCE dollars and further into B2B.
- Expands card-able TAMs into new payment flows (i.e., beyond PCE, into marketplace merchant payouts, insurance claim payouts, etc.) – sends to card-based accounts, then re-spent on cards (increased consumer and business debit card usage as an indirect benefit).
- Earthport (Visa) & Transfast (Mastercard) expand the reach of V/MA to 99% of accounts in the top 50 markets; Visa Direct remittance platform partnerships (and potentially bank partnerships) to drive premium priced cross-border transactions.
- A potential $350-$400b (with conservative assumptions) in incremental volumes would be ~100-150bps additive to V/MA combined 2019-2023E CAGR, but a lesser revenue impact given lower net yields vs. debit (as use cases become more commercial, pricing could improve).

"Push-to-card" payments (e.g., Visa Direct, Mastercard Send) expand card payments into new market opportunities, beyond C2B and into B2B, C2B, and P2P



Visa re-cast historical volumes pre- and post-inclusion of Visa Direct, suggesting the new product had already reached ~1%+ of total volumes in 2018 (vs. ~3-4% 2020E)

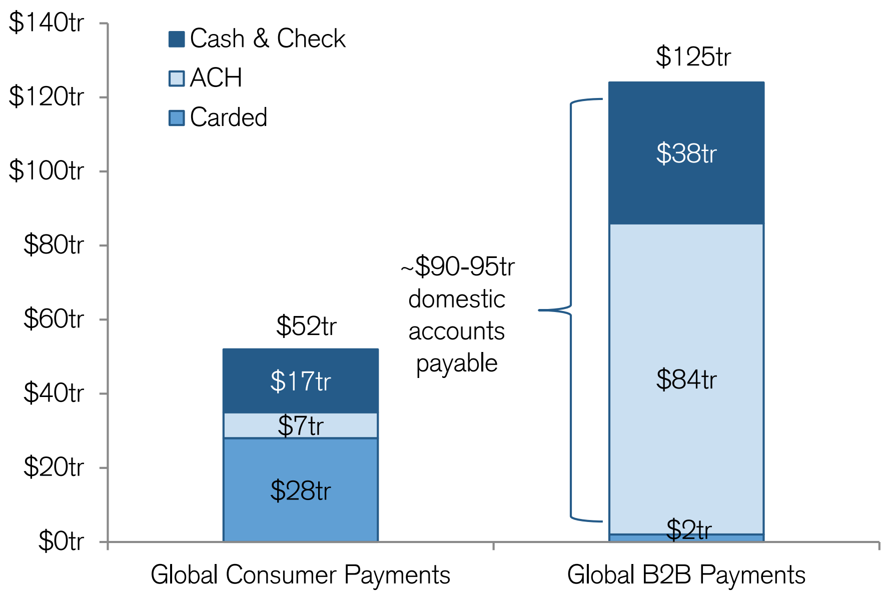


B2B Payments: Underpenetrated growth market nearing inflection

$125tr TAM that is so large, it almost does not merit discussion

- While the actual payments being made can be less of an issue for some merchants, antiquated processes, data/reconciliation challenges, and a lack of automation are common merchant pain points.
- Modern software/payments platforms are helping to solve these pain points and, in the process, are increasing awareness/usage of systems that will ultimately contribute to increased digitization of B2B payments.
- Additionally, card usage and/or rewards programs can lead to rebates – turning AP functions into revenue generators vs. cost centers, adding to the value proposition around efficiencies, reconciliation, etc.

Three buckets of B2B: 1) traditional corporate cards, virtual cards, etc. (~$20tr of volumes); 2) cross-border B2B (~$10tr); and 3) ~$90-95tr in accounts payable (domestic)



Common pain points are often related to processes and data, not the actual payments

Highly manual (people-intensive) processes are slow and expensive, given a lack of automation, and error prone

Checks have hidden costs (e.g., checks can be in the ~$4-20 range vs. ~$3 per ACH transaction, per AvidXchange) and are not guaranteed good funds

Limited transaction data from payments make reconciliation difficult

Cash flow management difficulty – i.e., paying on the due date with certainty vs. mailing a check a few days ahead of time, lacking certainty

Lack of visibility into supplier payment preferences

Source: Company reports, Mastercard, Visa, Credit Suisse estimates

B2B Payments: FleetCor and WEX, B2B pure-plays

Corporate payments a fast-growing portion for both companies

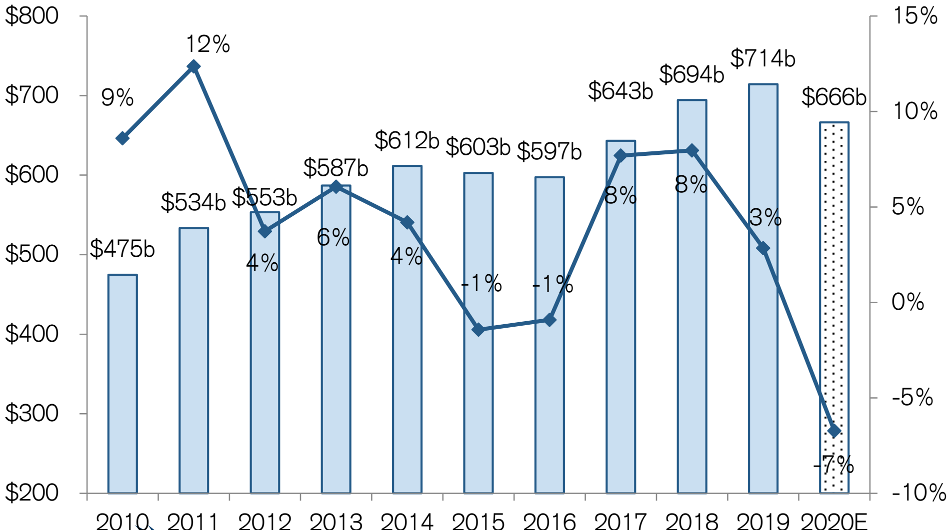
- Beyond their core fuel card businesses (also a form of B2B payments), both FleetCor and WEX have corporate payments businesses aiming to shift businesses more toward full-AP automation.
- Both handle entire AP files (ACH, eCheck, virtual card) and are building supplier networks to expand virtual card acceptance, bolstered by recent acquisitions – FleetCor's Nvoicepay (~$220mm), WEX's Noventis (~$310mm).
- Corporate payments represents ~20% of FLT revenue, growing ~20%, while the business makes up ~10% of WEX revenue, growing at a similar ~15-20%. As these businesses become a larger part of mix, they should be supportive of FLT & WEX multiples, given prospects for longer-term growth persistence in a whitespace opportunity.
- Though not nearly at the scale of FLT and WEX, RPAY has made several acquisitions into B2B payments to diversify away from cyclical loan repayments business, and likely continuing to be a focus of M&A efforts going forward

Corporate Payments segment	Virtual card	Cross-border	AP automation	Other	Comment/Description
FleetCor	Comdata	Cambridge	Nvoicepay	Fintwist for Payroll	Emphasis on mid-market; partnerships with AvidXchange and Bill.com (more SMB focused platforms)
WEX	WEX Virtual Payments	n/a	Noventis, EFS	3Delta Systems, AOC Solutions	Inspyrus partnership in AP automation; utilizes bank channel partners (American Express, PNC Bank, etc.); to address larger multi-national merchants' cross-border needs
REPAY	Partners w/ issuing bank (e.g., WEX)	n/a	cPayPlus, CPS Payments	APS, Ventanex	B2B now ~25% of volume; aims to cross-sell A/P and A/R solutions with diversified sub-vertical exposure; Ventanex is in both healthcare B2B (outbound payments on behalf of insurers) and mortgages

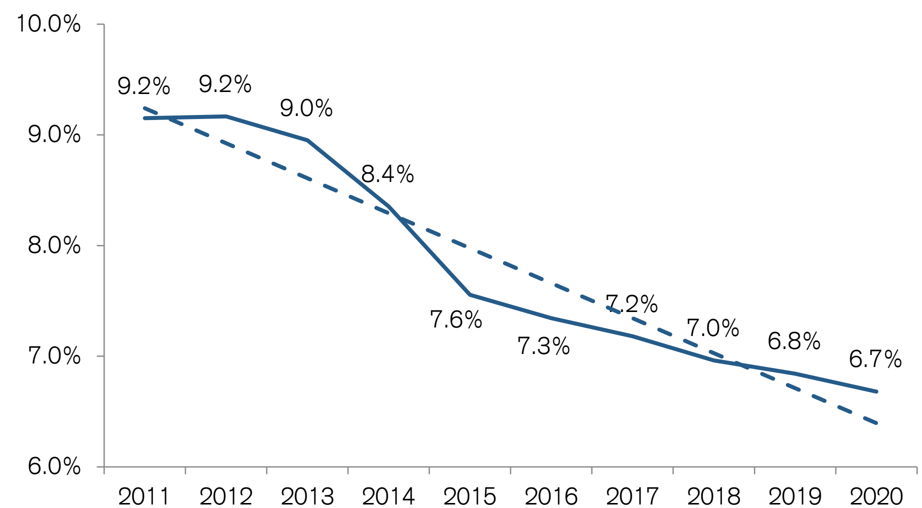
Money transfer & remittances: Large market, but increasingly competitive
$700b TAM with economics compressing over time

- Traditional bank wires (i.e., SWIFT messaging and usage correspondent banking, ~65% of global volumes) are a trusted form of money remittance but historically have come with uncertain timing and fees (i.e., number of hops and fees taken at each hop), and represent an opportunity for tech-forward platforms that have built their own global treasury operations and/or networks of users and agent locations.
- New entrants (e.g., Transferwise already at ~$5b in volume / month) offer low-fee alternatives to sub-sets of banked customers; Visa Direct-Earthport further enabling globalization of FinTech competitors (via both card and bank account connectivity, though only applicable for account to account / card transactions) – markets with high underbanked (cash-based) remittances (e.g., US into Mexico – largest corridor) remain attractive for traditional players (WU, IMXI).
- The $700b World Bank TAM likely excludes volumes from informal channels (could be ~$300b), including Transferwise cross-border (~$60b+ runrate exiting August), other FinTechs (i.e., Remitly, WorldRemit), certain consumer flows (i.e., some tuition pay), and small business transfers.
- Platforms like Western Union have both strategic/partnership value that is difficult to replicate – global breadth (operations in 200+ countries), local market knowledge, compliance infrastructure (~$200mm per year), numerous licenses, and a brand name.

~$700b TAM with volume growth in the MSD, offset by continued pricing pressure, likely results in LSD revenue growth



World Bank data suggest a decline in industry-wide pricing (fees as a percentage of volume), although data are heavily influenced by the bank channel (where fees remain higher than average)



Source: Company reports, World Bank, Credit Suisse estimates

US bank tech: Stable outlook as banks need to lean on providers

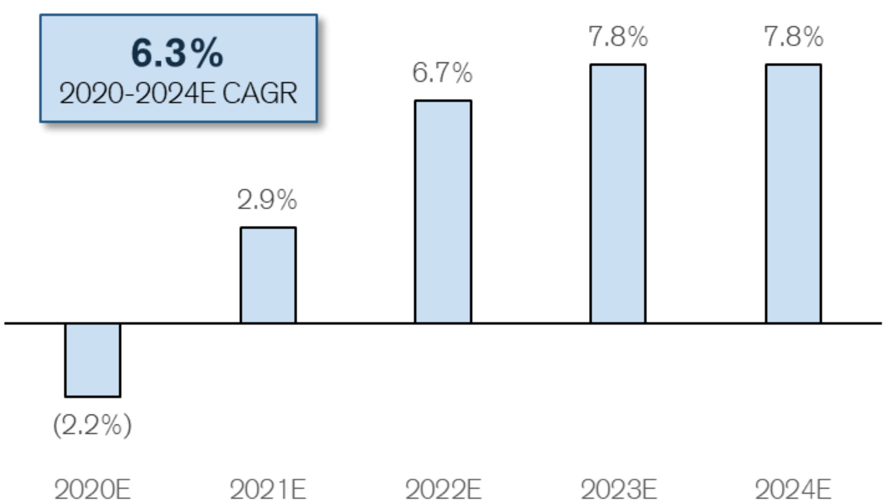
~$90b TAM growing ~6%, weighted toward growth vs. maintenance

- Healthy bank IT spend (~6% CAGR through 2024) driven by consumer expectations, leading to an increased need for banks to modernize infrastructure by leaning on technology providers.
- Banking is increasingly a technology business (73% of US consumer banking interactions occur digitally), lowering barriers to entry for FinTechs and large technology platforms (e.g., Apple, Amazon) while also favoring large incumbent banks with the capital to invest.

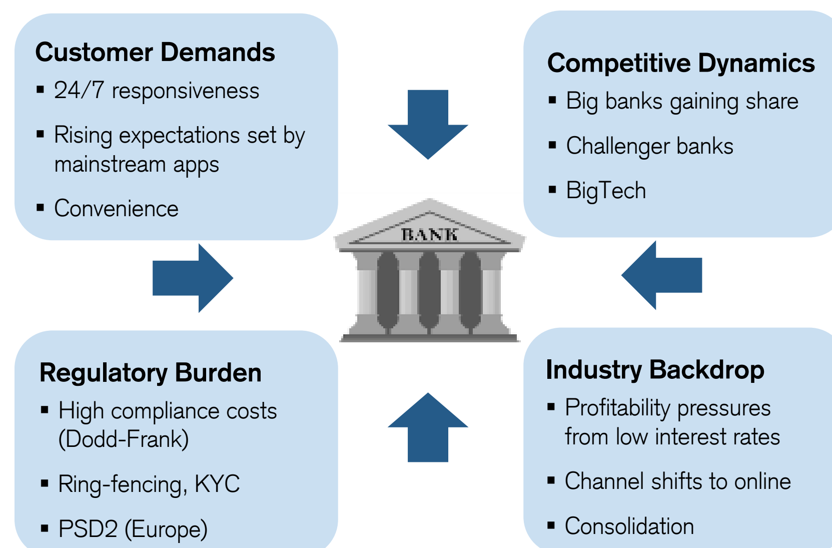
"It is a constant, never-ending set of investments that have to be made because as everyone in the audience knows our expectations change every day as we visit Amazon or Google or WeChat or whatever technology provider – Facebook – that you want to talk about, it changes the expectations that we have for our financial institutions. That puts pressure on the institutions to invest and that's good for us because it allows us to go into the market, aggregate services, deliver them both on a one-off and is scalable.."

– Jeff Yabuki, Fiserv CEO (March 12, 2019)

IT spend by financial institutions fell in 2020 but is expected to grow at a ~6% CAGR from 2020 to 2024 on a slightly lower base of ~$90b



Banks seeing pressure from all sides (customer demands, regulatory, competition, industry consolidation, and profitability pressures)



 Source: Fiserv, PWC, Company data, Credit Suisse estimates

US bank tech: Need to lean on core providers intensified by “barbell”

FinTechs are on one end of the “barbell”, big banks are on the other

- The top four banks in the US (~36% of deposits; ~50% of assets) have annual technology budgets totaling ~$40b, roughly equivalent to total aggregate private FinTech fundraising in 2020.
- As FinTechs (and BigTech) continue to gain new accounts, there are potential headwinds to monitor in the longer term (traditional banks’ potential to lose account & transaction share among digitally native generations).
- We believe the majority serve as secondary accounts with the potential for that to change as offerings expand.

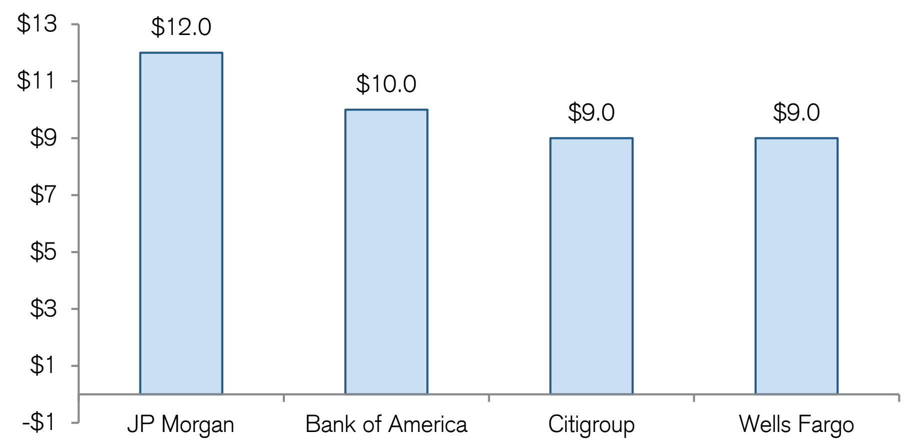
Both ends of the “barbell” are gaining share, in part due to better technology/user experience, along with tech & marketing spend

Neo/Challenger banks (FinTech) and large technology platforms (BigTech)	Regional banks, community banks, & credit unions (core FISV, FIS, JKHY customers)	Large US banks
Chime, Revolut, Monzo, N26, Uber Money, Google, Square Cash App, Varo Money, Apple, Marcus by Goldman Sachs, etc.	~10-11k US financial institutions	JP Morgan Chase, Bank of America, Wells Fargo, Citi, US Bank, PNC, TD Bank, Truist, Capital One

The top 15 banks in the US account for ~56% of total deposits, with their market share up ~150 bps YoY in 2020

	Branches		Total Deposits ($b)		Market Share	
Company	2020	YoY	2020	YoY	2020	YoY (bps)
Bank of America Corp.	4,254	-1.9%	1,747.3	28.0%	11.2%	56
JPMorgan Chase & Co.	4,980	-0.9%	1,704.7	30.0%	10.9%	70
Wells Fargo & Co.	5,413	-2.9%	1,486.7	14.3%	9.5%	-62
Citigroup Inc.	710	-0.1%	664.1	20.6%	4.3%	-4
U.S. Bancorp	2,774	-6.9%	398.5	16.3%	2.6%	-12
Truist Financial Corp.	2,921	-1.0%	391.2	18.2%	2.5%	-7
Capital One Financial Corp.	452	-7.4%	375.6	14.9%	2.4%	-14
Toronto-Dominion Bank	1,227	-1.4%	351.6	29.8%	2.3%	14
PNC Financial Services Group Inc.	2,324	-3.1%	338.1	25.5%	2.2%	7
Charles Schwab Corp.	3	0.0%	301.7	44.7%	1.9%	31
Morgan Stanley	3	0.0%	241.6	34.4%	1.6%	15
Goldman Sachs Group Inc.	5	0.0%	220.7	57.7%	1.4%	32
Bank of New York Mellon Corp	51	-1.9%	216.7	33.7%	1.4%	13
Fifth Third Bancorp	1,137	-7.1%	162.4	25.0%	1.0%	3
HSBC Holdings PLC	158	-30.1%	160.7	26.6%	1.0%	4
Top 15 Bank Holding Companies	**26,412**	**-3.0%**	**8,761.3**	**24.9%**	**56.2%**	**145**
United States Total	**85,045**	**-1.6%**	**15,588.5**	**21.7%**		

2020E anticipated technology spend show the big banks in a league of their own (annual spend of ~$40b)

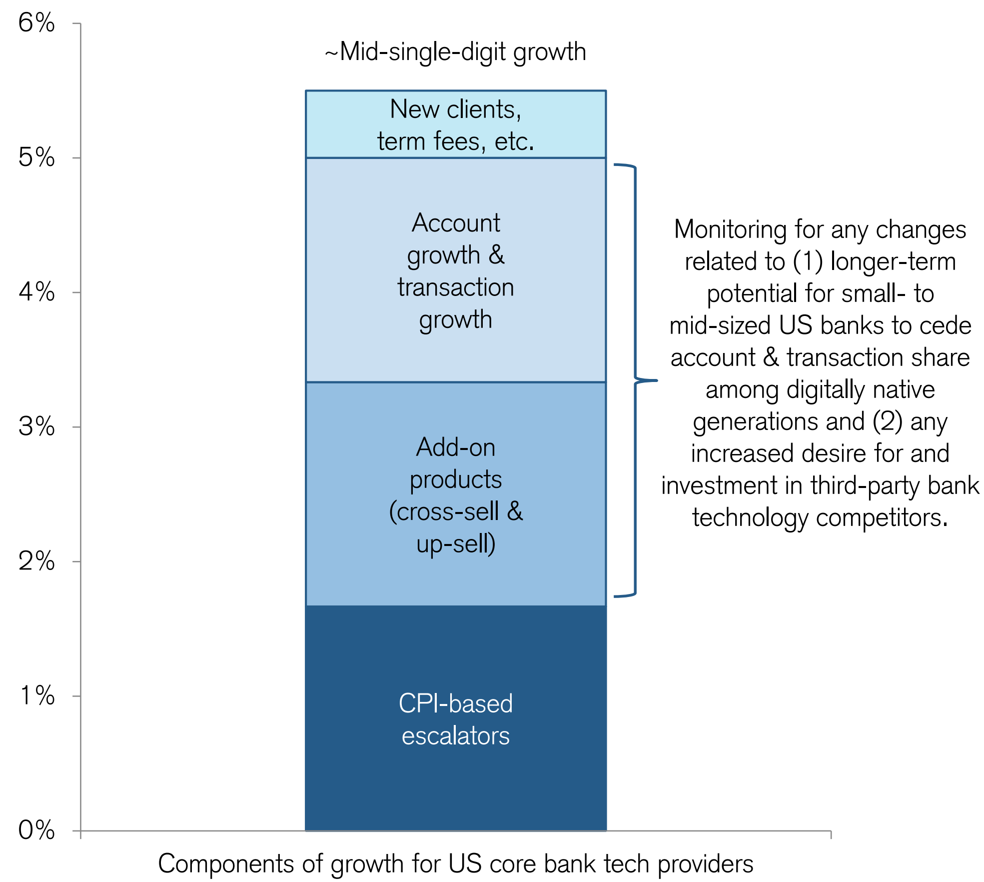


US bank tech: Growth algorithm all about existing customer growth

Four key drivers with an emphasis on up/cross-sell, accounts & transactions

- US bank technology businesses (e.g., Fiserv, FIS, Jack Henry) are mid-single-digit growers with existing customers driving the majority of growth.
- Four components of growth:
  - CPI-based escalators included in contracts (and contractually cannot go negative if CPI does).
  - Add-on product sales (e.g., bill-pay, Zelle, RTP, online banking, etc. sold by core providers and integrated into the core system) including upgrades to more dated versions.
  - Account & transaction growth (checking accounts, debit cards, transactions processed).
  - New client additions (smallest driver), term fees, and other
- While there are potential headwinds to monitor longer term, existing providers have meaningful moats such as:
  - Sticky relationships and long term contracts (~5 years).
  - Ability to price ancillary bank IT services attractively given low incremental costs.
  - Track record in maintaining technology leadership organically and via bolt-on M&A (further supported by elevated FCF levels from merger synergies).

Four key components to growth in US banking technology businesses (e.g., Fiserv, FIS, Jack Henry, etc.)



US bank tech: Next-gen cores challenged by a ~1-2% window

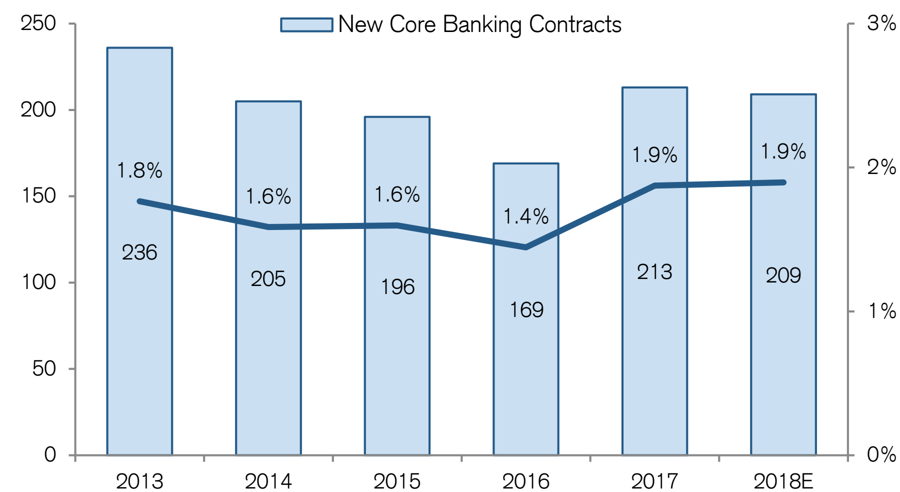
Easier road for ancillaries vs. cores, but signs of interest hard to ignore

- Roughly 1-2% of banks switch core providers per year with core conversions viewed as the most challenging and expensive IT project a bank can undertake (challenge for new entrants).
- Increasing signs that a substantial number of banks would like to use third-party ancillary offerings in lieu of those offered by their core provider (consistent with ABA CEO's conversations with ~3.9k US bank CEOs that led to the formation of the ABA Core Platforms Committee, and the ABA's investment behind Finxact).
- Third-party providers of bank IT services (e.g., mobile banking) face competition from ancillary add-ons offered by the cores (FISV, FIS, JKHY), along with integration challenges (although the hurdle for ancillary services is much lower than switching cores).
- Ability to consider working with third-party providers (aside from bank's core provider) correlates with the size of the bank (i.e., smaller banks often lack a CTO, outsource IT to core provider, and are more likely to maintain a single vendor approach). We believe that banks with at least ~$500mm in assets (~2k banks and credit unions vs. ~11k total) are potential buyers of third-party offerings.
- Emerging vendors should have the most success in new product launches with mid- to larger-sized financial institutions looking for best-of-breed products rather than full core conversions (i.e. considering new savings accounts on a modern core).

"…met with roughly 3,900 bank CEOs…one narrative came up again, and again, and again…we're struggling with our core relationship – the core is not as nimble, it's not as agile, we're not able to offer the innovative customer experience that we'd like to with the same efficiency or the speed…"

– Rob Nichols, CEO, American Bankers Association, speaking to his first year on the job in 2016 (quote from February 2019)

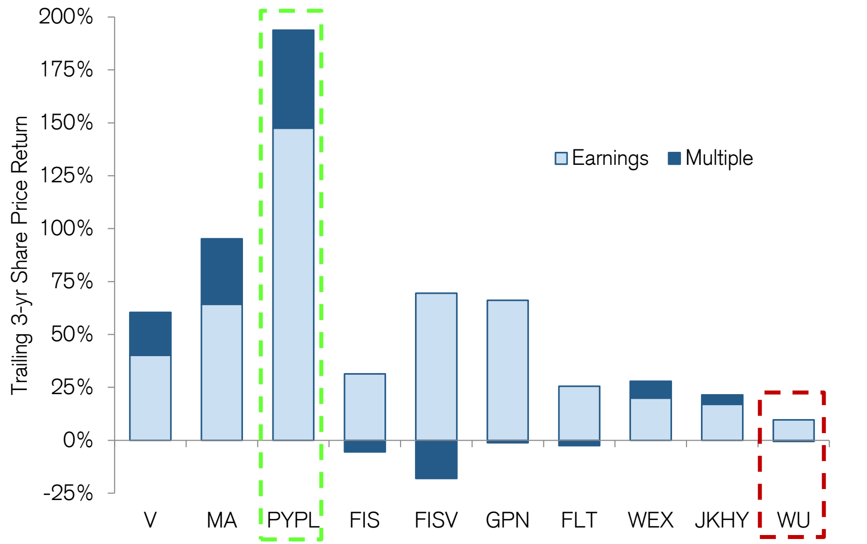
Roughly ~1-2% of US banks switch core providers each year (vs. ~20% up for contract renewal given ~5-year average contracts)



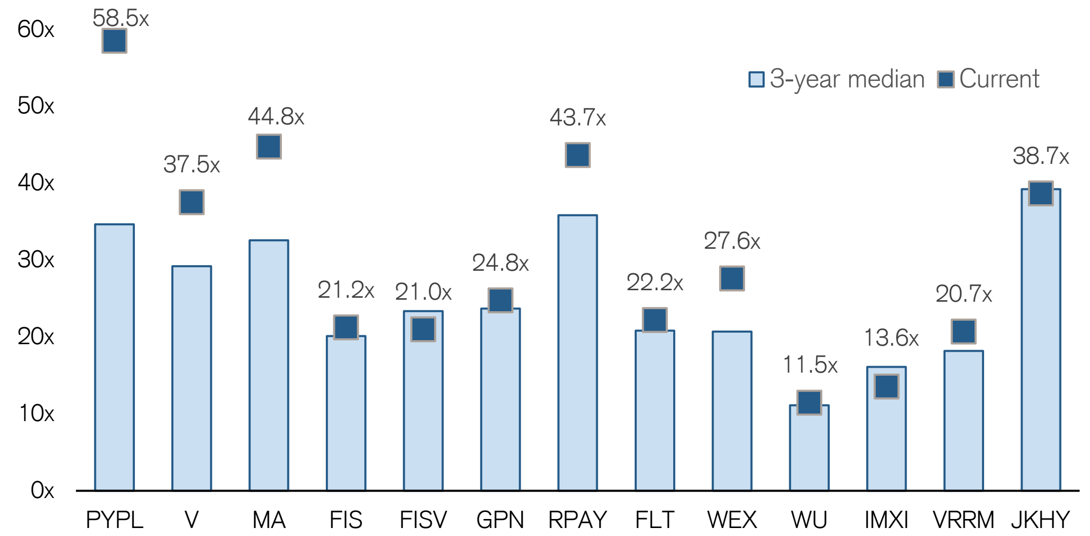
Valuations mostly at or above 3-year averages

But most of the stock price moves have been from earnings, not multiples

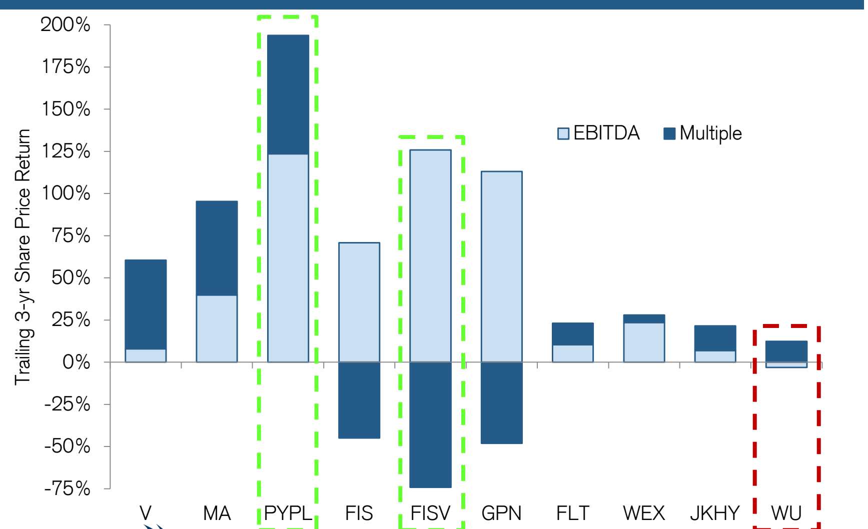
3-year price change – explained by earnings vs. multiple expansion



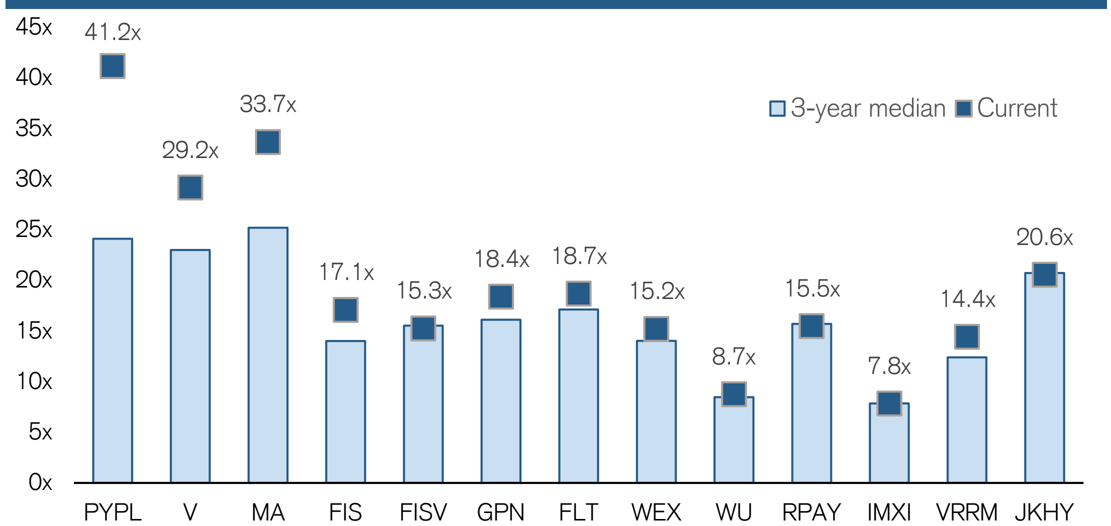
NTM P/E – current vs. 3-year median



3-year price change – explained by EBITDA vs. multiple expansion



NTM EV/EBITDA – current vs. 3-year median



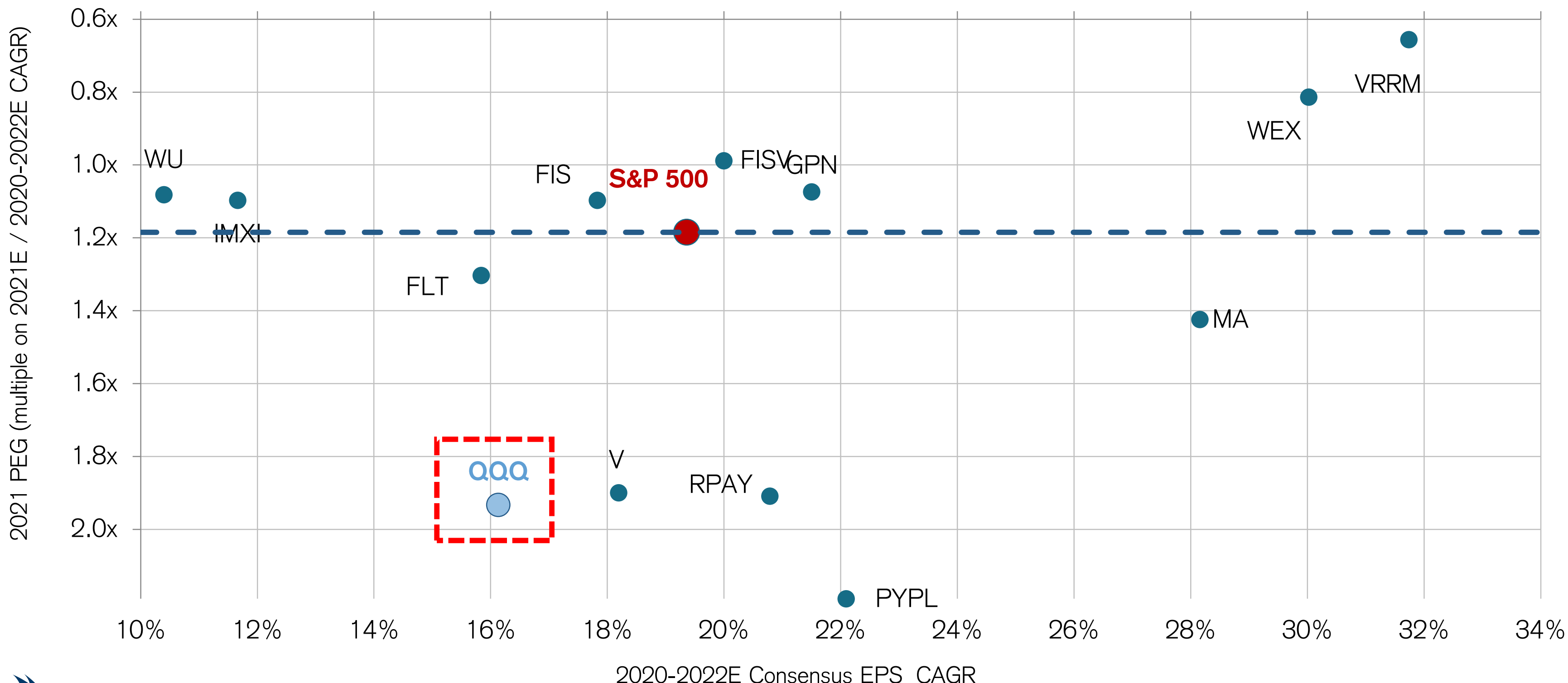
Source: Company reports, OnDeck, Credit Suisse research estimates

Median PEG ratio of ~1.2x

High valuation multiples, but more reasonable vs. growth, market

- Payments stocks appear expensive at first glance given mid-20s median P/E multiple (high-30s average), but on a growth adjusted basis valuations appear more reasonable (company dependent).
- For context, we show QQQ tracking the Nasdaq 100 (tech-centric) is more expensive on a multiple-to-growth basis than our sector coverage median.

PEG ratio (P/E on 2021 estimates vs. 2020-2022E EPS CAGR)
When compared the technology sector ETF (QQQ) valuation appears less demanding (i.e. adjusted for growth)

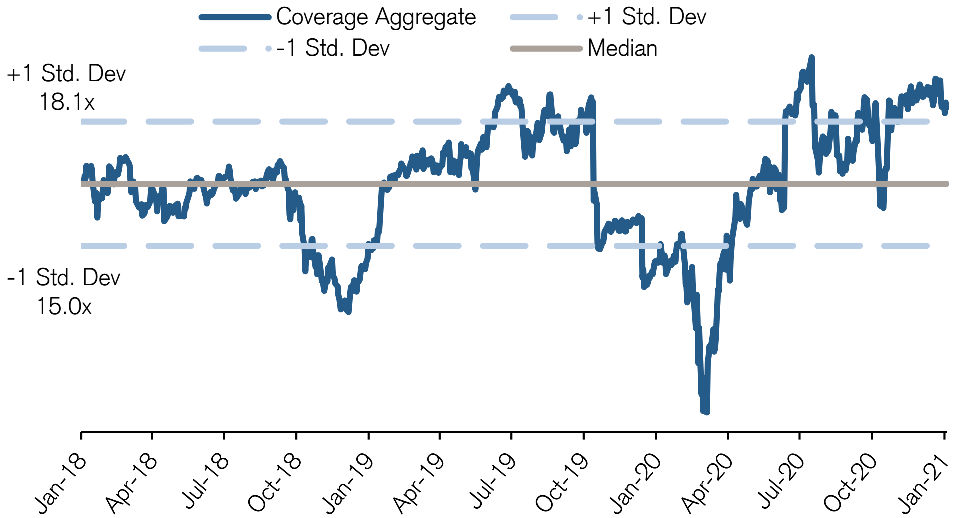


Source: Company reports, FactSet, Credit Suisse estimates; chart includes companies within bounds only.

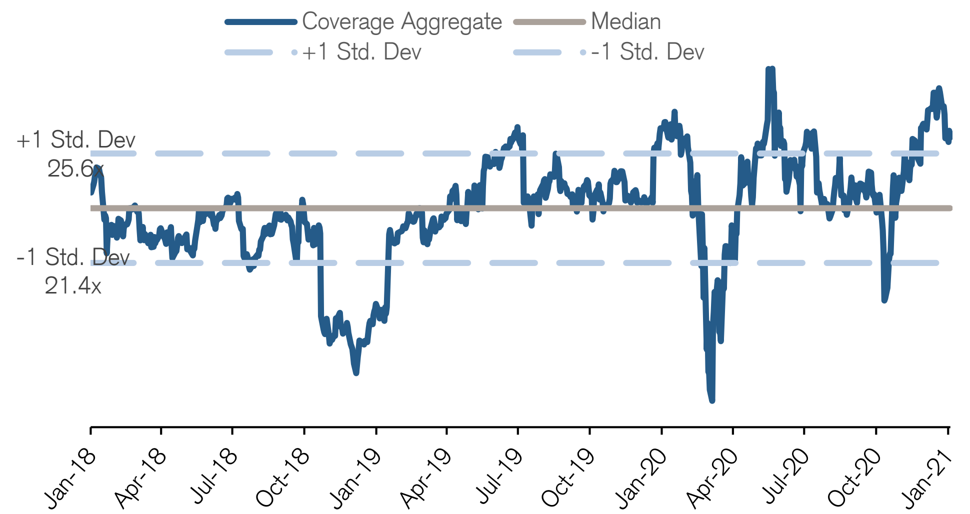
Payments, Processors, & FinTech sector valuation

Trades at a premium to S&P, currently about inline with average

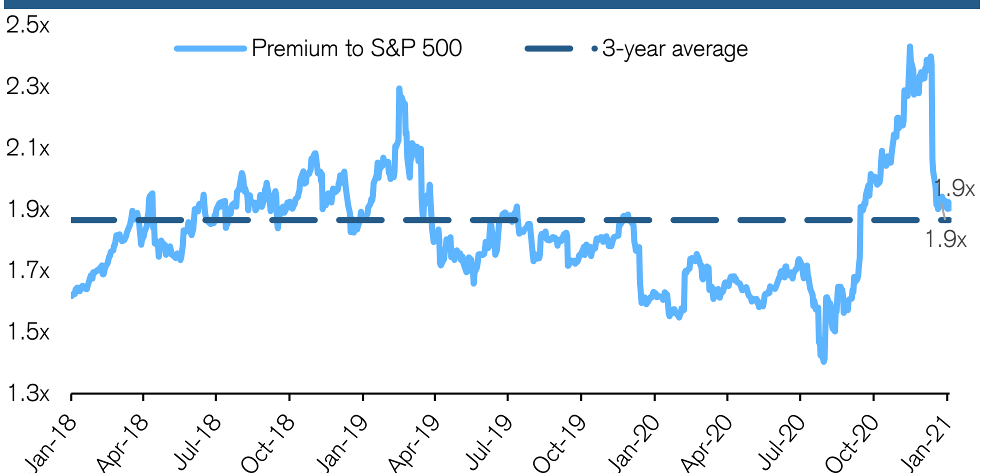
Sector 3-year historical median NTM EV/EBITDA



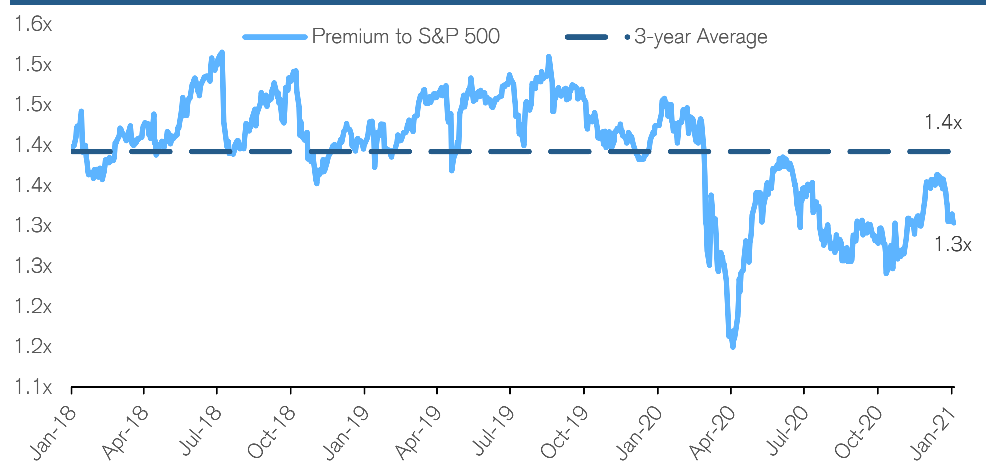
Sector 3-year historical median NTM P/E



Sector 3-year NTM EV/EBITDA premium to S&P 500 Index



Sector 3-year NTM P/E premium to S&P 500 Index



Source: Company reports, FactSet, Credit Suisse estimates; Sector includes CS payments coverage universe (excluding RPAY, SQ, FOUR - NM)

Payments macro dashboard

A view of some of the macro and sector-related items we track

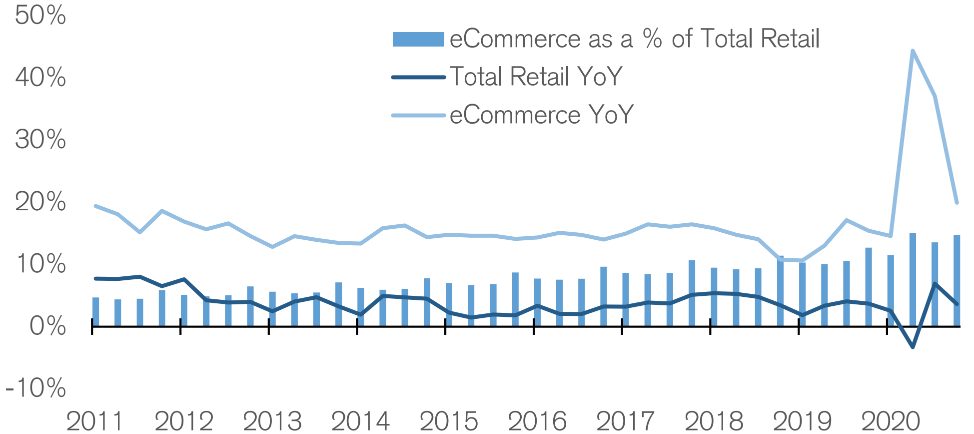
Metric	Comments	Direction
US retail sales	December US retail sales were down (0.7%) and ex-auto & gas were down (2.1%) compared to consensus expectations of 0% and (0.3%) and November revised levels of (1.4%) and (1.3%), respectively, with overall retail sales now sitting ~2.6% above their pre-COVID peak in February; Online sales fell (5.8%) MoM, but still is ~17% above pre-pandemic levels in February; Restaurant spending fell significantly as well (~22% below February levels) due to restricted indoor dining and weather limiting outdoor dining	
Global retail sales	November 2020 up ~2% vs. November 2019 but down ~(3.5%) MoM (CS economics team global consumption index); Growth has decelerated from ~5% YoY growth in September and nearly ~6% growth in October largely relating to increased COVID-related restrictions; Trend is slightly below longer term average of a ~2.2% YoY monthly growth (10-year average)	
US eCommerce	Q3 2020 was a strong eComm quarter up ~37% YoY vs. Q3 2019 as eCommerce adoption persisted with US consumers demonstrating lasting new habit formation and shopping behavior changes during the pandemic; Visa reported card not present spending excluding travel increased 27% YoY in November while card present declined (7%), signaling that eCommerce continued to absorb sales in Q4 2020; Mastercard SpendingPulse noted that eCommerce sales for the "75 Days of Christmas" (October 11 - December 24) time period grew 49% YoY across all payments types, including cash and check	
USD strength (DXY)	USD was down ~(575) bps YoY in Q4 2020 vs. down ~(400) bps in Q3 2020 (DXY quarterly, daily average); DXY has leveled out around ~90 over the last month, weaker against GPB and AUD, ~flat vs. EUR and CAD, and stronger vs. BRL in Dec/Jan	
FX Vol (CVIX)	Q4 2020 volatility down sequentially ~500 bps but remains up 24% YoY; FX volaitlity is below the longer term average of ~9, at ~7 as of December 31, 2020, having decreased from levels seen in March reaching ~15; Note: CVIX is Deutsche Bank's measure of currency trading volatility. Increased FX volatility is benefits cross-border yields; We caveat that cross-border volumes have been significantly impacted due to COVID	
US retail gasoline prices	Quarterly average retail gas price per gallon decreased ~(130) bps Q4 2020 vs. Q3 2020 and ~(1700) bps YoY; December average price was down ~(1400) bps YoY , but up sequentially (~400 bps M/M), V/MA ~MSD % of US volumes at gas stations; Summary is gas prices are still down YoY, but up ~2000bps from the lows in April	
IATA	Industry wide RPK's down ~(70%) YoY in November (vs. down (94%) at the lows in April); Declines acutely impacting International, which is down (88%) YoY in Nov (although an improvement from down (98%) YoY in May), with Domestic holding up relatively better posting a decline of (41%) YoY in Nov; Note: IATA airline data provides tourism reads, with tourism representing ~50-60% or more of cross-border card volumes	
Barclaycard UK	Barclaycard consumer spending grew 1% YoY in December on a nominal basis (a modest decline on a real basis when accounting for inflation) with essential spending falling (0.9%) YoY while non-essential spending grew 1.8% YoY; Online spending grew 4.2% YoY with online representing 40.3% of total spend and 26.3% of total transactions	
NFIB SMB confidence	The small business optimism index fell to 95.9 in December from 101.4 in November with sales expectations for the next three months declining (14%) to a net negative (4%); Note: SMB payments volumes are the highest yielding for merchant acquirers (vs. larger merchants)	
First Data SpendTrend	Q4 2020 average of ~(12.6%) roughly flat vs. Q3 2020 for All Industries data down ~50 bps QoQ, with signs of improvement (December up sequentially, but still negative), with Total E-Commerce Retail crossing back into positive territory with Q4 2020 improving ~110 bps vs. Q3 2020 (better than Total Brick & Mortar Retail down ~110 bps from Q3 2020); Note: SpendTrend is a macro-economic indicator based on aggregate SSS activity in the First Data POS network	
US card issuer volumes	Q4 2020 credit card volume declines improved sequentially from ~(10%) in Q3 2020 to ~(6%) YoY; Q4 2020 debit card volume growth decelerated ~200bps vs. Q3 2020 from 14% to 12% YoY; total carded volume declines improved ~200bps in Q4 2020 vs. Q3 2020 from ~(3%) to ~(1%); Note: US issuer volume includes AXP, BOA, COF, C, DFS, JPM, USB, WFC credit card volumes, and BOA, JPM, USB, WFC debit card volumes	

Source: the BLOOMBERG PROFESSIONAL™ service, FactSet, US Census Bureau, Company reports, NFIB, First Data, Visa, Barclays, IATA, Credit Suisse estimates

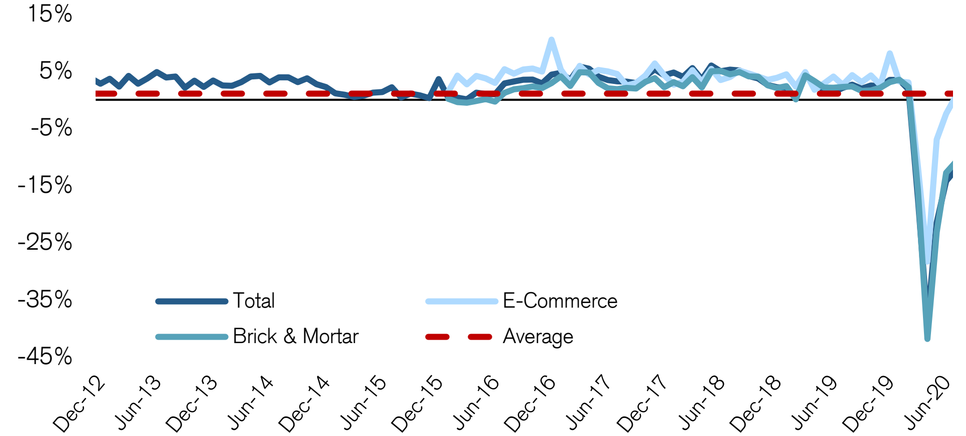
What's happening right now…macro and industry data backdrop

US Census Bureau & SpendTrend suggest eCommerce will continue to shine

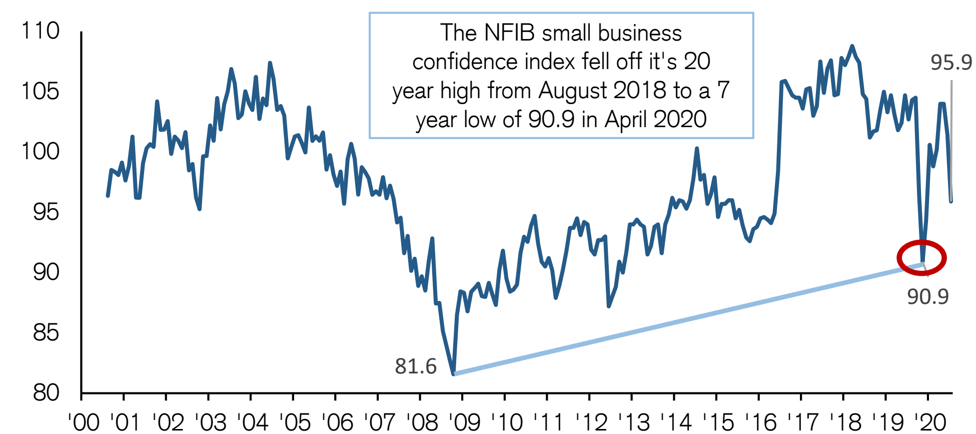
YoY Growth in e-Commerce retail sales was accelerated by the COVID-19 pandemic shifting consumer shopping habits. As a % of total retail sales, e-Commerce has grown to ~15% in 4Q 2020 from 1% in 2001



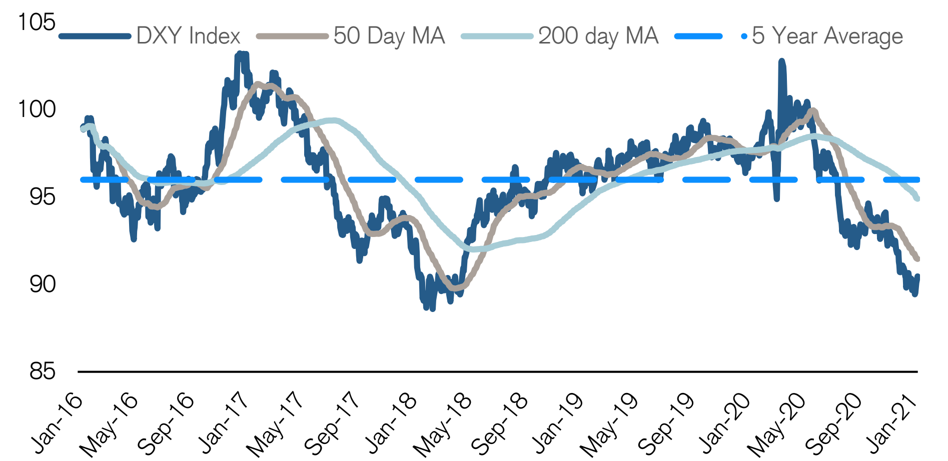
First Data Spend Trend (all industries SSS POS data) quarterly growth above recent low, but still significantly below long-term average



NFIB Small Business Confidence Index (1986=100); the index fell to a multi-year low in April 2020 as a result of the COVID-19 pandemic and has since rebounded, although remains below the 20-year high achieved in 2018



DXY index has fallen to levels last seen in 2018 (positive for cross-border card purchase volumes)



Source: FactSet, First Data SpendTrend, NFIB, US Census Bureau, Credit Suisse research

Payments, Processors, & FinTech detailed valuation table

Valuation across P/E, EV/Sales, EV/EBITDA, and relevant CAGRs

Ticker	Target Price	Rating	Price ($)	Market Cap ($mm)	EV ($mm)	Net Debt / EBITDA [2]	Sales 2020E	Sales 2021E	Sales 2022E	Sales 20-22E CAGR	EV/Sales (2022E)	Multiple-to-growth	Adj. EBITDA 2020E	Adj. EBITDA 2021E	Adj. EBITDA 2022E	Adj. EBITDA 20-22E CAGR	EV/ EBITDA (2022E)	EBITDA margin %	Multiple-to-growth	Adj. EPS 2020E	Adj. EPS 2021E	Adj. EPS 2022E	Adj. EPS 20-22E CAGR	P/E (2022E)	Multiple-to-growth	3-Year Average PE
Payments																										
V	255	OP	201	486,649	489,646	0.2x	21,846	23,226	27,318	12%	17.9x	1.5x	14,868	15,889	19,342	14%	25.3x	68%	1.8x	5.04	5.46	6.87	17%	29.3x	1.7x	29.1x
MA	380	OP	329	330,724	332,172	0.2x	15,197	18,005	21,064	18%	15.8x	0.9x	8,596	10,827	13,180	24%	25.2x	57%	1.1x	6.32	8.21	10.38	28%	31.7x	1.1x	32.6x
PYPL	215	OP	248	296,093	291,560	(0.8x)	21,421	25,447	30,264	19%	9.6x	0.5x	6,265	7,364	8,785	18%	33.2x	29%	1.8x	3.79	4.54	5.66	22%	43.8x	2.0x	35.4x
SQ	210	OP	217	112,581	111,867	(1.8x)	9,434	13,039	15,216	27%	7.4x	0.3x	429	663	1,086	59%	103.0x	5%	1.7x	0.76	1.16	1.83	55%	118.2x	2.1x	107.4x
FIS	160	OP	128	79,675	98,228	3.5x	12,616	13,687	14,766	8%	6.7x	0.8x	5,270	6,147	6,891	14%	14.3x	42%	1.0x	5.44	6.53	7.55	18%	16.9x	0.9x	19.8x
FISV	135	OP	107	73,104	94,423	3.8x	14,031	15,120	16,248	8%	5.8x	0.8x	5,472	6,427	7,041	13%	13.4x	39%	1.0x	4.41	5.40	6.35	20%	16.8x	0.8x	22.3x
GPN	215	OP	185	55,855	63,560	2.5x	6,766	7,596	8,332	11%	7.6x	0.7x	3,049	3,633	4,064	15%	15.6x	45%	1.0x	6.37	8.02	9.41	22%	19.7x	0.9x	22.5x
(1) ADYEN-NL	€ 2,283	OP	€ 1,875	€ 57,758	57,703	(0.2x)	3,641	5,459	7,736	46%	7.5x	0.2x	€ 374	€ 551	€ 787	45%	73.3x	10%	1.6x	€ 8.40	€ 13.24	€ 18.77	49%	99.9x	2.0x	102.9x
JKHY	175	NEUTRAL	153	11,685	11,490	(0.4x)	1,697	1,766	1,892	6%	6.1x	1.1x	543	549	616	7%	18.7x	32%	NM	3.86	3.80	4.45	7%	34.3x	4.7x	37.5x
TEMN-SWX	NC	NC	CHF 111	CHF 8,165	CHF 9,084	N/A	CHF 794	CHF 871	CHF 954	10%	9.5x	1.0x	CHF 357	CHF 387	CHF 427	9%	21.3x	45%	2.3x	CHF 3.01	CHF 3.27	CHF 3.64	10%	30.4x	3.1x	40.7x
QTWO	NC	NC	139	8,734	8,816	3.1x	404	489	596	22%	14.8x	0.7x	23	34	56	57%	156.1x	6%	2.7x	0.11	0.29	0.58	128%	241.0x	1.9x	403.8x
ACIW	NC	NC	40	4,778	5,990	3.5x	1,262	1,338	1,415	6%	4.2x	0.7x	312	348	389	12%	15.4x	25%	1.3x	0.39	0.86	1.13	70%	35.1x	0.5x	26.6x
LSPD	70	OP	69	7,677	7,202	N/A	199	332	436	48%	16.5x	0.3x	(28)	(28)	(12)	(35%)	NM	NM	NM	(0.54)	(0.39)	(0.29)	NM	NM	NM	NM
FOUR	66	OP	70	5,890	6,294	N/A	322	394	482	22%	13.1x	0.6x	90	156	210	53%	30.0x	28%	0.6x	(0.85)	0.26	0.82	NM	85.6x	NM	NM
GDOT	NC	NC	52	3,059	944	(11.0x)	1,182	1,225	1,331	6%	0.7x	0.1x	198	224	265	16%	3.6x	17%	0.2x	1.98	2.23	2.74	18%	19.1x	1.1x	19.8x
EVOP	NC	NC	24	2,077	3,068	1.8x	446	506	561	12%	5.5x	0.4x	145	178	203	18%	15.1x	33%	0.8x	0.63	0.82	0.99	25%	24.7x	1.0x	37.2x
NVEI-TSE	45	OP	59	8,383	8,406	N/A	459	583	685	22%	12.3x	0.6x	190	233	277	21%	30.4x	41%	1.5x	0.13	1.18	1.29	210%	45.4x	0.2x	59.4x
(3) RPAY	28	OP	24	1,866	1,984	1.2x	152	185	218	20%	9.1x	0.5x	65	81	96	22%	20.6x	42%	0.9x	0.52	0.61	0.76	21%	31.8x	1.5x	35.6x
Median						**0.7x**				**15%**	**8.4x**	**0.6x**				**17%**	**21.3x**	**33%**	**1.2x**				**22%**	**31.8x**	**1.3x**	**35.5x**
B2B Payments / Other																										
FLT	240	NEUTRAL	261	22,494	25,616	2.3x	2,377	2,686	2,973	12%	8.6x	0.7x	1,249	1,491	1,659	15%	15.4x	53%	1.0x	10.93	12.66	14.66	16%	17.8x	1.1x	19.9x
WEX	205	NEUTRAL	197	9,024	10,435	2.0x	1,548	1,761	1,996	14%	5.2x	0.4x	577	707	822	19%	12.7x	37%	0.7x	6.09	8.09	10.30	30%	19.2x	0.6x	19.6x
VRRM	13.5	OP	14	2,280	3,025	3.8x	387	423	496	13%	6.1x	0.5x	174	210	265	24%	11.4x	45%	0.5x	0.49	0.65	0.84	32%	16.1x	0.5x	19.4x
EPAY	NC	NC	51	2,394	2,405	0.1x	442	464	524	9%	4.6x	0.5x	95	103	118	11%	20.4x	21%	1.8x	1.17	1.21	1.47	12%	34.7x	2.9x	33.5x
BILL	NC	NC	128	11,302	10,660	N/A	158	196	255	27%	41.8x	1.5x	(12)	(20)	(15)	9%	NM	NM	N/A	(0.17)	(0.25)	(0.17)	(0%)	NM	NM	N/A
Median						**2.2x**				**13%**	**6.1x**	**0.5x**				**15%**	**14.1x**	**41%**	**0.8x**				**16%**	**18.5x**	**0.9x**	**19.8x**
Money Transfer																										
WU	22	UP	23	9,508	11,518	1.6x	4,819	5,011	5,160	3%	2.2x	0.6x	1,225	1,322	1,398	7%	8.2x	25%	1.2x	1.84	2.02	2.25	10%	10.1x	1.0x	11.0x
EEFT	NC	NC	131	7,101	6,967	(0.4x)	2,432	2,846	3,217	15%	2.2x	0.1x	288	526	699	56%	10.0x	12%	0.2x	2.44	5.67	7.85	79%	16.7x	0.2x	19.0x
MGI	NC	NC	6	581	1,274	3.0x	1,221	1,292	1,353	5%	0.9x	0.2x	240	254	269	6%	4.7x	20%	0.8x	0.20	0.31	0.39	40%	16.2x	0.4x	176.6x
IMXI	18	NEUTRAL	15	581	561	(0.3x)	352	392	442	12%	1.3x	0.1x	67	75	85	13%	6.6x	19%	0.5x	1.07	1.17	1.33	12%	11.2x	1.0x	45.5x
Median						**0.7x**				**9%**	**1.7x**	**0.2x**				**10%**	**7.4x**	**19%**	**0.7x**				**26%**	**13.7x**	**0.7x**	**32.2x**
Digital Lending (Mortgage)																										
RKT	27	NEUTRAL	23	46,465	78,721	N/A	16,139	11,161	10,467	(19%)	7.5x	NM	9,827	5,253	4,614	(31%)	17.1x	61%	NM	3.85	1.91	1.75	(33%)	13.3x	NM	11.3x
Min						(11.0x)				3%	0.7x	0.1x				(35%)	3.6x	5%	0.2x				7%	10.1x	0.2x	11.0x
25th %						(0.3x)				8%	4.8x	0.4x				12%	12.7x	20%	0.8x				17%	16.9x	0.8x	19.9x
Mean						0.8x				16%	7.7x	0.6x				21%	28.2x	32%	1.2x				40%	42.6x	1.4x	57.4x
Median						1.4x				12%	7.0x	0.5x				16%	15.6x	32%	1.0x				22%	29.3x	1.0x	33.0x
75th %						2.8x				19%	9.6x	0.7x				23%	25.3x	42%	1.7x				42%	35.1x	1.9x	41.9x
Max						3.8x				48%	17.9x	1.5x				59%	156.1x	68%	2.7x				210%	241.0x	4.7x	403.8x

CREDIT SUISSE

Source: Company reports, FactSet, Credit Suisse estimates

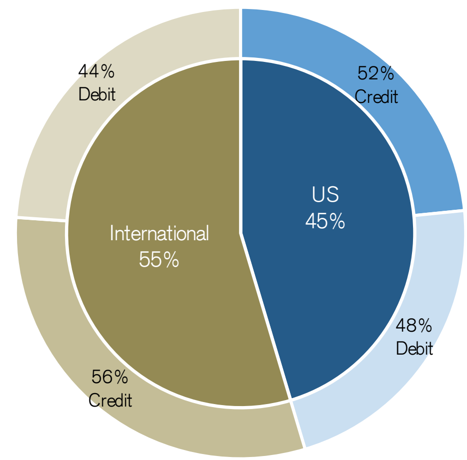
(1) Gross Profit is reported Net Revenue - which is revenue less interchange and other payaways, (2) International companies EBITDA on an annual basis, (3) Repay historicals and shares from CS model, FactSet does not have pro-forma financials in database or updated share count

CS Rating	OUTPERFORM
CS Target Price	$255

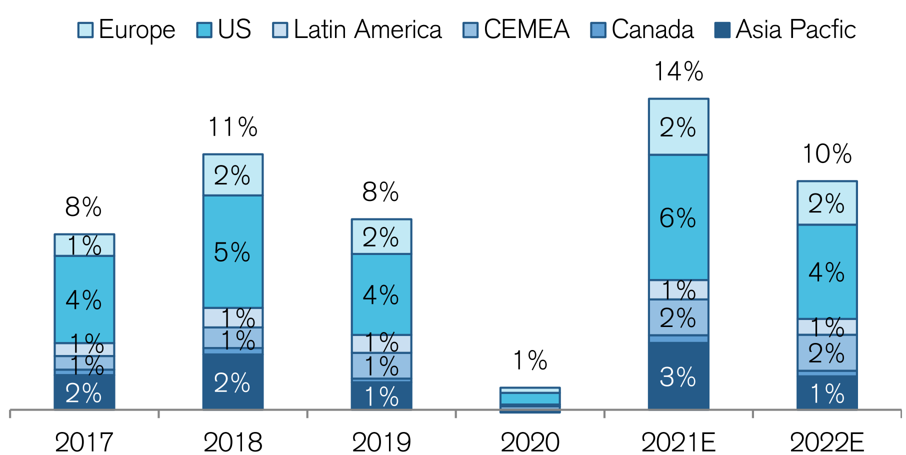
Visa (V)
Higher debit exposure to benefit from stimulus & other opportunities

- Mid- to high-teens EPS compounder featuring higher relative exposure to the US, UK, and debit (vs. MA higher international and credit).
- Value-added services to continue to grow in the mid-teens, particularly consulting & analytics services which continue to be in great demand.
- Largely fixed operating expense base to drive a return to operating leverage as volumes recover.
- Greater beneficiary of US contactless rollout given mix (~45% of volumes vs. ~35% for MA).

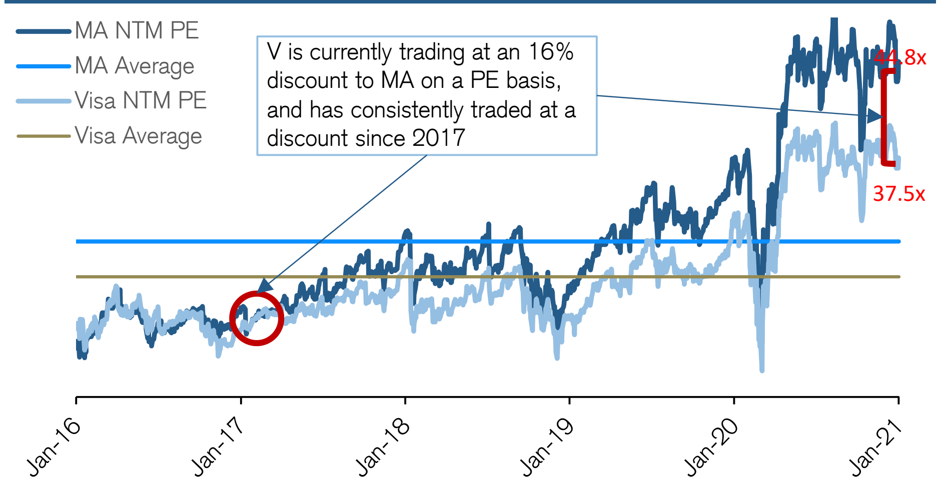
Visa's volumes are weighted more toward US & debit relative to Mastercard (which has higher exposure to International and credit)



Visa organic, ex-FX volume growth more driven by US vs. Mastercard, with ~65% of volumes international (vs. 55% for Visa)



5-Year NTM P/E; MA has consistently traded at a premium vs. V, dating back to 2017



CREDIT SUISSE

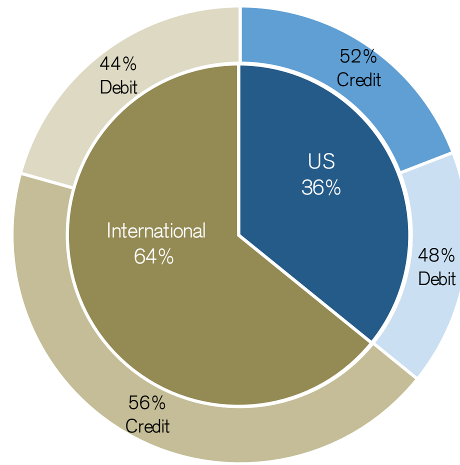
Source: Company reports, FactSet, Credit Suisse estimates

Mastercard (MA)

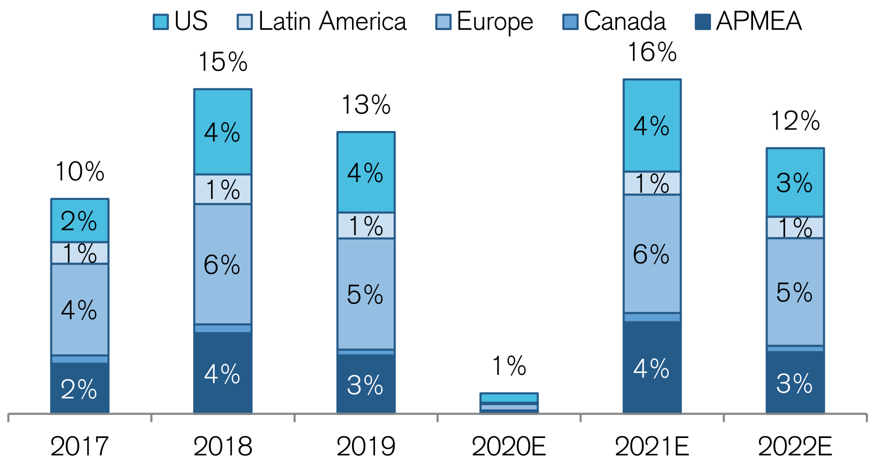
Attractive regional mix, double-digit compounder

- High-teens EPS compounder featuring higher relative exposure to faster-growth international markets (relative to V, although trading at a ~7x-turn premium on NTM EPS).
- Greater credit mix, and slightly greater travel mix (pre-COVID) within cross-border vs. Visa.
- Acquisitions (Vocalink, Transfast, Nets [pending close]) support a multi-rail approach and efforts to attract B2B flows (Mastercard Track), along with Transactis in bill-pay (Mastercard Bill Pay Exchange).
- Services business a key element to bringing in new clients, but also becoming an independent revenue stream. Additionally, MA is building significant loyalty and security assets which have also helped add issuers and merchants.

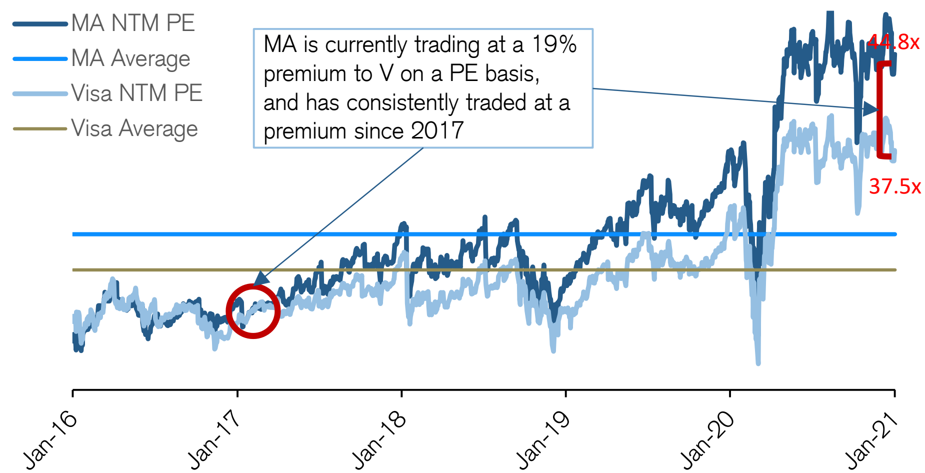
Mastercard's volumes are weighted more toward International & credit relative to Visa (which has higher exposure to US & debit)



Mastercard has an organic, ex-FX volume growth premium to Visa, driven by exposure to faster growing geographies



5-Year NTM P/E; MA has consistently traded at a premium vs. V, dating back to 2017



Source: Company reports, FactSet, Credit Suisse estimates

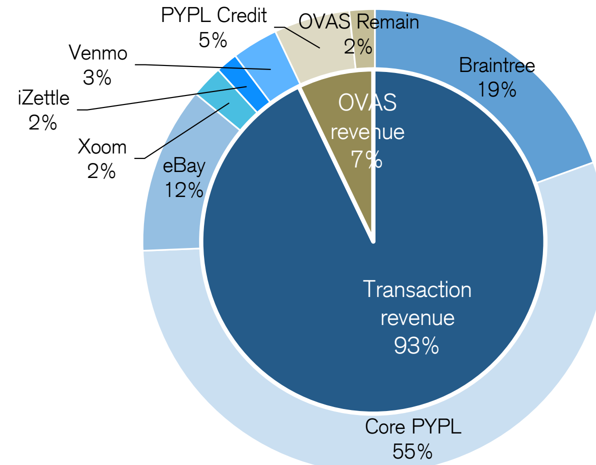
CS Rating	**OUTPERFORM**
CS Target Price	**$215**

PayPal (PYPL)

Best way to win a fight, not to get into a fight

- eCommerce pure play exposed to large TAM analysis ("True TAM" inclusive of global eCommerce, online travel, eFood delivery, eTicketing, online charitable donations, ride-sharing, crowdfunding, gaming, streaming subscriptions, and more).
- Long list of emerging areas of upside (i.e., Braintree becoming more global, Venmo moving from an EPS drag to boost, QR codes in-store, Buy Now Pay Later, cryptocurrency, tech partnerships [MELI, Uber, Facebook], bill-pay, China, iZettle, Honey).
- eBay headwind manageable and likely accompanied by previously restricted marketplace partnerships.

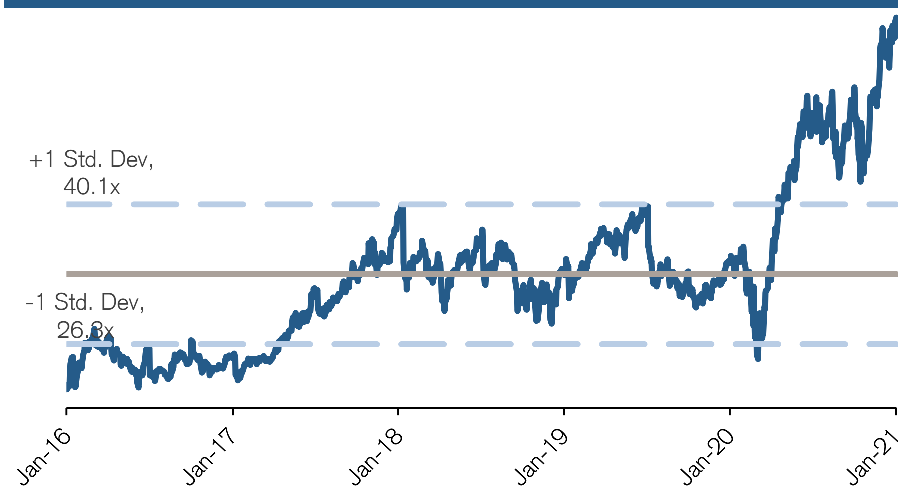
2020E revenue mix, with the vast majority of monetization via transaction-based revenue (Braintree ~20% of total)



2021 TPV will be impacted by lost eBay volumes, although supported by bill-pay, BNPL, Pay with Venmo, and a strong 2020 user cohort

	2019A	1Q20A	2Q20A	3Q20A	4Q20E	2020E	2021E	2022E
US TPV	423,178	117,056	132,673	149,618	162,513	561,860	701,613	868,430
YoY ex eBay OA expiry	-	-	-	-	*39%*	-	-	-
eBay OA expiry impact	-	-	-	-	*(2%)*	-	-	-
YoY	*27%*	*22%*	*30%*	*40%*	*37%*	*33%*	*25%*	*24%*
2-year	*56%*	*50%*	*58%*	*68%*	*63%*	*60%*	*58%*	*49%*
International TPV	288,748	73,511	89,058	97,074	106,534	366,177	439,835	547,507
YoY FXN ex eBay OA expiry	-	-	-	-	*31%*	-	-	-
eBay OA expiry impact	-	-	-	-	*(2%)*	-	-	-
YoY FXN	-	*14%*	*30%*	*30%*	*29%*	-	-	-
2-year FXN	-	*36%*	*54%*	*55%*	*47%*	-	-	-
Total TPV	**711,926**	**190,567**	**221,731**	**246,692**	**269,047**	**928,037**	**1,141,448**	**1,415,936**
YoY Organic FXN	*25%*	*19%*	*30%*	*36%*	*34%*	*30%*	*23%*	*24%*

PayPal's P/E has inflected since mid-2016's "Choice" decision, and further in 2020 due to meaningful "call options" ahead



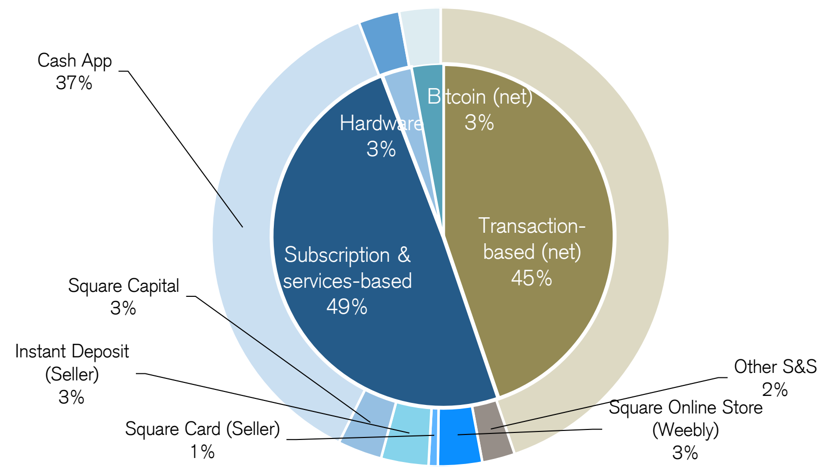
CS Rating	OUTPERFORM
CS Target Price	$210

Square (SQ)

Recycling monetization (Sellers & Cash App)

- Intersection of software + payments, with a 3x "recycling" (Seller ecosystem, Cash App/Card, and Business Debit/ID), with SMB digital banking as a potential 2021 driver & theme.
- Cash App scaling rapidly, spurred by COVID related stimulus efforts and a broader shift to digital banking (amid the pandemic), specifically direct deposit related funds feeding higher Cash Card attach and subsequent spending.
- Upside in Cash App, Omni channel (Square Online Store, powered by Weebly), scaling of recently introduced products, B2B (Square Card) and potential new products (credit card, expense management, AP/AR partnership, etc.).

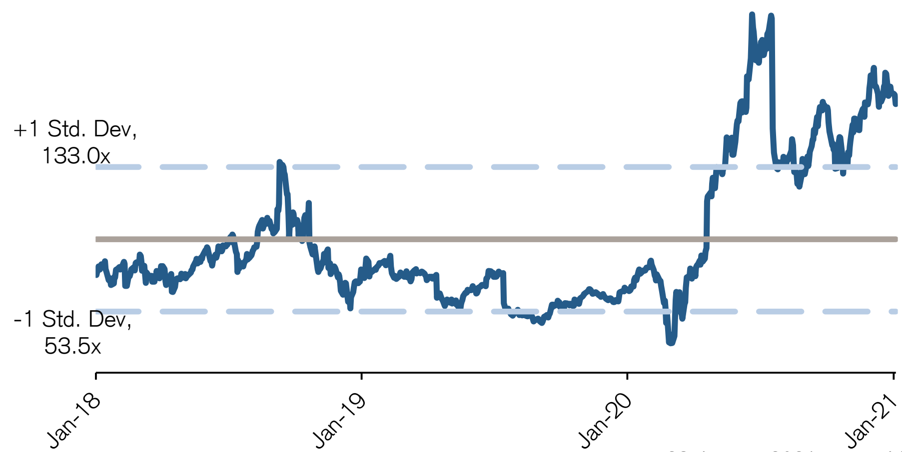
Square sources ~50% of its revenue from S&S (mostly Cash App) and another ~45% via the core seller transaction-based business in 2020E



Seller business share gains (large new cohort) in 2020, alongside expanded marketing, sales team additions, and recovery to drive 2021

	2019A	1Q20E	2Q20E	3Q20E	4Q20E	2020E	2021E	2022E
Gross Payment Volume (GPV)	106,239	25,743	22,801	31,729	31,261	111,534	148,864	186,085
YoY organic	*25%*	*14%*	*(15%)*	*12%*	*9%*	*5%*	*33%*	*25%*
2-year	*55%*	*41%*	*10%*	*38%*	*34%*	*30%*	*38%*	*58%*
Net transaction revenue	1,143	292	294	403	395	1,384	1,793	2,212
Net take rate	*1.08%*	*1.14%*	*1.29%*	*1.27%*	*1.26%*	*1.24%*	*1.20%*	*1.19%*
YoY	*25%*	*18%*	*3%*	*35%*	*26%*	*21%*	*30%*	*23%*
S&S revenue	886	296	346	448	438	1,528	2,410	3,289
Hardware revenue	85	21	19	27	22	90	109	125
Bitcoin revenue	8	7	17	32	34	90	47	54
Total adjusted revenue	**2,129**	**616**	**677**	**910**	**889**	**3,092**	**4,359**	**5,681**
YoY organic	*45%*	*39%*	*30%*	*62%*	*50%*	*45%*	*41%*	*30%*
Seller ecosystem	*1,548*	*395*	*349*	*464*	*474*	*1,682*	*2,337*	*2,934*
Cash App ecosystem	*574*	*221*	*328*	*446*	*415*	*1,410*	*2,022*	*2,747*

EV/EBITDA multiple on NTM estimates, expanded meaningfully in 2020 due to Seller share gains & Cash App acceleration



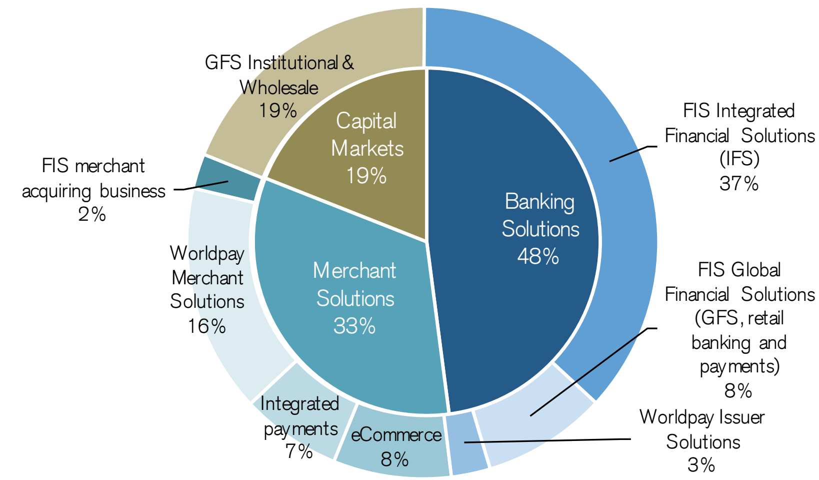
CS Rating **OUTPERFORM**
CS Target Price **$160**

Fidelity National Information Services (FIS)

Accelerating top line for the foreseeable future

- Acceleration in top line in the medium-term; revenue synergies from two deals benefiting the Merchant Solutions business (FIS-WP, VNTV-WP).
- Meaningful exposure to high-growth channels, with ~45% of merchant acquiring in global eCommerce & integrated payments; longer-term in-store expansion in new countries (i.e., ~HSD today vs. GPN at 38).
- Banking segment positioned to accelerate topline trajectory, fueled by top 100 bank wins (existing and new) and cross-sell (lending modules potential to double account & deposit-based revenue) opportunity

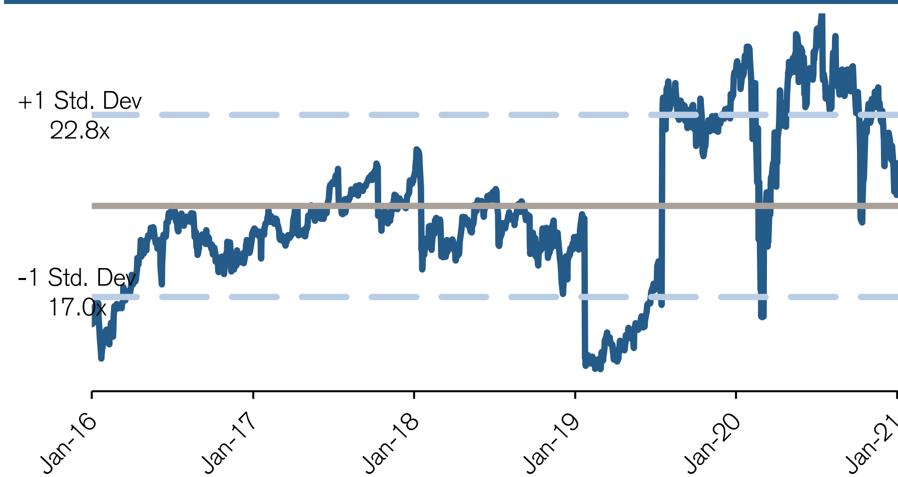
Estimated business mix (2019) of the combined FIS-WP entity



FIS set to accelerate top-line growth in the medium term, benefiting from top 100 bank wins and a recovering Merchant segment

	2019A	1Q20	2Q20	3Q20	4Q20E	2020E	2021E	2022E
Total revenue	12,702	3,078	2,962	3,197	3,347	12,584	13,690	14,893
YoY reported	2%	2%	(7%)	2%	0%	(1%)	9%	9%
YoY FXN	-	0	(6%)	0	0	-1%	8%	9%
Inorganic contribution to growth (%)	-	1%	1%	1%	1%	1%	0%	0%
Revenue synergies run-rate ($)	-	100	115	150	205	205	400	590
Revenue synergies contribution to growth (%)	-	1%	1%	1%	1%	1%	1%	1%
YoY organic FXN (w/ synergies)	-	2%	(7%)	1%	(0%)	(3%)	9%	9%
2-year	-	-	-	5%	5%	(4%)	3%	14%
YoY organic FXN ex-synergies	-	1%	(8%)	(0%)	(1%)	(4%)	7%	7%
2-year	-	0%	0%	5%	5%	(4%)	3%	14%

FIS multiple on out year numbers came under pressure vs. pre-COVID levels during 2020

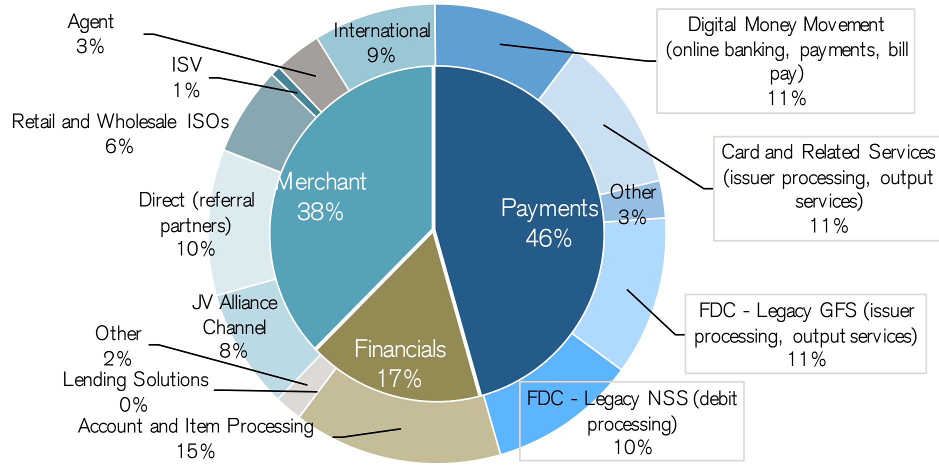


Fiserv (FISV)

Scale begets scale

- We expect Acceptance segment to benefit from an improving mix toward its four "crown jewel" businesses in Clover, ISV (CardConnect), eCommerce (Carat), and International.
- Medium-term guidance (2022-2023) suggests a runway ahead for +7-9% internal revenue growth and +15-20% EPS growth. Acceptance segment mix analysis suggest Merchant segment growth forecast is achievable.
- At Dec 2020 Analyst Day, the ~$1.2b in cost synergies pulled forward implies a more conservative pace of underlying margin expansion ex-cost synergy, leaving potential for upside ahead, either via margin flow-through or added re-investment for the persistence of growth.

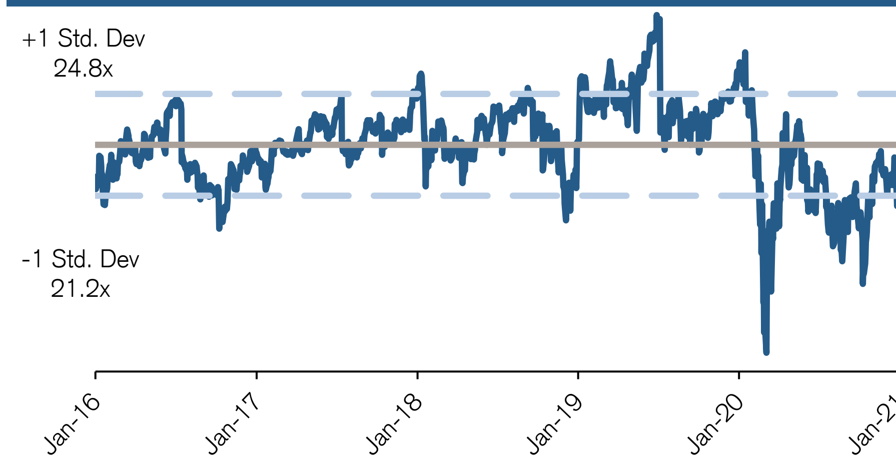
Estimated business mix (2019E) of the combined FISV-FDC entity



FISV will benefit from revenue synergies and an improving Acceptance segment mix (toward "crown jewel" businesses)

	2019A	1Q20A	2Q20A	3Q20A	4Q20E	2020E	2021E	2022E
Total Adj. Revenue	**14,445**	**3,478**	**3,220**	**3,590**	**3,669**	**13,957**	**15,069**	**16,167**
YoY reported	4%	0%	(12%)	(1%)	(1%)	(3%)	8%	7%
YoY Organic	(1%)	3%	(8%)	2%	0%	(1%)	9%	7%
YoY FXN Organic (w/ Synergies)	6%	4%	(7%)	3%	0%	0%	9%	7%
Run-rate Synergies ($)	3	7	10	12	12	41	148	314
Incremental Synergies (%)	0%	0%	0%	0%	0%	0%	1%	2%
YoY FXN Organic ex-Synergies	6%	4%	(8%)	2%	0%	(0%)	8%	6%
2-year FXN Organic ex-Synergies	-	11%	(2%)	8%	5%	6%	8%	14%
Inorganic % to growth	1%	(1%)	(0%)	(0%)	0%	(0%)	2%	0%

Similar to FIS, FISV's multiple (on out year numbers) came under pressure vs. pre-COVID levels during 2020



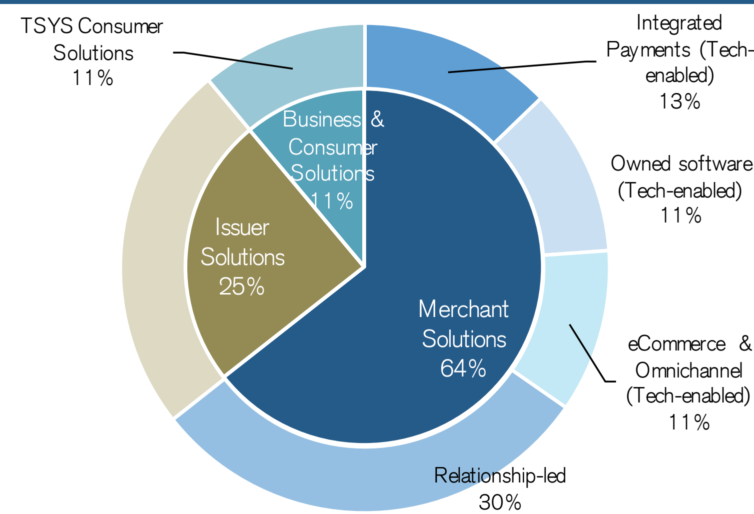
Source: Company reports, FactSet, Credit Suisse estimates

CS Rating	OUTPERFORM
CS Target Price	$215

Global Payments (GPN)
In all the right swim lanes

- Highest relative exposure to the fastest growing channels: 1) ~40% owned & partnered software growing; 2) ~20% global eCommerce & omnichannel.
- Leading credit issuer processor with dominant share in the US, UK, Ireland, Canada, and China (+5-7% growth vs. industry +3%); improved ability to win bank partnerships and joint ventures, AWS partnership TAM expansive.
- Our preferred pick amongst the three mega-mergers given it offers the fastest revenue growth as a payments pure play with the lowest leverage, the least dependence on revenue synergies, and greater bounce back in meaningfully depressed verticals.

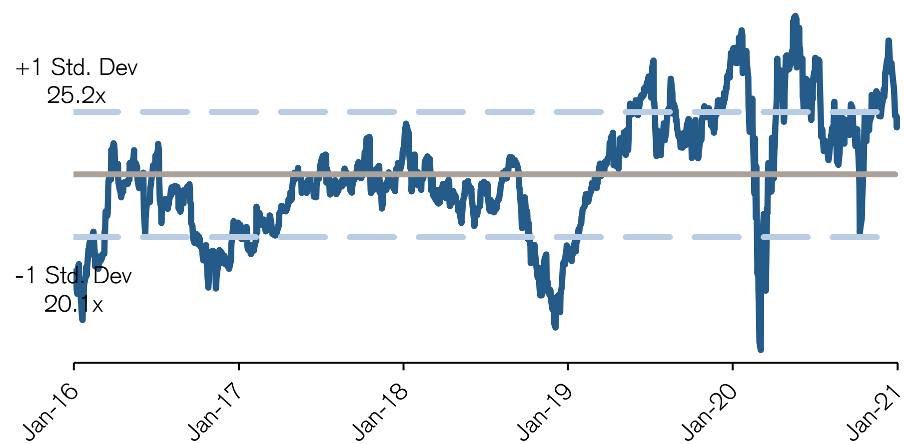
Estimated business mix (2019E) of the combined GPN-TSS entity



We expect Global Payments to maintain an organic growth range of +8-11% (ex-COVID), bolstered by a vertical software M&A strategy

	2019A	1Q20A	2Q20A	3Q20A	4Q20E	2020E	2021E	2022E
Total adjusted revenue	**7,121**	**1,729**	**1,521**	**1,746**	**1,743**	**6,738**	**7,475**	**8,189**
YoY reported	-	*0%*	*(14%)*	*(4%)*	*(3%)*	*(5%)*	*11%*	*10%*
YoY Organic	-	*(0%)*	*(15%)*	*(5%)*	*(4%)*	*(6%)*	*11%*	*10%*
YoY FXN Organic (ex-Synergies)	-	*1%*	*(14%)*	*(5%)*	*(5%)*	*(6%)*	*9%*	*9%*
Run-rate Synergies ($)	-	5	5	15	30	30	109	159
Incremental Synergies (%)	-	*0%*	*0%*	*0%*	*0%*	*0%*	*1%*	*1%*
YoY FXN Organic (w/Synergies)	-	*1%*	*(14%)*	*(4%)*	*(4%)*	*(6%)*	*10%*	*10%*
Inorganic contribution to growth (%)	-	*0%*	*0%*	*1%*	*1%*	*1%*	*0%*	*0%*

GPN has historically traded at a meaningful premium to the market , with estimates typically low due to continued M&A (software emphasis)



Source: Company reports, FactSet, Credit Suisse estimates

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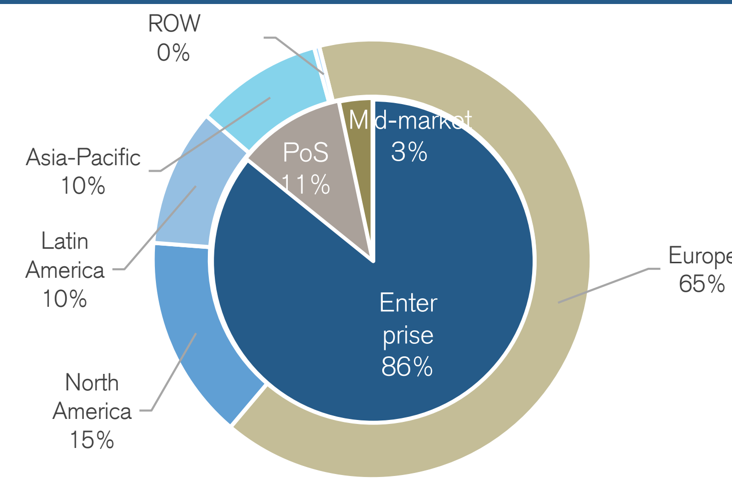
Adyen (ADYEN.AS)

Leading on all fronts

CS Rating	OUTPERFORM
CS Target Price	€ 2,283

- Leading global payments platform with large eCommerce exposure (88% FY19 volumes) offering superior runway for growth.
- Differentiated single platform (vs. a patchwork of different systems often atop outdated legacy payments infrastructure) allowing fast implementation of ideas and simplified operations for merchants.
- Clear share gainer within eCommerce with market share climbing from ~6-11% in FY19 to ~11-15% by 2023 (depending on TAM data source).

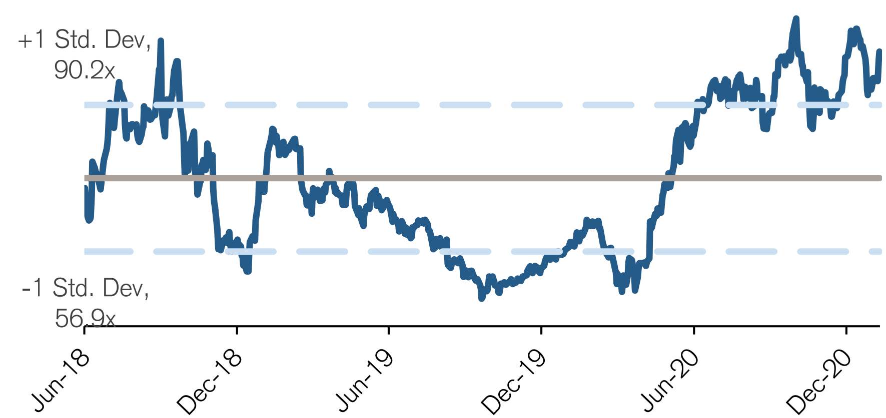
Enterprise accounted for ~85% of processed volumes (center) in 2019, with ~2/3 of total net revenue from the Europe



Volume and net revenue build: forecast annual volume growth well above 30% with stable total net take rates stable at ~0.22%

	FY18A	FY19A	FY20E	FY21E	FY22E	FY23E	FY24E
Total processed volume (x)	**159**	**240**	**301**	**433**	**603**	**829**	**1114**
YoY		*51%*	*26%*	*44%*	*39%*	*37%*	*34%*
Group average transaction value (y)	29	29	27	27	27	27	27
Total no. of transactions (bn) (a) = (x) / (y)	5.5	8.3	11.2	16.1	22.6	31.0	41.8
Processing fees (b)	0.024	0.021	0.021	0.019	0.019	0.018	0.018
Processing revenues (a) x (b)	133	176	231	313	424	565	736
as % of troessed volume	*0.08%*	*0.07%*	*0.08%*	*0.07%*	*0.07%*	*0.07%*	*0.07%*
Total Acquired volume	**111**	**173**	**238**	**355**	**510**	**708**	**957**
YoY		*55%*	*38%*	*49%*	*43%*	*39%*	*35%*
% of processed volume	*70%*	*72%*	*79%*	*82%*	*85%*	*85%*	*86%*
Net Acquiring fees	*0.13%*	*0.13%*	*0.14%*	*0.13%*	*0.13%*	*0.13%*	*0.13%*
Net settlement revenue	149	229	333	473	678	942	1274
Other services revenue	65	93	121	170	230	310	418
Total net revenue	**349**	**497**	**685**	**956**	**1,332**	**1,817**	**2,428**
YoY	*60%*	*42%*	*38%*	*40%*	*39%*	*36%*	*34%*
Net take rates	***0.22%***	***0.21%***	***0.23%***	***0.22%***	***0.22%***	***0.22%***	***0.22%***

Valuation history (EV/EBITDA on a NTM-basis) since IPO in Q2 2018



Source: Company reports, FactSet, Credit Suisse estimates

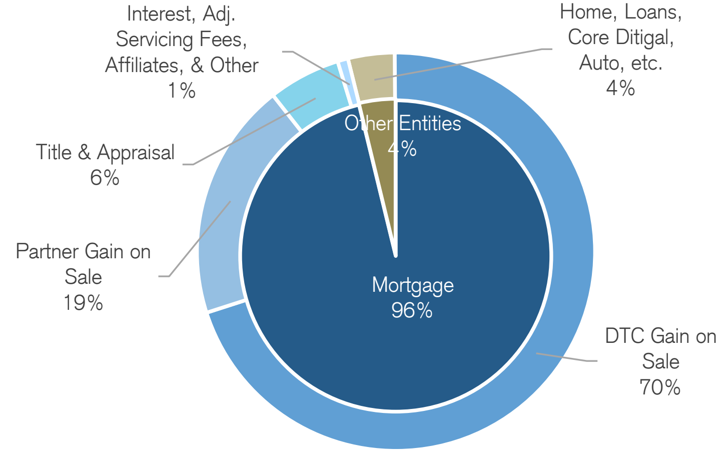
Rocket Companies (RKT)

Mortgage industry leader driven by best-in-class tech platform

CS Rating	NEUTRAL
CS Target Price	$27

- Share gainer (~5% in 2018 to ~10% CSe by 2022E) within a large TAM (~$2-3tr US mortgage market).
- First mover industry leadership supported by its technology platform (enabling its partner network) and industry-high recapture rates to a fully online mortgage platform (~80% vs. <20% industry average).
- Other (non-mortgage) business lines (<5% of 2020E adj. revenue) reinforce the stickiness of the platform and have the potential to grow faster than the core business – including home search & agent referral, personal loans, auto loans, 3rd party appraisal, marketing, and sales.

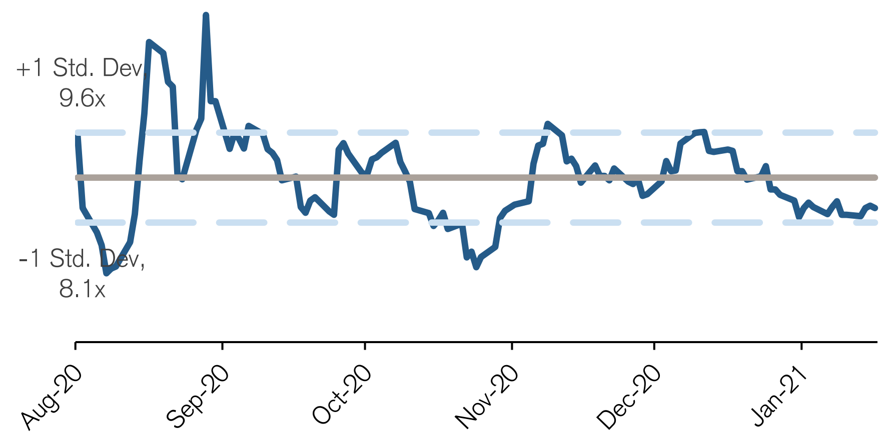
Mortgage (the main operating segment of RKT) makes up ~95% 2020E adj. revenue, composed of sub-buckets within that segment



RKT mortgage origination volume and revenue build: we model RKT gaining ~500bps in market share by 2023 vs. 2018

	2019A	1Q20A	2Q20A	3Q20A	4Q20E	2020E	2021E	2022E
Industry Origination Volumes	2,173,000	563,000	928,000	1,151,667	1,089,500	3,732,167	3,466,000	2,835,000
RKT Total Originations (Closed)	**145,180**	**51,704**	**72,324**	**88,982**	**92,608**	**305,617**	**318,368**	**286,038**
YoY	*75%*	*132%*	*126%*	*122%*	*82%*	*111%*	*4%*	*-10%*
Market Share (%)	*6.7%*	*9.2%*	*7.8%*	*7.7%*	*8.5%*	*8.2%*	*9.2%*	*10.1%*
DTC Originations (Closed)	92,476	31,760	45,792	54,599	55,565	187,716	179,453	150,742
% of Total	*64%*	*61%*	*63%*	*61%*	*60%*	*62%*	*56%*	*53%*
Rate Lock Volume	-	*35,571*	*65,025*	*58,967*	*51,675*	*211,238*	*170,480*	*152,249*
Partner Originations (Closed)	52,703	19,944	26,532	34,383	37,043	117,902	138,915	135,296
Rate Lock Volume	-	20,479	26,952	35,701	35,191	118,324	131,969	136,649
Gain on Sale Revenue								
DTC Gain on Sale	4,319	1,469	3,939	3,129	2,661	11,198	7,880	6,623
% of Volume (Rate Lock)	*4.5%*	*4.6%*	*6.1%*	*5.3%*	*5.2%*	*5.3%*	*4.6%*	*4.4%*
Partner Gain on Sale	538	345	783	1,151	809	3,089	2,401	2,323
% of Volume (Rate Lock)	*0.8%*	*1.7%*	*3.0%*	*3.3%*	*2.3%*	*2.7%*	*1.8%*	*1.7%*
Total Mortgage GOS, net	**4,888**	**1,814**	**4,722**	**4,280**	**3,471**	**14,287**	**10,281**	**8,946**

Valuation history (P/E on a NTM-basis) since IPO in Q3 2020



Source: Company reports, FactSet, Credit Suisse estimates

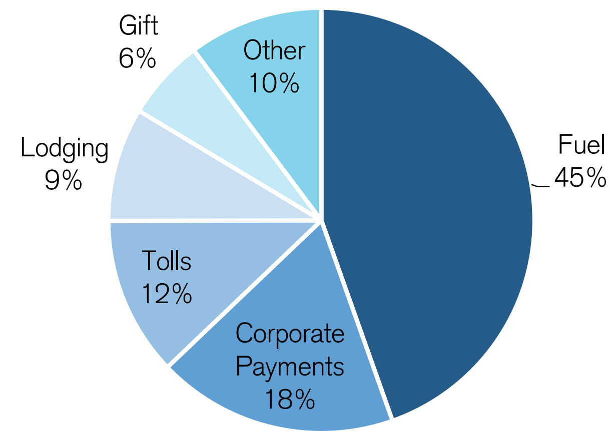
FleetCor Technologies (FLT)

King of the cross-sell

CS Rating	NEUTRAL
CS Target Price	$240

- More than half of revenues ex-fuel and just ~13% of revenue exposed to fuel prices in 2019 (~19% in 9M 2020) vs. WEX's ~21%.
- Four main verticals (Fuel, Corporate Payments, Lodging, Tolls), share similar appealing characteristics (recurring revenue, high margins, network effects, similar distribution, scale) & overlapping customer bases.
- A potential return to success in "Beyond Fuel", faster-growth platforms in corporate payments (once lapping T&E pressures) & Brazil, and the prospect for more of what FleetCor does best (cross-sell & accretive M&A).

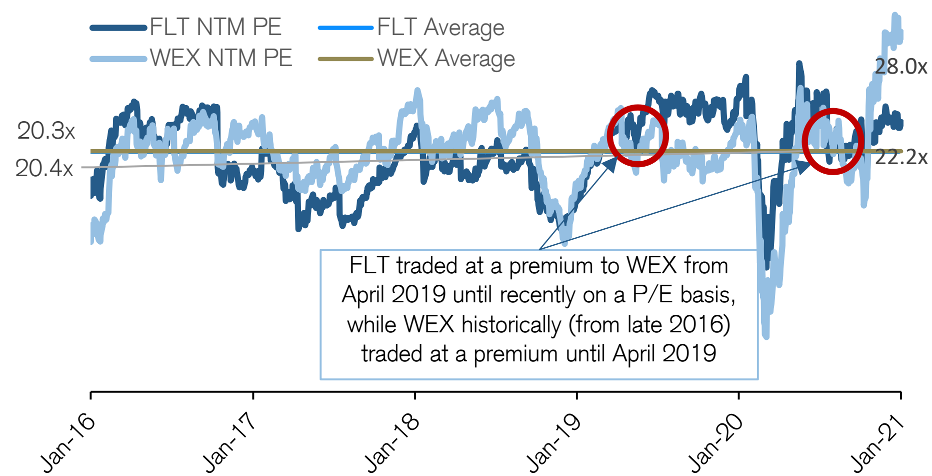
FleetCor has diversified away from the core fuel card business, with ~55% of revenue ex-fuel (Corporate Payments, Lodging, Tolls, 2020E)



Key to modeling FleetCor is uncovering the 2-year organic, macro-neutral (ex-fuel & FX) growth rate

	2019A	1Q20A	2Q20A	3Q20A	4Q20E	2020E	2021E	2022E
Total net revenue	**2,649**	**661**	**525**	**585**	**609**	**2,380**	**2,781**	**3,056**
YoY	*9%*	*6%*	*(18%)*	*(14%)*	*(13%)*	*(10%)*	*17%*	*10%*
YoY organic	*9%*	*5%*	*(20%)*	*(16%)*	*(13%)*	*(11%)*	*18%*	*10%*
YoY macro neutral	*11%*	*7%*	*(15%)*	*(9%)*	*(8%)*	*(7%)*	*17%*	*10%*
YoY macro neutral organic	***11%***	***5%***	***(17%)***	***(12%)***	***(10%)***	***(8%)***	***14%***	***9%***
2-year macro neutral organic	*22%*	*15%*	*(5%)*	*(1%)*	*0%*	*3%*	*6%*	*23%*
Inorganic %	*2%*	*4%*	*1%*	*1%*	*0%*	*1%*	*4%*	*0%*
"Like for like" adjustments	12	-	-	-	-	-	-	-

FLT multiple typically driven by combination of consistent organic performance and accretive M&A



CREDIT SUISSE

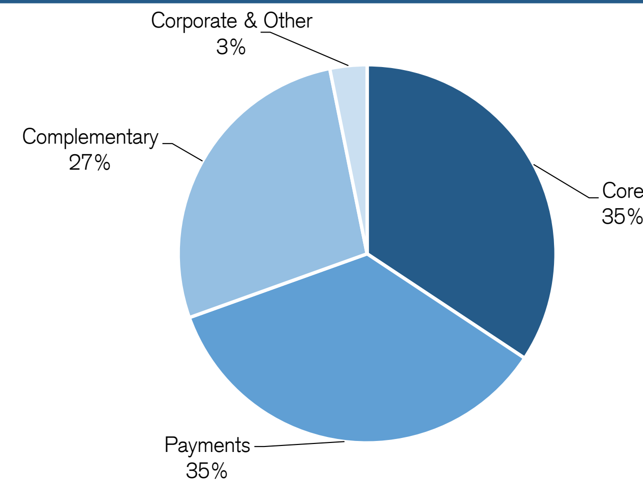
Source: Company reports, FactSet, Credit Suisse estimates

Jack Henry & Associates (JKHY)

High-quality business with secular & idiosyncratic growth drivers

- Second largest market share and the fastest-growing core processor among the big three (FIS & FISV) in the US bank IT market, an industry guarded by significant barriers to entry.
- Highly resilient financial model with ~85%+ recurring revenue from LT contracts enabled by sticky relationship with customers (~1-2% of banks switch core providers per year).
- Longer term, we are mindful of the potential accelerating consolidation among JKHY's small community bank customer base and the competitiveness of Neobanks pressuring incremental account additions and transactions for core providers.

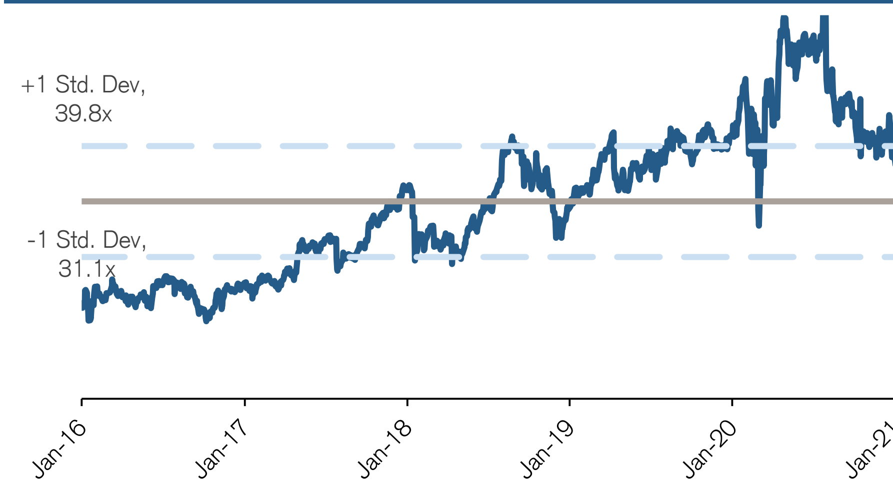
FY2020A revenue mix with three product level segments: Core, Payments, and Complementary Solutions



All three product level segments are projected to generate mid to high single digit revenue growth over the next few years

	FY2020A	F1Q21A	F2Q21E	F3Q21E	F4Q21E	FY2021E	FY2022E	FY2023E
Core (reported)	**582**	**159**	**141**	**147**	**152**	**600**	**648**	**685**
Core (Organic)	556	157	140	144	149	590	628	665
YoY organic	*7%*	*5%*	*4%*	*6%*	*9%*	*6%*	*6%*	*6%*
2-year	*13%*	*15%*	*10%*	*13%*	*13%*	*13%*	*12%*	*12%*
Payments	**598**	**157**	**159**	**156**	**159**	**630**	**679**	**729**
Payments (Organic)	582	155	158	154	157	624	669	719
YoY organic	*8%*	*7%*	*6%*	*7%*	*9%*	*7%*	*7%*	*8%*
2-year	*17%*	*17%*	*16%*	*15%*	*12%*	*15%*	*14%*	*15%*
Complementary	**463**	**124**	**119**	**121**	**123**	**488**	**520**	**556**
Complementary (Organic)	442	123	118	120	122	483	516	552
YoY organic	*8%*	*7%*	*6%*	*6%*	*9%*	*7%*	*7%*	*7%*
2-year	*14%*	*15%*	*14%*	*17%*	*15%*	*15%*	*14%*	*14%*
Corporate & Other	**54**	**12**	**12**	**14**	**10**	**47**	**49**	**50**
Total net revenue	**1,697**	**452**	**432**	**438**	**444**	**1,765**	**1,895**	**2,020**
YoY	*9%*	*3%*	*3%*	*2%*	*8%*	*4%*	*7%*	*7%*
2-year	*15%*	*15%*	*12%*	*15%*	*12%*	*13%*	*11%*	*14%*

Valuation history on P/E, benefiting during COVID-19 given stability of a largely B2B-driven business model



Source: Company reports, FactSet, Credit Suisse estimates

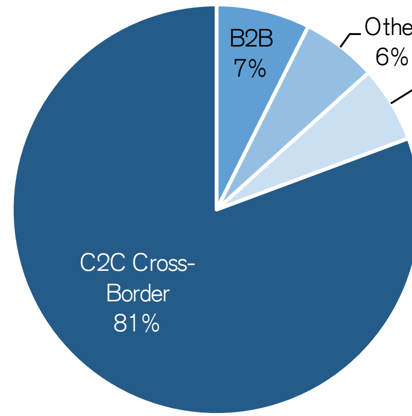
CS Rating	UNDERPERFORM
CS Target Price	$22

Western Union (WU)

Hard-to-replicate network, but slow growth and competition

- Continued competitive pressures from incumbents & FinTechs and declining US domestic C2C (~6% of revenue).
- Strong digital transaction growth, showing resilience during COVID, albeit partially fueled by lower RTP white-label partnerships (facing tougher comps on scaling white-label business in 2021).
- Discrete cost saves detailed in the 2019 Investor Day lay out a path to ~23% Non-GAAP operating margin, beneficial to a business that has limited operating leverage due to a highly variable cost structure paired with significant infrastructure and compliance spend.

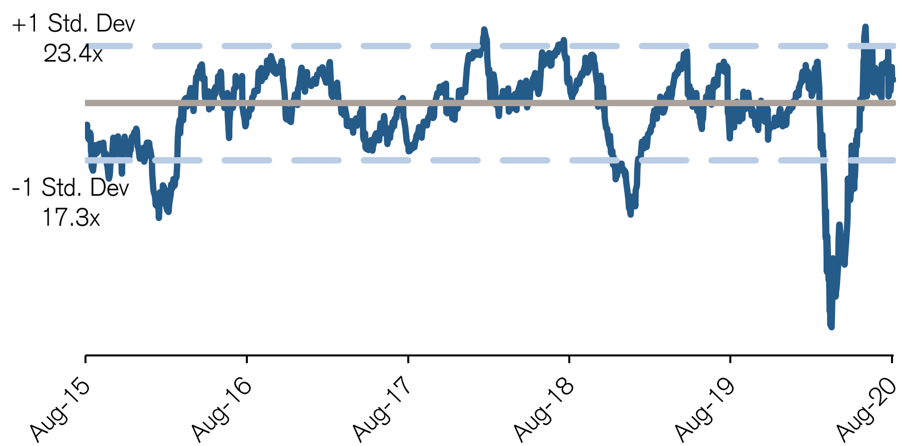
Western Union receives ~80% of revenue via the core C2C business, while the C2C segment makes up a single-digit component (2020E)



We parse out Western Union's 2-year organic, ex-FX, ex-Argentina inflation benefit

	2019E	1Q20	2Q20	3Q20E	4Q20E	2020E	2021E	2022E
Total revenue	**5,292**	**1,190**	**1,115**	**1,259**	**1,251**	**4,814**	**5,040**	**5,087**
YoY	(5%)	*(11%)*	*(17%)*	*(4%)*	*(4%)*	*(9%)*	*5%*	*1%*
YoY FX Neutral	(1%)	*(7%)*	*(13%)*	*(1%)*	*(3%)*	*(6%)*	*5%*	*1%*
YoY organic	(1%)	*(4%)*	*(14%)*	*(4%)*	*(4%)*	*(7%)*	*5%*	*1%*
YoY organic ex-FX	***3%***	***(1%)***	***(11%)***	***(1%)***	***(3%)***	***(4%)***	***5%***	***1%***
2-year organic ex-FX	*6%*	*1%*	*(7%)*	*3%*	*0%*	*(1%)*	*1%*	*5%*
Argentina Inflation benefit	*2%*	*1%*	*0%*	*1%*	*0%*	*0%*	*0%*	*0%*
YoY organic FXN ex-Argentina benefit	***1%***	***(2%)***	***(11%)***	***(2%)***	***(3%)***	***(4%)***	***5%***	***1%***
2-year FX neutral ex-Argentina benefit	*4%*	*(2%)*	*(9%)*	*0%*	*(1%)*	*(3%)*	*0%*	*5%*
Revenue per transaction ex-FX	*$15.58*	*$15.39*	*$14.63*	*$14.46*	*$14.19*	*$14.64*	*$13.87*	*$13.32*
Take Rate ex-FX	*5.03%*	*4.92%*	*4.45%*	*4.14%*	*4.50%*	*4.48%*	*4.41%*	*4.27%*

Western Union benefited from multiple expansion in 2019 following the announcement of its cost-savings initiative and 3-year targets



Source: Company reports, FactSet, Credit Suisse estimates

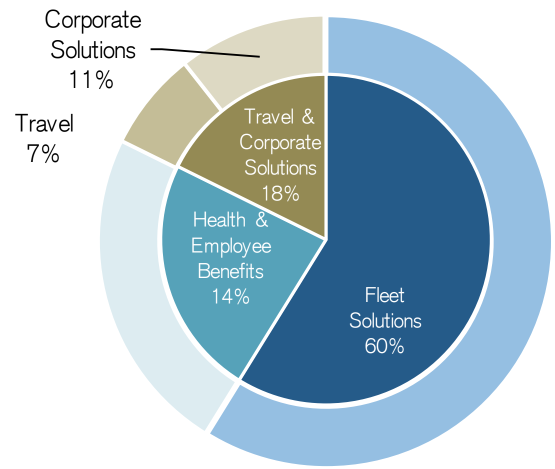
CS Rating	NEUTRAL
CS Target Price	$205

WEX (WEX)

Exposed to attractive FinTech end markets

- Positive on the underlying businesses and the longer term.
- While we are optimistic around an eventual recovery in COVID-impacted business units and the prospects for further accretive M&A ahead, we see a more balanced risk-reward given a combination of valuation, limited, visibility in travel, and a slower recovery in high-margin SMB Fleet customers.
- Higher relative fuel exposure at ~21% of 2019 revenue vs. FLT's ~13% (~19% in 9M 2020). Corporate Payments revenue surpassing ~10% of total (vs. ~20% for FleetCor).
- Recently closed eNett/Optal acquisitions removed an overhang and should be growth accretive longer-term.

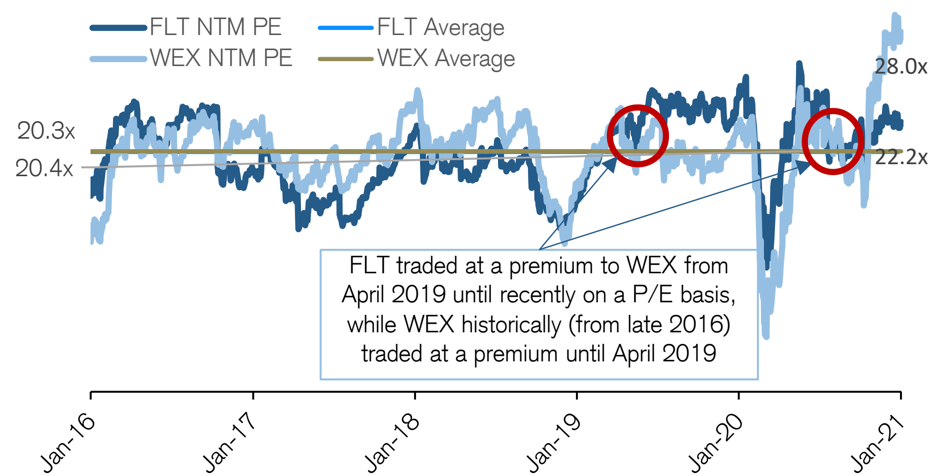
WEX business is heavier fuel (Fleet Solutions) and US vs. FleetCor, with Corporate Payments surpassing ~10% of revenue



For WEX, similar to FLT, we look at the 2-year organic, macro-neutral, growth (albeit greater emphasis on travel recovery in 2021)

	2019A	1Q20A	2Q20A	3Q20A	4Q20E	2020E	2021E	2022E
Total net revenue	**1,724**	**432**	**347**	**382**	**395**	**1,556**	**1,837**	**2,058**
YoY	*16%*	*14%*	*(21%)*	*(17%)*	*(13%)*	*(10%)*	*18%*	*12%*
Organic FXN (ex-FX, ex-Fuel, ex-M&A)	*10%*	*6%*	*(15%)*	*(15%)*	*(8%)*	*(8%)*	*17%*	*12%*
2-year Organic FXN	*23%*	*12%*	*(3%)*	*(3%)*	*4%*	*2%*	*9%*	*29%*
FX impact %	*(1%)*	*(1%)*	*(0%)*	*0%*	*(0%)*	*(0%)*	*0%*	*0%*
Fuel impact %	*(1%)*	*1%*	*(7%)*	*(2%)*	*(5%)*	*(3%)*	*1%*	*0%*
Inorganic %	*9%*	*8%*	*1%*	*0%*	*0%*	*2%*	*0%*	*0%*
Fleet solutions segment revenue	1,038	250	204	229	232	915	1,004	1,051
YoY	*6%*	*9%*	*(22%)*	*(18%)*	*(16%)*	*(12%)*	*10%*	*5%*
Organic FXN (ex-FX, ex-Fuel, ex-M&A)	*8%*	*6%*	*(13%)*	*(14%)*	*(8%)*	*(7%)*	*8%*	*5%*
2-year Organic ex-FX	*20%*	*10%*	*(0%)*	*(2%)*	*4%*	*1%*	*1%*	*13%*

FLT and WEX have swapped premiums over the past few years



Source: Company reports, FactSet, Credit Suisse estimates

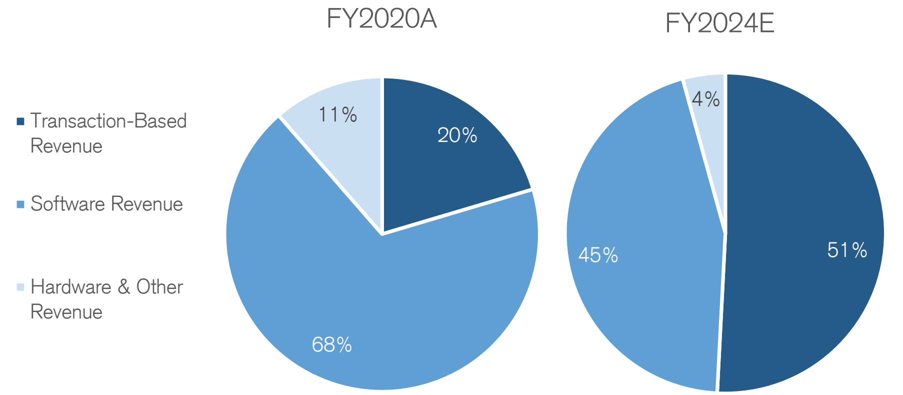
CS Rating	OUTPERFORM
CS Target Price	$70

Lightspeed POS (LSPD)

Operating at the intersection of software and financial services

- Levered to one of the most important themes within our coverage, the intersection of software + payments (and "beyond", including embedded a wider range of financial services), such as instant payouts, lending, card issuing, banking & treasury services, and much more.
- Capable of enabling complex merchants (large global TAM from ~8mm SMBs) to run their businesses (vs. horizontal offerings for less complex merchants).
- Continued penetration of Lightspeed Payments will be the key growth driver for revenue and gross profit given its higher net take rate vs. revenue share.
- Cloud-based POS gaining share on legacy solutions while offering ARPU upside from up-selling & cross-selling.

We expect transaction-based revenue to grow to roughly ~50% of total revenue by FY2024E as payments becomes increasingly important



Revenue Build – We expect the biggest revenue growth driver to be Lightspeed Payments' continued penetration of a growing GTV

	FY2020A	F1Q21A	F2Q21A	F3Q21E	F4Q21E	FY2021E	FY2022E	FY2023E
Gross Transaction Volume (GTV)	22,300	5,400	8,500	9,891	11,790	35,581	53,881	64,657
GTV - Lightspeed Payments	731	269	496	577	836	2,179	5,995	10,546
% total GTV	*3%*	*5%*	*6%*	*6%*	*7%*	*6%*	*11%*	*16%*
% card-based	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*
Gross take rate	2.55%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%	2.60%
Revenue - Lightspeed Payments	**14.0**	**5.3**	**9.7**	**11.3**	**16.3**	**42.5**	**116.9**	**205.7**
GTV - Revenue share	5,676	1,080	1,700	1,978	2,122	6,880	8,675	8,470
% total GTV	*25%*	*20%*	*20%*	*20%*	*18%*	*19%*	*16%*	*13%*
% card-based	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*	*75%*
Net take rate	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%	0.25%
Revenue - Revenue share	**10.6**	**2.0**	**3.2**	**3.7**	**4.0**	**12.9**	**16.3**	**15.9**
Customer locations (end of period)	76,500	77,000	80,000	114,180	115,740	115,740	126,157	138,772
Software monthly ARPU	109	113	120	118	117	122	129	146
Software revenue	**82.3**	**26.1**	**28.2**	**32.2**	**40.3**	**126.9**	**185.1**	**230.4**
Hardware and other revenue	13.8	2.8	4.4	4.5	4.7	16.5	21.7	24.9
Total revenue	**120.6**	**36.2**	**45.5**	**51.7**	**65.3**	**198.7**	**339.9**	**476.9**
Organic growth	*36%*	*36%*	*36%*	*36%*	*36%*	*36%*	*36%*	*36%*

Valuation history (EV/Sales on a NTM-basis) since IPO in Q1 2019

Source: Company reports, FactSet, Credit Suisse estimates

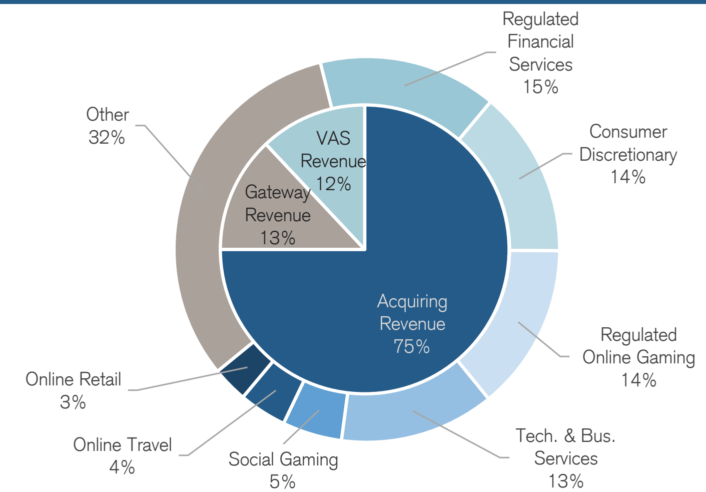
Nuvei (NVEI)

Attractively positioned for global digital payments tailwinds

CS Rating	OUTPERFORM
CS Target Price	$45

- Operates in relatively attractive swim lanes (~70% eCommerce/CNP volume mix), with exposure to niche verticals (e.g. online gambling, gaming, regulated FX trading) and a willingness to customize offerings.
- Part of a smaller group of companies with nearly global omnichannel capabilities: ~35 local acquiring markets of its own (and acquiring partners outside these markets) and acceptance of 450+ Alternative Payment Methods.
- Transformative SafeCharge acquisition followed by additional accretive M&A (identified ~4 targets with ~$40mm in EBITDA including the recent acquisition of Base Commerce).

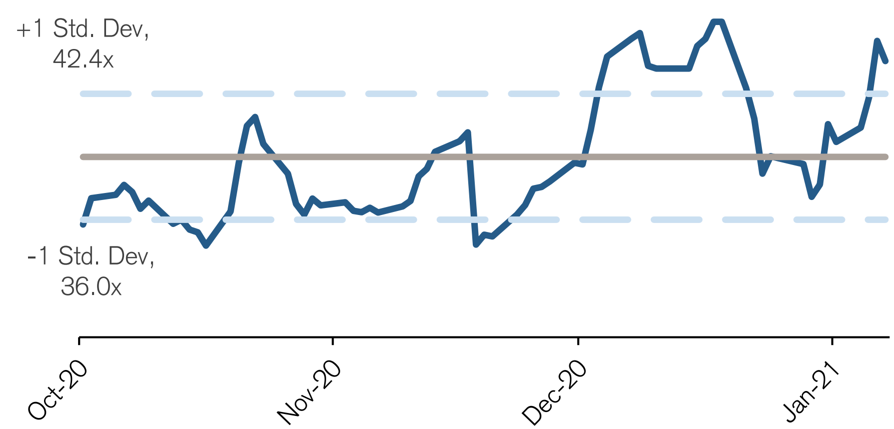
Majority of NVEI's 2020E net revenue mix (center) is from acquiring, with top four verticals accounting for over half of gross profit mix



High-teens volume growth over the medium term (and faster near term) with upside potential via additional accretive M&A

	2019A	1Q20A	2Q20A	3Q20A	4Q20E	2020E	2021E	2022E
Reported Payments Volume	**24,280**	**8,820**	**8,894**	**11,500**	**11,885**	**41,099**	**50,535**	**58,527**
YoY	*77%*	*118%*	*107%*	*62%*	*35%*	*69%*	*23%*	*16%*
YoY organic	*22%*	*-3%*	*-12%*	*30%*	*32%*	*18%*	*20%*	*16%*
Inorganic volume	7,521	4,883	5,120	2,302	218	12,524	1,305	-
Contribution to growth	*55%*	*121%*	*119%*	*32%*	*2%*	*52%*	*3%*	*0%*
Pro Forma Volume (incl. SafeCharge)	33,968	8,820	8,894	11,500	11,885	41,099	50,535	58,527
Total Revenue	**246**	**83**	**83**	**94**	**100**	**359**	**459**	**541**
YoY	*64%*	*83%*	*64%*	*32%*	*26%*	*46%*	*28%*	*18%*
YoY organic	*0%*	*6%*	*-9%*	*9%*	*19%*	*8%*	*20%*	*18%*
Total take rate	*1.01%*	*0.94%*	*0.93%*	*0.81%*	*0.84%*	*0.87%*	*0.91%*	*0.93%*
YoY bps	*(8 bps)*	*(18 bps)*	*(24 bps)*	*(18 bps)*	*(6 bps)*	*(14 bps)*	*3 bps*	*2 bps*

Valuation history (EV/EBITDA on a NTM-basis) since IPO in Q3 2020



CREDIT SUISSE Source: Company reports, FactSet, Credit Suisse estimates

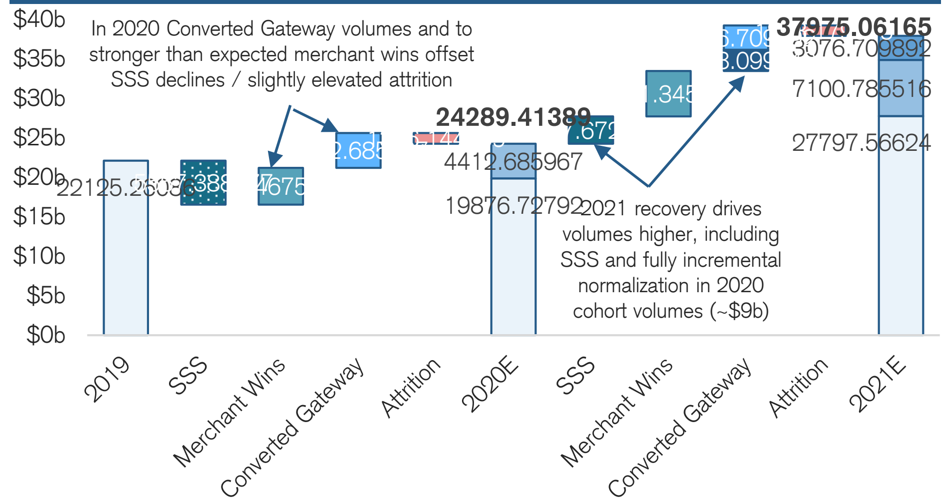
Shift4 Payments (FOUR)

Integrated payments pure play with idiosyncratic drivers

CS Rating	OUTPERFORM
CS Target Price	$66

- FOUR has historically displayed its ability to do strategic M&A unlocking value (i.e., Merchant Link, Shift4 Corporation, Future POS, and more). We believe it could return to M&A in 2021 (recently raised additional capital) and see the possibility for international expansion.
- Two-pronged growth algorithm driven by ~$185b (2019A) gateway volume conversion opportunity and ~900-1000bps margin expansion (with a portion already realized in 2020 via acquisition cost synergies).
- An integrated payments pure-play – where SSS growth is not a part of the growth algorithm (due to end market exposure to restaurant, hotel/hospitality, and retail verticals) – and outside of gateway conversion, the remainder of growth is driven by organic share gains.
- November 2020 acquisition of 3dcart (online marketplace platform) offers upside in providing omnichannel payments for SMBs.

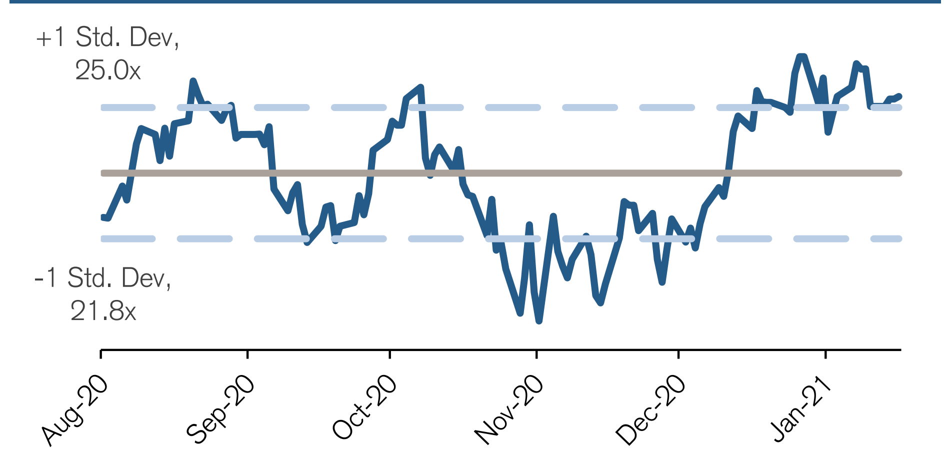
Our volume bridge shows the recovery of 2021E gateway volumes give an incremental boost in addition to that year's gateway conversion cohort



Gateway conversion to drive a significant portion of E2E volume growth, corresponding mix shift to large merchants drags net take rate

	2019A	1Q20A	2Q20A	3Q20E	4Q20E	2020E	2021E	2022E
End-to-end payment volumes	**22,125**	**6,146**	**4,240**	**7,091**	**7,124**	**24,601**	**38,425**	**55,139**
YoY	37%	*32%*	*(23%)*	*20%*	*18%*	*11%*	*56%*	*43%*
Organic Volume Growth	37%	*13%*	*(36%)*	*(6%)*	*(3%)*	*(9%)*	*32%*	*20%*
2-year organic volume	-	*53%*	*3%*	*28%*	*33%*	*28%*	*23%*	*52%*
Gateway conversion volume - incremental	-	*860*	*721*	*1,560*	*1,271*	*4,413*	*4,707*	*5,606*
Inorganic Gateway Conversion Volume growth	*0%*	*18%*	*13%*	*26%*	*21%*	*20%*	*19%*	*15%*
Penetration of Gateway Volume Opportunity	-	*860*	*721*	*1,560*	*1,271*	*4,413*	*10,365*	*19,326*
Penetration of Gateway Volume Opportunity	0%	*2%*	*3%*	*4%*	*5%*	*3%*	*7%*	*11%*
Penetration of Ex-Enterprise Gateway Opp	0%	*4%*	*6%*	*8%*	*9%*	*6%*	*12%*	*20%*
Net E2E Payments Revenue	**173**	**44**	**38**	**57**	**55**	**194**	**255**	**354**
YoY	22%	*20%*	*(15%)*	*25%*	*21%*	*12%*	*31%*	*39%*
Take Rate	0.78%	*0.72%*	*0.91%*	*0.80%*	*0.77%*	*0.79%*	*0.66%*	*0.64%*
YoY bps	*(10 bps)*	*(7 bps)*	*8 bps*	*3 bps*	*2 bps*	*1 bps*	*(13 bps)*	*(2 bps)*

Valuation history (EV/EBITDA on a NTM-basis) since Q3 2020 (IPO in June 2020)



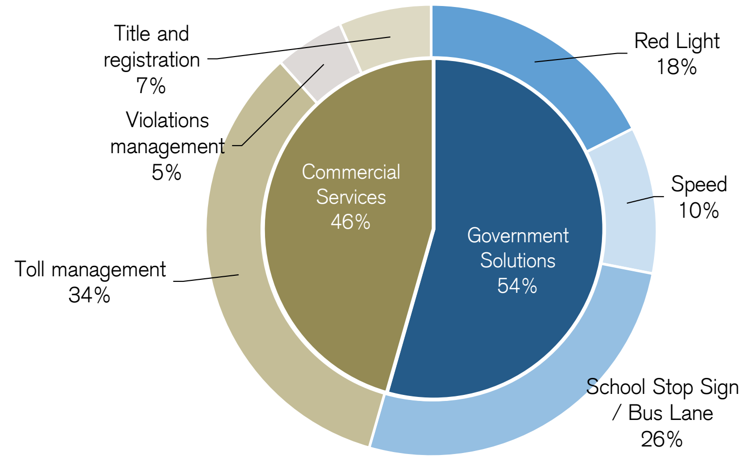
Source: Company reports, FactSet, Credit Suisse estimates

CS Rating	OUTPERFORM
CS Target Price	$14

Verra Mobility (VRRM)
Leader in tolling payments & traffic safety solutions

- Share leader in both segments, and we expect sustained mid-single-digit+ growth (in-line with medium-term guidance of Government +2-4%, Commercial +6-8%, with a boost via M&A, Europe, and new initiatives).
- We view positively the agreement to acquire competitor RDF (photo enforcement provider), which expands VRRM to AUS and EU, with both expected cost and revenue synergies.
- We are optimistic on the European expansion (~$350mm TAM), given initial agreements (tolling authorities, rental car companies) and relationships with US Rental Car Companies (existing customers) compose 40%+ of the market.

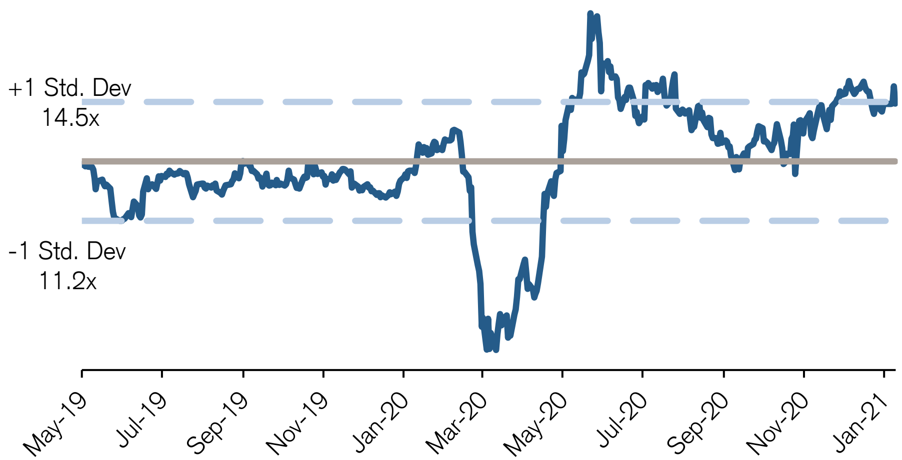
Mix roughly ~60/40 for Commercial vs. Government (~55/45 in COVID impacted 2020), and it is the undisputed share leader in both



We discretely model components of Government Solutions given numerous moving parts (NYC schools, Miami and Texas red light, etc.)

Government Solutions segment	2018A	2019E	2020E	2021E	2022E	2023E
Red light	76	68	61	60	58	57
Reported YoY	*2%*	*(10%)*	*(11%)*	*(2%)*	*(2%)*	*(2%)*
Discrete contract impacts (bps)	*-271 bps*	*-768 bps*	*-880 bps*	*0 bps*	*0 bps*	*0 bps*
Speed (school, city)	36	41	70	88	95	101
Reported YoY	*4%*	*15%*	*71%*	*25%*	*9%*	*6%*
Discrete contract impacts - NYC (bps)	*-*	*1360 bps*	*7627 bps*	*1946 bps*	*256 bps*	*288 bps*
YoY ex-discrete impacts	*4%*	*1%*	*(5%)*	*6%*	*6%*	*3%*
Other (school stop, bus lane)	31	34	21	31	34	37
Reported YoY	*9%*	*10%*	*(39%)*	*45%*	*12%*	*7%*
Total segment revenue (ex-product)	**142**	**140**	**152**	**178**	**188**	**195**
Reported YoY	*4%*	*(2%)*	*8%*	*17%*	*6%*	*4%*
Implied underlying organic YoY	*5%*	*(3%)*	*(17%)*	*14%*	*9%*	*5%*
Total discrete contact impacts (bps)	*-146 bps*	*-22 bps*	*1673 bps*	*1104 bps*	*167 bps*	*184 bps*

Valuation history (EV/EBITDA on a NTM-basis) since SPAC merger in March 2019 (post the acquisition of HTA, largest competitor, in 2018)



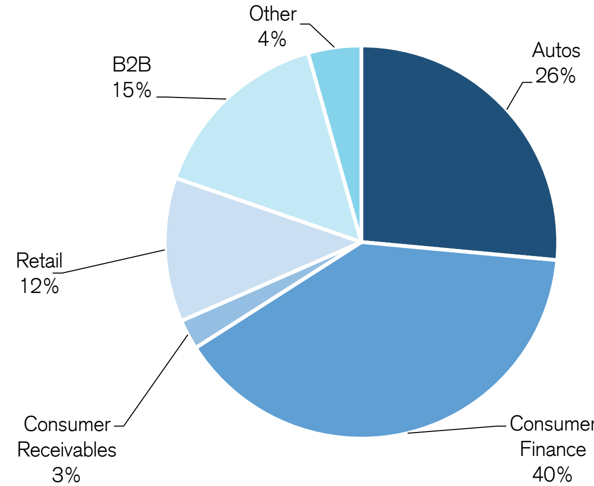
CS Rating	**OUTPERFORM**
CS Target Price	**$28**

Repay (RPAY)

Integrated Payments in niche verticals, and expanding beyond

- We expect further debit card penetration of existing verticals, entry into new verticals (B2B, Healthcare, Mortgage), new merchants & ISV partners to drive organic growth.
- Further upside potential exists in captive auto finance arms (i.e. Mercedes Benz FS US), representing a move upmarket to more prime borrowers (although lower take rates).
- Benefits from scale and processing cost leverage (in part due to TriSource acquisition, insourcing prior back-end partner); expect gross margin expansion with flattish EBITDA margins.
- Valuation reasonable for a ~mid- to high-teens top-line grower with a continued boost from M&A.

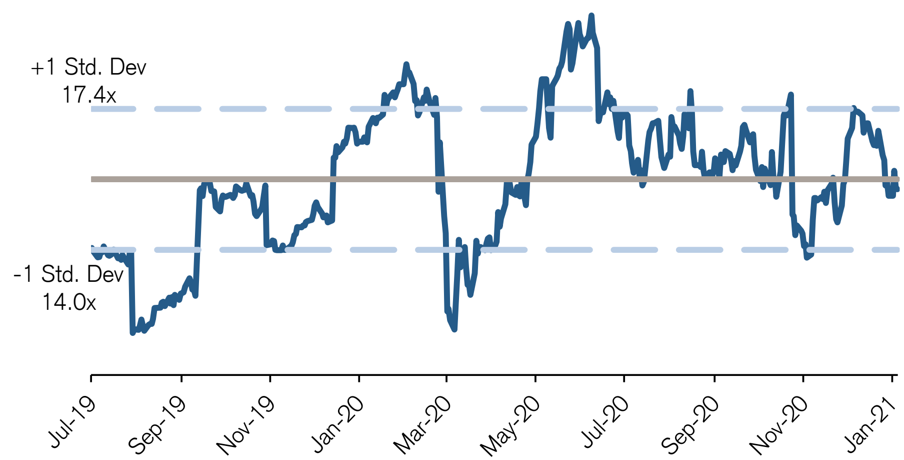
Repay's card volumes are most heavily weighted toward personal loans (consumer finance), with auto loans the 2nd largest component



Repay organic 2-year card payment volume build – we model organic growth in the high teens, plus ~3,000bps of inorganic contributions

	2019A	1Q20A	2Q20E	3Q20E	4Q20E	2020E	2021E	2022E
Card payment volume ($)	10,697	3,849	3,613	3,766	3,868	15,096	18,597	21,759
QoQ	-	*12%*	*(6%)*	*4%*	*3%*	-	-	-
YoY	*44%*	*58%*	*63%*	*44%*	*13%*	*41%*	*23%*	*17%*
Inorganic Volume growth	*21%*	*42%*	*40%*	*36%*	*9%*	*30%*	*9%*	-
Organic Volume growth	*23%*	*16%*	*23%*	*7%*	*4%*	*11%*	*15%*	*17%*
2-year organic volume	*43%*	*36%*	*50%*	*30%*	*25%*	*34%*	*26%*	*32%*
Inorganic Volume	1,559	1,025	885	953	309	3,172	1,301	-
Inorganic Volume growth	*21%*	*42%*	*40%*	*36%*	*9%*	*30%*	*9%*	-

Valuation history (EV/EBITDA on a NTM-basis) since SPAC merger in Q3 2019 (attractive vs. expectations for mid-high teens topline + M&A)

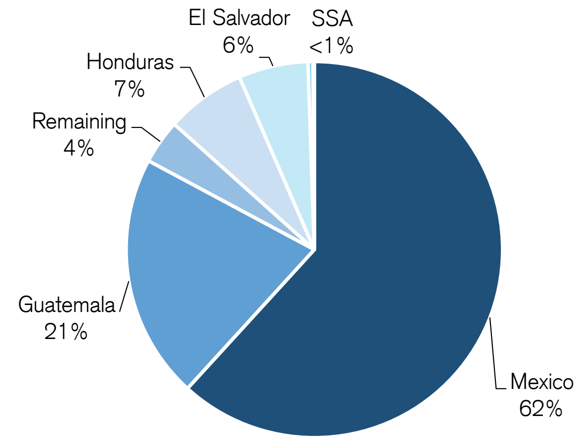


Source: Company reports, FactSet, Credit Suisse estimates

International Money Express (IMXI)
Focused money remittance provider

- Operates within a large addressable market and is a share gainer within that opportunity (high-quality tech, targeted geographical focus).
- Numerous nascent initiatives in motion (Africa inbound, Canada outbound, white-labeling with Latin American banks, general purpose reloadable [GPR] card) to support growth.
- Approach punctuated by purposefully targeted corridors (i.e. US-MEX the largest in the world, also very profitable), purposefully targeted send locations (i.e. certain states, cities, etc. within the US), with optionality in expansion to other high traffic corridors in the wings (i.e. US-Nigeria).

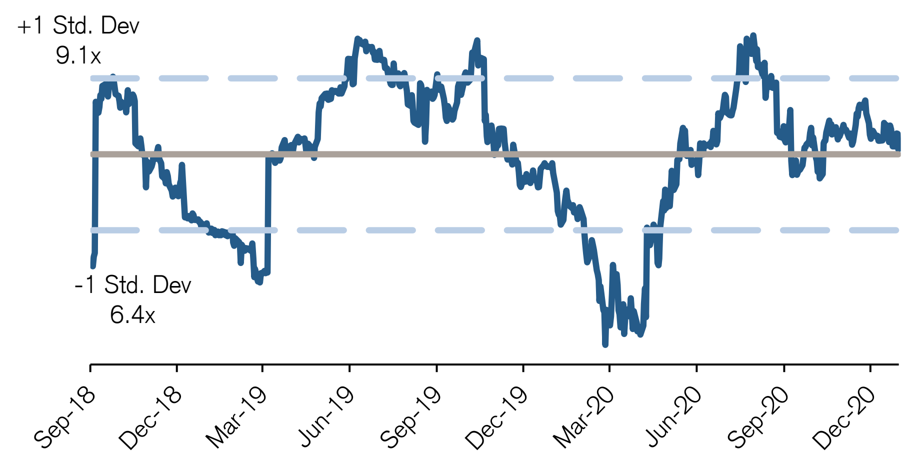
Intermex sources ~2/3rds of its volume (2020E) via the US-into-Mexico corridor (maintains #2 share in largest remittance corridor in the world)



Intermex remittance volume build – we model continued share gains in its two biggest remittance corridors (US-Mexico, US-Guatemala)

	2017	2018	2019	2020E	2021E
US -> Mexico Inbound Volume ($b)	$ 29	$ 32	$ 35	$ 41	$ 43
Growth		*11%*	*8%*	*16%*	*5%*
IMXI share	15%	17%	18%	18%	18%
IMXI Mexico Volume	4,321	5,617	6,270	7,291	7,798
Growth	-	*30%*	*12%*	*16%*	*7%*
Incremental share	***38%***	***41%***	***26%***	***18%***	***25%***
% of IMXI volume	*63%*	*63%*	*60%*	*62%*	*66%*
US -> Guatemala Inbound Volume	7.4	8.4	9.5	9.7	10.9
Growth		*13%*	*13%*	*2%*	*12%*
IMXI share	22%	24%	25%	26%	26%
IMXI Guatemala Volume	1,601	2,016	2,414	2,485	2,812
Growth	-	*26%*	*20%*	*3%*	*13%*
Incremental share	***41%***	***42%***	***36%***	***31%***	***28%***
% of IMXI volume	*23%*	*23%*	*23%*	*21%*	*24%*

Valuation history (EV/EBITDA on a NTM-basis) since SPAC merger in Q3 2018 (trading at a low absolute level, and more so vs. growth)



Payments & Payments-related FinTech private company map

US-focused mapping, including select global/regional platforms

- $30b in global VC-backed FinTech investments during Q1-Q3 2020; $42b in 2019 and $153b over 2015-19

Merchant Acquiring/Service Providers

PayFac Enablement
Amaryllis, Finix Payments, Infinicept, Payrix

Other
AuthVia, Emergent, Flow, Flutterwave, MagicCube, PPRO, Rapyd, ReCharge Payments, Text2Pay

iPOS
Appetize, CitiXsys, Pine Labs (India), Revel, SumUp, Toast, TouchBistro, Veloce POS (CAN), Vend, Verifone

ISO/Acquirers/PSPs/Gateways
Billing Tree, BillDesk, BlueSnap, Checkout.com, Clearent, Fast, Fattmerchant, Forter, FreedomPay, Gravity Payments, Mollie, NETS, NMI, Paragon Payments, PayNearMe, Pineapple Payments, Primer (UK), Priority Payment, Razorpay (India), RealPage, Riskified, Silverflow, SpotOn, Stripe, Tidal Commerce, Titanium Payments, Tribe, Yapstone, Zelis Payments

Bank IT

Core Processors
Alkami, CoreCard, Correlation, Finastra, Finxact, Mambu, Moov, Neocova, NYMBUS, Thought Machine

BaaS
11:FS Foundry, Avaloq, Bankable, Cambr, ClearBank, Conductor (Brazil), Deposit Solutions, Fidor Bank, Railsbank, solarisBank, Starling Bank, Synctera, Treezor

Additional Services
Allied Payment Network, 100credit (China), Apiture, Ascent, Ascent, Atomic FI, Backbase, Blend, Bond, BondLink, Carta, Chainalysis, ClearSale, Episode Six, FDATA Global, Fisoc, Hydrogen Platform, Kard Financial, Midaxo, Mistral Mobile, Nova Credit, Symphony, Synapse, Thought Machine, Treasury Prime, Trumid, Unqork, Vesta

Neo / Challenger Banks

Consumer Digital Banking

Europe: Atom Bank (UK), Curve (UK), Monese (UK), Monzo (UK), N26 (GER), Numbrs (CHE), Raisin (GER), Revolut (UK), Starling Bank (UK)

US: Aspiration, booyah!, Chime, cred.ai, Current, Dave, GoBank, Greenlight, Lili, MoneyLion, Oxygen, Simple, Stash, TrustFund, Varo Money, Zenus

ROW: :86 400 (AUS), Albo (MEX), Douugh (AUS), Klar (MEX), Mozper (MEX), NuBank (Brazil), OlaMoney (India), Ualá (ARG), Volt Bank (AUS), WeLab (HK), Xinja (AUS)

Digital Lending

SMB Lending / Banking
BlueVine, C2FO, CGTZ (China), Forward Financing, FundBox, FundingOptions, Greensill, Joust, Judo Bank, Loan Builder, Neptune Financial, OakNorth, On Deck Capital, Payability

Alternative Consumer Lending

Europe: Habito, Kreditech

ROW: Credit Culture (SG), Creditas (Brazil), Simpl (India)

US: Avant, Better Mortgage, Clara, College Ave, CommonBond, Credible, Earnest, Elevate, Fair, Figure, Happy Money, LendingHome, Marlette (Best Egg), Payoff, Petal, Prosper, Tala, Unison, Upgrade, Upstart

BNPL
Hoolah, ChargeAfter, Klarna, Laybuy

Other
Built Technologies, Roofstock

Remittances
NIUM (formerly InstaRem), Paysend, Remitly, Transferwise, World Remit

C2B & P2P
Dwolla, Early Warning (Zelle), Funding Circle, Ovo, PayQwick, Plastiq, Toss (Korea), Trustly, Verse (Europe)

Cryptocurrency (wallets, payments)
Binance, BitPay, Blockchain, Circle, Coinbase, Dash, Kraken, Liquid

Connectivity / Payments APIs
Button, Finlync, Mobeewave, Plaid, Trovata.io, Tink, Token, TrueLayer, Yapily, Yodlee

Networks
Faster Payments (UK), RTP (The Clearning House), RuPay (India), Smartlink, UnionPay (China)

Issuer Processing
Extend, Glopal Processing Services, i2c, InComm, Marqeta, Stripe Issuing, VPay

Personal Finances
Acorns, Addepar, Albert, Alex.fyi, Betterment, Deserve, Digit, DriveWealth, Ellevest, Ibotta, M1 Finance, Moven, Personal Capital, Petal, PolicyBazaar, Propel, Robinhood, Stakin', Stash, Vestwell, Wealthfront, Wealthsimple (CAN), Weatlhfront, YieldStreet

Super Apps & Diversified FinTech
Ant Group, Go-Jek, Grab, Paytm, Rappi

B2B Payments

AP / AR
AvidXchange, HighRadius, MineralTree, Modulr, Paystand, Tipalti, YayPay, Tradeshift, Ivalua

Corp. cards & Exp. Mgmt.
Brex, Divvy, Expensify, Radius Payment, Tide

Payroll
BambooHR, Gusto, Justworks, Kickfin, PayActiv, Zenefits

Instant Payments
Ingo Money, Earnin, PayFi

Cross-Border
Airwallex, CurrencyCloud, dLocal, EBANX, Flywire, Payoneer, Ping-Pong, RTGS.global, Ripple, Veem

The Credit Suisse Payments, Processors, & FinTech Top 40 Industry Themes

40 topics we expect to be top of mind for investors and industry participants

Global eCommerce & Software-led Payments

1. Global eCommerce as a key source of growth
2. Global eCommerce (and omnichannel) acquiring platforms
3. Secure Remote Commerce (SRC)
4. Checkout buttons/digital wallets
5. Increasing complexity in global eComm/Omnichannel
6. Fraud & chargebacks on card-based transactions
7. SaaS platform monetization of payments & financial services
8. Further rationale for software-enabled payments

NextGen FinTech Ecosystems

9. Continued consolidation and scaling of platforms
10. Open Banking expands to Open Finance
11. BigTech in FinTech, highlighting Apple's FinTech efforts
12. Unbanked and Underbanked opportunity for US FinTechs
13. P2P as a customer acquisition and engagement tool
14. Global remittance market innovation
15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings
16. FinTech-driven credit for merchants (micro & SMB lending)
17. Neobanks gaining scale

Drivers of Cash-to-Card Conversion

18. "Push-to-card" payments unlocking new payment flows
19. Contactless payments
20. Loyalty & rewards becoming easier to spend
21. Long runway for card penetration in both EM & DM markets
22. Cross-border payments volumes
23. COVID-19 as a forcing factor

B2B/Corporate Payments

24. B2B payments coming of age
25. Virtual cards in B2B Payments
26. Next leg of B2B payments puts SMB services in focus

Back-End Banking Innovation

27. "Faster payments" & "RTP" become more real
28. Issuer Processing key drivers and overview
29. Bank Tech key drivers and outlook
30. Modern Issuing Platforms

Regulation & Litigation

31. Two-Factor Authentication Implications
32. Trends in Global Payments Regulation
33. European Payments Regulation
34. US vs. International FinTech regulations and market dynamics
35. Industrial Loan Company (ILC) bank licenses for US FinTechs

Threats to Monitor for the Existing Ecosystem

36. Amazon's building blocks in Payments & FinTech
37. Alipay & WeChat expand acceptance beyond China
38. Cryptocurrency impact on the payments ecosystem
39. Emergence of modern platforms in EM
40. National payment schemes, alternatives to V and MA

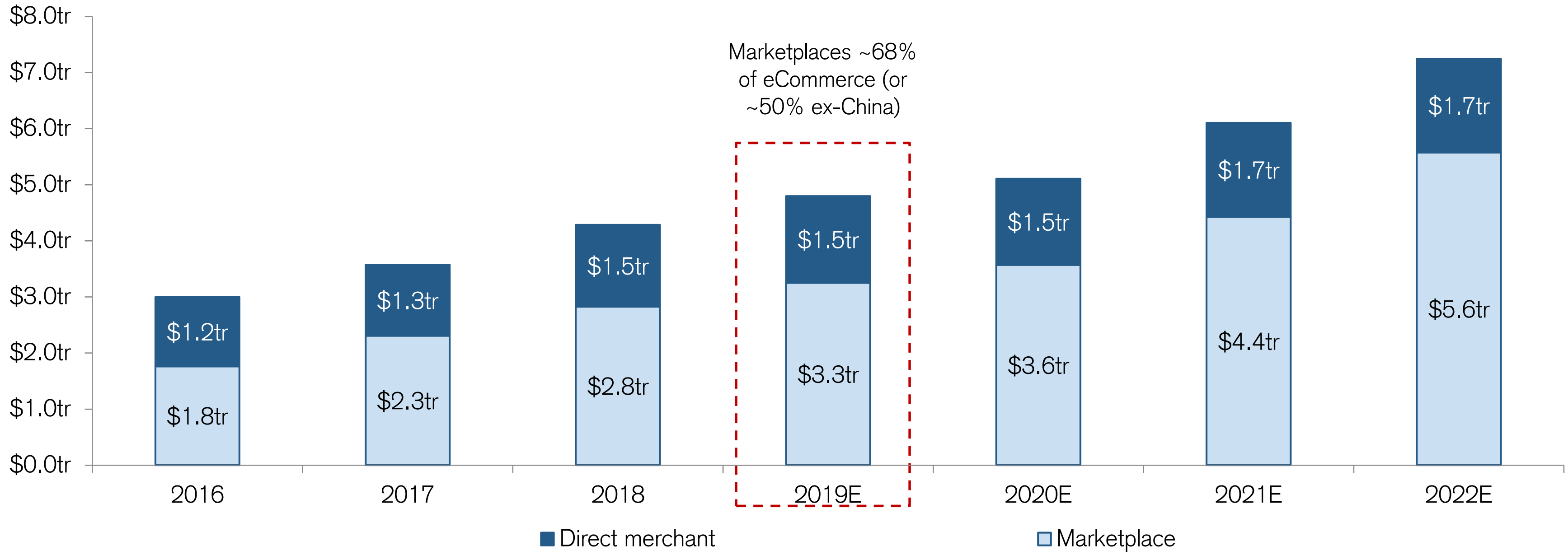
Global eCommerce & Software-led Payments

Return to Themes Table of Contents

1. Global eCommerce as a key source of growth
eCommerce a mid-high teens grower, Marketplaces even faster

- It is a fast-growing TAM overall, which (depending on the source and definition of what is in scope) generally suggests a ~$5tr global market growing ~mid-teens to high teens (vs. ~4-5% PCE).
- One way to segment eCommerce is Marketplace vs. Non-marketplace (direct merchant). When viewed in this manner, Marketplace eCommerce is a faster-growth sub-segment (high teens CAGR through 2022 vs. ~mid-teens for the "rest" of eCommerce); a further, even faster-growing sub-segment is cross-border eCommerce (addressed separately in this presentation).
- We note that China meaningfully skews these data given it makes up ~50% of global eCommerce and is dominated by Alibaba-owned marketplaces (Marketplaces make up ~68% of eCommerce including China, and we estimate Marketplaces make up ~50% of global eCommerce excluding China).

Global eCommerce is a ~$5tr global market, with Marketplaces-based eCommerce sales expected to be a key driver of total market growth (~19% CAGR 2018-2022 vs. direct merchant eCommerce growing more at a high-single-digit pace)

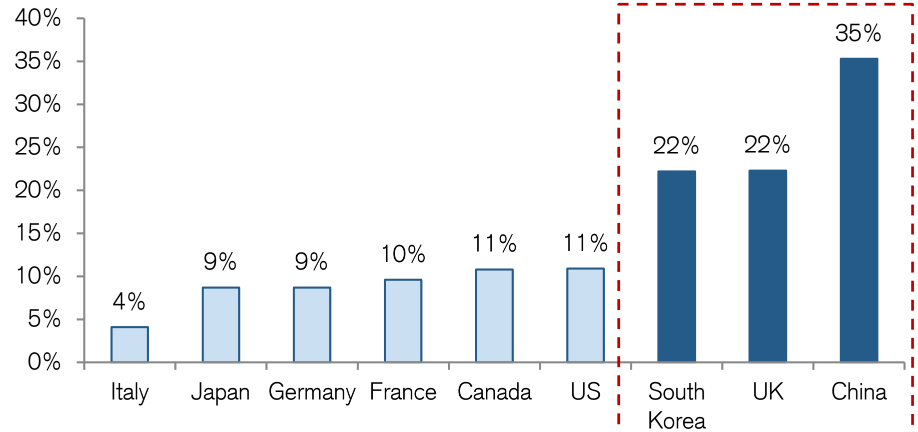


Source: Payoneer, eMarketer, Credit Suisse research

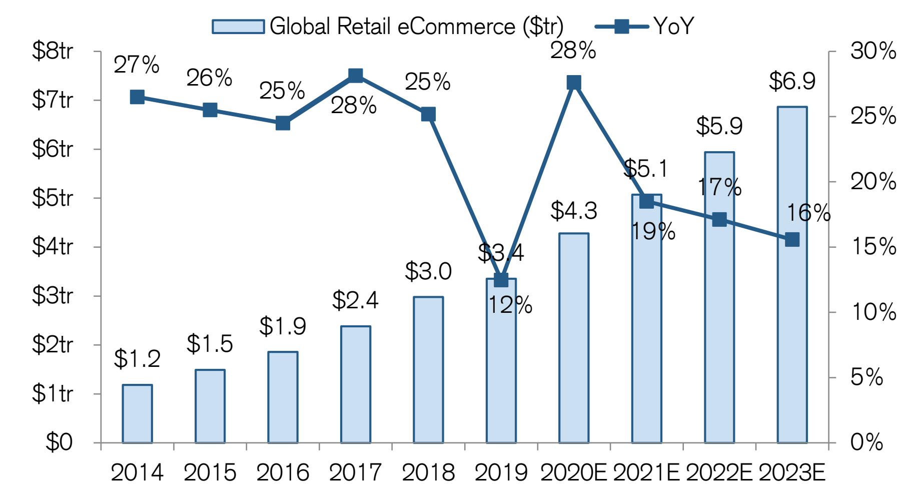
1. Global eCommerce as a key source of growth
Many large, developed markets still at just ~10-15% penetration

- The global retail eCommerce market was about $3.5tr in 2019, although $1.8tr of that is in China, a meaningful portion of which is considered less addressable to many payments platforms.
- In China, the majority of volumes are done through Alipay and WeChat closed-loop systems, particularly with Alibaba [Tmall and Taobao] and JD.com as the dominant marketplaces.
- Still low levels of eCommerce penetration in large developed markets (including the US), particularly when viewed vs. penetration levels that are 2-3x higher in South Korea, UK, and China, suggest stable growth ahead.
- A subset of drivers supportive of growth persistence include:
  1. Continued faster delivery times (supported by improvements in logistics infrastructure),
  2. Rising mobile penetration and conversion rates (supported by stored/tokenized credentials and eWallets), and
  3. Increasing availability of alternative payments methods (both for country-specific use cases and for the underbanked).

Numerous large, developed markets still at just ~10-15% penetration of retail sales, suggesting meaningful eCommerce runway remains



Global retail is approaching ~$4.3tr in annual volumes, growing at a mid- to high-teens pace (albeit bolstered by China)



Source: Company reports, eMarketer, Credit Suisse estimates, Top right chart 2019E

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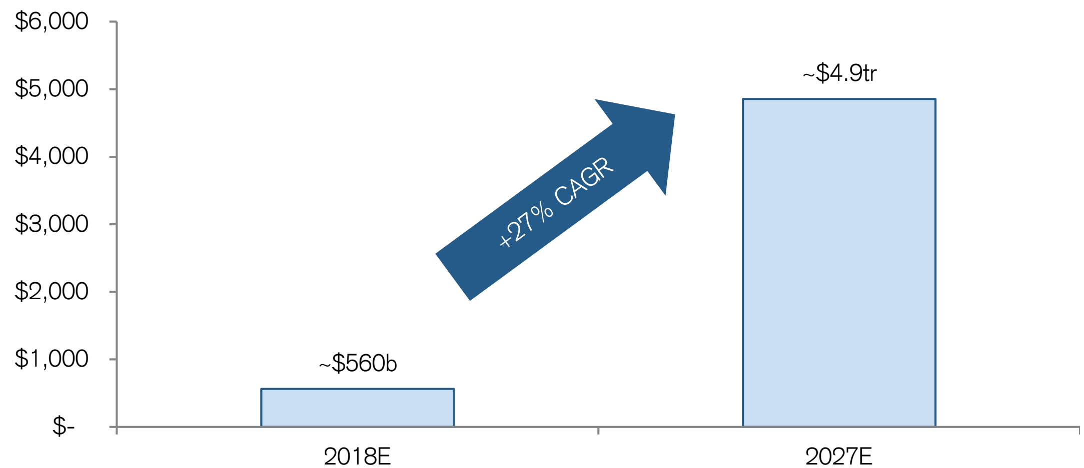
1. Global eCommerce as a key source of growth
Cross-border the fastest growing sub-segment of eCommerce

- Cross-border eCommerce is becoming an increasingly important component of the overall online commerce market and as a driver of cross-border payments volumes (cross-border eCommerce now makes up ~50% of [pre-COVID] cross-border card volumes for the networks vs. ~30% five years ago, with travel-related purchases comprising the remaining portion).

- Cross-border eCommerce growth: (1) Zion Market Research expects cross-border eCommerce to grow at a +27% CAGR 2018-2027E; (2) Forrester expects a +17% CAGR (vs. +12% for overall B2C eCommerce) and estimates cross-border eCommerce is ~20% of the market, with ~2/3rds of cross-border done via marketplaces; and (3) Worldpay had forecast ~25% CAGR 2015-2020 vs. ~16% CAGR for eCommerce overall.

- Reasons for the growth: (1) improved localization (language, look and feel); (2) more payments method choices; (3) means to gain access to goods not available in local markets; (4) means to benefit from lower priced goods; and (5) improved logistics.

Cross-border eCommerce is expected to grow 2x broader eCommerce (~mid-high 20%s vs. ~mid-teens for eCommerce overall), per Zion Market Research



Source: Zion Market Research, Forrester, Worldpay, Credit Suisse research

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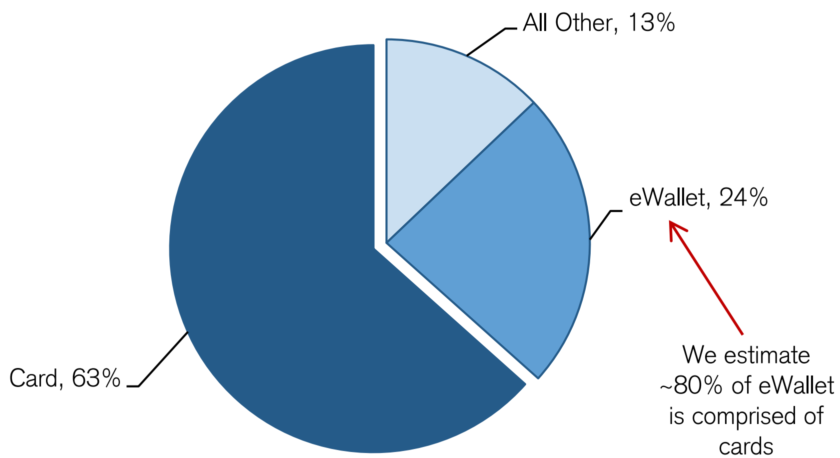
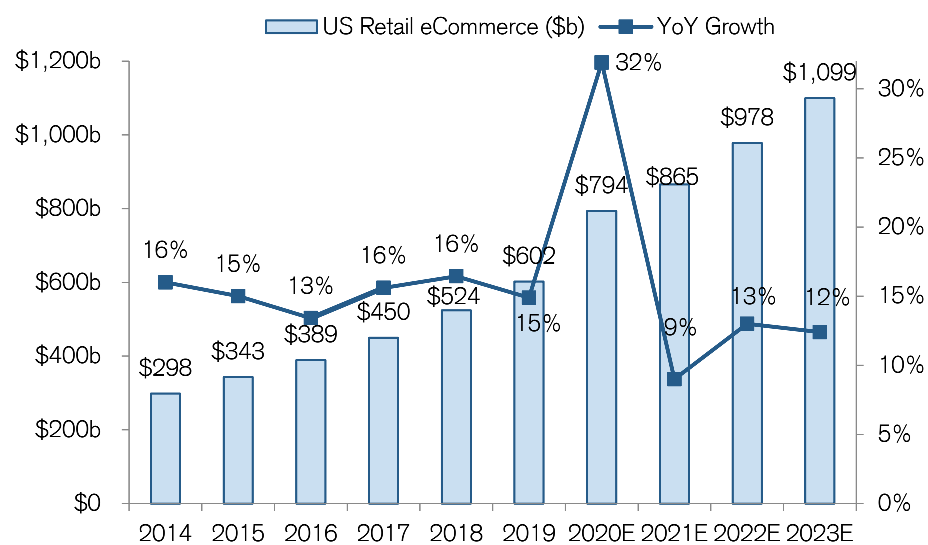
1. Global eCommerce as a key source of growth
US market focus – eComm still growing 3-4x faster vs. in-store

- US Retail eCommerce market is approaching ~$800b and has been growing roughly mid-teens on average (expected to continue at a similar pace).
- It represents a meaningful growth driver for Visa and Mastercard given card mix for eCommerce transactions is significantly higher vs. in-store in the US (~roughly 85% vs. ~50%).
- Card not present was ~40% of transactions for Mastercard in 2019 (50% in April 2020)
- Amazon US GMV for 2020E is roughly $285b, which implies Amazon makes up ~35% of the US Retail eCommerce market (but will make up roughly half of total growth on average from 2019-2023).

North American eCommerce payments by card were~60% of transactions (2019); when combined with eWallet transactions, it suggests card payments are a part of ~82% of eCommerce



US Retail eCommerce approaching~$800b as of 2020 but is projected to exceed ~$1tr by 2023 (growing at a ~mid-teens CAGR)



Source: eMarketer, Worldpay Global Payments Report, Credit Suisse research

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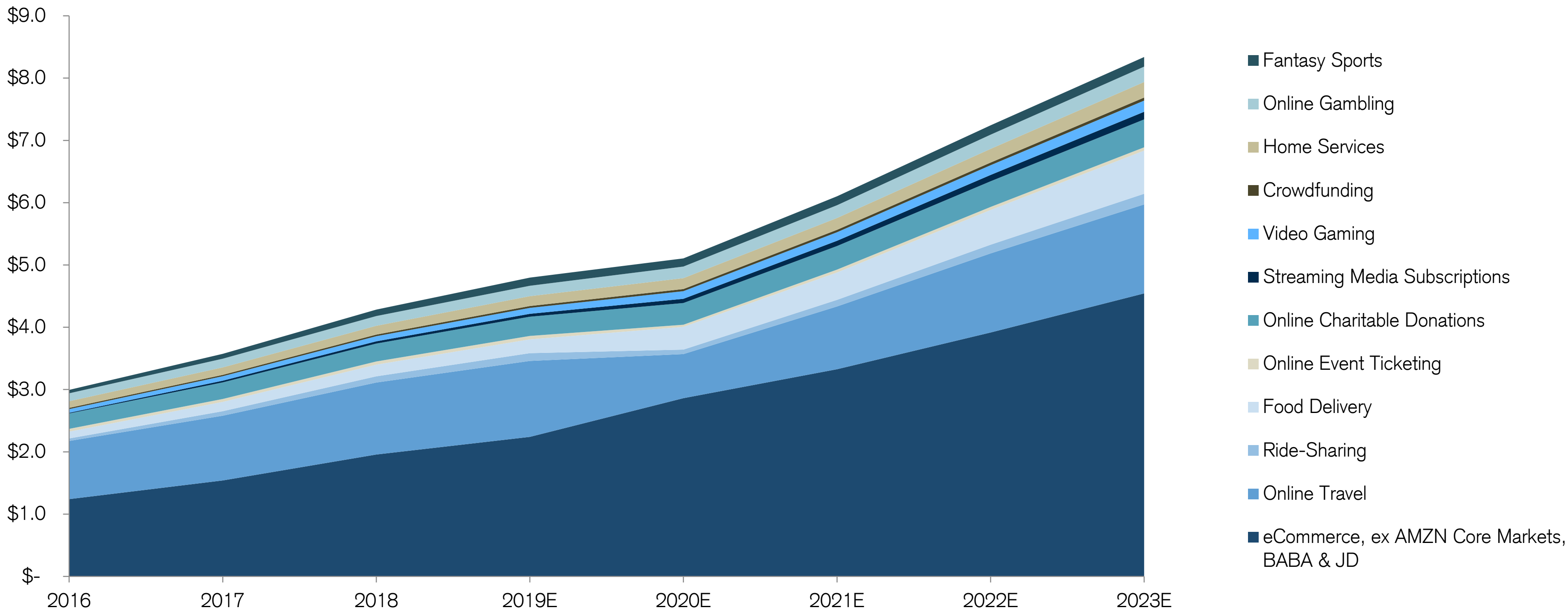
1. Global eCommerce as a key source of growth

"True TAM" for Global Online Acquirers

- Given various data sources include or exclude portions of "eCommerce", we constructed a "True TAM" that we estimate to be ~$5tr today, growing toward ~$8tr by 2023E.
- Our "True TAM" model is inclusive of global eCommerce, eTravel, eFood delivery, eTicketing, online charitable donations, ride-sharing, crowdfunding, gaming, & streaming subscriptions, online gambling, home services, fantasy sports (does not include Amazon core markets, bill-pay, Alibaba & JD.com).
- This adds up to confidence in the persistence of growth (often underappreciated in payments) and annual compounding.

We constructed a "True TAM" that we estimate to be ~$5tr today, growing toward ~$8tr by 2023E



 Source: Company data, eMarketer, Phocuswright, Euromonitor, ResearchAndMarkets.com, nonprofitsource.com, Statista, Credit Suisse estimates

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1. Global eCommerce as a key source of growth

True TAM assumptions and rationale

Global Category	TAM Assumptions & Rationale	2019-2023E CAGR	2020E Size ($b)	% of TAM
Global retail eCommerce, ex-BABA & JD	eMarketer Global Online Retail Estimates. Assumes BABA and JD eCommerce as unaddressable and utilize consensus GMV estimates. Conservative given Adyen announced in 2019 (via partnership with Alipay) that it will facilitate payments outside of Chinese mainland for AliExpress, Taobao, Tmall, and Alibaba.com.	19%	$2,850	56%
Online Travel	Global online travel forecasts informed by Euromonitor, including Online Travel Agency (OTA) and direct to merchant volumes. We assume the online travel market doesn't recover to 2019 pre-COVID levels until 2022.	4%	$700	14%
Ride-Sharing	Assumes Uber and Lyft represent 50% of the global ride-sharing market, with their global share declining slightly in each year in our forecast (assumes additional regional competitors gain share). We utilize Uber & Lyft ride-sharing consensus estimates.	8%	$70	1%
Food Delivery	Informed by Euromonitor estimates for Global Food Delivery market size (i.e., GrubHub, UberEats, DoorDash, Postmates, Deliver Hero, Takeaway.com, Deliveroo, Just Eat, restaurant websites, etc.)	33%	$375	7%
Online Event Ticketing	Assumes ~$47b market size in 2017, with a ~7% CAGR through the forecast period (ex-COVID impacted 2020E and assumed recover in 2021). Market sizing base sourced via ResearchAndMarkets.com.	(1%)	$30	1%
Online Charitable Donations	Forecasts assume US Charitable donation market has 40% global market share and grows ~5% annually (in-line with historical trends). US market historical figures reflect donations from individuals. Sources include givingusa.org and Funraise.	8%	$375	7%
Streaming Media Subscriptions	We utilize consensus revenue estimates for Netflix and Spotify, and assume these two platforms represent 75% and 35% of the 2018 global video and music streaming markets, respectively. We then assume slight annual share loss (i.e., additional platforms grow faster off of a smaller base, gaining share) of the global video and music streaming markets, respectively.	27%	$70	1%
Video gaming	Includes in-game purchases of virtual goods (e.g., points, tools, additions) that video game players use to enhance their gaming experience. Our assumptions are informed by the CS video game industry model (Stephen Ju).	17%	$125	2%
Crowdfunding (ex-China)	Fundly estimates for global crowdfunding market size; addressable market growth CAGR below global forecasts from Technavio (17%) given expectations for non-addressable markets to grow faster (e.g., China).	15%	$30	1%
Online On-demand Home Services	IAC estimates for US Home Services TAM; assumes online penetration of 19% in 2019 with online penetration increasing over time; also assumes the US has 50% share of the global TAM; not all online transactions will have payments attached, but this portion of the market is becoming increasingly addressable.	12%	$175	3%
Online Gambling (Sports Betting / iGaming)	Our TAM for online gambling represents our estimate of "Payments Volume" (said differently actual card or APM payments processed) on online gaming platforms - which we estimate is ~3x Gross Gambling Revenue (widely quoted as "market"), the processor will observe volume for pay-ins and pay-outs. Online gambling includes sportsbook wagering, casino, state lotteries, poker, and other. Source: Grand View Research	10%	$190	4%
Fantasy Sports	Our TAM for fantasy sports represents our estimate of "Payments Volume" flowing over fantasy platforms. Fantasy is a lower revenue business but tends to have higher payments flows vs. Online Gaming. We project payments volume as a multiple of market revenues (assuming ~7x or roughly double the multiple for Online Gaming). Includes Daily Fantasy and traditional fantasy. Source: Allied Market Research. IBISWorld	4%	$125	2%
Total		**17%**	**$5,100**	**100%**

Source: Company data, eMarketer, Phocuswright, Euromonitor, ResearchAndMarkets.com, givingusa.org, Funraise, Statista, IAC, Grand View Research, H2 Gambling, Credit Suisse estimates

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2. Global eCommerce (and omnichannel) acquiring platforms

Large eCommerce payments providers (summary)

- eCommerce payments providers compete on:
  - Authorization & fraud rates
  - Global acceptance methods
  - Conversion rates
  - Ease of integration
  - Ease of ongoing operations
  - Omnichannel capabilities
  - Vertical or segment expertise
  - Additional software & services
  - Pricing
  - Service & support
- Stripe has become a much more meaningful competitor, for both SMB and larger multi-nationals (now ~43 countries of local acquiring, 25+ unique forms of payment acceptance [aiming toward 50 in 2020], 100+ payout countries by 2020). Payments volume has reached "hundreds of billions", headcount is ~3k, and valuation most recently $36b – all indicative of a more scaled competitor. Our industry discussions suggests that Stripe has been appearing in and winning more RFPs, armed with its more fulsome global capabilities, ease of integration, and access via a single API. Innovation cadence resulting in numerous new offerings bolstering its position with software platforms (e.g., Stripe Treasury, Stripe Issuing, Stripe Corporate Cards, Stripe Capital, Stripe Terminal, etc.)

	Braintree (A PayPal Service)	stripe	adyen	worldpay	globalpayments	First Data is now fiserv.
	~$340b	"Hundreds of billions"	~$270b	~$480b	~$170b	~$480b
2020E eCommerce volumes	~+22% YoY (inclusive of gateway and PayPal button transactions), impacted by heavy travel & events exposure (e.g., ticketing)	"Hundreds of billions" (disclosed by management in September 2019)	Adjusts volume down ~10% [assumption] to remove offline/in-store volumes	CS est. based on legacy WP disclosures, $279b in 2017, assumed 20% YoY growth in 2018 and 2019or 2020 assumed eComm ex. Travel volume grew inline with ~30% reported transaction growth at ~75% of mix and Travel volume declined ~70% at 25% of mix	CS est. based on $900mm eComm & Omni revenue, adjusted to ~$720mm ex-network fees, grossed up assuming ~50bps net acquiring spread	CS est. based on an assumed lower yield given mix of volume that is processing only, along with several disclosures: eCommerce was ~$500mm in revenue in 2016 growing mid-teens, eCommerce transaction growth

Source: Company reports, Credit Suisse estimates

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2. Global eCommerce (and omnichannel) acquiring platforms

Large eCommerce & omnichannel payments providers (detail)

Metric	Braintree (A PayPal Service)	stripe	adyen	worldpay	globalpayments	First Data is now fiserv.
Valuation	~35% of PayPal's volume (when including Braintree volume from PayPal button and gateway only), which is a $270b business	$36b (April 2020 financing)	~$65b	$43b acquisition price (now a part of FIS)	~$50b (when combined with TSS acquisition)	Global Business Solutions (GBS) was ~2/3rd of First Data revenue, acquired by Fiserv for ~$22b in 2019
2020E eCommerce volume	~$340b estimate, ~+22% YoY (including gateway only and PayPal button transactions)	"Hundreds of billions" (disclosed by management in September 2019, we estimate that volumes are slightly below Adyen & Braintree when including PayPal transactions)	~$270b (Adjusts volume down 10% (CSe) to remove offline/in-store volumes)	~$480b (CS est. based on legacy WP disclosures, $279b in 2017, assumed 20% YoY growth in 2018 and 2019, for 2020 assumed eComm ex. Travel volume grew inline with ~30% reported transaction growth at ~75% of mix and Travel volume declined ~70% at 25% of mix);	~$170b (based on ~$850mm eComm & Omni revenue, grossed up assuming ~50bps net acquiring spread)	~$480b (CS est. based on an assumed lower yield given mix of volume that is processing only, along with disclosure that eCommerce was ~$500mm in revenue in 2016 growing mid-high teens+)
Geographic	- 130+ currencies, 45+ countries - Available for merchants based in US, Canada, Australia, Europe, Singapore, Hong Kong, Malaysia, and New Zealand - Merchant base more US-focused	- ~43 countries as of January 2021 (plus additional markets from Paystack; with local/domestic acquiring) - Paystack Africa expansion and continuing to add countries based on importance and merchant needs - Gaining some traction with merchants in Europe and Asia	- 65% of net revenue from Europe in 2019 - 15% North America - 20% AsiaPac, LatAm, and Rest of World	- UK/Europe heavy given legacy Worldpay roots - 146 countries, 126 currencies	- 33 countries of local presence (including local support staff on the ground serving local merchants); potential to move to ~38 supported by TSYS physical locations - eCommerce business in 60 markets, 135+ currencies	- 50+ countries and "hundreds" of currencies", with noted more recent expansion into Mexico, Australia, and China - Over 100 countries with First Data clients (including in-store)
Acceptance methods	~25 unique forms of payment globally, given business is largely US-focused; PPRO investment/partnership has the potential to expand LPMs	25+ unique forms of payment globally by year-end 2019 (aiming toward doubling this number to 50 during 2020); first non-bank to integrate with Cartes Bancaires (France)	250+ payment methods	300+ payments methods (potentially expanding due to recent agreement with ACI Worldwide)	140 payment methods	260+ payment methods
Processing partners & licensing	- Regional banking relationships for processing (banks with acquiring licenses), e.g., Wells Fargo and Chase Paymentech in the US, AIB Merchant Services in Europe, NAB in Australia, etc. - PayPal does not serve as an acquirer in any market (acts as either a PayFac or ISO, depending on merchant size)	- Stripe serves as a merchant acquirer (direct licenses via the card networks) in virtually all markets (including all of Europe)	Began ramping efforts to get local licenses in 2013/2014 and now owns acquiring licenses in the US, Brazil, Canada, Hong Kong, Malaysia, Australia, Europe, Singapore, and New Zealand	- Offers direct domestic /local acquiring in 59 markets (with another 88 with cross-border capabilities) - Obtained an acquiring license in New Zealand (March 2019) - Obtained an acquiring license in Argentina (October 2020)	- 58 owned domestic acquiring licenses - Differentiation via local market, in-store presence at scale (i.e., local merchants doing in-store in ~33 markets, including local support for all merchants, including SMB) - Unified Commerce Platform (UCP) provides a single omni-channel payments capability via a single API integration	- 50-55 markets "which we are licensed to acquire from merchants", partially with owned licenses and partially via sponsorships (with plans to expand self-sponsorship in a few new markets in 2020); Act as a direct acquirer and manage own sponsors in these countries
Customer segment	- Wide range, including SMB and large merchants (e.g., Uber, Airbnb, Facebook, Pinterest, L) - Self-service service largely aimed at SMB, but ability to scale with larger merchants - Within the smaller merchant category, tends to skew more toward SMB vs. startup vs. Stripe)	- Spans full gamut of merchants, with a focus on start-ups/SMB community, but also working with enterprise level merchants (Lyft, Target, UnderArmour, etc.) - Shopify Payments partner (expands start-up/SMB reach) - Increasing large enterprise wins (RFP processes)	- Focused on enterprise (large, global, eCommerce and omni-channel) - Expanding into mid-market - Pursuing SMBs via a platform/ISV approach	- Larger merchants, many of which require live contact/support - Cross-border leader globally - Global digital retailers and leading online travel sites	- Focused almost exclusively on the SMB segment, along with multi-national corporations that require cross-border capabilities	- Serve a range of merchants from the largest retailers and platforms (PayPal, Yapstone, etc.) to smaller business via Clover (although not quite into the micro-merchant segment, given even Clover's average merchant is larger than Square's); gains SMB exposure via bank distribution channel (Bank of America, Wells Fargo, PNC, etc.)
Number of merchants	- "28mm merchants on the platform" (inclusive of standalone PayPal button-only merchants)	- "Millions of businesses on Stripe" and "thousands of platforms" - 40+ users with over $1b in annual payment volume as of October 2020	- 3.4k as of December 2017 (last disclosure); this was down from 4.5k December 2016 (focused on higher quality merchants); no longer disclosed	- ~1mm merchants in total for WP (inclusive of offline only merchants)	- 2.5mm merchant locations via Global Payments; 820k via TSYS	- 6mm+ merchant locations
Pricing Approach	- 2.9% + $0.30 for full-stack in the US - Lower in Europe (e.g., 1.9% + €0.30) - Priced differently by region (volume discounts for large customers negotiated) - $0.10 per trans + $49 per month for gateway	- 2.9% + $0.30 in the US for standard, smaller merchant pricing (although larger merchants and/or platforms are able to negotiate based on volumes, which is similar to competitors) - Lower in Europe (e.g., 1.4% + €0.25 for European cards, 2.9% + €0.25 for non-European cards) - Priced differently in each region	Interchange ++ (net yield ~23bps, which is a blend of fully acquired and gateway, ~70% vs. 30% mix)	Mix of bundled and interchange plus (net yield ~31bps on legacy WP eCommerce business)	Priced to value given high touch sales support ~80bps acquiring spread	Interchange ++ for larger merchants, and could employ a bundled approach for smaller merchants; processing only fees (either a small bps figure or cents per transaction for processing only relationships); competitive on pricing, in part due to scale (i.e., ~40% share in the US, largest acquirer globally)
Additional services	- Braintree Extend (contextual commerce/sell on another platform) - In-store payments (US, UK, Australia, although set to expand due to iZettle acquisition)	- Stripe Treasury (BaaS offering for platform customers to offer bank accounts), Stripe Billing (recurring business models), Atlas (incorporation, tax & legal services), Radar (machine learning applied to fraud), Chargeback Protection (40bps "insurance"), Stripe Terminal (programmable offline POS), Stripe Sigma (business data platform), Stripe Issuing (card issuance, including corporate cards), Stripe Capital (lending via bank partner), Premium Support (for complex cases), although support is offered to all merchants	- RevenueProtect risk management solution (being offered to merchants separately, including non-processing clients) - In-store payments and terminal (Unified Commerce), customer insights, revenue optimization, and other features - Launched card issuance business November 2019	- AuthMax to increase auth rates for CNP - Card issuance capabilities - in-store offerings (omnichannel solutions) - Data dashboard for customer insights, etc. - Increased data (FIS issuer processing & banking relationships) to aid in increasing authorization rates (management expects ~200bps potential increase, from mid-80%s to high 80%s)	- 60+ lenders connected via API (merchant cash advance, no B/S risk) - In-store API-based terminals - Card issuance capabilities - Issuer processing business (potential for improved authorization rates, SCA capabilities, economics) - Payroll services (e.g., Heartland Payroll) - High-touch local support in 33 markets	- Clover POS for in-store capabilities (omnichannel) - Owns both STAR and Accel debit networks (low cost debit routing), along with Acculynk (least-cost routing gateway supporting optimized online transaction routing) helps to prioritize based on approvals, costs, etc. - Card issuance capabilities
Go-to-market	- Self-service via Drop-in ("a few lines of code") for smaller merchants/developers or Customer UI - Combined salesforce with PayPal means a greater presence in countries outside core US/Europe	- Growing Business Development / Salesforce (largely self-serve to developers/startups, but high-touch for larger merchants)	- Salesforce on commission - Must ensure regional involvement - Work streams to ensure sales & engineering coordination	- Salesforce on commission, including a Global eCommerce sales team (expanding in 2019)	- 3.5k direct sales people (including ~3k from Global Payments and ~500 from TSYS)	Combination of bank partners (both revenue share & JVs), direct sales, and other partners (agents, ISOs, ISV through CardConnect and BluePay); S-1 filing from 2015 suggests ~2.3k sales people
Marketplaces offering	Braintree Marketplace offering, bolstered by the acquisition of Hyperwallet for improving the payout capabilities	Stripe Connect (marketplaces & platforms), Stripe Treasury (BaaS offering for platform customers to offer bank accounts), Stripe Issuing, Stripe Capital, along with recently expanded payout capabilities (aiming for 100+ payout countries [over local bank rails], 90% users with instant payouts, and 1-2 day payouts everywhere, per Stripe Sessions 2019 in SF) amongst others	Adyen for Platforms, which aims to smooth onboarding of merchants, funds movement/payouts, etc. easy and compliant; Recent notable client win in eBay	In addition to working with Marketplaces merchants (pure-play eCommerce), also offers programs for Payment Facilitators (onboarding sub-merchants, collecting payments, reducing risk, etc.)	Works with marketplaces, in keeping aligned with overall company strategy of focusing on more niche verticals, SMB, and multi-nationals, where services and added capabilities are valued and compensated	Noted emphasis on Marketplaces, on-demand platforms, and aggregators at 2018 investor day, along with capabilities in digital disbursements, etc.; Programs tailed for Payment Facilitators for single and multi-MID programs (e.g., PayPal as a notable customer) and Marketplaces
Employees	500+	~2,500+ (vs. ~2k+ at Stripe Sessions September 2019, 2.5k end-year 2019 aim per CEO, 11FS June 2019; we believe the company is likely approaching ~3k)	~1.6k as of Q3 2020	~8.2k as of end 2018	~11k for Global Payments; ~13k for TSYS (TSYS includes issuer processing business)	~44k at Fiserv (where merchant acquiring was ~40% of the business in 2019)
Other	- Single contract and integration for PayPal and Venmo appealing to smaller merchants (single contract)	- GPTN foundation (Global Payments & Treasury Network) - Large investors include Tiger Global, Capital G, General Catalyst, etc. - Acquired Touchtech Payments in April 2019 (SCA technology) - Fast moving engineering team (250+ new features added TTM as of Stripe Sessions 2019) - Single integration to access global capabilities of Stripe	- No single merchant customization (unless applicable to broader platform) - Top 10 merchants 27% of 2019 net revenue (31% of 2018 net revenue) - Top 120 merchants 69% of revenue (2017 stat) - Single integration to access global capabilities of Adyen	- Will customize for clients, "consultancy services" on market expansion - Defines eCommerce as pure play eCommerce merchant volume only (i.e., the eCommerce associated with an omnichannel client is not included, and thus, the actual size of the total eCommerce business is by definition under-stated to an extent) - Single integration to access global capabilities via Access Worldpay launched in September 2020	- Vertical specific expertise and high-touch customer support, even for SMB level merchants - Defines eCommerce as CNP for both pure-play eCommerce merchants and the eCommerce/CNP portion of their omnichannel merchant clients - Single integration to (UCP) access global capabilities of Global Payments	- Notable clients in Dell, Lyft, Apple, Yapstone, PayPal (14 of top 20 global brands) etc. - A single integration to reach global, omnichannel capabilities (including more unique, local footprints in high-value markets like India, Argentina, South Korea, and Philippines) - Rapid Connect can serve as a middleware layer (although requires an added hop for transaction data) - Multiple gateways and platforms (e.g. Payeezy, CardPointe, Clover Gateway, etc.)

Source: Company reports, Credit Suisse estimates

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2. Global eCommerce (and omnichannel) acquiring platforms
Forrester's global payments provider assessment

- In the latest Forrester Wave report for merchant payment providers, Stripe was ranked the leader of the space, scoring highest in both the Current Offering & Strategy categories and being the only provider to receive a 5 out of 5 score in the "payments for platforms and marketplaces" category, a new category in Forrester's analysis.
- Adyen followed closely in the report, with strengths identified as global capabilities, single platform, and omnichannel solutions (homegrown terminal software and hardware).
- Fiserv (First Data), Worldpay (FIS), PayPal (including Braintree), Worldline, and JPMorgan were also listed as strong performers.
- We expect an increasing trend toward merchants consolidating acquirers around a few global omnichannel providers (displacing local acquirers).

Source: Forrester (The Forrester Wave™: Global Merchant Payment Providers, Q3 2020); Forrester excludes large bank acquirers that use third-party processing technology (e.g., Wells, Citi, Bank of America Merchant Services)

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2. Global eCommerce (and omnichannel) acquiring platforms

Stripe additional service offerings "beyond payments"

Stripe additional service	Description	Pricing
BILLING	Offering for subscription and/or recurring billing businesses, including ability to customize pricing (e.g., usage-based, tiered, billing frequency, one-time charges, etc.).	0.5% for Starter package; 0.8% for Scale Package
CONNECT	For marketplaces and platforms, enabling account setup (i.e., onboarding, 1099 reporting, KYC), including Stipe Instant Payout to a debit card (Visa Direct) and standard ACH transfers. Connect pricing is usage-based and flexible based on the capabilities needed, with pricing varying by account type (standard, express, or custom).	$2 per account and 0.25% + $0.25 per ACH payout; instant payout 1%; account debits 1.5%
RADAR	Machine-learning enabled fraud, with the ability to adapt to changing fraud patterns. Allows fraud teams to take action quickly once fraud patterns emerge. Chargeback Protection, insurance against chargeback disputes (i.e., pay a fixed 40bps in exchange for ability to redirect focus back on the business). No evidence submission is required, Stripe effectively takes on the risk.	$0.05 per transaction (included for those paying standard pricing); 0.40% for Chargeback protection
SIGMA	Reporting and data analytics (standard and custom SQL queries) for business operations/intelligence, accounting, finance, and product management teams.	$0.014 - $0.02 per charge (negotiated pricing for >50k charges/mo)
ATLAS	Outsourced offering for business start-up and formation, ranging from corporation filing (Delaware), IP documentation, stock issuance for founders, tax ID (EIN), bank account opening, Stripe accounts, etc.	$500 one-time fee, along with ongoing costs for Delaware filings, tax prep, etc.
ISSUING	Card issuance platform for both physical and virtual cards. Use cases include employee expense cards, virtual cards for couriers to pay via mobile, etc. Can also support the entire card stack for digital banks. Includes features such as dynamic spending limits, merchant category controls, per-user bookkeeping, and other controls. Both Visa and Mastercard cards are able to be built.	$0.10 per virtual card; $3 per physical card; 0.2% + $0.20 after first $500k in transactions; 1% + $0.30 for cross-border transactions; $15 per lost dispute
PREMIUM SUPPORT	While all Stripe accounts get 24/7 phone, email, and chat support, this is a white glove, dedicated support offering with a named individual person as account manager (i.e., prioritized responses).	Starts at $1,800 per month
TERMINAL	Unified experience for online and offline sales, and provides a seamless customer experience across channels. Ability to build custom POS software, all linked to EMV compliant card readers (hardware).	2.7% + $0.05 (+1.0% for international) for in-store payments; Hardware options $59 and $299
PARTNER PROGRAM	Expands the service offerings and integration (stickiness) of Stripe's platform via a marketplace of third-party apps that integrate with Stripe (e.g., accounting, shipping, tax calculation, inventory management).	By third-party app
CORPORATE CARD	Instant sign-up corporate expense card, no personal guarantee required. 2% cash back on top two spend categories, and 1% cash back on everything else, includes $50k in free payment processing. Implements custom spend controls (i.e. by merchant category) with real-time expensing. Integrated with Expensify and Quickbooks Online.	No fees (annual, foreign, late), no interest (must pay balance in full monthly)
CAPITAL	Similar to Square capital - quick and easy onboarding for SMB loans. Repayment is not a term structured interest payment, but is deducted from daily sales of the merchant as a fixed %. Stripe Capital for platforms now also available.	One flat fee, no interest, paid as a % of daily sales
Treasury	Banking-as-a-service API that enables Stripe's marketplace or platform users to embed financial services, allowing them to offer business customers bank accounts in minutes, near-instant access to revenue, transfer it, pay bills, and more.	N/A (currently invitation-only after initial roll-out in Dec 2020)
Climate	Enables Stripe users contibue a fraction of their revenue to funding carbon removal and let their customers know about the commitment with a new badge updated automatically on Stripe-hosted checkout, receipts, and invoices.	Free enrollment for Stripe users and no fee for contributions

Source: Stripe

3. Secure Remote Commerce (SRC) "Click-to-pay"

The network's unified payments button, an "easier sell"

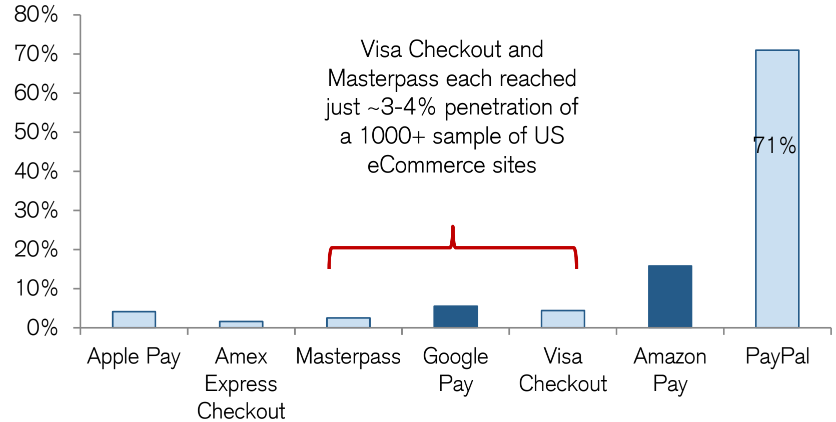
- EMV SRC aims to create a "virtual payment terminal", mimicking the offline world where all payments methods come through the same terminal, along with a set of authentication and security standards

- While Visa Checkout and Masterpass gained limited traction, we believe the SRC button will be an "easier sell" (relative to separate buttons from V, MA, and AXP) to all parts of the traditional "four-party model"
  - Consumer - less cluttered checkout
  - Bank card issuers - increased eCommerce volumes
  - Merchants - increased online conversion, a single integration vs. multiple, and potentially reduced acceptance costs
  - Merchant Acquirers - potentially increased volumes (and possibly fewer transactions siphoned off to PayPal, Amazon Pay, etc.) and likely higher conversion over time (closing gap vs. wallet oriented alternatives)
  - Networks – carve out a role alongside wallets (that have longer-term disintermediation risk associated with them)

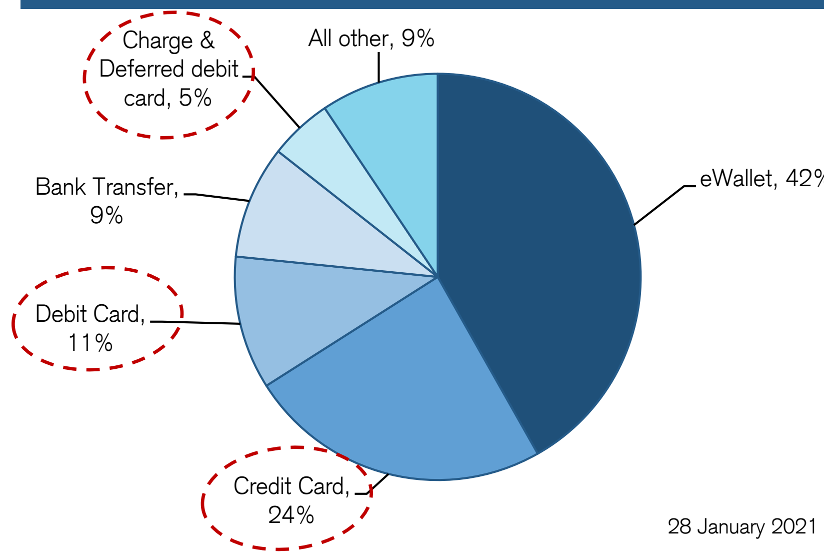
- Risk to PayPal (and Amazon Pay), although we believe the most readily addressable audience for an SRC button is consumers currently manually entering cards (40% globally, 63% in the US) vs. PayPal's >360mm active users (and ~26mm accepting merchants) and network effects

- Began rollout with a few merchants in October 2019 and has since added 15,000 merchants in 16 markets as of November 2020.

Visa Checkout & Masterpass failed to gain meaningful traction, although we believe SRC will be an "easier sell" (data for Q1'20)



~40% of Global eCommerce (~63% US) in 2019 was done via card (most readily addressable portion for the SRC button)



Source: Worldpay, PYMNTS.com, Credit Suisse estimates

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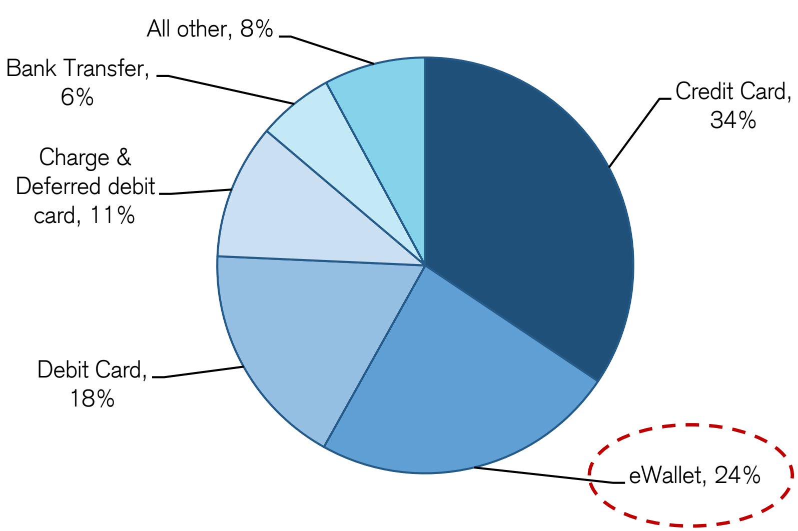
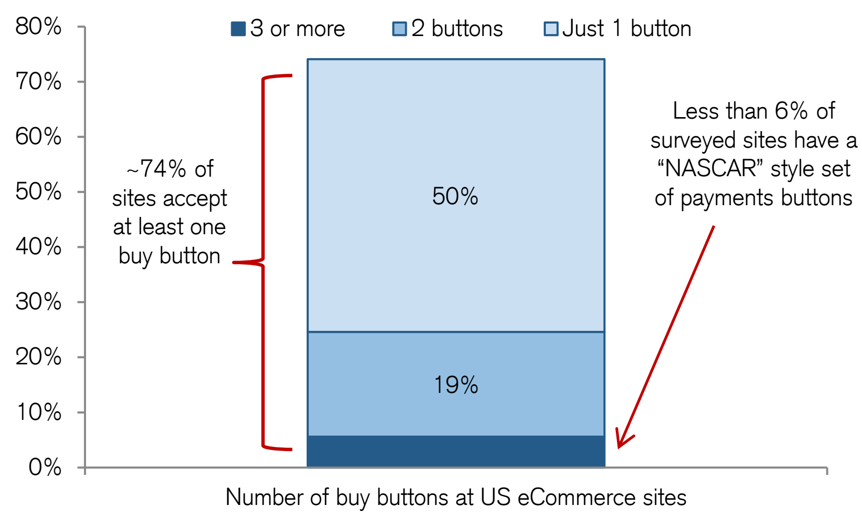
4. Checkout buttons & digital wallets
eWallets ~24% of North American eCommerce; ~37% by 2023

- Approximately ~24% of North American eCommerce occurs via checkout buttons, as of 2019; Worldpay expects this to reach ~37% by 2023.
- Close to 3/4ths of US eCommerce sites have at least one checkout button; this has been relatively stable since 2017.
- The basic value proposition is increased conversion (via reduced manual entry) and security & trust (card numbers not passed to the merchant).

eWallets made up ~24% of North American eCommerce payments in 2019, per Worldpay



Close to 3/4ths of US eCommerce sites have at least one checkout button; this has been relatively stable since 2017



Source: Worldpay, PYMNTS.com, Credit Suisse estimates

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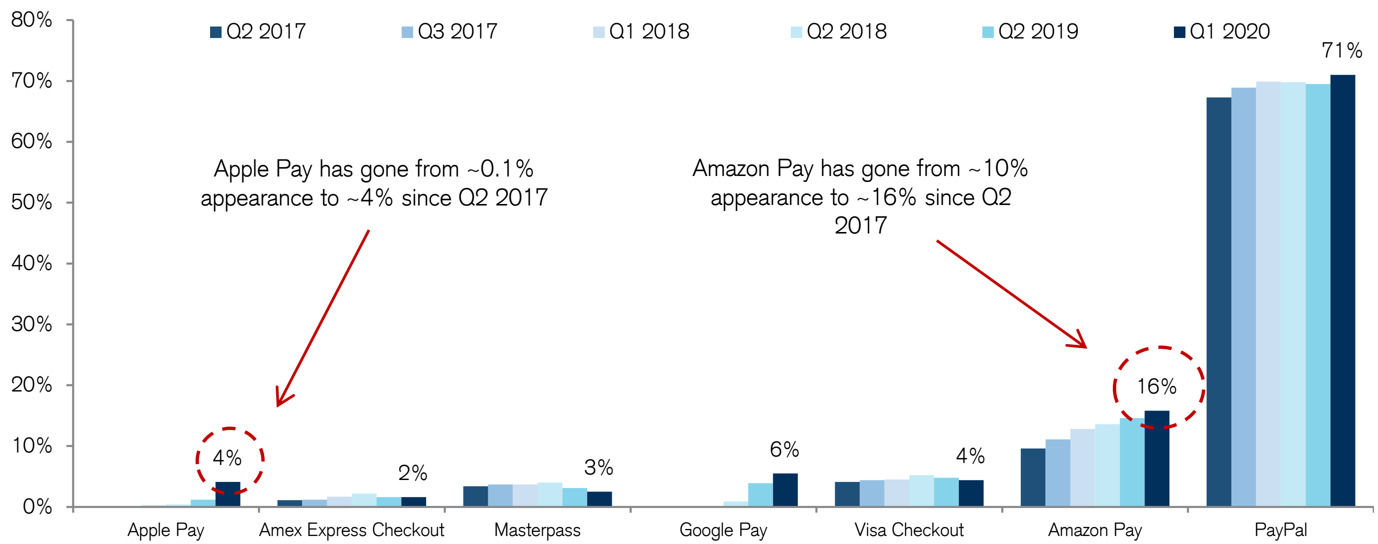
4. Checkout buttons & digital wallets

PayPal the leader, Amazon gaining, and a new kid on the block

- PayPal remains the dominant option for merchants, appearing on ~71% of a surveyed group of US eCommerce sites (n = 1000+). Amazon Pay is now appearing at ~16% of these sites, an increase of ~65% since Q2 2017.
  - Google Pay appears on ~6% of these sites, showing a meaningful uptick following its re-brand and consolidation.
  - Apple Pay now appears on ~4% of these sites, and increase of ~242% since Q2 2019
  - The Chase Pay app was discontinued in February of 2020, however the service is still being offered
- A new checkout button has emerged (October 2019 launch) in the form of the network-supported EMV SRC button, which takes the place of Visa Checkout, Masterpass, and Amex Express Checkout. We expect an "easier sell" to merchants and acceptance rates that far surpass predecessor offerings.

PayPal (~71% appearance rate) has a ~4-5x lead over its nearest competitor, which is Amazon Pay (~16% appearance rate)



Source: Worldpay, PYMNTS.com, Credit Suisse estimates

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4. Checkout buttons & digital wallets

Overview of the major US wallets and business models

Product	PayPal	Amazon Pay	Google Pay	Apple Pay	EMV SRC "Click-to-pay"
Pricing	2.9% + $0.30 for online (US)	2.9% + $0.30 for online (US)	No fees charged by Google (online payments are considered card-not-present transaction, and card-present when done in-store)	No fees to merchants (merchants pay their standard card acceptance fees through their acquirer or PSP); Apple share in a portion of the bank issuer's interchange, ~15bps	No fees to merchants (merchants pay their standard card acceptance fees through their acquirer or PSP)
eCommerce acceptance (US)	71.0%	15.8%	5.5%	4.1%	15,000+ merchants rolled out as of November 2020, per Visa
Contracting required?	Must be contracted with PayPal, offering "rack rate" pricing and negotiated deals for larger merchants	Must be contracted with Amazon, offering "rack rate" pricing and negotiated deals for larger merchants	Pass-through mechanism only, no contract (integration and development work only), i.e., paying with a Google-stored card credential	Pass-through mechanism only, no contract (integration and development work only)	Pass-through mechanism only, no contract (integration and development work only); Replaces (and consolidates) Visa Checkout, Masterpass, and Amex Express Checkout
User and/or transaction statistics	~360mm active users as of Q3 2020	~33mm last reported February 2017, but ~100mm Prime subscribers & ~350mm customers, this user number is understated	Hundreds of millions of card credentials compiled by Google (although that does not equate to usage of the Google Pay button)	We estimate >300mm users; ~12b transactions in 2019, growing ~100%+ YoY (although these statistics are largely offline in-store)	Live October 2019 at select merchants, with further expansion planned for 2020
Additional comments	• Venmo ~65mm active users, monetizes same as PayPal • MercadoPago agreement expands utility (~230mm LatAm users enabled to transact at PayPal merchants)	• Amazon customers become Amazon Pay users simply by using their Amazon credentials on a third-party site (i.e., no separate registration process)	• All payments products consolidated and re-branded as "Google Pay" in early 2018 (prior offerings included Google Wallet, Google Checkout, Android Pay, etc.) • PayPal is a partner and funding option on Google Pay	• Online transactions limited to Safari browser, iPhone, iPad, or Mac devic4.9k card issuers supporting • Launched in September 2014	• We expect the merchant acquirers to be supportive (increased conversion, and also the potential to gain a small portion of PayPal "button" volumes, supportive of growth) • SRC users will still need to go through their issuers for chargebacks & disputes (similar to most other wallets)

Source: Company websites, PYMNTS.com, Glenbrook Partners, EMVCo, Credit Suisse

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5. Increasing complexity in global eComm/Omnichannel

Favors tech-forward acquirers with global omnichannel scale

- Increasing complexity in global eCommerce payments favors acquirers that can address all of a merchant's payments needs across geographies and channels, driving a trend toward consolidating providers from ~10-15+ down to 3-5 more globally capable, omnichannel providers.
- Some of the largest and fastest growing areas of eCommerce have the most complicated needs (global/local payments acceptance methods, payout capabilities, and seller identification for onboarding process, etc.).
- Competition in merchant acquiring is making additional services essential (software, capital, installments, etc.).

Global reach and expanding local payments methods (LPMs)

Trend toward consolidating acquirer relationships from 10-15+ to 3-5, favoring acquirers with global capabilities

Accept the primary payment types in each country, which can vary significantly, with many payment methods country-specific (domestic schemes, eWallets, bank transfers, etc.)

Aim toward processing as many payments in-country (local acquiring capabilities), reducing interchange fees (for those on interchange ++) and increasing authorization rates

Omnichannel needs

Merchants need to deliver a seamless commerce experience across channels: in-store, in-app, and online

Value-added services

Integrated payments, business management software, inventory, payroll, card issuance, instant transfer

Financing solutions such as working capital loans (and/or cash advance programs) and ability to offer consumer installments to consumers at the POS

Customer engagement (CRM tools), marketing program management

Increasing compliance burdens

Country-specific regulations put a heavy compliance burden on merchants and their acquiring partners

Know Your Customer (KYC), PCI compliance, PSD2 and SCA requirements, Anti-money laundering (AML), OFAC sanctions are a few examples that require continued investment and effort

Source: Credit Suisse research

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5. Increasing complexity in global eComm/Omnichannel

Complexity associated with 400+ LPMs globally

- While cross-border eCommerce is gaining share within the broader eCommerce market (~2x growth rates, expected to reach ~20% of B2C eCommerce by 2022), consumer payments habits remain locally and culturally specific.
- Country-specific acquiring license requirements make it burdensome and time consuming for merchant acquirers to add new countries.
  - In markets where an acquirer does not have a directly owned license, an alternative is to rent a license from an acquiring bank (i.e., “bin sponsor”).
  - Generally speaking, this works just the same as owning a license, and often comes down to a decision around the level of volumes expected vs. the required investment to achieve a license.
- Consumer payment preferences by country make it difficult for local, sub-scale acquirers to compete in global eCommerce with 400+ local payment methods.
  - Checkout friction goes up when consumers are unable to pay with their preferred method, increasing their importance to merchants.
  - Adding local payment methods requires local integrations, which can take months, favoring scaled players.
  - For balance, beyond the first ~50-75 local payment methods, the volumes begin to become less incremental on a global basis (although it can still be important in specific, local markets).
- Global merchants use multiple acquirers to meet these needs, but each acquirer adds complexity to operations, favoring acquirers with global omnichannel capabilities.

Platform	Methods	Countries	Currencies
Worldpay	300+	146	126
Adyen	250+	200+	150+
PayPal (Braintree)	25 (we expect more via PPRO)	45+	130+
Stripe	25 by end 2019, 50+ planned	95+ (43 local acquiring)	135+
Global Payments	140+	33 in-store domestic (60 inc. eComm)	135+

Worldpay estimates that local payment methods were 56% of 2017 global eCommerce, increasing to ~70% by 2022

Bank Transfers
Fast and safe
Allows your customers to pay for your goods or services by transferring money from their bank account. Examples: IDEAL, Sofort Classic

Mobile
Real-time payments
Your customers can send money using a mobile number. Example: Unified Payments Interface (UPI)

Direct Debits
Recurring transactions
Let's your customers pay you an agreed amount, on an agreed date. Example: SEPA DD

eWallets
Easy to use
Your customers fund their eWallet to pay for online purchases. Examples: WeChat Pay, Alipay

Local Card Schemes
Go local
Local cards work in the same way as traditional cards, in specific domestic markets. Examples: Bancontact, UnionPay

Pre-Pay
Safe and secure
Lets your customers buy a prepaid card or voucher to pay for goods or services online. Examples: NeoSurf, Paysafecard

Post-Pay
Convenient
Allows your customers to shop online and complete their payment at an affiliated outlet, store or ATM. Examples: Konbini, Multibanco

Invoices
Buy now, pay later
Your customers can buy goods or services and pay at a later date. Example: Klarna

Source: Company websites, Worldpay, Forrester, PPRO, Credit Suisse research

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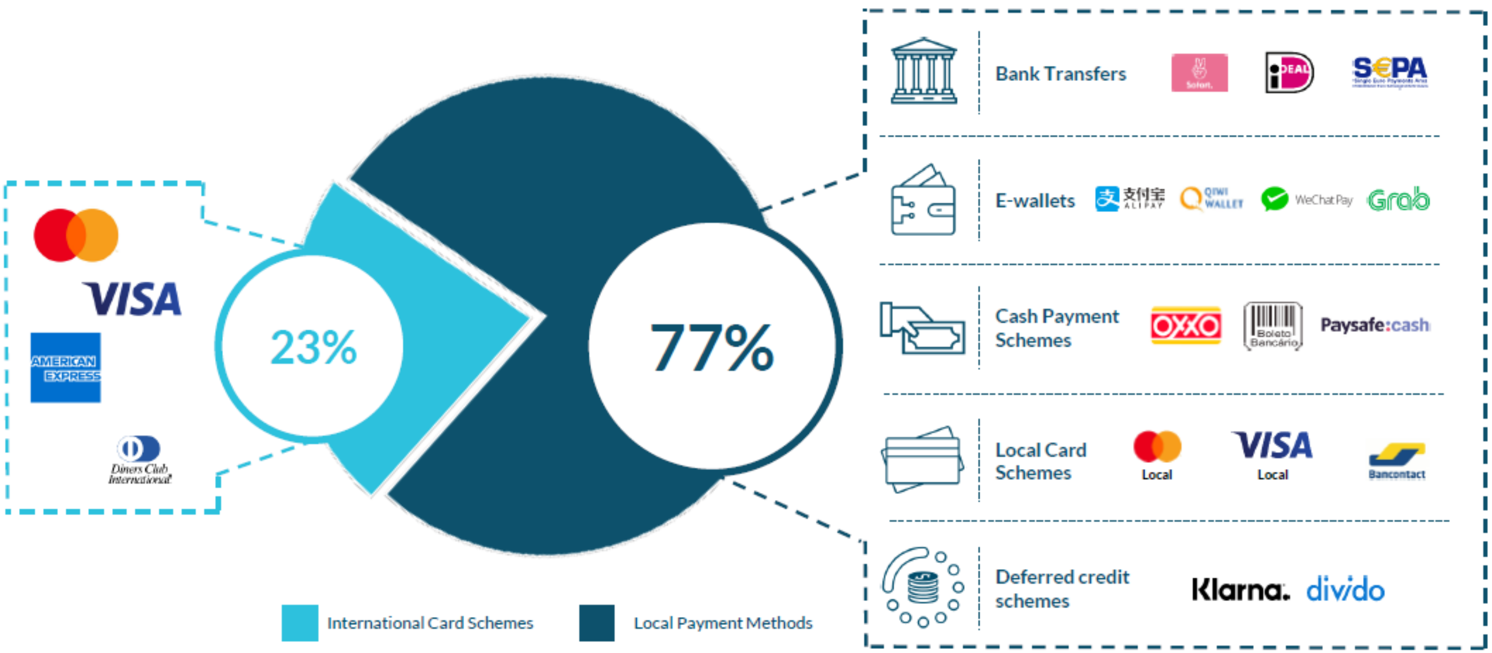
5. Increasing complexity in global eComm/Omnichannel
PPRO offering solutions to help alleviate this complexity

- PPRO estimates that there are ~400 LPMs globally (e.g., eWallets, bank transfers, cash-based, deferred credit), up from just ~300 in 2017.
- PPRO works with 7 of the top 10 merchant acquirers to provide a single API integration, on one contract, to 150+ LPMs while also providing additional services (e.g., ongoing compliance, pricing negotiations, unified reporting, refund services, etc.).

PPRO estimates that only ~1/4th of global eCommerce is done on international card networks (although we note that localized versions of Visa and Mastercard are excluded from this figure)



Source: PPRO, Credit Suisse research

Note: PPRO data separates local V/MA cards when they are not enabled for usage outside of the countries (e.g., mainly LatAm) and the transactions are not going through the global Visa and Mastercard rails, and thus are not counted into the international credit card split

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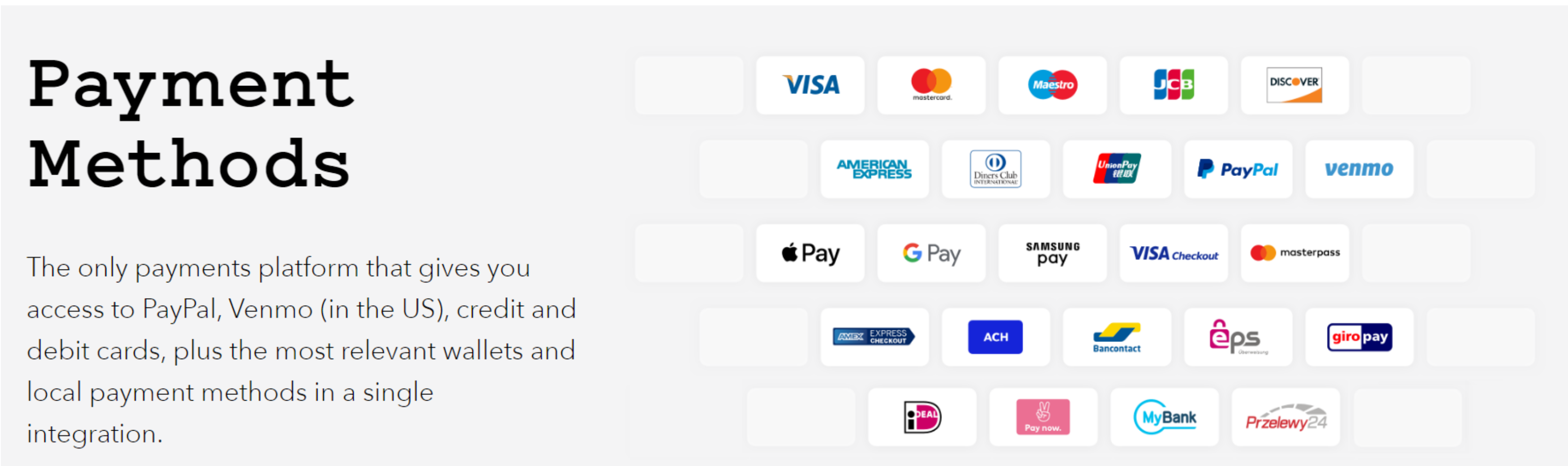
5. Increasing complexity in global eComm/Omnichannel

PayPal's Braintree beginning to expand globally

- We expect Braintree to expand more globally in part due to its partnership with PPRO (we note that PayPal led a $50mm investment in PPRO in July 2018), alongside a recently expanded acceptance list (now at 25 payment methods), and an appreciation for the importance of cross-border eCommerce inherent within PayPal.

- "Braintree is available for merchants in the United States, Canada, Australia, Europe, Singapore, Hong Kong SAR China, Malaysia, and New Zealand. In legal terms, you have to be domiciled in a supported country/region. We are working hard to bring Braintree to other countries/regions." – Braintree website

Braintree currently supports 25 payment methods, including credit & debit cards, digital wallets, and select local payment methods, although we expect this number to continue to expand over the coming years



Source: PayPal, Braintree, Credit Suisse research

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5. Increasing complexity in global eComm/Omnichannel

Expect continued share gains for globally leading platforms

- We expect larger merchants to increasingly consolidate their payments relationships around fewer (~3-5) scaled platforms
- Share gainers will provide global acceptance across hundreds of local payments methods (card & non-card) both in-store and online
- Provide local acquiring and consumer experiences, leading to higher authorization rates, increased conversion, and reduced costs (interchange, network fees, and fraud)
- Parallel to Visa & Mastercard vs. local schemes – hard for the domestic schemes to keep up with required technology investment/innovation (e.g., share loss by European domestic schemes)

Payments platforms with an ability to provide global eComm/omnichannel payments processing along with an ability to invest/innovate will continue to demonstrate growth above industry levels, particularly as cross-border eCommerce increases in importance

"…Point blank, it's share gains. If you look at our consistent growth…Just look in any metric…Visa, MasterCard numbers in the UK.- if you look at GDP in the UK, if you look at SSS growth in the UK, those numbers tend to be 0% or 1% or whatever the number is on a given day…it's another high-single-digit quarter growth for us (GPN). So there's no doubt in my mind, it's share gains. I would say that's augmented by our focus on the small to midsized business and leading with technology. UK, in particular, is a big place for us to have our eComm and omni business…"

- Jeff Sloan, CEO, Global Payments (October 2018)

"…It's not unusual for a large global retailer to be managing 30 to 60 and sometimes 100-plus contracts and partners…It is not unusual for a large international company to be eliminating potentially dozens of different partners and integrate one implementation across all of those regions with one set of contracts and one solution…"

- Brian Dammeir, Head of Product, Adyen (April 2019)

"…And our competitors span the gamut -- actually, globally, outside the U.S., primarily Adyen, but who we're taking share from when we win there [are] a lot of local acquirers [we are taking share from]…around share of wallet versus market share…in eCommerce, people use multiple acquirers. They just do. No one's going to go down to one single acquirer, which is how we are here in the US typically. They'll use multiple acquirers. They've grown up with multiple acquirers. Typically, they'll use anywhere from 4 to 8. A lot of them…are historical in terms of using local acquirers to enter certain countries…"

- Stephanie Ferris, CFO, Worldpay (now FIS) (November 2018)

Source: Company reports, AlphaSense, Credit Suisse research

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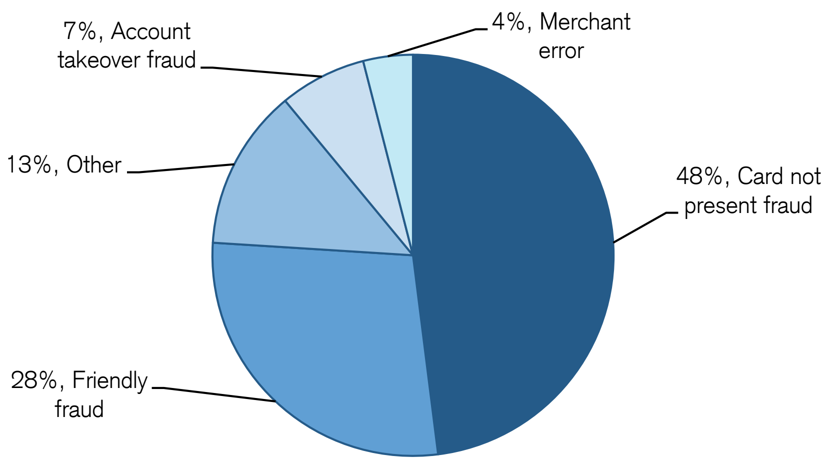
6. Fraud & chargebacks on card-based transactions
Overview of the chargeback & dispute process

- This process is part of the consumer protection provided by the card network rules (i.e., part of zero-liability consumer protection policy for unauthorized transactions dictated by both Visa and Mastercard network rules for participating issuers, acquirers, and merchants).
- Chargebacks are a forced transaction reversal initiated by the cardholder's bank when a customer disputes a transaction (i.e., this construct is often viewed as a positive for consumers, although a big negative for merchants). Verifi estimates ~$1 in disputed transactions costs merchants $1.50.
- Chargebacks are an increasing burden on merchants driven by the rise of CNP fraud and the time-consuming dispute resolution process; both in terms of time and costs, dispute process can be highly manual, involving documentation, and take ~60-90 days.
- "Friendly fraud" is when a consumer makes an eCommerce purchase and then contacts the card issuer to dispute the transaction (e.g., reports item not delivered, item does not match description, claims to have cancelled the order, claims to not remember, etc.).
- Note: Merchant acquirers ("acquiring risk") are only financially exposed when their underlying merchant is either: a) fraudulent from the start; and/or b) not able or willing to stand up for its chargebacks (due to bankruptcy).

The largest source of chargebacks in the US is card-not-present (CNP) fraud, followed by "friendly fraud"



Typical chargeback & dispute process, which can take ~60-90 days to complete

1	Someone makes a purchase using a Visa or Mastercard
2	Cardholder initiates the chargeback by contacting their issuing bank (e.g., Bank of America, Wells Fargo, Citi, Chase, PNC)
3	Issuing bank reaches out to the merchant's bank asking for evidence to refute the claim (perhaps the merchant provides an invoice, receipt, proof of delivery of some sort, etc.)
4	Issuing bank makes a decision as to whether or not they believe the transaction was a valid one
5	Customer is informed of the decision – he/she can either accept the "proof" provided by the merchant or escalate to arbitration
6	As a last resort (issuing bank and merchant's bank are not able to agree), Visa and/or Mastercard govern an arbitration process

 Source: Javelin Strategy & Research, Chargebacks911, Verifi, Square, Credit Suisse research

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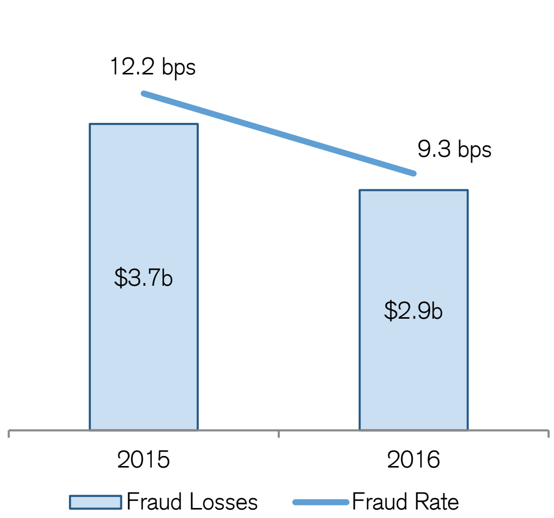
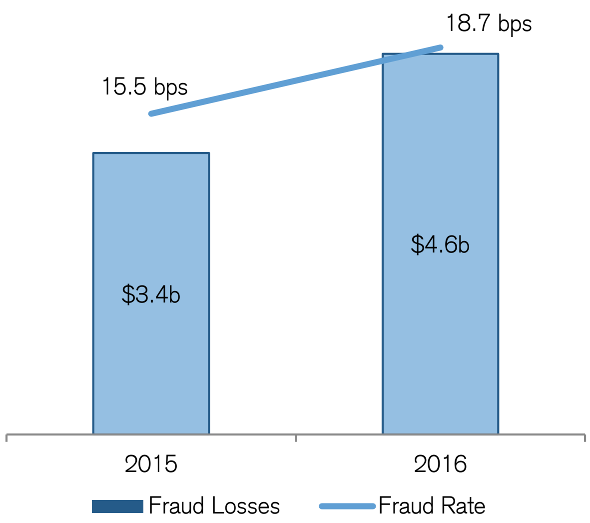
6. Fraud & chargebacks on card-based transactions
Card fraud migrating from in-store to online – Key drivers

- Migration to EMV – the migration away from magstripe "swipe" cards to chip-and-pin effectively reduced in-store counterfeit card fraud, causing criminals to shift their focus to online or card-not-present (CNP) fraud
  - 2015 EMV Liability shift in the US – Merchants that have not adopted EMV chip terminals became liable for counterfeit fraud done via EMV cards
- Data breaches – Fraudsters have access to card data, login credentials, and personal information from numerous data breaches
- eCommerce growth – High secular growth of eCommerce relative to in-store payments amplifies CNP fraud losses

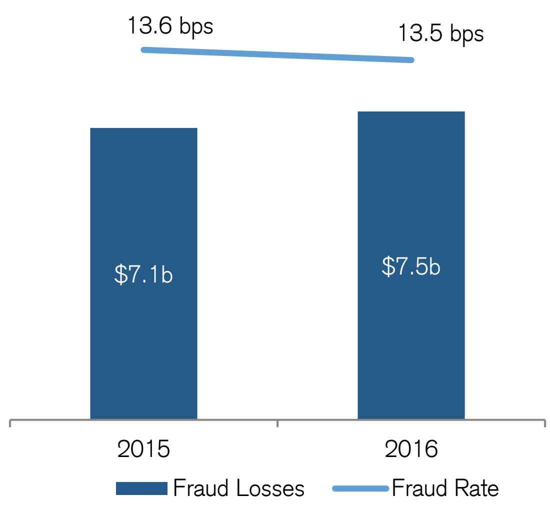
US in-store fraud losses and rates came down after EMV migration…



….while US card-not-present (CNP) fraud losses and rates increased…



…while total US market fraud losses and rates remained about the same



Source: Federal Reserve Bank of Atlanta, Credit Suisse research

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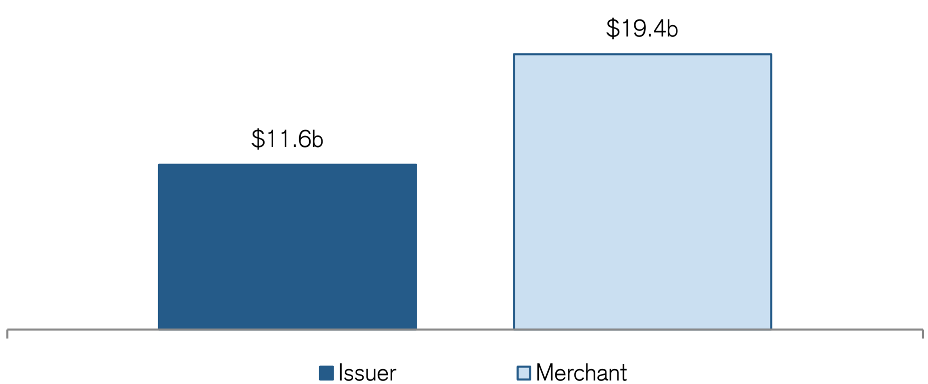
6. Fraud & chargebacks on card-based transactions

Who pays for what?

- In-store transactions – Card issuers are liable for card fraud if the merchant is utilizing an EMV-enabled card reader and follows network rules in acceptance.
- Online or CNP transactions - Merchant is liable for fraud (unless the merchant is utilizing a 3D Secure authentication solution, which can shift the liability back to the issuer).
- Both Visa and Mastercard have made recent acquisitions to support chargeback-related capabilities (Visa acquisition of Verifi in June 2019, and Mastercard acquired Ethoca in March 2019).
- In addition to costs (the actual chargebacks and fees from acquirers to support the process ranging from $10-25), merchants often have to dedicate time in responding to the dispute as well. Square does not charge merchants for chargeback disputes, while Stripe offers an insurance product (Stripe Chargeback Protection, at a cost of ~40bps) to cover all potential losses.

Of an estimated $31b of chargeback costs in 2017, roughly two-thirds of that cost burden was ultimately borne by merchants

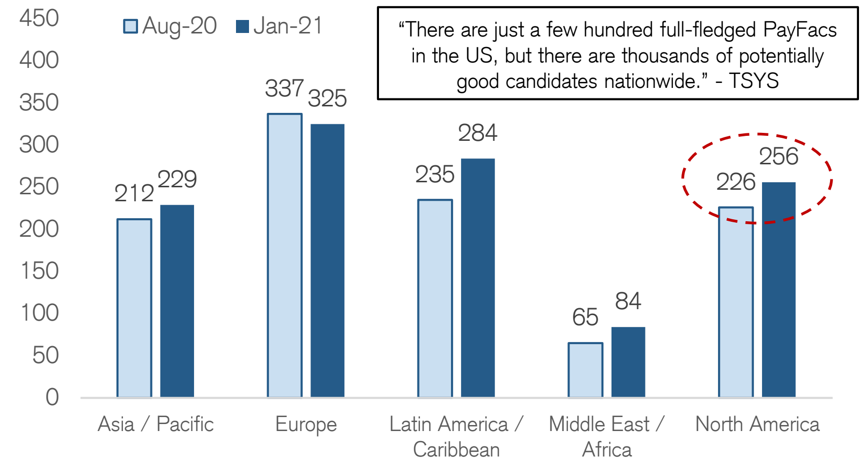


Source: Javelin Strategy & Research, Chargebacks911, Square, Credit Suisse estimates

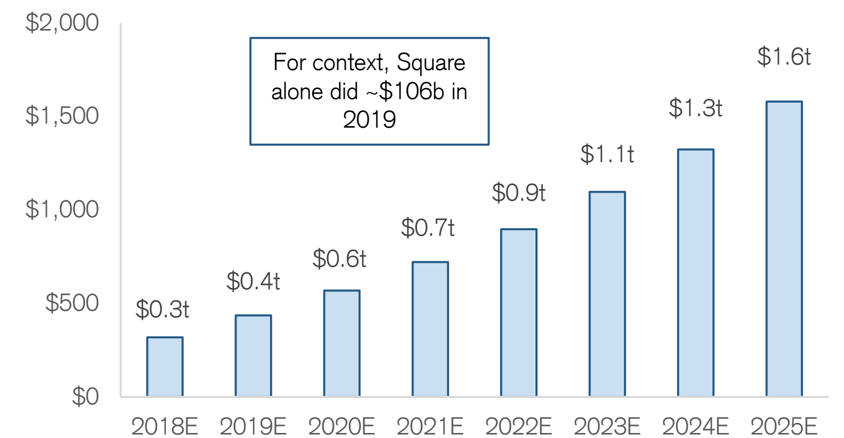
7. SaaS platform monetization of payments & financial services
Expanding the addressable market of payments acceptance

- The original Payment Facilitator was PayPal; Square and Stripe also operate under the PayFac model; the term "PayFac" is a registered trademark owned by Worldpay
- PayFacs (notably Square) have been vital in expanding card acceptance to micro and SMB merchants over the past decade
  - Traditional acquiring bank onboarding processes have historically been more suited for larger merchants and were often lengthy and complex; approval processes could range from a week to months
  - Customer acquisition costs were also a hindrance to attracting micro & SMB merchants; the PayFac model's streamlined onboarding processes, enabling "self-serve" and digital onboard processes, as it's less profitable for direct salesforces to individually prospect SMBs
- Companies becoming PayFacs (or PayFac-like alternatives) generally can be grouped into three buckets:
  1. Core commerce platforms/payments companies (e.g., Square, Stripe, PayPal, BlueSnap, PagSeguro, SumUp), although even within this group, both PayFac and non-PayFac models can be employed (e.g., Stripe can serve as both PayFac and ISO)
  2. Integrated Software Vendors (ISVs) with vertical-specific SaaS offerings (e.g., software to help manage a restaurant or fitness center), which have a payments aspect to their software and/or workflow (e.g., Toast, Mindbody, Lightspeed)
  3. Marketplaces and related technology platforms that "take payments in-house" (e.g., Etsy, Shopify, Wix, Yapstone)

256 PayFacs are registered with Mastercard in North America



Infinicept expects payment volumes attached to PayFacs to reach $700b by 2021E (ex-PayPal, Square, Stripe)



Source: Mastercard, Double Diamond Group, Infinicept, Stripe, Credit Suisse research, AZ Payments

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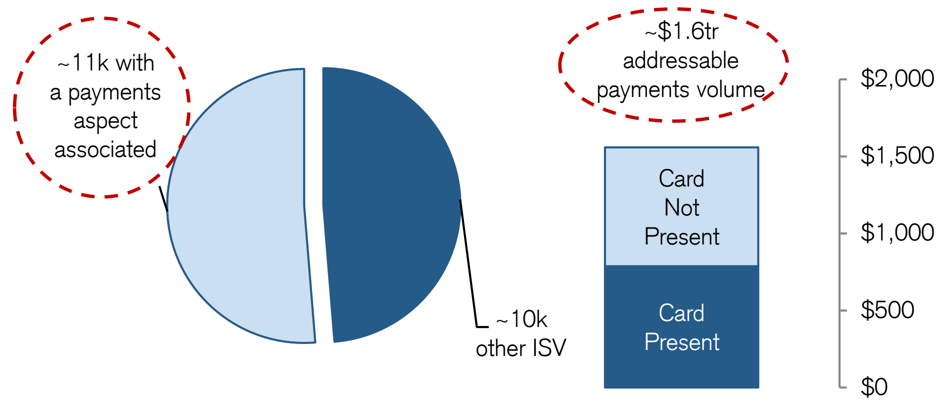
7. SaaS platform monetization of payments & financial services

Advantages for ISVs & platforms that become PayFac-like…

The advantages of becoming a PayFac (or a PayFac-like alternative) largely revolve around: (1) maximizing revenue generation, (2) faster onboarding of sub-merchants, and (3) increased control & ownership of experience

1. Building a more meaningful revenue stream
   - Ownership of the payments experience, as a PayFac (or a PayFac-like alternative) maximizes the revenue the ISV or platform earns on each transaction (i.e., ability to maintain all payments net revenue)
   - Must be evaluated vs. revenue share opportunities via a traditional integration payments relationship with a merchant acquirer (e.g., integration and revenue share with a traditional merchant acquirer, which takes on the payments risk and responsibilities, but pays a "lead gen" fee to the ISV in exchange for sourcing the volume)
2. Faster onboarding of sub-merchant
   - Sub-merchants avoid lengthy application processes required to receive merchant accounts via traditional acquiring bank onboarding
3. Increased control of experience
   - Control pricing of payments to underlying sub-merchants
   - Single point of contact for customer service (software & payments); consolidation in the merchant acquiring space has led to reduced service levels for ISVs partnering with acquirers
   - Ability to improve processes for your merchants (e.g., chargeback handling, funding) given ownership of those processes
   - Portability of merchant contracts (in case change of acquirer)

There are ~20k SaaS platforms in the US, ~11k are ISVs with approximately ~$1.6tr in potentially addressable payments volume; larger ISVs are addressable as potential PayFacs



Advantages of becoming a PayFac (or a PayFac-like alternative) for ISVs & tech platforms (vs. a traditional integrated payments relationship)

Revenue generation	• Create a recurring revenue stream (combination of software + payments is powerful) • Must be weighed vs. revenue share opportunities via a traditional integrated payments relationship
Fast onboarding of sub-merchants	• Sub-merchants avoid lengthy application processes required to receive merchant accounts
Control of customer experience	• Consolidation in the merchant acquiring space has led to reduced service levels for ISVs partnering with acquirers; so, take control of that, bring in-house

Source: Infinicept, Credit Suisse estimates; Note: $1.6tr from 2015 analysis represents a gross opportunity for conversion to the Payment Facilitator model (i.e., portions of volumes that flow through ISVs but are actually owned/managed by ISOs and bank acquirers, along with traditional integrated payments, that could potentially migrate to the Payment Facilitator model

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7. SaaS platform monetization of payments & financial services

…but must be weighed against the requirements and alternatives

Our view is that over the near to medium term, becoming a full-fledged Payment Facilitator will make sense for select scaled platforms & ISVs that operate in specific vertical markets (which limits the medium-term risk to traditional acquirers, but also provides meaning opportunities for enablers of this transition)…

- Requires hiring payments expertise (both technical aspect and business processes such as chargebacks, fraud, data privacy, PCI compliance)
- Meaningful payments volumes would be required to justify the upfront and ongoing costs of becoming a PayFac
- ISVs and platforms in specific verticals and with a more domestic focus can more easily justify PayFac start-up costs (i.e., less complexity, reduced fraud, and increased homogeneity of sub-merchants) vs. a global marketplace that brings on vast sub-merchant types and cross-border complexities

…while remaining ISVs, marketplaces, and platforms are more likely to opt for alternative solutions (which generally means reduced revenue share and control, but also reduced responsibility and investment)

- Hybrid solutions, including the "Managed PayFac" alternative – options that allow for many of the advantages of being a PayFac, such as speedy onboarding, reduced support & compliance burdens, easier to expand internationally, etc., with enhanced revenue opportunities via "beyond payments" monetization and technology partners to assist with new product rollouts and innovation
- Traditional payments partnership – traditional integrated payments providers (e.g., Global Payments Integrated, Worldpay, CardConnect); come with lower revenue shares (wide range of ~20-80%) but zero risk and reduced support & compliance responsibilities

What are the traditional steps, processes, and costs associated with becoming a full-fledged Payment Facilitator? (but platforms are emerging to meaningfully reduce the time and costs associated with the process below)

Hiring team to manage capability
Requires team of full-time employees to manage business, legal, and engineering processes, along with building a customer service function, etc.

Payments systems set-up (6-12+ months, ~$650k – $1.1mm)
Acquiring processor (bank) sponsorship, potential gateway integrations, Level 1 PCI DSS certification, building initial merchant dashboard and payout systems; could require consultants/advisors

Merchant onboarding & compliance (6-18 months, ~$1.8mm)
Develop merchant underwriting and onboarding procedures (e.g., ID verification, risk scoring systems), along with compliance with various licenses and card network requirements, data retention & privacy, etc.

Ongoing management of capability (~$200k – $ millions per year)
Per account costs for onboarding & monitoring, risk monitoring, fraud prevention, chargeback process handling (i.e., responding with evidence submissions, reporting [1099s], annual compliance validation, etc.)

Additional costs to consider longer term
- International expansion (some of the above, but for a new market)
- Technical & procedural changes due to changing regulations (e.g., PSD2)

Platforms & consultancies such as **Payrix, Finix, Infinicept, Amaryllis, etc.** are beginning to emerge to help reduce the time & costs associated with transitioning from an ISV to a full-fledged PayFac.

Source: Stripe, Agile Payments, Credit Suisse research

7. SaaS platform monetization of payments & financial services

Sample of a "Hybrid" alternative, Stripe Connect

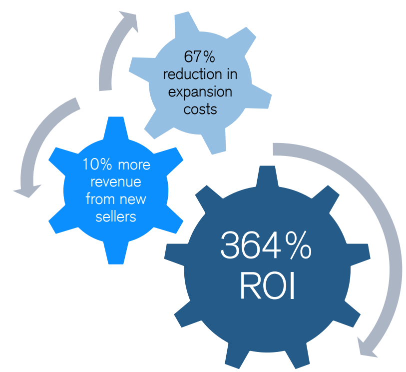
Stripe Connect allows ISVs, marketplaces, and other platforms to "act like a PayFac, but not be a PayFac"

- Stripe Connect was built specifically for platforms and marketplaces
- Stripe's offerings fall under the PayFac hybrid category. With Stripe Connect, platforms receive the benefits of fully customizable and speedy onboarding, control of pricing and fees, payout management, and integrated financial reporting but with lesser support and compliance burdens, greatly reduced up-front costs, and allows the platform to stay outside the flow of funds
- Stripe Connect is API-first and allows the platform partner to:
  - Launch quickly with minimal upfront costs
  - Enable payments acceptance and payouts to sub-merchants
  - Still offer fast onboarding via fully customizable onboarding flows, with Stripe responsible for all KYC, AML, OFAC compliance, etc.
  - Scale globally without new market start-up costs (including not having to open bank accounts and legal entities in various regions)
  - Allows Stripe to handle all payment processing, acquiring bank sponsorship, support (24x7), compliance, further global expansion over time, tax reporting, etc.
- The platform (customer of Stripe) maintains the ability to determine pricing and fees charged to merchants (i.e., adding a margin on top of Stripe fees), allowing for a degree of monetization of the payments and financial services aspect of their business, in addition to the advantages outlined above
  - Revenue = fees charged to sub-merchants
  - Cost of revenue = fees paid to Stripe

Stripe enterprise and SaaS platform partners that have opted to use this alternative (examples by sub-segment)

eCommerce & Retail	adidas, shopify, Warby Parker, Under Armour, Target, amazon, wayfair, Blue Apron, wish, Peloton, OpenTable, Shopstyle
B2B Platforms	DocuSign, salesforce, Booking.com, Mindbody, Automattic, Squarespace, blackbaud, sportsengine, catawiki, Wix, xero, Indiegogo
Software as a Service	zoom, slack, HubSpot, DigitalOcean, splunk, twilio, docker, tableau, Marin Software, Optimizely, Atlassian
B2C Marketplaces	Grab, TaskRabbit, deliveroo, Postmates, lyft, Uber, Kickstarter, Handy, DoorDash, instacart
Non-Profits & Fundraising	charity: water, Khan Academy, USO, Save the Children, (RED), Human Rights Watch, American Cancer Society, unicef, Habitat for Humanity, Oxfam

Forrester survey showed 364% ROI for platforms that switched to Stripe Connect



Source: Stripe, Credit Suisse research

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7. SaaS platform monetization of payments & financial services

ISV or PayFac? It's not that simple…

ISV (with revenue share) — **In between exists a range of (often negotiable) options with varying degrees of control over experience, portability, revenue, costs, and risks** — **Full-fledged PayFac**

	ISV partners with integrated payments provider	Emerging "Hybrid Approach"	"Managed Payment Facilitator"	Full-fledged PayFac
Revenue	Typically ~20-80% of net revenue (ex-interchange, network fees, and other) but varies meaningfully by vertical and volumes	Revenue share can be lower in exchange for the instant onboarding, but negotiable (volumes matter)	Platform may determine mark up on partner pricing (under buy rate agreement) or some form of (negotiated) revenue share with a degree of ongoing costs	Keeps full amount of net revenue (ex-interchange, network fees, processing, and banks sponsor fees); also has ongoing operating costs (staff, compliance, etc.)
Onboarding & Experience	Standard onboard with a separate MID for each merchant; acquirer handles KYC, AML, etc.; less control over experience	Depends on vertical, but potential for instant onboard for majority of sub-merchants; acquirer handles KYC, AML, etc.; increased control over experience (but can still have limitations around onboarding process/design/capture)	Can include "white-labeled payments"; Instant and near-complete control over onboarding (incl. merchant underwriting) and near-complete control over experience; greater customization via Flexible APIs for custom UI / UX	Instant onboard with full control over experience; single touchpoint for sub-merchant
Ongoing support	Payments co. handles; i.e., sub-merchant has two touchpoints	Stays with payments partner (acquirer); i.e., sub-merchant has two touchpoints	Software company takes on	Payment Facilitator takes on
Risk	Stays with payments partner (acquirer)	Stays with payments partner (acquirer), generally, but varies	Software company takes on (as the "equity" tranche), but could revert to the payments partner ultimately	Payment Facilitator takes on
Portability (merchants, tokens)	No	Generally no (but can be negotiated)	May have contractual portability, but not practical portability	Yes
One-liner (ISV's perspective)	Can be profitable (i.e., no payments-related costs or responsibilities) if revenue share negotiated well	Close to full benefits of being a PayFac (although generally lacks portability), with minimal effort/costs	Must share revenue with the partner, but still takes on risk & support, and lacks practical customer/token portability	Highest revenue, best onboarding & experience, but comes with cost base justifiable only by larger ISVs
Selection of sample partners	Global Payments, Worldpay, First Data (CardConnect), Braintree (PayPal), Stripe Connect, BlueSnap, Paysafe, Nuvei, Repay, Shift4, Paya, Chase, and others	Clearent, First Data (CardConnect), Stripe Connect, Adyen for Platforms, Braintree Marketplace (PayPal), Chase, and others	WePay (owned by Chase), ProPay, USIO, Stripe Connect (custom), Paysafe, Payrix, and others	Requires acquiring bank sponsor; Numerous aspects (e.g., tokenization, vaulting, fraud detection, onboarding, chargebacks, risk mgmt.) can be outsourced (e.g., Finix, Payrix, Infinicept, Amaryllis, etc.)

Less control & merchant contract portability ← → **More control & merchant contract portability**

Source: Finix Payments, Infinicept, Payrix, Credit Suisse research; Note: Arrangements along this spectrum are often negotiated and customized, and various partners are able to operate and provide services across the spectrum (albeit with varying degrees of focus and mix) – i.e., the distinctions and boxes above are more illustrative and not hard rules; We note select circumstances where being a full-fledged PayFac is necessary: 1) if the platform has specific fund flows that require money transmission licenses in certain states, 2) if the platform has legacy systems that require registration as a PayFac, 3) if the platform must hold money for more than 30 days.

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7. SaaS platform monetization of payments & financial services

Methods of monetizing payments and financial services

There are a variety of pricing options for a platform to monetize payments and associated services ranging from subscription-based models that align with other SaaS fees to transaction-based fees driven by use of the services

Charge customers a fee to access payments	Platforms can create subscription models with fixed monthly charges for access to payments with tiered plan options. Plans can include access to capabilities such as accepting payments or donations, selling gift cards, POS, subscription management, or discounting tools.
Mark up transactions	Platforms can charge a mark up on each transaction and earn the spread earned above the processor's pricing. Mark ups can be adjusted based upon the payments plan tier referenced above, with higher cost plans charging lower mark ups.
Add fees for additional payment features	Platforms can charge for additional features such as chargeback protection or faster payouts. For example, platforms can charge a fixed fee for instant payouts and no fee for regular payouts.
Charge a fee for using other payment gateways	Platforms can charge fixed fees or percentage fees on any transactions that are made through payment providers other than the platform to allow for monetization of all transactions made by the merchant. For example, Shopify charges up to 2% in additional fees for use of other payments providers.
Charge for custom reporting and analytics	With the data that platforms accumulate from transactions, platforms can build custom reporting and detailed analysis which can then be sold to customers as part of the premium payments plan tiers or as a separate service.

Source: Finix Payments, Infinicept, Credit Suisse research

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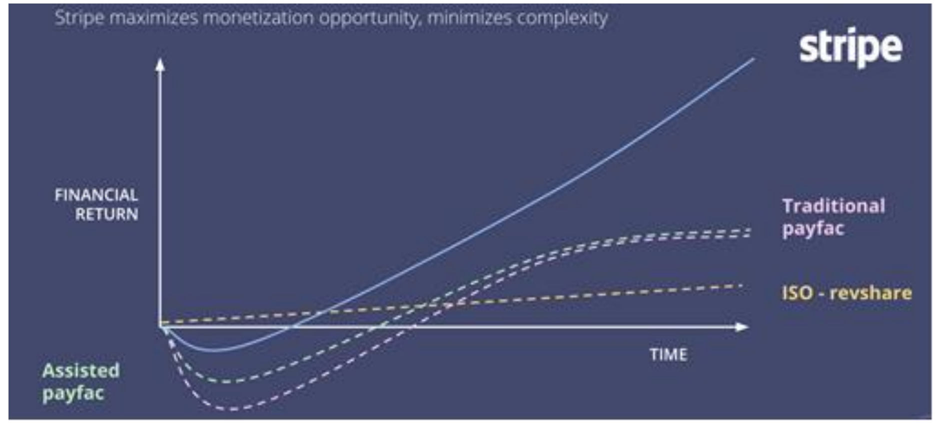
7. SaaS platform monetization of payments & financial services

Stripe enabling the journey to embedded finance

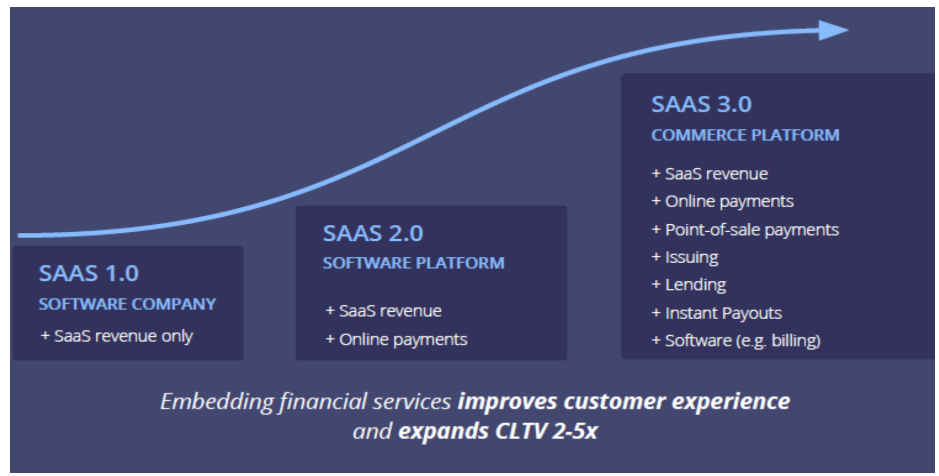
Ultimately we expect a continued move towards SaaS 3.0 for SaaS platforms, where an integration with Stripe and/or other providers can allow the software platform to serve as a one-stop-shop for financial services (i.e., distribution into its underlying merchants)

- **SaaS 1.0** - Refers to companies that derive revenue solely from SaaS subscription fees. Under this first iteration of the software company business model, companies were wholly reliant upon revenue relating to the sale of software and renewal of subscriptions.
- **SaaS 2.0** - Includes the introduction of integrated payments, with revenue generation from payments flowing through the platform. This transforms and extends the business model, and can lead to improved business valuations. Our panel pointed to the example of Shopify launching Shopify Payments in 2012.
- **SaaS 3.0** - Expands upon the payments opportunity, with the evolution from a software platform to a commerce platform. SaaS 3.0 includes the opportunity for POS payments, card issuing, merchant lending, instant payouts, billing management, etc. Our view is that all SaaS platforms and marketplaces have the potential to become commerce platforms over time, and penetration of integrated payments will drive growth both for software companies and payments companies that are facilitating this evolution.

Stripe enables SaaS platforms and marketplace to monetize payments, with little initial investment, but great upside potential



For software companies, the evolution from SaaS 1.0 (software only) to SaaS 3.0 (fully embedded finance) can expand CLTV by ~2-5x



Source: Stripe, Credit Suisse research

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7. SaaS platform monetization of payments & financial services

Example of a platform embedding financial services: Lightspeed POS

In 2019, Lightspeed POS introduced its own integrated payments offering, Lightspeed Payments. The company has since expanded into other embedded financial services, including Lightspeed Capital, a working capital lending program, and Lightspeed Subscriptions, a recurring billing platform, with yet more opportunities on the horizon.

- Lightspeed has simplified the back offices of its restaurant and retail merchants by acting as a single point of contact for both POS software and payment processing, helping to build stickier customer relationships
- Lightspeed recognized that its merchants' financial services needs extended beyond payments, and has discovered that it can offer a simplified solution for many of those needs through their software platform
- While generating modest revenue (direct benefit) for Lightspeed, Lightspeed Capital also boosts merchant growth, which further serves to benefit Lightspeed Payments as merchant volumes grow (ecosystem, i.e., indirect benefits)
- We believe Lightspeed, like other SaaS platforms and marketplaces, could expand into additional embedded financial services such as instant payouts, card issuance, payroll management, and treasury services

Lightspeed is finding ways to monetize financial services beyond simply payments – already offering lending through Lightspeed Capital and subscriptions (recurring payments), with Treasury potentially the next leg

Commerce-Enablement Opportunities		
Payments	✓ (Lightspeed Payments)	In-store and eCommerce payment acceptance, monetized via a fee as a % of transaction value plus a per transaction fee
Financing	✓ (Lightspeed Capital)	Extension of capital to merchants (up to $50,000 per customer location), monetized via a revenue share on interest income
Subscriptions	✓ (Lightspeed Subscriptions - Beta)	Establish recurring payments with automatic billing/processing, monetized similar to standard payments (% of transaction value plus a per transaction fee)
Payouts	Opportunity	Enable merchants to instantly access their revenue prior to funds settlement, typically monetized by charging a fee as a % of payout volume
Card Issuing	Opportunity	Provide expense cards to merchants to pay for business expenses and provide instant access to funds, typically monetized via interchange fees
Payroll	Opportunity	Offer merchants the ability to manage payroll through their Lightspeed platform and potentially allow employees early access to paychecks, monetized as a % of volume
Treasury Services	Opportunity	Provide financial products (interest-bearing and no interest bank accounts, bill payment, money movement, etc.) to merchants, likely monetized via debit card interchange

Source: Finix Payments, Infinicept, Credit Suisse research

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7. SaaS platform monetization of payments & financial services

Stripe Treasury – a re-envisioned business banking relationship

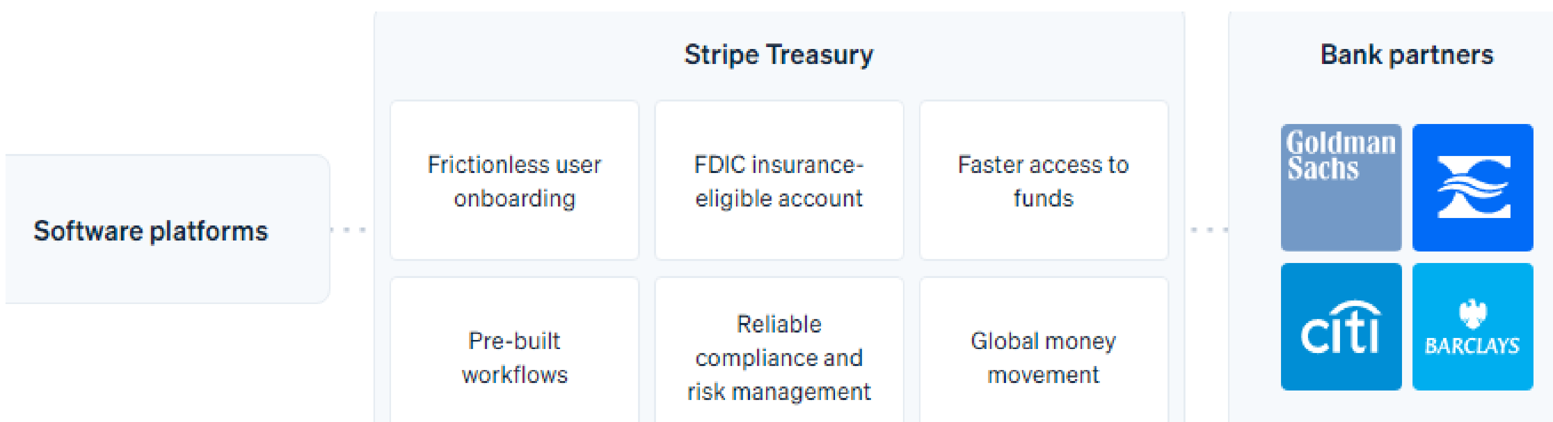
Stripe recently introduced Stripe Treasury – a BaaS API enabling several commonplace treasury features

- Merchants are able to open bank accounts to hold funds and earn interest (partner with Goldman Sachs, Evolve Bank & Trust, Citi, Barclays)
- Make and manage bill payments for merchants; cash flow management tools and services
- Merchants benefit from speed to open accounts and simplified management of funds through the same software used to operate the business

Platforms owns the relationship and can participate in monetization of underlying banking offerings

- While a bank partner holds the funds behind the scenes, the platform is the primary point of contact and the front-facing provider of the banking services, helping to grow and enhance the platform-merchant relationship, reducing churn and increasing customer LTV
- Similar to other embedded financial services, platforms could potentially monetize via a range of fee streams and/or revenue shares (e.g., subscription fees, fees for additional services, marking up transactions, etc.)
- Platforms can integrate Stripe Issuing services for merchants, allowing them to pay employees and/or suppliers via stored-value account and other payment-based products such as a supplier payments account for order fulfillment

Stripe Treasury works with global bank partners to enable software platforms to integrate traditional banking services into the software via a Banking-as-a-Service API making it easier for SMB merchants to access financial services



Source: Stripe, Credit Suisse research

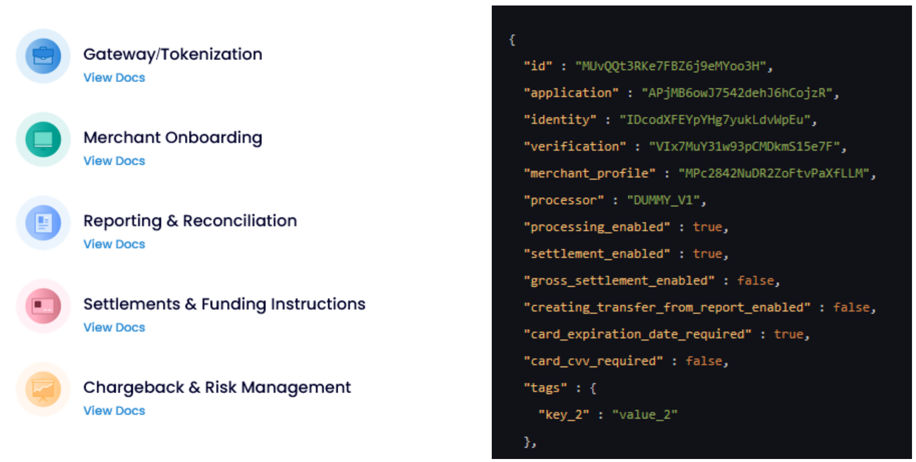
7. SaaS platform monetization of payments & financial services

Finix reduces the burden of integrating payments

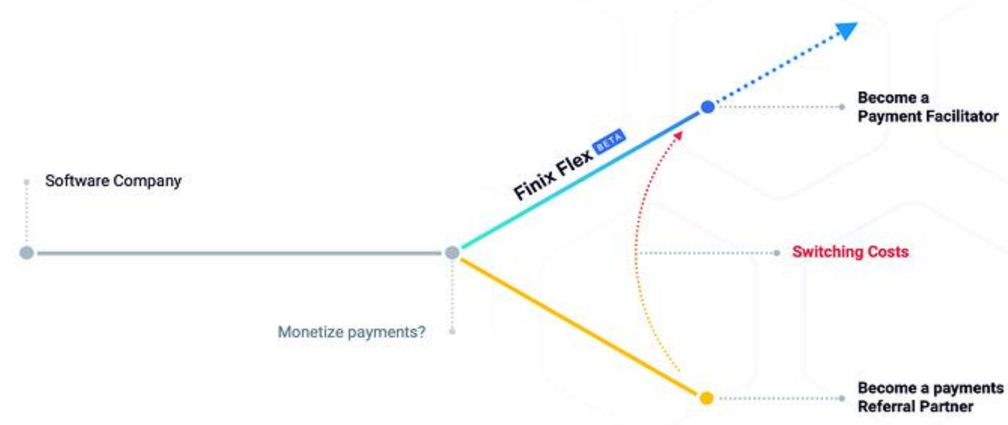
Finix is a payments Infrastructure-as-a-Service (IaaS) company that can assist software platforms to become full-fledged PayFacs or help companies with lower volumes to integrate payments without all of the cost burdens of becoming a PayFac (and reduced switching costs if a decision is made at a later time to become full-fledged PayFac)

- Finix aims to reduce the time required to bring payments in-house, often by months or even years, by providing the infrastructure required to onboard merchants, tokenize payments, manage settlements, funding, & chargebacks, and develop risk management processes
- Finix estimates that software platforms require at least ~$50 million of card volume in order to recoup the costs of becoming a PayFac
- With Finix Flex, earlier stage software platforms with less than $50 million in card volume can integrate payments into their platforms faster and start building the foundations to become a PayFac without immediately incurring all of the upfront costs
  - With Finix Flex, interchange-plus pricing is offered by Finix which the ISV can then choose to mark up to monetize payments
  - Finix Flex helps to avoid switching costs in the future when the ISV platform eventually decides to become a full-fledged PayFac

Finix provides APIs to help facilitate merchant onboarding, risk management, settlements, transfers, disputes, tokenization, and more



Finix Flex is built for software platforms that plan to eventually become PayFacs but don't have the volume necessary to justify the decision now



Source: Finix Payments, Credit Suisse research

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7. SaaS platform monetization of payments & financial services

Infinicept enabling and expediting the PayFac process

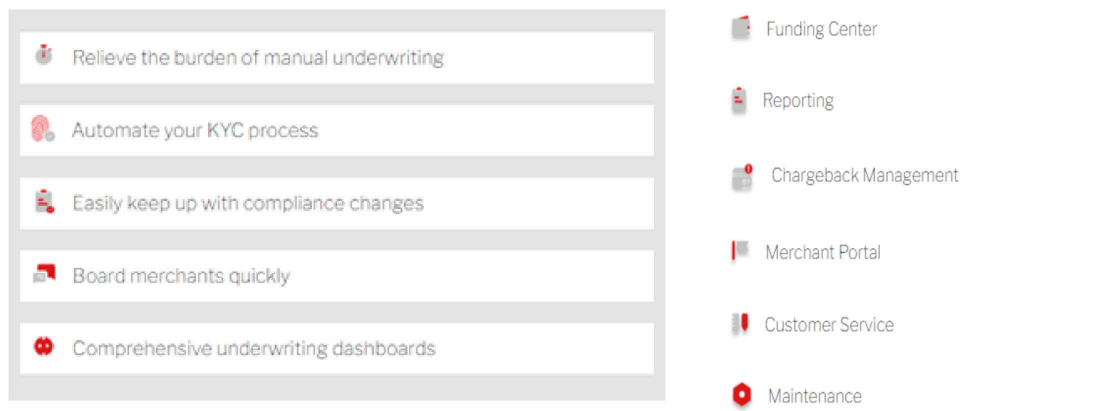
Infinicept makes the process of becoming a PayFac (or a PayFac hybrid) and managing a PayFac easier.

- Focused on the enterprise software market, Infinicept offers a provider-agnostic platform, serving as an access portal to numerous payments (e.g., gateways, token providers) and financial services offerings
- Enables clients to participate in both the direct (monetization, revenue share, etc.) and indirect benefits (ecosystem, customer relationships, reduced churn, etc.) of embedding payments into their software
- Infinicept allows software companies to take ownership of their payments (sometimes as a Payment Facilitator, sometimes via an alternative or lighter model) at roughly the same cost as a hiring a single software developer
- Infinicept's business model is based on a monthly subscription-based fee (vs. basis points of dollar volume), thus allowing partners to benefit from operating leverage and scale

Infinicept estimates there are ~20k US software platforms that touch the payments function, and ~209k worldwide (segmented as outlined below), resulting in what it considers to be a ~$15b recurring revenue opportunity on a global basis

Tier	ISV Population (thousands)	ISV Mix %	SaaS TAM ($mm)	Additional Products +50% of annual opportunity per ISV ($mm)	Recurring TAM ($mm)
Large & Enterprise (revenue $50mm - >$250mm)	21	*10%*	$3,597	$1,799	$5,396
Medium (revenue $10mm - $50mm)	42	*20%*	$3,754	$1,877	$5,631
Small & Micro (revenue <$1mm - $10mm)	146	*70%*	$2,399	$1,200	$3,599
Total	**209**	***100%***	**$9,750**	**$4,875**	**$14,625**

Infinicept enables software partners to seamlessly underwrite & onboard new merchants to their platform, providing a real-time dashboard & tools for the management of merchant data, reporting, etc.



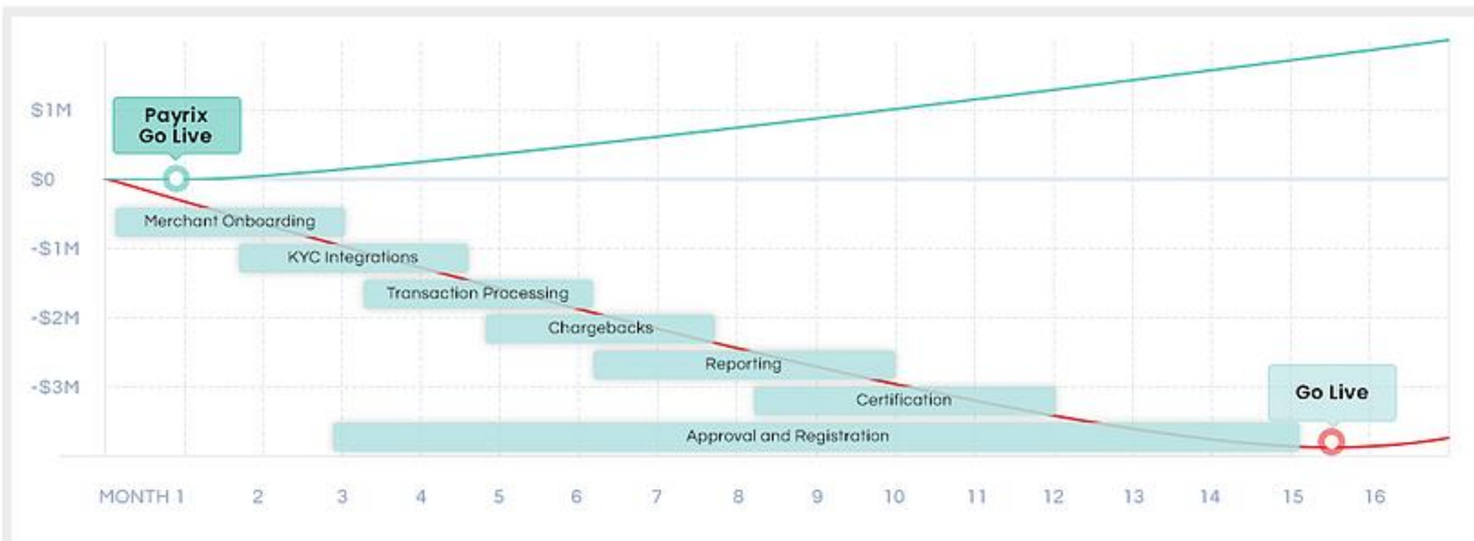
Source: Infinicept, Credit Suisse research

7. SaaS platform monetization of payments & financial services
Payrix helps small- to mid-sized software companies embed payments

Payrix provides SaaS businesses & marketplaces the ability to embed, brand, and scale their own payments capability via an open API approach through two offerings:

- Payrix Pro is a white label solution with no regulatory burden and shared risk that can be fully integrated with the software platform in a month, allowing for low upfront investments to embed and monetize payments
- Payrix Premium provides the platform or marketplace with maximum control over the payments experiences and allows the company to earn more on each dollar of payments volume, but the platform takes full liability for risk and must become fully registered and compliant, requiring greater upfront investment and a longer time period (~3+ months) before going live
- Payrix does have some larger enterprise customers, but tends to work with smaller companies relative to Infinicept, with customers often providing industry/vertical-focused software (e.g., spas & salons, fitness studios, pest control, lawncare, HVAC, landscaping, etc.)

Payrix significantly reduces the time required to go live with payments on a software platform



Source: Payrix, Credit Suisse research

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7. SaaS platform monetization of payments & financial services

Difference between ISOs and PayFacs

Although often bucketed together in industry conversations, PayFacs are distinct from ISOs. Blurring this topic further, service providers often act as both (e.g., Stripe, Square, PayPal are all PayFacs and operate as ISOs for larger merchants).

- Independent Sales Organization (ISOs), like PayFacs, help to onboard SMBs into the payments ecosystem.
- Merchants that work with ISOs contract directly with the underlying acquiring bank and (historically) have gone through a more traditional onboarding process, which generally leads to PayFacs having meaningfully faster (i.e., minutes vs. weeks) onboarding processes.
- PayFacs generally have greater levels of control (i.e., funding and ownership of merchant relationships) but also assume greater risks.

Aspect of business	PayFacs	ISOs
Merchant of record?	• Merchants of record have their own master Merchant ID (MID) • Sub-merchants do not have their own MID (their payments are aggregated under the master MID)	• Varies by contract with underlying acquiring bank
Size of merchants/ sub-merchants	• Smaller, generally < $1mm in V and/or MA volumes (per network rules, although enforcement varies)	• Larger merchants that are not able to be onboarded via the PayFac model
Portability of merchants?	• Owns the sub-merchant relationship and can take sub-merchants to another acquiring bank sponsor	• Varies by contract with underlying acquiring bank (making the merchant relationship beholden to the sponsor bank)
Onboarding directly?	• Onboards sub-merchants directly • If sub-merchants exceed volume thresholds, they may be required to contract directly with the acquiring bank	• Onboarding done through the acquiring sponsor bank
Onboarding speed?	• Fast, can happen within minutes • Creates their own application process and underwriting criteria	• Time consuming, traditional merchant account application • Beholden to underlying acquiring bank process and criteria
Risk assumption?	• Takes on risk of chargebacks, fraud, failure to perform, etc. across its portfolio of sub-merchants • Ensures PCI, KYC, AML, OFAC, etc. compliance	• Wholesale ISOs take on risk • Retails ISOs do not take on risk (the risk is absorbed by the underlying wholesale ISO and/or acquiring bank)
Fund flows & payouts?	• Controls the flow of funds (and all associated reporting) • Handles payouts to sub-merchants	• Does not actually touch the money (acquiring bank controls, and handles payouts)

Source: PaymentFacilitator.com, Stripe, Credit Suisse research

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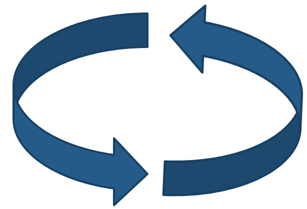
8. Further rationale for software-enabled payments

Convergence of software + payments attractive from both starting points

- Results in a highly recurring revenue stream, with reduced attrition, and the potential for higher margins (i.e., distribution leverage – "acquire the merchant once, sell the merchant many times", including additional ancillary products and services such as working capital loans, payroll processing, invoicing, cards, etc.)
- Makes sense for payments and software to work together given payments data are valuable for decision making and planning (customer preferences, inventory planning, cash flow management)
- Both payments and software companies are attempting to work with the same underlying merchants, which are often SMB and mid-market merchants (also an attractive area of payments, which higher net revenue yields vs. working with larger merchants)
- Payments companies can get exposure via owned software (e.g., Global Payments, Square) or partnered (integrating payments into ISVs, referral relationships)

Software & services platforms adding payments	Payments platforms adding software & services
Shopify	Square
Lightspeed	Global Payments
Mindbody	Clover (Fiserv/First Data)
Coupa	Stripe
TouchBistro	Shift4
RealPage	iZettle (PayPal)



Example Platform	SaaS & other revenue ~%	Payments revenue ~%	Comment
Shopify	50%	50%	Based on CSe 2020 revenue mix; vast majority of Merchant Solutions revenue (>70% of total) is Payments
Intuit	85%	15%	2017A result (last payments disclosure), as a % of Small Business & Self-employed revenue
MindBody	61%	39%	2017A result, prior to being acquired by Vista Equity Partners
RealPage	77%	23%	Payments resides in the "Resident Services" category, which was ~46% of revenue LTM Sep. 2020 (we assume ~1/2 payments for illustrative purposes)

Source: Company reports, Infinicept, Credit Suisse estimates

8. Further rationale for software-enabled payments

Software is one of the fastest growing swim lanes in payments

Channel/Type of Entity	Description	Increasing or decreasing in importance?	Growth	Sample payments providers employing model
Direct self-serve	In-house sales force, generally focused on larger, high-value merchants within their employer/merchant acquirer's target market	↑	~20%+	Global Payments, FIS (Worldpay), Repay, FISV (First Data)
Direct sales force	Mainly focus on micro and SMB merchants, where it can be less economical to deploy live sales resources; Square is the best example of self-serve digital onboard (for the majority of Square sellers), while Clover (and others) is also employing this approach	↑	~Mid-high singles	Square, Fiserv (First Data/Clover), Adyen
Bank branch	Bank-owned acquiring (e.g., Chase, US Bank) or referral partner relationships (e.g., First Data JV with Wells Fargo), leveraging the business customer base of the bank, effectively cross-selling payments acceptance in addition to loans, business checking accounts, etc.	—	~Mid-singles	First Data (via JVs with Bank of America, Wells Fargo, Citi, and PNC), FIS (Worldpay), Global Payments (mostly outside the US)
Independent Software Vendor (ISVs)	Vertical-specific SaaS offerings (e.g., software to help manage a restaurant, dental practice, fitness center, etc.) which have a payments aspect to their software and/or workflow; Range of options spanning ISV-payments partnerships with revenue share, owned-approach (payments company owns software), and PayFac approach (software company takes payments "in-house").	↑	~Mid-teens	Global Payments, FIS (Worldpay), Fiserv (First Data), Repay, Shift4, Paya, BlueSnap
Value Added Reseller (VAR)	A type of sales organization that packages together ISV technology (generally vertical specific, but could be ERP, accounting, etc. software as well) + Payments processing + other value added services to sell to merchants, typically earning a revenue share of payments-related volume. Could be selling a fully integrated, vertical-specific solution (i.e. Shift4) or packaging together a still integrated, but more commoditized solution (i.e. legacy acquirers / gateways).	↑	~Mid-teens	For payments: Shift4, FIS (Worldpay), Fiserv (First Data); For ISVs: Oracle, Microsoft, SAP (ERP/acctg), Shift4 (POS), Agilysis (real estate mgt) + many more
Modern Independent Sales Organization (ISO) - wholesale	In the US, technically, the large acquirers (Global Payments, Worldpay, First Data, etc. all operate as ISOs). This category employs the other categories as distribution methods. Third-party payment processing companies authorized by one or more underlying acquiring banks to sell/service payments acceptance and merchant accounts for businesses. There are also "Super ISOs" that operate as partners of the larger ISOs. Also, when PayFacs work with larger merchants, they must operate under the ISO (wholesale) model - e.g., PayPal, Stripe, Square must do this when working with merchants that exceed certain volume thresholds set by Visa & Mastercard); modern platforms add layers of technology and services to their product and distribution; Category includes many of the payments platforms that are "an authorized ISO of" an underlying acquiring bank.	—	~Slightly above market rates	Majority of large payments platforms in the US (Global Payments, First Data, Worldpay, etc.) are technically ISOs (of their sponsor bank) in the US market, but also have ISOs distributing their payments processing solutions
Traditional wholesale ISO	Traditional "feet on street" salesforce extensions; Wholesale ISOs take on the risk of merchant failure, and thus, are more well compensated than retail ISOs.	↓	~Low-mid-singles	Numerous smaller organizations
Independent Sales Organization (ISO) - retail	Retail ISOs do not take on the risk of merchant failure, and thus, are less well compensated than wholesale ISOs.	↓	~Low-mid-singles	Numerous smaller organizations
Total			~7%	

Source: Credit Suisse research; Note: There is overlap above (i.e., a modern ISO will use many or all of these distribution methods, but included for definitional purposes)

8. Further rationale for software-enabled payments
Front-end differentiation extends to SMB too, not just consumers

Square

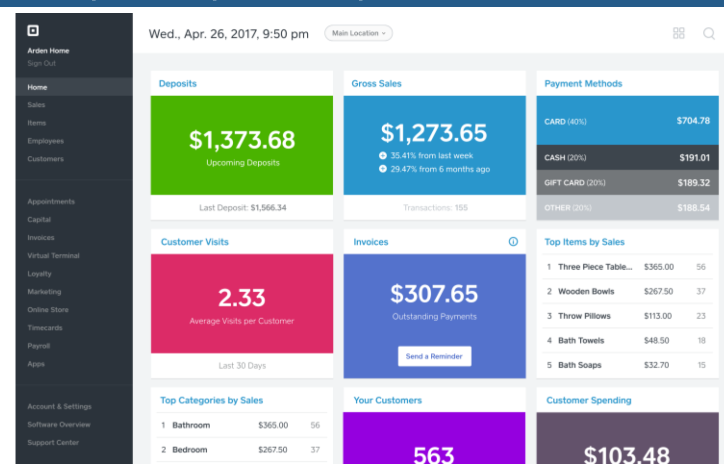
- Frictionless onboarding: merchants can sign up for Square in ~5 minutes vs. potentially weeks with banks/ISOs
  - ~+90% of Square's sellers self-onboard without any human intervention
- Cross-sell enabled by integrated software and self-serve nature of products
  - Facilities ease of use vs. integrating various
  - Square can proactively offer additional products (Square Capital Loans)
- Staged sign-up flow – removes friction by enabling users to sign up with minimal information and requests information as needed for additional services
- Minimal employee training required reflects intuitive software – Square POS app runs on Apple and Andriod operating systems, which users are already know how to use

"…We know we have very compelling and differentiated hardware products. We know we have very compelling and differentiated hardware products. We build our hardware in-house, and that means we have greater reliability, speed of data and elegant design and interoperability with our software products.…"

– Amrita Ahuja, CFO, Square (November 2019)

Square's user interface has a more natural feel for digitally native consumers compared to legacy solutions

Square's entire ecosystem of "self-serve" products in one place simplifies the operations of their sellers



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8. Further rationale for software-enabled payments

Square as an example of additional software services for merchants

Service	Description	Pricing
Square POS	General purpose POS software, pre-installed on Square Register. Automatically tracks sales, inventories, customer data, digital receipts, and more	Free
Square for Retail	Designed for retail industry. Includes POS, online store, inventory management, and more advanced/premium features	Free; Plus and Premium plans from $60/month
Square for Restaurants	POS for full-service restaurants. Provides front of the house (tables, orders, courses) and back of the house (revenue and cost reporting) business management solutions	Free; Plus and Premium plans from $60/month
Order Manager	Integrates >20 delievery platforms with Square for Restaurants, allowing sellers to manage all orders from the POS. Top partners include DoorDash, Postmates, and Chowly.	~1% take rate
Payroll	Comprehensive payroll offering enabling sellers to pay wages and taxes, hire new employees, and offer employee benefits. Available in all 50 US states as of 2018	$29 monthly subscription + $5/month per employee
Appointments	Provides sellers with an integrated appointment scheduling solution. Focused on the services industry	Free for individuals; from $50/mo. for 2+ employees
Team Management	Enables services including manage employee timecards, view employee sales analytics, secure employee permissions, and more	Free for basic version; $35/month for Team Plus
Text and Email Marketing	Enables sellers to run targerted marketing campaigns by linking customer data with transaction data, providing sellers easily assess the ROI of their marketing spend	From $10/month for text; from $15/month for email
Loyalty	Provides sellers with an integrated loyalty program for repeat customers	From $45/month
Gift Cards	Enables sellers to offer custom gift cards	From $0.80/card
Invoices	Enables sellers to create and send custom digital invoices to customers (recorded in transaction revenue)	No monthly fee; 2.9% + $0.30 fee per invoice
Developer Platform	Set of APIs and SDKs that enable third-party developers to integrate Square Payments into their Apps. Expands Square's addressable market to businesses with industry specific needs	N/A

Source: Company reports, Credit Suisse estimates

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8. Further rationale for software-enabled payments

Industry thoughts on software-led payments

"…So if you think about the thousands of ISVs that still have not monetized payments…. the ISV business, which is still early, early innings…"

– Frank Bisignano, Chairman and CEO, First Data (December 2018)

"…We've configured the pricing model for Lightspeed Payments such that we receive an average of ~2.6% of the gross noncash transaction volume and a normalized rate of ~65bps net of direct processing costs. When you consider that Lightspeed has only been earning around 25bps under our previous referral-stage program…you can start to see why we're so excited…"

– Brandon Blair Nussey, CFO, Lightspeed POS (May 2019)

"… I think the challenge is, the most rapidly - our most valued relationship, not the most valued relationship, but the ISV that has referred us the most merchant accounts in the US is one that was previously working with one of our competitors. And they called us, actually, we didn't call them. And they said, "Hey, listen, the processor that we were working with just bought one of our competitors. And I can't work with someone that owns software that competes in my space. So what is your view on owning software?" And we said, well, we're going to be in Switzerland. That's not the business that we're in. We're not going to own point-of-sale software. And he said, great, I'm going to integrate to your Snap platform, and I'm going to send you tens of thousands of accounts. It's a laundromat software. But I think if I were First Data and I was 50% of the U.S. market, would I feel differently? Potentially. And -- but I think for the rest of us, it's a really challenging proposition to preclude yourself from working with all the other ISVs that service any one market segment by choosing one to own. And the software development business is tricky. You have to constantly be investing and innovating. We happen to have a lot of exposure to the restaurant world, as I alluded to at the beginning. And 3 years ago, no one had heard of Toast. And today, Toast is the preeminent ISV in the sector. And I don't know that I would want to be super long Toast 3 years from now because someone else is going to come up with a new solution. So I think our skill set is moving money around super quickly, super securely. I think in the integrated payments world, what's incumbent on us is to have APIs that allow software companies to integrate to us in a very compressed time frame and get access to our global solutions in a very seamless way, to have very strong reporting tools, to have transparent contracts, referral agreements, pricing, rev splits, all that kind of good stuff. But I see point-of-sale software as being a very, very different business. And I think I'd rather have an addressable market of all the ISVs in the market rather than just picking a horse, buying it and praying that it remains the market leader.…"

– Brendan Tansill, President, North America, EVO Payments (November 13, 2019)

"…So in terms of thinking about where are we now in the US, I'd say we're probably in middle innings. So as you go out and you spend money at all your SMB retail restaurant, spa, health care, B2B, et cetera, a lot of those guys have converted off the old on-prem or they've moved away from terminals into this software, and payments is enabled. So we continue to take a ton of share there. It's growing mid-teens for us. But with respect to the U.S., over the next 5 years, we think it's middle innings. If I fast-forward, I think the U.K. and Europe, this trend is just starting. So you're just starting to see in the U.K. and Europe them begin to -- the integrated point-of-sale situation is happening there, and payments has not yet been enabled in a massive way there. So we think there's a big opportunity over the next 3 years to enable payments in those integrated point-of-sale solutions across U.K. and Europe.…"

– Stephanie Ferris, CFO, Worldpay (March 2019)

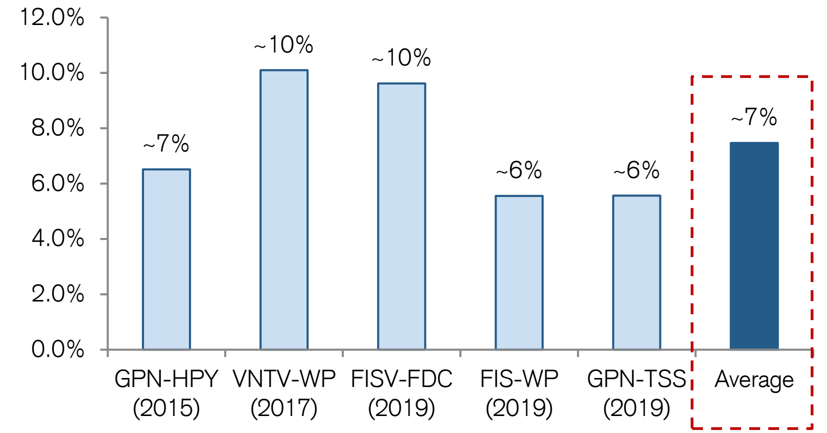
Source: Statista, comScore

NextGen FinTech Ecosystems

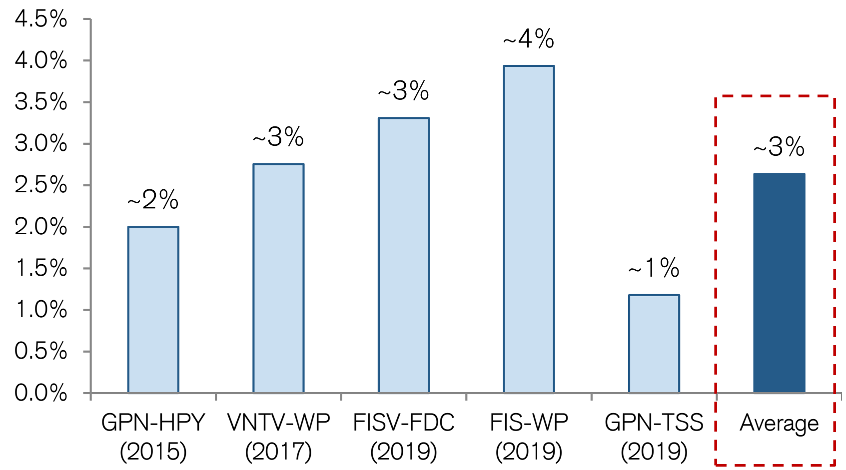
9. Continued consolidation and scaling of platforms
Driving distribution and expense synergies

- M&A is a core competency of incumbent payments players…
  - Historically, more "scale-driven" M&A in merchant acquiring vs. more bolt-on, product capability focused for bank technology providers (FIS/FISV/JKHY) to leverage existing distribution channel
- …while "Next-Gen" players have digital distribution advantages
  - Square ~+90% of merchants self-onboard given seamless onboarding and strong brand in the US
  - Stripe and Braintree are predominately eCommerce with distribution advantages over incumbents skewed toward in-store payments
- Distribution scale drives top line and lowers hurdles for future M&A
  - Cross-selling (key driver of the three large 2019 deals)
  - Geographic expansion given heavy reliance on issuer relationships and regulatory barriers from country-specific license requirements (i.e., called out by FIS – WP for WP acquiring)
  - We expect the next phase of bolt-on M&A outside of traditional acquiring scale to feature purchases of next-gen FinTech ecosystem account connectivity assets and adjacent capabilities around authentication, risk, and personalization/data monetization (e.g., Honey)
- Operating expense scale, driving bottom-line growth and creating cash flow to re-invest
  - High fixed cost structures of payments companies create large cost synergy opportunities:
  - Duplicative corporate overhead
  - Technology and infrastructure costs (data center)

Announced cost synergy target as a percentage of combined cost base, average of ~7% across recent deals



Announced revenue synergy target as a percentage of combined revenue, average of ~3% across recent deals



Source: Company reports, Factset, the BLOOMBERG PROFESSIONAL™ service, Credit Suisse research

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9. Continued consolidation and scaling of platforms

Recent acquisitions (>$0.5b) by FIS, FISV, GPN, & their predecessors

Target Company	Closing Date	Description	Rationale	Price (EV)	LTM EV/EBITDA	Acquiring Company
Total System Services	Sep-19	Merchant acquiring and issuer processing	Enhanced scale and product capabilities in merchant acquiring businesses, and diversification benefits by adding consumer and issuering processing business lines	~$26b	20x	Global Payments
Worldpay	Jul-19	Merchant acquiring and issuer processing	FIS' banking customer base provides a meaningful cross-sell opportunity for Worldpay's merchant acquiring business in high-growth international markets	~$35b	23x	FIS
First Data	Jul-19	World's largest merchant acquirer and issuer processor	Highly complementary combination with at least $500mm of revenue synergies from cross-selling and geographic expansion (Fiserv was 95% US) and $900mm of anticipated cost synergies	~$39b	13x	Fiserv
Elan Financial Services (Debit Processing Unit)	Oct-18	Electronic payments network (bills and invoices)	Sits within the Payments segment and expands reach/capabilities in debit card processing and ATM managed services.	~$690mm	NA	Fiserv
AdvancedMD	Sep-18	Software-led	Adds software and payments for SMB ambulatory physician practices	~$700mm	NA	Global Payments
Worldpay	Jul-18	UK-based global merchant acquirer	Expanded presence both internationally (Vantiv was a 100% North American-based business) and in eCommerce	~$12b	19x	Worldpay (legacy Vantiv)
Cayan Holdings	Jan-18	Merchant acquiring	Accelerate technology-led payments business, and added ~70k merchants and more than 100 integrated partners in the US. Strengths in omnichannel	~$1.05b	23x	Total System Services
BluePay	Dec-17	Integrated payments ISO	Strengthened the company's position in the card-not-present integrated software vendor (ISV) channel	~$760mm	NA	First Data
ACTIVE Network	Sep-17	Software-led	Adds event organization software and booking technology platform, focused on the health and fitness market	~$1.2b	12x	Global Payments
CardConnect	Jul-17	Integrated payments ISO	Strengthened the company's position in the card-present ISV channel	~$750mm	20x	First Data
Heartland Payments	Aug-16	Merchant acquiring	Added software and payments business, with an SMB emphasis	~$4.3b	20x	Global Payments
TransFirst	Apr-16	Merchant acquiring	Added ~1.3k integrated technology and referral partners in important areas such as ISVs, healthcare, not-for-profit, referral banks, and eCommerce	~$2.4b	16x	Total System Services
SunGard	Nov-15	Financial software & technology	Allowed FIS to expand its capabilities and client roster, gaining scale and technologies	~$5.1b	NA	FIS
Mercury Payments Systems	Jun-14	Merchant acquiring	Integrated payments leader, and part of the foundation of the integrated business today	~$1.65b	18x	Worldpay (legacy Vantiv)
NetSpend	Jul-13	Prepaid cards	Expands business capability to include prepaid debit card issuance	~$1.4b	14x	Total System Services

Source: Company filings, Credit Suisse research

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9. Continued consolidation and scaling of platforms

Additional recent FinTech acquisitions of greater than $1b

Target Company	Closing Date	Description	Rationale	Price (EV)	LTM EV/EBITDA	Acquiring Company
Nets	Pending	Merchant acquiring and issuer processing	Increases scale (resulting in the creation of the European PayTech leader); synergies	~$9b	~20x	Nexi
SIA	Pending	Merchant acquiring and issuer processing	Increases Nexi's scale in the Italian payments market to better position for international consolidation opportunities; synergies	~$7b	~20x	Nexi
Ellie Mae	Sep-20	Cloud-based platform provider for mortgage finance industry	Extends ICE's reach to the mortgage origination space, establishing ICE as the leading provider of end-to-end electronic workflow solutions serving the US residential mortgage industry	~$11b	~23x	Intercontinental Exchange
Ingenico Group	Oct-20	Merchant acquiring	Increases scale (creates one of the world leaders in merchant acquisition and payment processing); synergies	~$8.5b	~15x	Worldline
Credit Karma	Dec-20	Consumer technology and personal finance	Defensive on the tax side and offensive on the consumer side, expanding consumerTAM from $29b to $57bB and revitalizing the Consumer Platform strategy (based on Credit Suisse research)	~$7.1b	NA	Intuit
Galileo Financial Technologies	Apr-20 (announced)	Modern card issuance technology	Strengthens SoFi's capabilities, round out its technology ecosystem, and extends the reach of its products to other Galileo partners, while offering diversification and scale to SoFi's infrastructure.	~$1.2b	NA	Social Finance (SoFi)
Nets A/S's account-to-account payment business	Pending	B2B payments	Captures account-to-account real time payment and bill pay opportunities and reinforces MA's vision as a multi-rail one-stop shop for payment solutions	~$3.2b	>25x	Mastercard
SIX Payment Services	Nov-18	Merchant acquiring	Complementary geography and product offering; becomes the largest European provider in the payments industry; synergies	~$2.9b	<20x	Worldline
iZettle	Sep-18	SMB merchant acquiring and commerce platform	Gains in-store capabilities in 11 markets and near-term in-store expansion opportunities into other existing PayPal markets, as well as acceleration of omnichannel commerce solution	~$2.2b	NA	PayPal

Source: Company filings, Credit Suisse research

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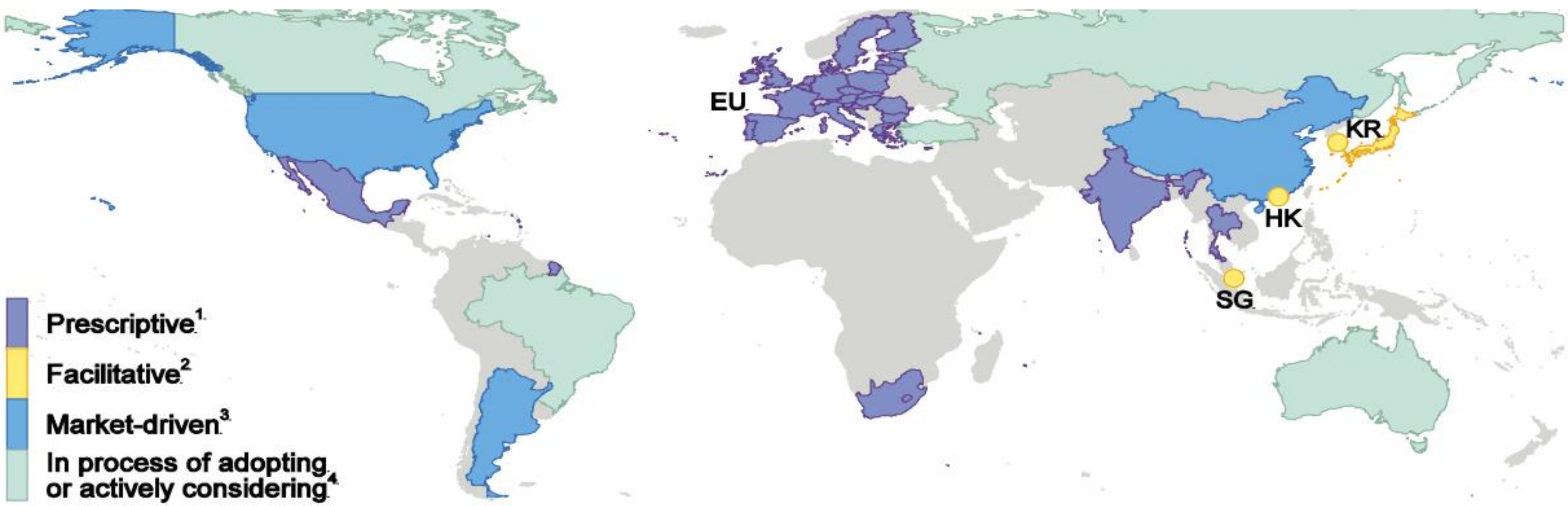
10. Open Banking expands to Open Finance

Open Finance = Open (consented) access to customer financial data

- Started in Europe with PSD2 & Open Banking in the UK – Policy objectives to facilitate innovation and competition in retail financial services; now governments across the world are pursuing open-banking agendas for similar reasons (see map below)
- Characterized as regulations mandating banks to make consumer financial data available (i.e., granting consumer rights to *openly* share their financial data) for licensed third-parties to build services on (FinTechs/Techs) via APIs
- Has more recently expanded to "Open Finance" to give consumers and businesses more control over a wider range of their financial data (e.g., savings, insurance, mortgages, investments, pensions and credit), given initial European regulations were limited to payments accounts (akin to a doctor providing medical advice with only access to parts of your medical history)
  - The UK's FCA solicited a call for input on Open Finance in 2020 to extend Open Banking principles beyond payments accounts
  - In September 2020 the European Commission announced an intention to adopt a new open finance framework by mid-2022

Open Banking initiatives around the world, noting that there is no formal program in the US (rather, open banking is being introduced by market forces)



Source: Basel Committee, Credit Suisse research; 1 Requires data sharing, 2 Encourages data sharing, 3 No explicit rule/guidance requiring data sharing, 4 In process of adopting or actively considering adopting

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10. Open Banking expands to Open Finance

State of Open Finance in the US

BigTech	State of Open Finance in the US
Open Finance Penetration	▪ Despite no formal regulations specifically mandating Open Finance like in Europe & the UK, Open Finance penetration is higher in the US given: ▪ Regulations are not limited to payments accounts like in Europe and the UK (both of which are looking to correct this) ▪ Standards are set by industry groups rather than regulators (e.g., FDX with 168 members) ▪ Section 1033 of Dodd-Frank provided a gave consumers legal rights in 2010 to financial account and transaction data, years before the EU and UK (albeit it had shortcomings included below)
Shortcomings of Dodd-Frank Section 1033	▪ Non-specific statutory language with a general lack of robustness that deals with disclosure/informed consent, scope of data, security, accountability, privacy, etc. Key issues include: ▪ Some banks argued that consumer data rights only apply to direct consumer access, but not through consumer authorized third-parties. The US Treasury recommended the CFPB to affirm agents of consumers (authorized third-parties) fall within the definition of a consumer so that banks are mandated to share data with aggregators (e.g., Plaid, Finicity) ▪ A lack of guidance on a liability accountability framework (e.g., who is responsible for account takeover, the bank, Fintech, the data aggregator?) ▪ The scope of financial data that is required to be shared with consumers is not specific and some banks are unwilling to share certain types of consumer financial data (e.g, account fees, pricing, etc.)
CFPB actions to address shortcomings of Dodd-Frank Section 1033	▪ Released Consumer Protection Principles in 2017 on Consumer Authorized Financial Data Sharing and Aggregation – but no mandates ▪ Held an industry symposium in February 2020 to assist with the policy development process – findings included here ▪ Issued an Advance Notice of Proposed Rulemaking in October 2020 "in developing regulations to implement section 1033" ▪ The CFPB is soliciting input from all stakeholders on how to "efficiently and effectively implement section 1033" until February 4th, 2021
CS Take	▪ We expect the outcome of CFPB's actions to "effectively and efficiently implement section 1033" will ultimately result in increased consumer financial data rights and will be instrumental to unlocking innovations in financial services and leveling the playing field with incumbents ▪ Giving FinTechs unrestricted, consumer permissioned, and standardized access to consumer financial data will make it easier for FinTechs to build new products (e.g., all of the same data fields provided by each bank, using industry developed standardized API format)

Source: CFPB, US Treasury, Arent Fox Credit Suisse research

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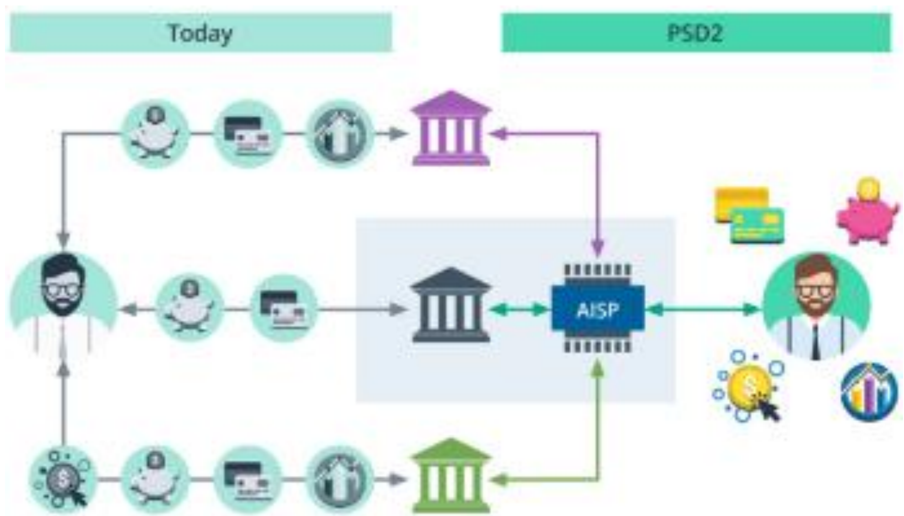
10. Open Banking expands to Open Finance
Driving force of innovation by enabling FinTech

- Bringing about the "platform-ification" of banking as distribution of financial services becomes increasingly digital and decouples financial products from banks, allowing consumers and Neobanks to cherry pick the best services
- Data aggregators are building the infrastructure that power Fintech apps by connecting them to banks via APIs
- APIs facilitate the sharing of data between (financial service) providers in a controlled, yet seamless fashion
- Essentially developer platforms, allowing for faster product creation (hours from months), enabling developers to:
  - Initiate payments from a bank account or transfer funds (Venmo)
  - Aggregate all of a customer's account data (Mint)
  - Innovate with the data (credit assessment, automating loan applications, budgeting, etc.)

APIs enable the platform model into financial services



Source: Open Banking UK, Earnst & Young, Credit Suisse research

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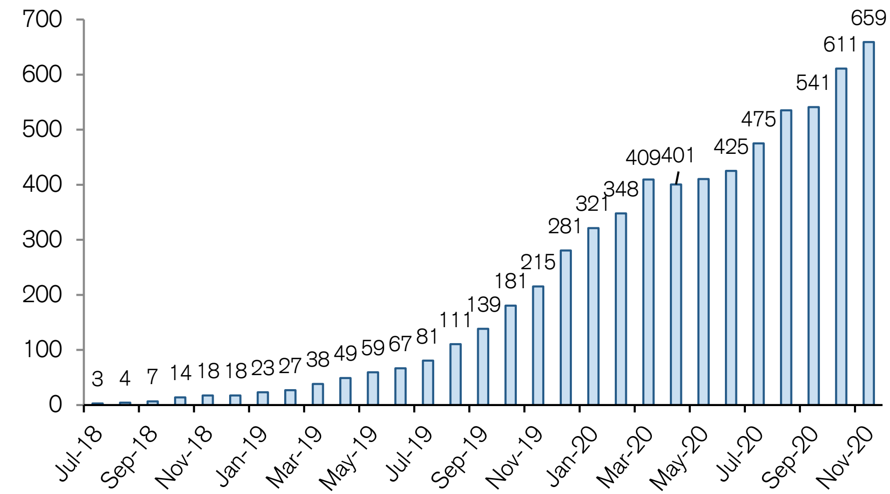
10. Open Banking expands to Open Finance
European enablers: Tink, TrueLayer, Token, and Yapily

- Tink (founded in 2013), TrueLayer (founded in 2016), Token (founded in 2015), and Yapiliy (founded in 2017) are European provider examples/leaders
  - TrueLayer powers both Revolut and Monzo
  - Tink powers both N26 and PayPal (in Europe, while PayPal/Venmo work with Plaid in the US)
  - PayPal has a minority investment in Tink
- Tink and Plaid founders (and CS Research) believe that no single company will build all products in-house and that there will be an ecosystem of specialized applications
- Regulations require banks to make customer account data available electronically:
  - PSD2 in Europe requires banks to have open APIs
- US market challenging because:
  - US banks are required to make data available electronically from Dodd-Frank section 1033, but has many shortcomings as discussed earlier
  - More challenging in the US given >10k banks

Monthly open banking API calls (millions) in the UK – Illustrates continued increasing levels of adoption



European example N26 – Brings the platform model into financial services via APIs connecting to point-solutions

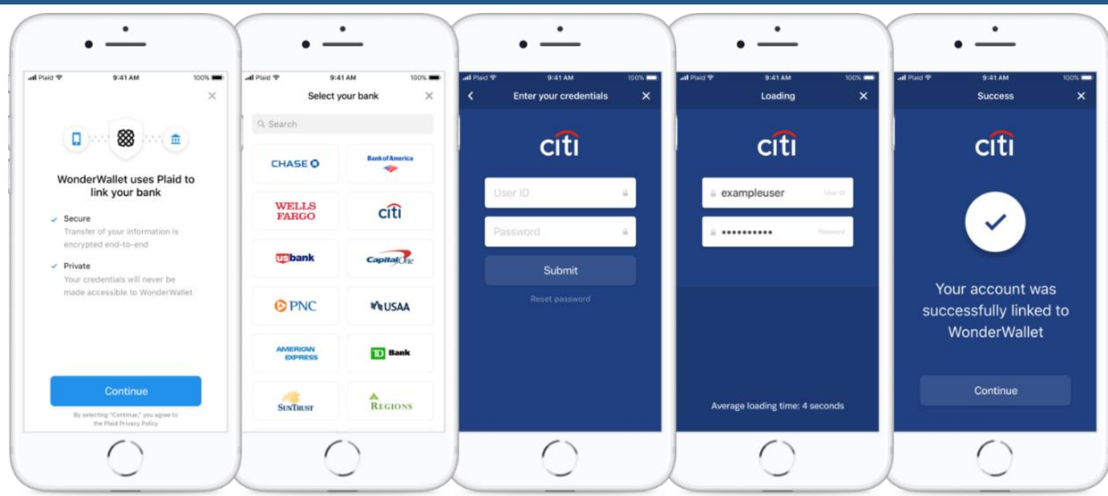
1	Barzahlen: cash withdrawal & deposit at retailer partners
2	Transferwise: international foreign currency transfer
3	Vaamo: Robo-investing
4	Raisin: marketplace for highest rate savings accounts
5	Clark: InsureTech
6	Auxmoney: loans

10. Open Banking expands to Open Finance

US enablers: Plaid, Finicity, and Yodlee

- Plaid is the infrastructure (data plumbing) layer, allowing FinTechs to access customer account data via APIs to "*build any financial application from payments to lending to wealth management*"
  - In the US, Plaid powers over 4k apps, connecting >200mm consumer accounts to over 11k banks (as of January 2020)
  - Sample FinTechs working with Plaid: Venmo, Robinhood, Cash App, Acorns, Expensify, SoFi, Marcus, Betterment, and more
  - Visa signed an agreement to acquired Plaid for $5.3b in January 2020, which was terminated a year later following the DOJ filing an anti-trust lawsuit against Visa for attempting to acquire Plaid; Plaid was previously valued at $2.65b valuation (Series C)
- Finicity, another leading provider of financial data and insights was acquired by Mastercard in November 2020 for $1b
- Yodlee (founded in 1999) is the pioneer of account data aggregation, but it has been utilized less by FinTechs

Plaid example, with an illustrative wallet ("WonderWallet") using Plaid to link to a selection of banks, with the user giving access via their familiar online banking logon credentials



Plaid's mission statement summarizes the spirit of open finance well:

"Transform financial services by lowering the barriers to entry for developers, spurring technical interest in the sector and democratizing access to critical services."

Source: Plaid, Credit Suisse research

10. Open Banking expands to Open Finance
Plaid, the leading enabler of North American FinTechs

- Now focused on Phase 1, solving the financial data engineering challenge: (1) providing connectivity to all banks via one API, with high up-time access; (2) categorizing and cleansing data to enable FinTechs to offer services (e.g., budgeting); and (3) building out a merchant database across the US (to enable transaction categorization and budgeting tools for consumers)
- Phase 2 will be focused on value-added services through analytics, with examples including loan and mortgage application automation (both of which require ~60 pieces of information to process)
  - "*Products that need to interact with your financial data*" – Plaid CEO, Zach Peret
- Acquired Quovo in January 2019 for $200 million: (1) bolsters ability to incorporate investment and brokerage data; and (2) supports expansion into Europe with Quovo's PISP license with the UK regulator (FCA)
- We believe Plaid will help US FinTechs compete in Europe and be the go-to for European Challenger banks in the US

>11k financial institutions

JP Morgan Chase, Wells Fargo, Citi, Bank of America, American Express, Fidelity, BBVA, PNC, Capital One, Ally, USAA, Charles Schwab, Regions, Simple, US Bank, SunTrust (now Truist)

PLAID

- 25% of people in the US have an account linked through Plaid (Summer 2019)
- The average US bank account has >15 connected services
- >200 million accounts are connected to Plaid (January 2020)

Powers >4k applications

Venmo & PayPal, Square (Cash app), Marcus by Goldman Sachs, Robinhood, Coinbase, Betterment, Gusto, Transferwise, Acorns, Intuit, Microsoft, Zillow, LendingClub, Quicken Loans, Blend

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11. BigTech in FinTech, highlighting Apple's FinTech efforts

BigTech focusing on payments to better monetize consumer interactions within their ecosystems and reduce friction

BigTech	Actions taken in FinTech
Amazon (detailed in Theme 36)	▪ Suite of both consumer & merchant credit offerings, in partnership with both JP Morgan and Synchrony ▪ Amazon Pay for third-party merchants off-Amazon (i.e., PayPal competitor)
Apple (detailed below in Theme 11)	▪ Launched Apple Card with Goldman Sachs (Aug 2019), which GS believes to be "the most successful credit card launch ever" ▪ Apple Pay (launched Sept 2014), at 15b annual transaction run-rate as of Q4 2019 at a 155% CAGR since Q1 2017, in nearly 70 markets ▪ Apple Cash and Apple Cash Card (launched Dec 2017)
Google	▪ Received a pan-European e-money license in Dec 2018, enabling Google to issue e-money (e.g., cards) and provide payment services (e.g., execute payment transactions, money transfers) ▪ Announced plans to offer checking accounts in partnership with Citi ▪ Hired Bill Ready to lead Google Commerce in Dec 2019 (ex. PYPL COO), an area of increased focus with visions for a universal shopping cart across Google's properties (search, shopping, YouTube, Gmail), ultimately to support/strengthen its core ad business ▪ Focused on scaling Google Pay in EM initially and then mature markets with strong progress in India, rising to #1 market share of UPI transactions within 2 years of launching with ~67mm MAUs in 2019 ▪ In Nov 2020, launched the redesigned US version of Google Pay app, through which Google Plex Accounts will be offered in 2021 from 11 bank and credit union partners for checking and savings accounts with no monthly fees, overdraft charges or minimum balance requirements ▪ Increased focused on connecting merchants, advertisers and users, in addition to helping SMBs
Facebook	▪ Launched Facebook Pay in Q4 2019 in the US, a mobile wallet powered by PayPal and Stripe for users to make purchases across Facebook's ecosystem (Messenger, Instagram, WhatsApp, and Facebook Marketplaces), P2P, and donations ▪ Potential to build a substantial eCommerce business with substantial reach and a highly engaged user base: >1.8b DAUs and140mm registered businesses on Facebook, 500mm DAUs on Instagram and 75% of US businesses expected to use IG by 2020, and WhatsApp with 1b DAUs ▪ Launched Instagram shopping in March 2019, which we believe has big potential longer-term, noting 90% of users follow a business and the average user spends ~30 minutes per day on the app ▪ Diem (formerly Libra) cryptocurrency wallet expected to launch in 2021 but not essential for FB's other FinTech efforts to be successful, in our view; we see this as a longer-term call option, noting that FB could achieve similar transaction cost/speed benefits via on-platform transactions ▪ Received a pan-European e-money license in Dec 2016, enabling FB to issue e-money (e.g., cards) and provide payment services (e.g., execute payment transactions, money transfers)

Source: Company reports, bizcommunity.com, qz.com, Credit Suisse research

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11. BigTech in FinTech, highlighting Apple's FinTech efforts

BigTech focusing on payments to better monetize consumer interactions within their ecosystems and reduce friction

- Alibaba (Alipay) and Tencent (WeChat) are the pioneers of BigTech in Fintech that US BigTech is attempting to emulate, albeit in a drastically different regulatory environment with world-class established incumbents.
- Alipay and WeChat are expanding into Southeast Asia, where Grab and Go-Jek have dominant positions.

BigTech	Actions taken in FinTech
Alibaba	▪ The scaled Ant Group ecosystem includes MYBANK, asset management, insurance ▪ Flagship Alipay wallet with a nearly 55% share of China's mobile payments market ▪ Expanding acceptance into key international tourism locations (including US and Europe) ▪ Owns ~30% share in Paytm, $16b valuation and #3 market share of UPI payments in India
Samsung	▪ Samsung Pay ▪ Started worldwide deployment of Samsung POS in Q4 2019; the solution (in partnership with Mobeewave, which was later acquired by Apple) enables merchants to accept debit and credit payments by tapping contactless cards, Samsung Pay, Apple Pay, and Google Pay wallets onto Samsung NFC-enabled devices ▪ Piloted SoftPOS in Q4 2019, which powers contactless payments on Samsung phones with via an app download
Tencent	▪ WeChat FinTech ecosystem (Tenpay, WeBank, asset management, insurance) ▪ Leading lifestyle super app with ~1.2b MAUs ▪ WeChat's mobile payment wallet has a nearly 40% share of China's mobile payments market
Uber	▪ Uber Money bank-like services (for drivers), following Instant Transfer capabilities ▪ Uber credit card (for consumers)

Source: Company reports, iResearch, statista, Credit Suisse research

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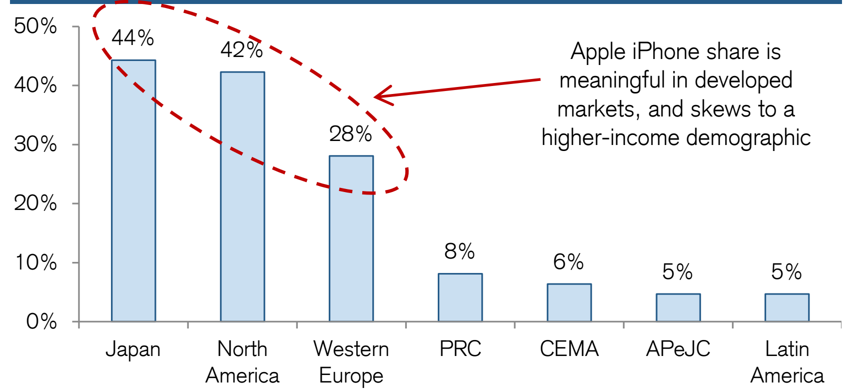
11. BigTech in FinTech, highlighting Apple's FinTech efforts

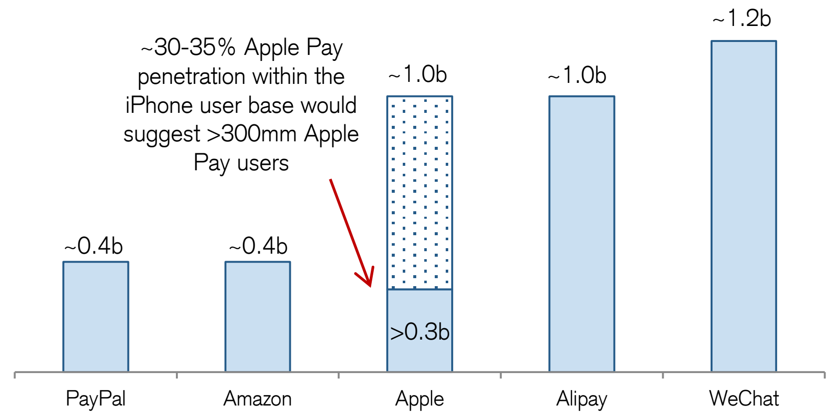
Began with Apple Pay, now expanding its financial services ecosystem

- From its first financial services product, Apple Pay (launched in September 2014), to the more recent Apple Card, the company has built the beginnings of a digital financial services ecosystem, leveraging partnerships with both Green Dot and Goldman Sachs.
- The audience for these products is generally confined to iOS device users – although iPhone share is meaningful in developed markets and skews to the higher-income demographic – i.e., Apple's importance in payments outweighs is unit share.
- Payments & FinTech offerings are additive to the ecosystem (i.e., direct monetization is not the sole focus) and reduce friction and customer stickiness – acting as "the glue".
- Apple products in payments and financial services
  - Apple Pay (launched September 2014)
  - Apple Cash and Apple Cash Card (launched December 2017)
  - Apple Card (launched in the U.S. in August 2019)
    - Goldman Sachs had issued ~$10bn in credit to Apple Card users as of 9/30/19

Apple's financial services are limited to the iOS audience, although iPhone share is meaningful in developed markets



Apple's iPhone install base is ~1b globally, which compares favorably to PayPal active users and Amazon customers



Source: Company reports, IDC, Credit Suisse research

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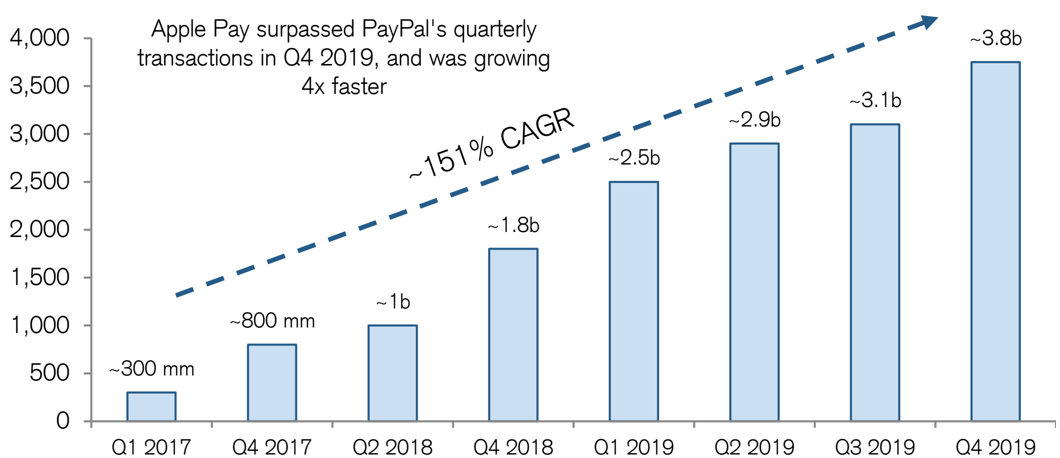
11. BigTech in FinTech, highlighting Apple's FinTech efforts

Apple Pay, Apple Cash, and Apple Cash Card overview

- **Apple Pay** acts as a "glove" that goes around card credentials.
- We believe Apple can earn ~15bps of the purchase price on credit and $0.005 per transaction on debit, paid by the issuers (depending on issuer arrangement). The value proposition to issuers is reduced fraud (tokenization, biometrics) and increased eCommerce volumes.
- No separate merchant fees and no contracts with Apple (standard card processing fees from the acquirer or PSP are paid by the merchant).
- Any offline merchant that has a modern payments terminal (NFC contactless enabled) can accept Apple Pay.
- For online merchants, Apple provides developer tools to add the Apple Pay market to websites and apps (Apple Pay will be shown to the customer only when an enabled Apple device is detected).
- Available in nearly 70 markets globally (as of early 2021); ~90% of stores in the US accept Apple Pay as of early 2021 (up from >70% in early 2019).

Apple Pay transactions more than doubled YoY in Q4 2019 with annual run rate >15b and was "doing exceptionally well" in 2020



Source: Company reports, Company website, Credit Suisse estimates, AAPL calendar year (not FY)

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11. BigTech in FinTech, highlighting Apple's FinTech efforts

Apple Pay, Apple Cash, and Apple Cash Card overview

- **Apple Cash** is an iMessage-enabled P2P payments service that works in conjunction with the **Apple Pay Cash Card**.
- Funds are received into a virtual Apple Pay Cash card (powered by Green Dot), which is stored in the Apple Wallet
- Funds can be spent via Apple Pay (using the Cash card at any merchant that accepts both Apple Pay and Discover) or transferred to a bank.

Apple Cash and the Apple Pay Cash Card, a virtual prepaid debit card that allows P2P received funds to be spent in-store & online

Green Dot powered virtual prepaid debit card that sits within the Apple Wallet

Discover is the card network partner (i.e., Apple Pay Cash card is accepted anywhere Discover is accepted)

Source: Company reports, Company website, Credit Suisse estimates, AAPL calendar year (not FY)

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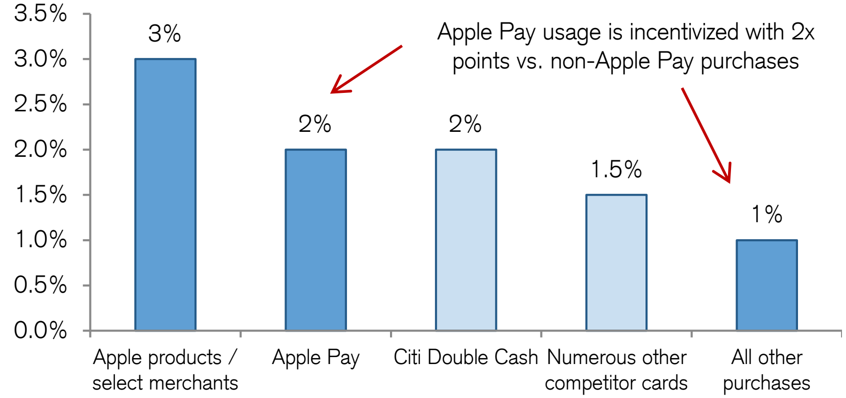
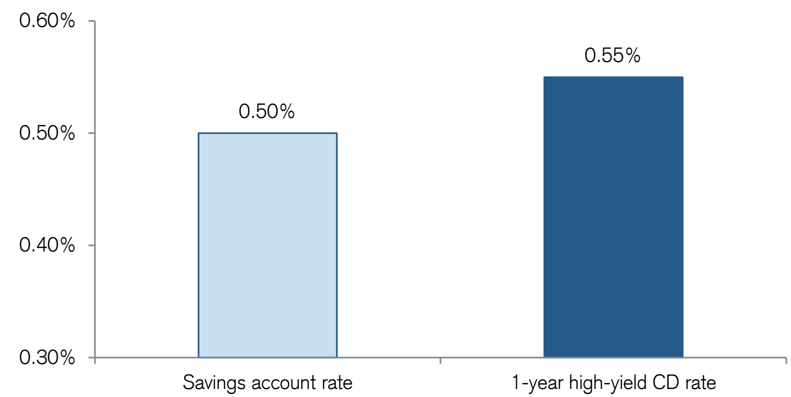
11. BigTech in FinTech, highlighting Apple's FinTech efforts
Apple Card, in conjunction with Goldman Sachs, and what's next?

- **Apple Card** is a physical and virtual credit card that we expect to appeal to Apple enthusiasts and help to increase engagement with Apple's other financial services (Apple Pay, Apple Cash).
  - Goldman Sachs is the card issuer, Mastercard is the network. Apple sharing in card economics (interchange and interest income).
  - Cardholders earn more when using Apple Pay, and rewards are delivered through Apple Cash same day ("Daily Cash"); 3% on Apple products, 2% when using Apple Pay, and 1% on all other purchases.
  - Spending tools within the Apple Wallet will be color-coded by category and contain various analytics (weekly and month summary data, interest expense estimates based on various payment amounts, etc. – though we note Apple maintains the highest data privacy standards, enabled by owning the hardware that runs the software / applications).
  - Apple launched an installments product (BNPL) for Apple Card holders, initially available for iPhone purchases in Sept 2019 (0% APR, 24-month), and in June 2020 added installments for additional products in the US.
- What could be next for Apple in payments & FinTech? Expanding the product suite into a more full-service digital bank offering (competing with traditional & Neo banks).
  - Additional Goldman Sachs partnering (i.e. savings accounts, CDs, loans)
  - Physical Apple Cash debit card (monetize via debit interchange)
  - Wealth Management and/or Investing/Trading functionality
  - Enable iPhone to accept contactless card payments with no additional hardware (Samsung is already doing this), to be potentially enabled by the technology of Mobeewave which Apple acquired in August 2020

Apple Card rewards attractive when used within the Apple ecosystem, but less attractive on non-Apple Pay purchases



Goldman Sachs Marcus offers highly competitive interest rates for savings accounts and CDs (as of Jan 2021)



Source: Company reports, NerdWallet, Credit Suisse research *Apple is covered by CS analyst Matthew Cabral

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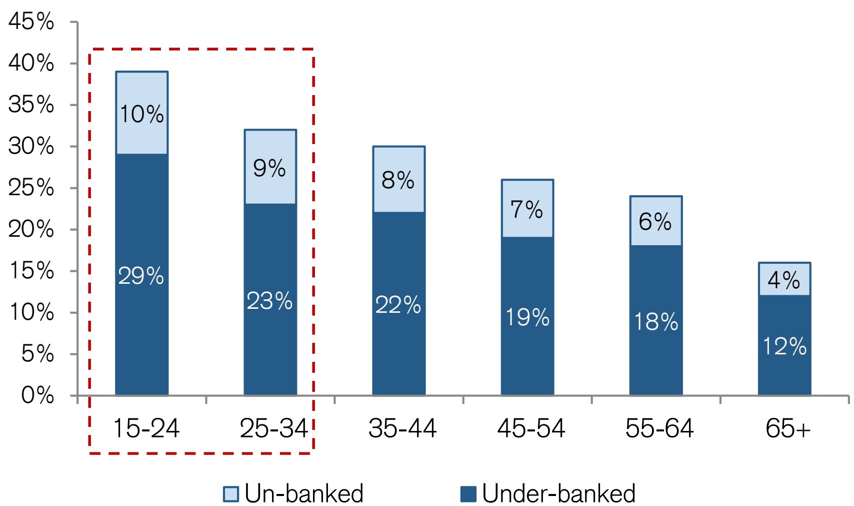
12. Unbanked and Underbanked opportunity for US FinTechs

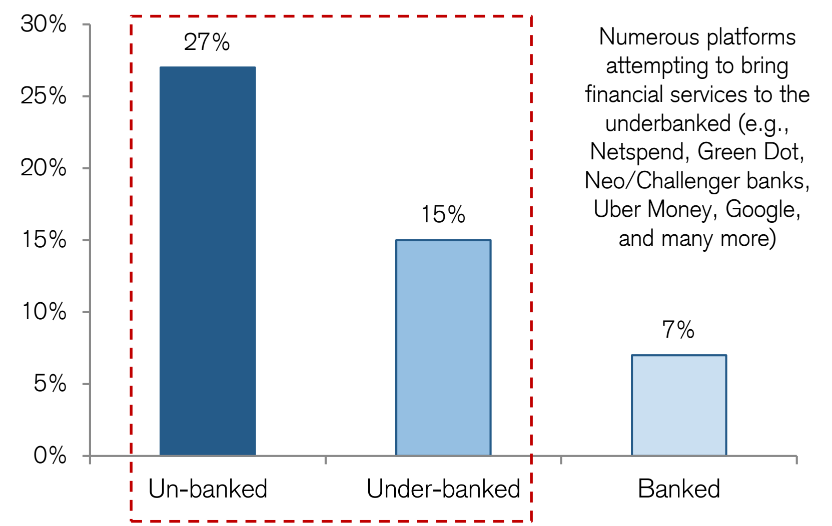
Providing access to modern / affordable financial services

- FinTech companies are targeting the ~60-80mm underserved US consumers
  - 14mm unbanked adults in the US (no accounts) + 49mm underbanked adults in the US (have a checking or savings account, but also utilize services from alternative providers, e.g., money orders, check cashing, international remittances, payday loans, etc.), per FDIC
  - Square estimates 70-80mm underserved US consumers
- Value proposition to the consumer:
  - Low fees and low/no account minimums
  - Digital-only bank hallmarks of smooth UI/UX & fast onboarding
  - Checking account functionality (e.g., prepaid debit card, ATM access, direct deposit)
  - “Hook” features (e.g., Bitcoin trading & Boost rewards via Cash App, free FX conversion via Revolut)

There are ~63mm underbanked and unbanked in the US, demonstrating a high overlap with Millennials and Gen Z consumers



Prepaid card usage data by market segment suggest a heavy skew toward underserved consumers



Source: 2017 FDIC Survey of Unbanked and Underbanked Households, Credit Suisse research

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13. P2P as a customer acquisition and engagement tool
Why does P2P matter if it does not make any money?

- Strong network effects lower customer acquisition costs, a key advantage for FinTechs vs. traditional banks (i.e., users sign up new users, "*Download Venmo, so I can pay you back*.")
- Costs of P2P are offset by cross-selling other services to large P2P user base
  - Transaction costs for getting funds on and off of the platform – debit and ACH fees (loss making at first)
  - Technology costs to build and maintain the platform
  - Cards attached to wallets to monetize via interchange (e.g., Venmo Card & Cash Card)
  - Instant transfer fees (consumer fees of ~1-1.5% for faster funds access)

P2P was the foundation for many of the largest FinTech companies

PayPal	WeChat Pay	venmo	Cash App
Market leader globally ex China	Market leader in China	Largest FinTech app in the US	2nd largest FinTech app in the US behind Venmo (owned by Square)
- Started in 1998 as a P2P company	- Started in 2014 via P2P (tradition of giving money in red envelopes)	- Started in 2009 as a P2P app	- Started in 2013 as a P2P app
~361mm active accounts (as of Q3 2020)	~1.2b Weixin & WeChat MAUs (as of Q2 2020)	~65mm users (as of Q3 2020)	~37mm MAUs (CSe; as of Q4 2020E)

Source: Company reports, Credit Suisse research; Credit Suisse estimates

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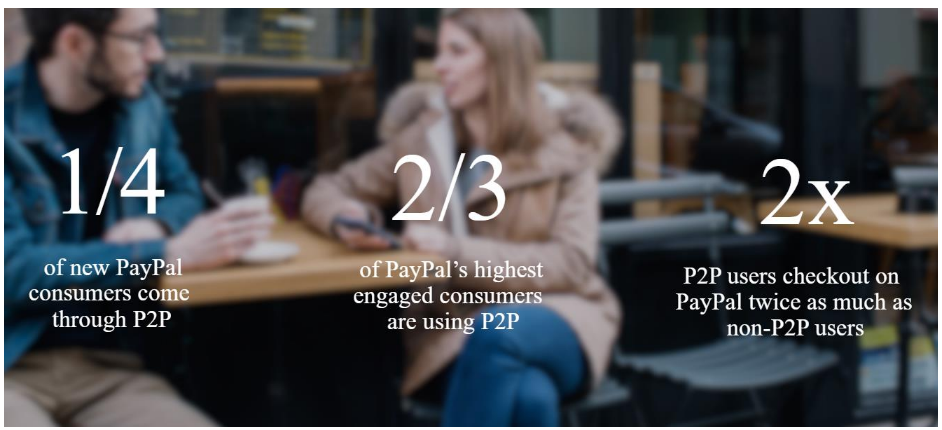
13. P2P as a customer acquisition and engagement tool

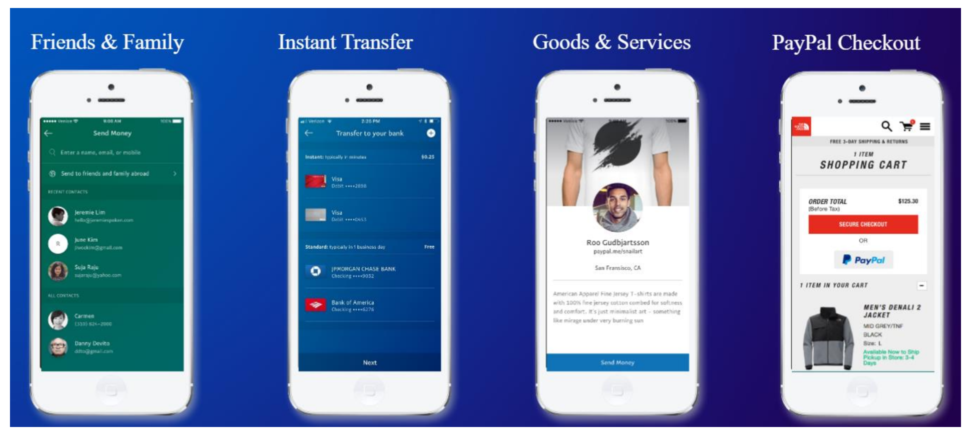
Direct and indirect benefits for the platforms providing P2P

- Strategic value for the FinTech platform is two-fold:
  - Direct monetization opportunity from banking services (e.g., prepaid card interchange, instant transfer fees, increased use of checkout button in PayPal's case), and
  - Network effect benefits (e.g., driving activations, user growth, and engagement).
- PayPal receives ~25% of new users via P2P, with these users making up ~2/3rds of the highest engaged accounts on the platform.
- Square notes that the Cash App's P2P business provides efficient customer acquisition through network effects and that the business is evaluated by management on the basis of its network, engagement, and monetization.

PayPal disclosed that P2P users checkout on PayPal (monetized transactions) twice as much as non-P2P users



PayPal P2P contributes to activations, user growth, and engagement with the platform (benefiting network effect)



Source: PayPal, Credit Suisse research

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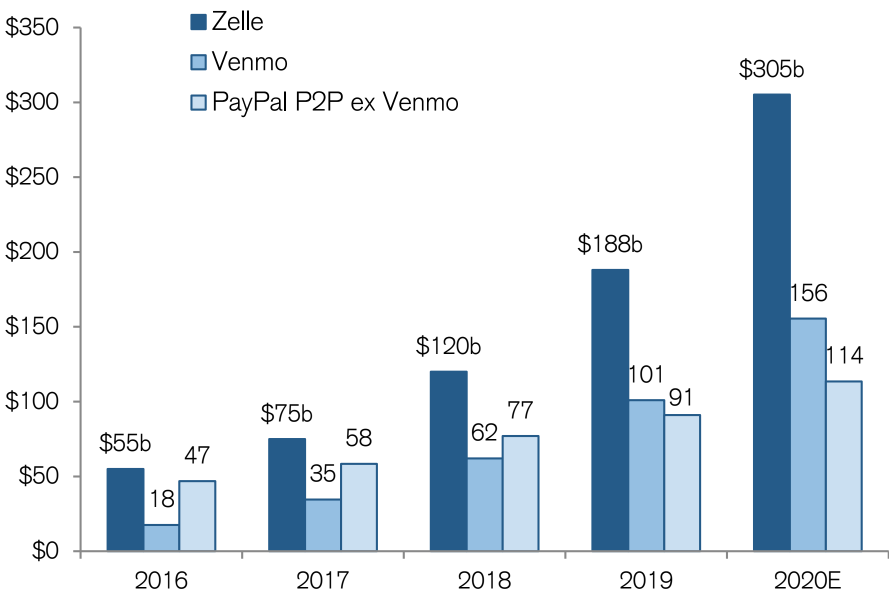
13. P2P as a customer acquisition and engagement tool

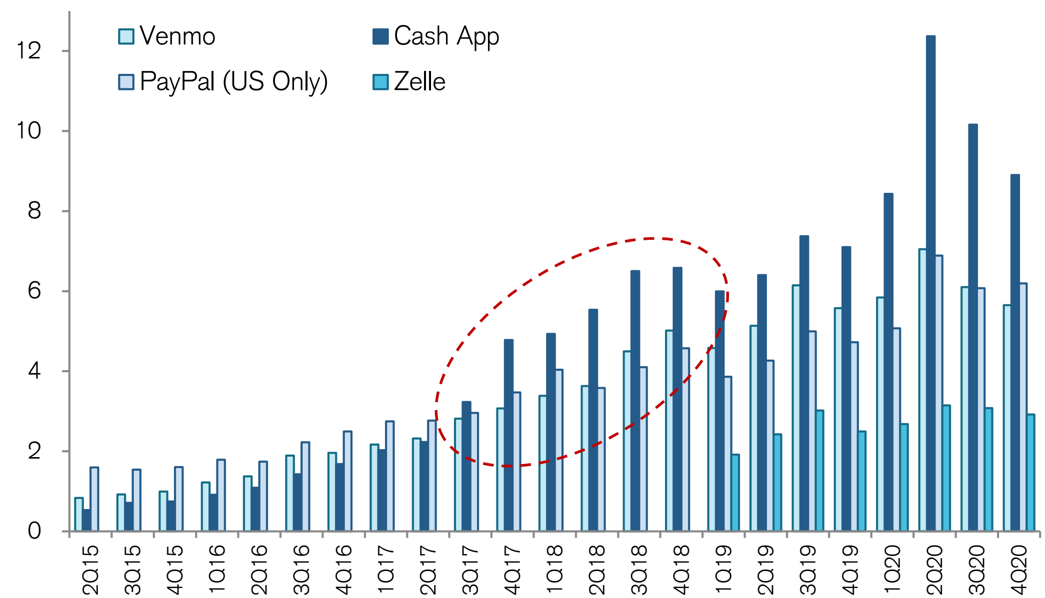
How we think about Zelle vs. FinTechs

- US banks are addressing P2P FinTech competition by introducing Zelle.
  - Checking accounts are a key part of a bank's relationship with customers (daily engagement).
  - Consumers are using P2P apps like a checking account (e.g., paying rent with Venmo or direct depositing paychecks into Cash App).
- In our view, assessing P2P volume trends is a good proxy for engagement & user base growth but has limited importance beyond that – it's a customer acquisition tool (the important thing is what the platform does with that engagement in terms of cross-selling and/or a consumer network for payments).

Zelle volumes are nearly 2x Venmo's, largely driven by different use cases (i.e., Venmo used more for everyday expense sharing)



US quarterly app download data show the rise of the use of Square's Cash App (surpassing core PayPal in Q3 2017)



Source: Sensor Tower, Company Data

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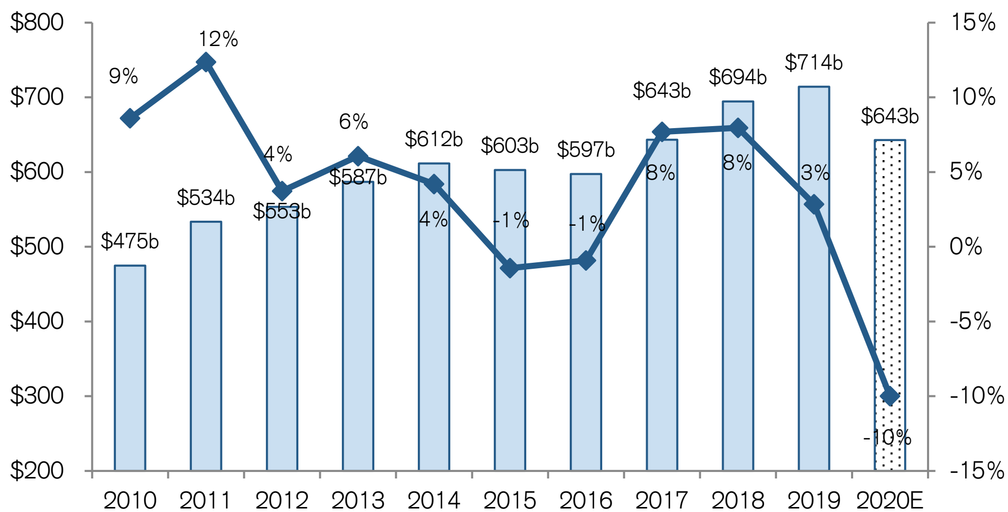
14. Global remittance market innovation

~$700b industry TAM, typically growing ~low- to mid-singles

- Historically a MSD+ growth market, mostly driven by migrant flows (many in industry estimate a true TAM > $700b, which likely excludes informal channels, some tuition pay, SMB, etc)
- Cross-border remittances are still dominated by traditional bank wires, despite higher and uncertain sending costs vs. money remittance providers and FinTech entrants.
- An opportunity exists for incumbents (already in progress at Western Union) to convert bank wires (65% of global volumes) into payments over their own remittance network via white-label partnerships with traditional banks.
  - Bank wires are a trusted form of money remittance but often come with uncertain timing and uncertain fees.
  - The correspondent banking system causes this uncertainty, involving a variety of local and international branches in each country before the money arrives.

Global remittance market TAM of ~$700b in volumes, expected to grow ~low- to mid-single digits (although differs meaningfully by corridor)



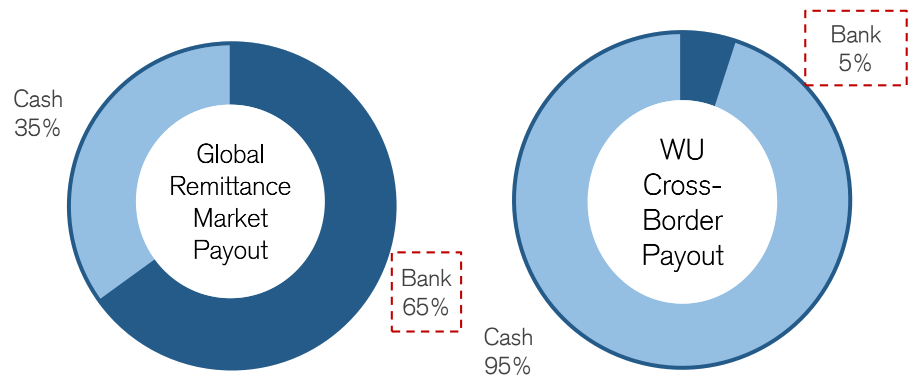
Source: World Bank, Western Union, Credit Suisse research

14. Global remittance market innovation

FinTech entrants could play a role in expanding TAM

- FinTech entrants could play a role in expanding the TAM of the market, adding volumes from individuals who would not have otherwise transferred money cross-border (i.e. easy-to-use mobile phone apps, travelers, international business more willing to move money).
- A linked bank account is normally required to open an account with a FinTech remittance company; therefore, it is not feasible for a portion of wire senders (unbanked or underbanked).
- Visa Direct + Earthport has teamed with "every large remittance provider", enabling direction connection to the majority of bank accounts around the world, easing expansion for less-scaled players (though likely used in conjunction with, not in lieu of, local operations, due to non-account based payout requirements in certain geographies – i.e. cash pickup).

Global remittance market cash vs. bank split, compared to Western Union (inverse, with only ~5% bank-based for Western Union)



Source: World Bank, Western Union, Credit Suisse research

14. Global remittance market innovation

Cash = Still King in remittances

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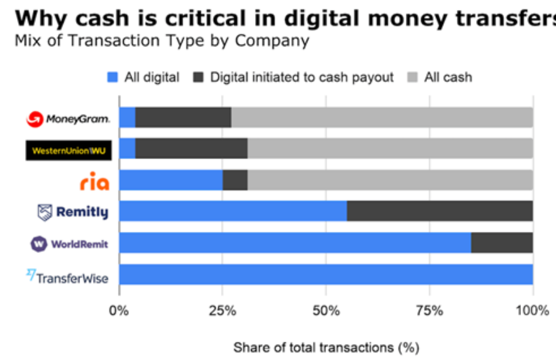
- In a prior slide we cite that 65% of all remittance transactions are cash based
- As long as one side of the transaction is cash based, we would consider that a cash transaction (i.e., Transferwise would not be able to handle that transaction, at the moment, and Remitly & WorldRemit would have limited ability to handle that transaction)
- Cash transactions (if any part is cash based) cannot be facilitated by Visa Direct + Earthport or Mastercard Send + Transfast (as this provides access to accounts – so an account is required on both sides of the transaction)
  - While we believe the networks will help establish scale amongst digital remittance providers, ultimately they will still have to enable local treasury networks or partnerships to facilitate transfers for many of their users and markets (i.e., will miss the long tail, which is actually not really the tail, but comprises a good portion of remittance volumes)
- Over time, as more individuals become banked globally (especially in developing countries), we expect digital remittances to become more and more important
- Digitally initiated transactions have been growing as a percent of transactions, which has been accelerated by COVID

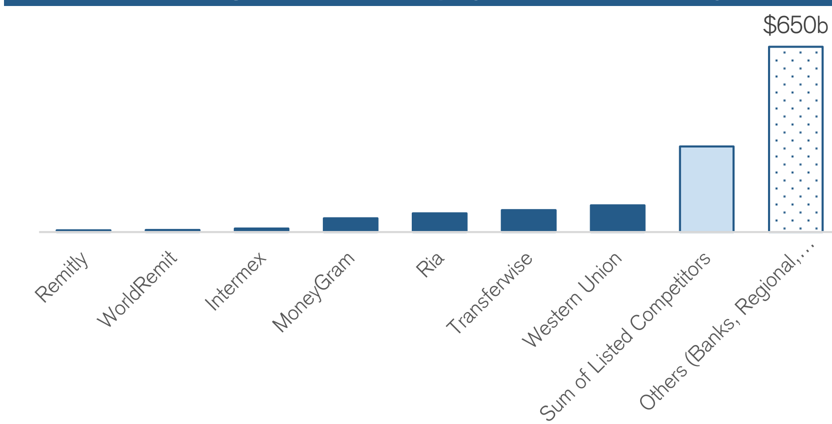
Cash still makes up one side of a good portion of transactions in remittances

Cash has been the enabler of digital growth

Digital growth has stolen all the recent headlines but even before the pandemic, counter-intuitively, cash has been the critical component enabling digital growth. We've published some new data on transactions mixes across the six leading players to show why.



Of the ~$900-$1000b market (the informal global TAM) the majority of volumes are handled by the large players (MGI, Ria, WU) and banks and other regional remittance players – who are mostly cash



Source: World Bank, Western Union, Credit Suisse research, FXC Intelligence

14. Global remittance market innovation

Transferwise reimagining remittances

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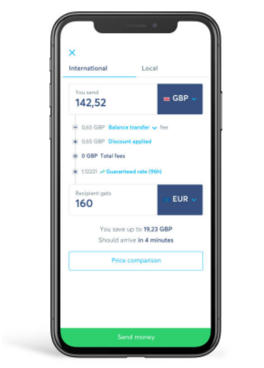
The borderless account is a cross-border Neobank offering for more affluent expats worldwide solving a massive pain point amongst consumers around difficulties getting banked when living abroad

- As part of its hook, Transferwise offers remittances to 70+ countries at competitive rates (fees < 1% for some currency pairs)
- The borderless account by Transferwise adds on to its remittance services eliminates the complexities of banking while living abroad, allowing expats
- Transferwise partners with banks worldwide to be able to hold deposits and is regulated by the FCA (UK financial authority)

Features of the Borderless Account include

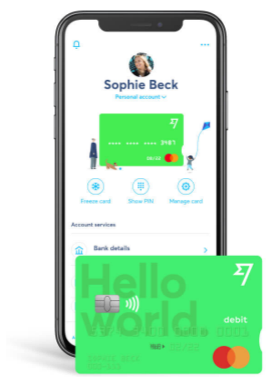
- Receive bank account details in UK, EU, USA, New Zealand, Australia, Singapore, Turkey and Hungary, which can be used to receive payments from any other account in and transfer out (enabling bill payment, salary receipt, etc.)
- Debit card which can be used anywhere in the world, transacting at the current FX rate, without fees
- Can move your money in between your bank accounts with various currencies for a small fee
- No international ATM withdraw fees

Cross-border payments and banking has often been regarded as one of the more complex and difficult pain points to solve within remittances, and Transferwise has made significant headway into this market



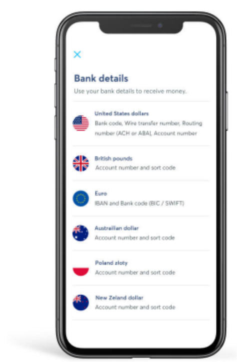
Send money cheaper and easier than old-school banks.

Send money at the real exchange rate with no hidden fees.



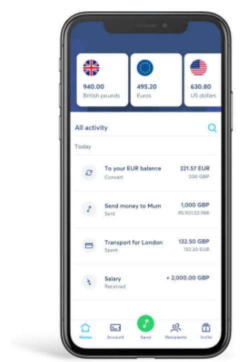
Spend abroad without the hidden fees.

Use a card in 200 countries, spend with Apple and Google Pay, and withdraw anywhere. Get yours for 9 USD.



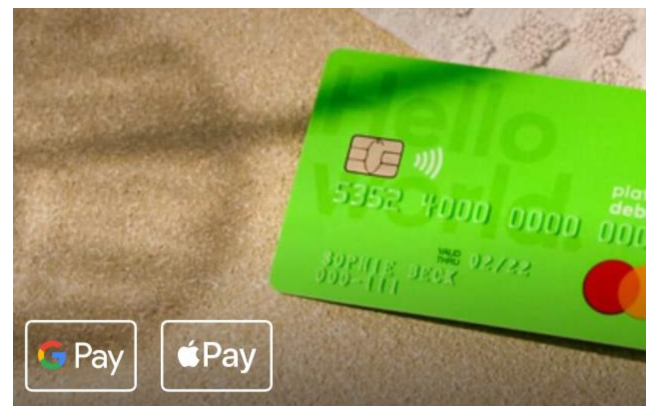
Receive payments like a local in 8 currencies.

Get your own UK account number, Euro IBAN, US routing number, and more.



Convert and hold 55 currencies.

Holding multiple currencies is completely free, and we use the real exchange rate to convert.



Source: World Bank, Western Union, Credit Suisse research

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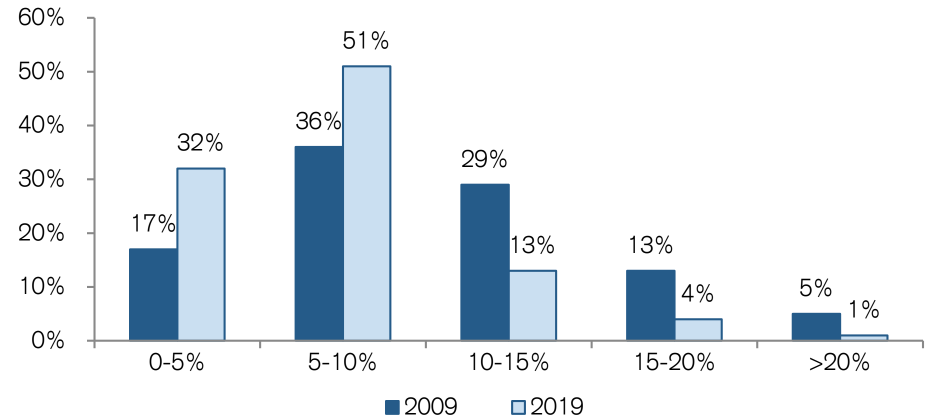
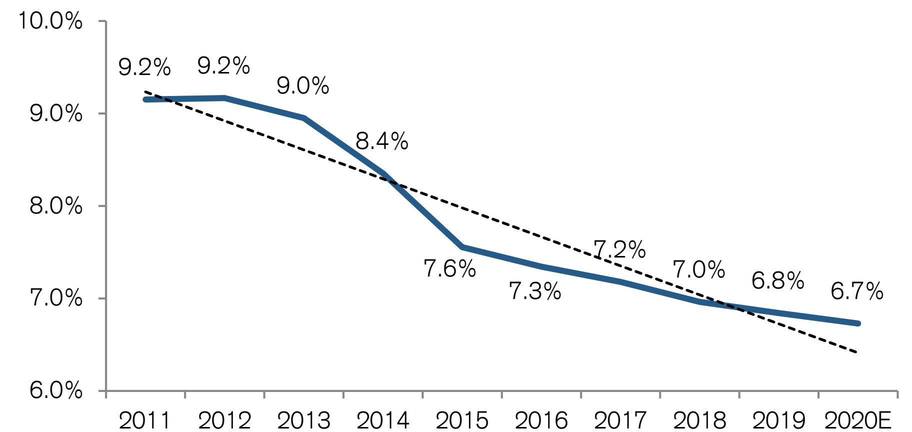
14. Global remittance market innovation
Large market with pockets of pricing pressure

- Global money transfer prices still high at 7% on average (which includes bank wires) despite innovation given high barriers to entry and high-cost structures of incumbent players:
  - Barriers to entry – money transmitter licenses in each country
  - High costs to manage agent networks, receiving fees when money is sent and received
  - Increased regulatory requirements such an know-your-customer (KYC) and anti-money laundering (AML)
  - A local presence, including bank accounts and capital held in that country's foreign currency (FX markets are a last resort to complete a transfer)
- Costs vary widely between specific corridors, generally inversely correlated with volumes
- Costs are gradually coming down from increased competition taking a digital approach such as Transferwise, Remitly, WorldRemit, and others

Pricing varies widely by corridor – now 83% of corridors cost <10%, up 30% from 2009



Sustained broader industry level pricing pressure (global average cost for sending $200 shown below), although impacted by bank channel and other mix-related dynamics



Source: World Bank, Credit Suisse research

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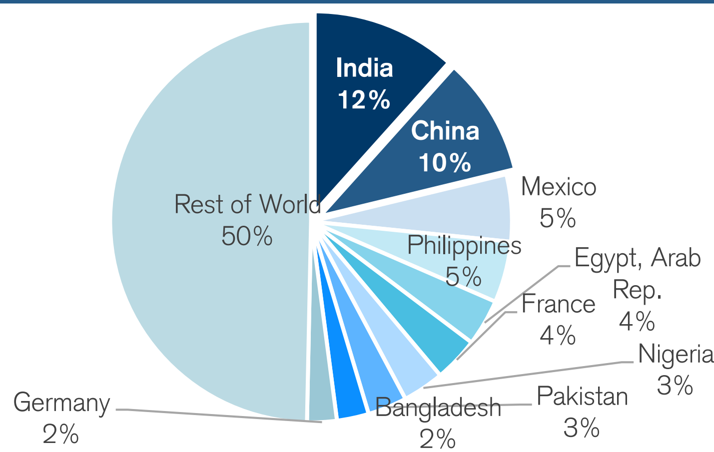
14. Global remittance market innovation
US dominates the world remittance landscape

- Generally speaking, flows are most frequently moved from developed countries to developing countries (typically job-seeking activity).
- Inbound remittance market:
  - India and China are leading receive markets but are driven by a more fragmented distribution of immigrants around the world.
  - No one corridor is overly material to migrant flows, with all < 25% of the country's inflows.
  - Flows to Mexico, the 3rd biggest country in the world by inflows, are highly concentrated, with 90%+ volumes of coming from the US.

2019 Global inbound remittances (% of total volume), with India and China the two largest inbound markets, followed by Mexico



Source: World Bank, Credit Suisse research, US Census Bureau

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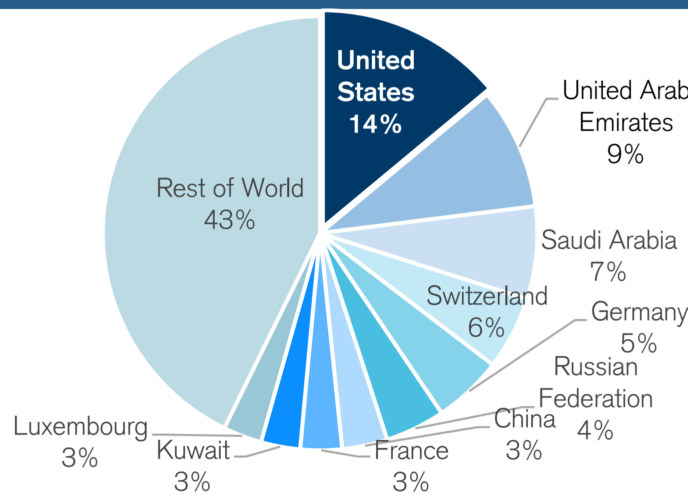
14. Global remittance market innovation
US dominates the world remittance landscape

- Outbound remittance market:
  - The largest outbound remittance market is the United States, by a margin of ~2x the number two market (Saudi Arabia).
  - The US Census Bureau estimated in 2017 that ~14% of the American population was foreign born (~44mm people, 3x more immigrants than the next closest country).
  - 6 of the top 10 money remittance corridors originate in the United States, with US into Mexico representing the single largest remittance market in the world (~5% of the entire industry).

2018 Global outbound remittances (% of total volume), with the US and the UEA the two largest outbound markets, followed by Saudi Arabia



Source: World Bank, Credit Suisse research, US Census Bureau

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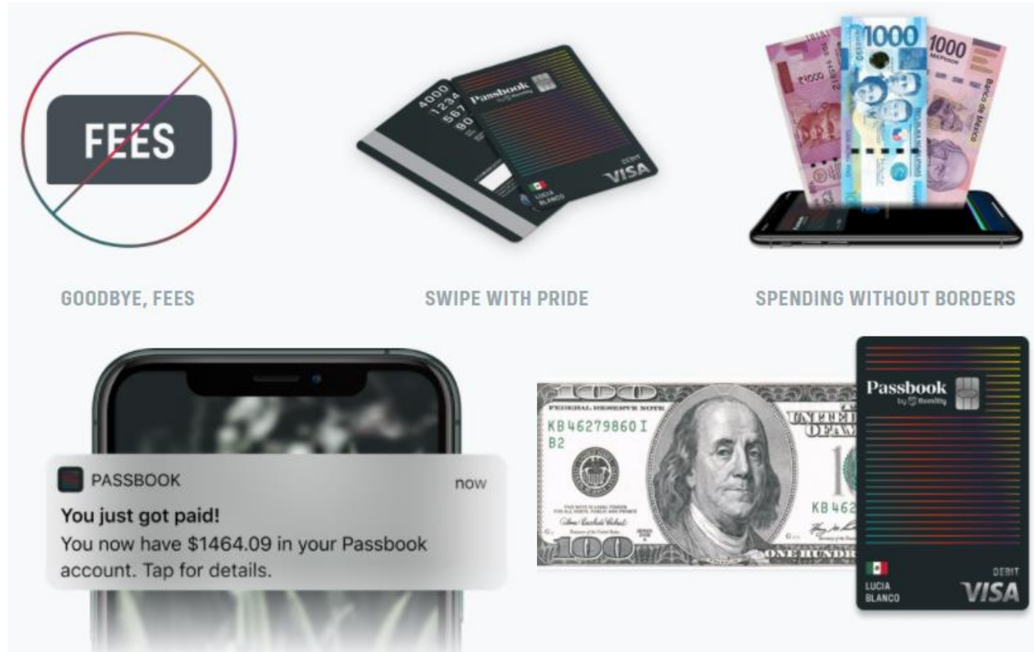
14. Global remittance market innovation

Remitly provides Neobank for those “impossible” to bank

Remitly launched Passbook in 2020 to enable immigrants living in the United States to access banking services:

- Passbook was designed for multi-nationals with the understanding that not all immigrants have a Social Security Number (generally required to open a bank account in the US), instead allowing for accounts to be opened with a passport, ITIN, immigration ID, US visa, Mexican Matricula Consular ID, or other form of government-issued ID and physical US address
- Passbook is designed to suit the needs of migrants and traditional unbanked individuals, with a variety of features:
  - Early access to direct deposits (up to 2 days early)
  - Cash deposits at 90k+ retail stores
  - Earn cash back on Remitly transfers made with the Passbook Visa debit card
  - International spending without foreign transaction fees
  - No overdraft, minimum balance, transfer, or ATM withdrawal fees, and no service charges
  - Provides a bank account number and routing number for receiving funds
- Passbook is an attempt by Remitly to address a previously mostly un-bankable population (undocumented immigrants) estimated at ~10.5mm of ~18-20mm unbanked individuals
- Remitly has most recently cited ~4mm total users, but given the recency of the rollout we believe Passbook comprises a small percentage of these users

Passbook by Remitly provides a banking solution for immigrants that have gone unaddressed by the traditional banking system



Source: Passbook by Remitly, Credit Suisse research, Pew Research Center, FDIC

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14. Global remittance market innovation
Start-ups see elevated remittance prices as an opportunity

Metric	Transferwise	Remitly	WorldRemit
Recent valuation	$5b (July 2020)	~$1.5b (July 2020)	~$900mm (June 2019)
Geographic reach	59 countries	50 send and 150 receive countries	50 send and 150 receive countries
Approach	• Started off as P2P focused on GBP to EUR, now can transact in 54 currencies across 2.5k routes • Now white-labeling banking "network" for others to build on • Expanding into B2B with business accounts (borderless accounts) • Revenue +53% at £179mm, 3rd year in a row of posting a profit	• Launched in 2011 • Initially had send capabilities from the US and Canada to 10 high-traffic countries (e.g., Mexico, India, the Philippines and Guatemala) • Expansion to ~600 send-to-receive corridors (as of December 2018)	• Launched in London in 2010, focused on consumer cross-border payments • Expanded into B2B payments with business accounts for SMBs • 90+ currencies, 150 countries
User base	~8mm	">2mm" as of June 2019	~4mm
Other notes	• $5b monthly transfers (or $60b annualized vs. Western Union at ~$90b in C2C volumes 2019), as of September 2019 • In the summer of 2018, was ~3m users transferring £2b monthly (both doubled) • Multi-currency debit card w/ $250/month free ATM withdrawal • Business accounts: international invoices, payouts, APIs (Xero)	• Visa Direct partnership to send funds internationally from US Visa cards • Perfect Delivery Promise: guarantee of exact date and time of delivery • Funding via bank account or card, and recipient can receive directly in a bank account or do cash pickup • Added delivery options (e.g., M-Pesa, home delivery)	• Bank transfers, cash pickups, mobile money accounts, WorldRemit Wallet, and airtime top ups • Business accounts • 90%+ transactions are authorized within minutes, and 70% of mobile-to-mobile transfers take less than 3 minutes

Source: Company reports, World Bank, Crunchbase, PYMNTS.com Credit Suisse research

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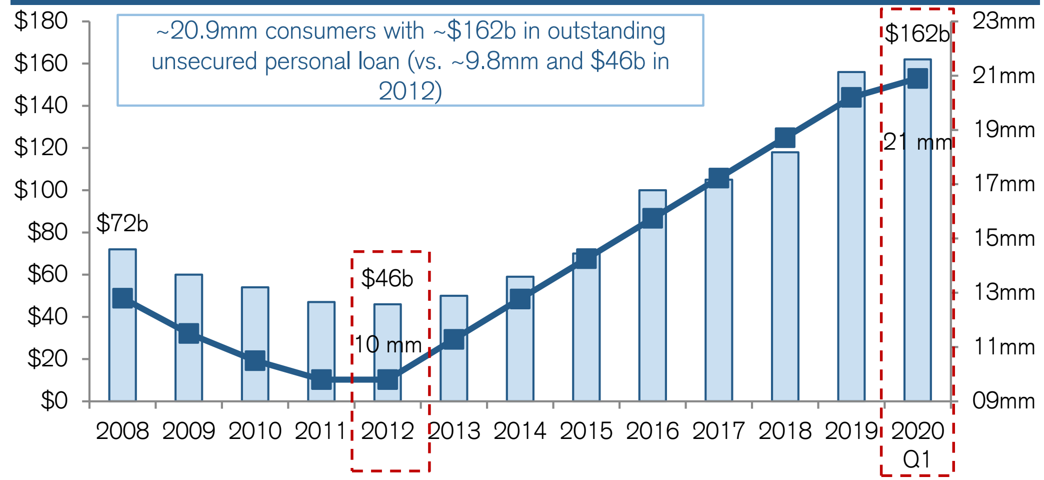
15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

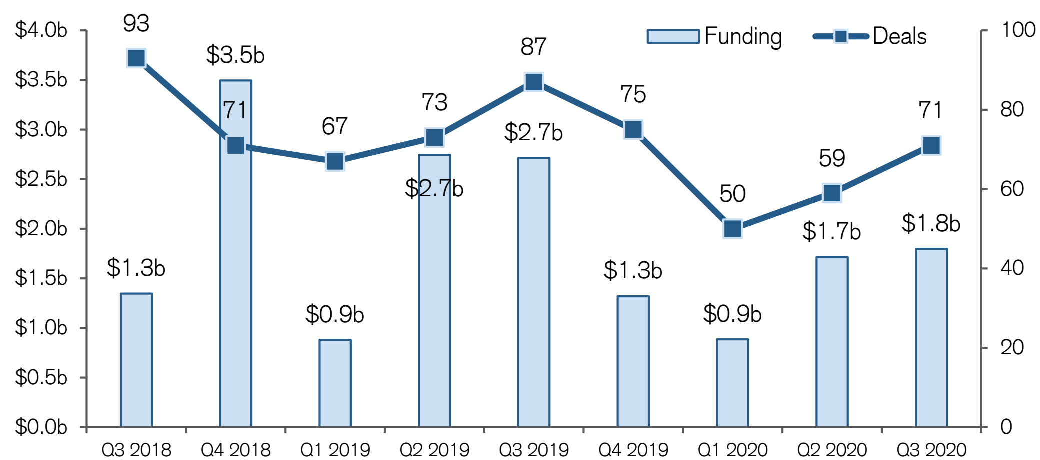
Expanding the addressable market of consumer credit

- The current market size for the personal loan industry is ~$160b, and it is considered to be the fastest growing sub-segment of consumer credit, with FinTech lenders driving personal loan growth since 2012
- TAM expansion via FinTech platforms that often leverage traditional data points (e.g., FICO scores) in conjunction with potentially thousands of other alternative data sources (e.g., employment, education, income potential, spending habits, etc.)
  - Reduced costs vs. traditional banks (lack of brick-and-mortar branches, modern tech platforms reducing back-office expense)
- Personal lending platforms generally prefer customers who would like to consolidate debt, although offerings span a wide range of loan products (e.g., student loan refinancing, private student loans, personal loans, purchase-specific financing)
  - We believe a subset of FinTechs are considering moves further upscale, given varied degrees of success with riskier borrowers (which comes with larger loan sizes).
- FinTech led sub-segments of the personal loan market are:
  - **Marketplace lending** – Generally unsecured installment loans done through an online P2P lending platform (e.g., Lending Club, Prosper, Avant, and Marlette)
  - **Dedicated POS financing** – Financing options that are offered when consumers are checking out, either online or in-store (e.g., AfterPay, GreenSky, PayPal Credit, Klarna, Square Installments, Vyze, etc.). Varying degrees of maintaining risk and/or selling off to investors (there are FinTech personal lending platforms that keep lending on balance sheet, e.g., Marcus).

The US market for unsecured personal loans stands at ~20.9mm consumers, with ~$162b in outstanding loan balance (vs. ~9.8mm and $46b in 2012)



Global VC-backed lending received more than $5.7b in funding in the last 12 months (through Q3 2020)



Source: Company reports, CB Insights, LendingClub, TransUnion consumer credit database, Credit Suisse research

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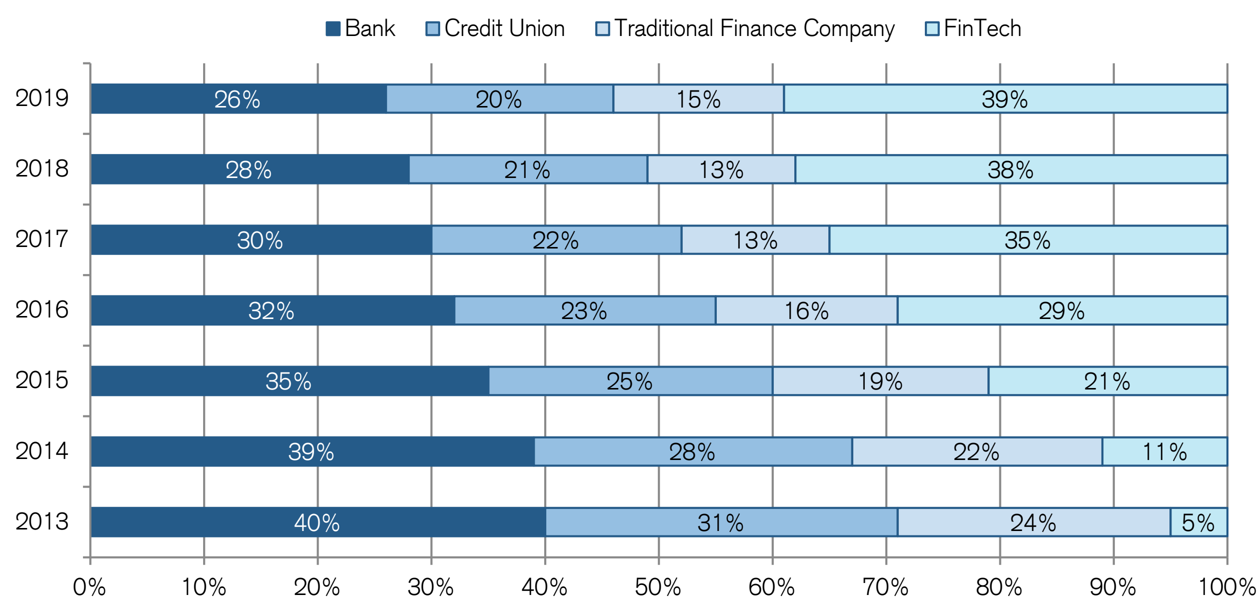
15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

FinTech loans gains share within the personal loan market

- FinTech platform loans made up 39% of personal loans in 2019, having first gained a market share leadership position in 2018 (relative to banks, credit unions, and traditional finance companies – when combined, banks and credit unions make up ~46% of all personal loans).
- In 2013, FinTechs accounted for just 5% of such balances (and combined bank and credit union share has decreased from 71% to 46% during the same time period).

FinTech share of the personal loan market has grown from ~5% in 2013 to ~39% in 2019



Source: Company reports, TransUnion consumer credit database (TransUnion does not break out POS personal loans separately, per The Financial Brand), Credit Suisse research

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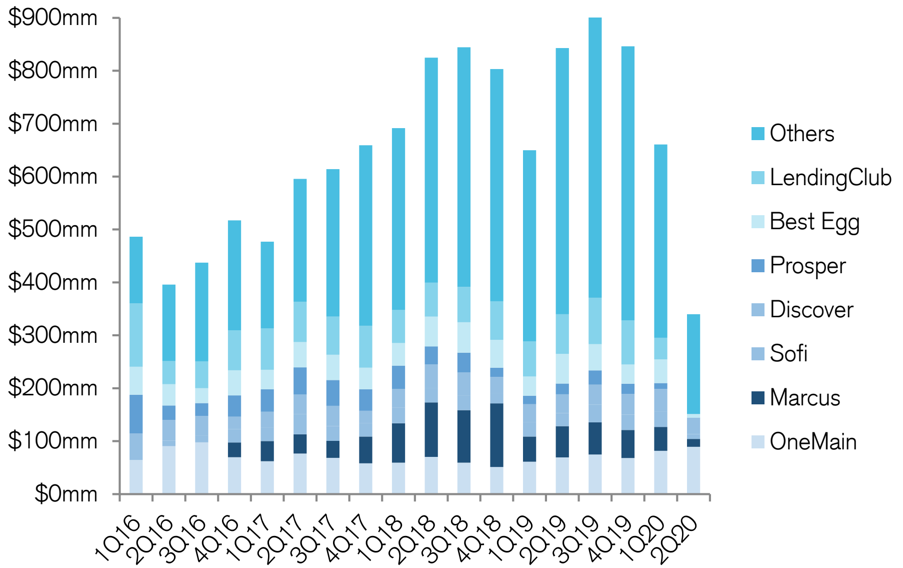
15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

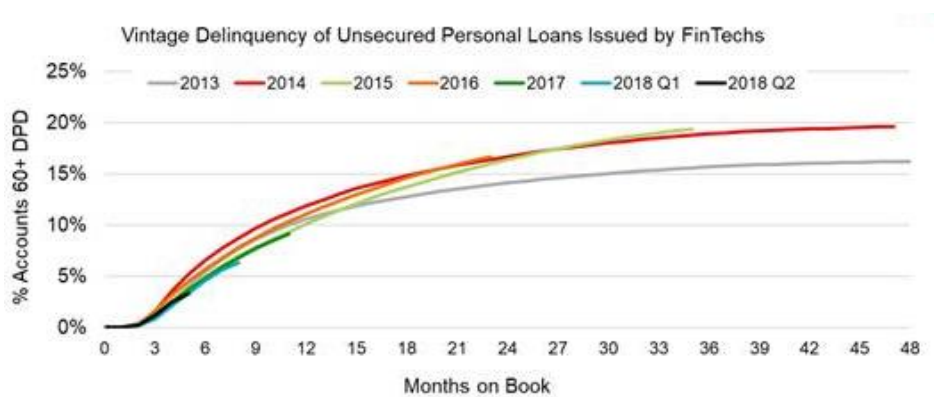
Marketplace (peer-to-peer) lenders

- Examples of large marketplace (P2P) lenders are Lending Club (LC), Prosper, Avant, and Marlette (Best Egg)
- Marketplace lenders generally offer unsecured installment loans done through an online investment platform (i.e., P2P lending platform)
- Serve as an intermediary in matching borrowers (attracted by speed and convenience) and investors (prospects for higher returns), although a "true" marketplace model is no longer viable (hybrid model has emerged, some funding is necessary)
- Key question is whether risk separation of credit grades will be maintained; the test will be in a weaker economy
- Additional notes: (1) Risks tend to increase significantly as growth scales up; and (2) These lenders are not just consolidating other debts (although debt consolidation and/or credit card debt repayment are key uses cases)

Top personal lending brands by mail volume (i.e., the number of mail offers personal lenders mail out to solicit personal loan applications)



FinTech vintages are showing steady improvement when viewed by the percentage of accounts that are 60 days+ past due

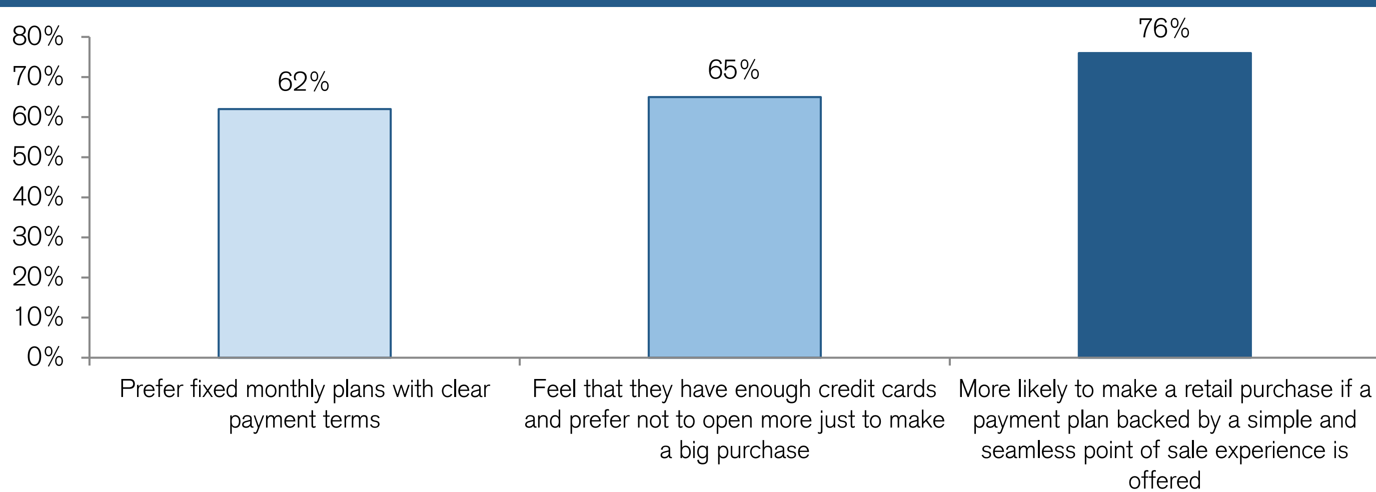


15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

Dedicated POS financing (purchase-specific credit offerings)

- Examples of large, FinTech-dedicated POS financing platforms are AfterPay, PayPal Credit, GreenSky, and Klarna, along with Synchrony Financial, ECN Service Finance, and private-label issuers (Wells Fargo, Citi, etc.) and, increasingly, traditional banks (e.g., Chase offering "My Chase Plan", Synchrony offering "SetPay")
- FinTechs offer financing at the POS (online & in-store), with merchants benefiting from conversion rates and higher average basket size
  - Accounts for only ~20% of approved loans (suggesting a different purpose than personal lending and, thus, less competitive), partially due to many of the providers being newer products/concepts
  - POS lending accounted for ~8% of total unsecured lending balances in 2018, up from ~5% in 2015
- Considerations: (1) What will happen to the industry if more credit card issuers allow borrowers to turn credit card balance into monthly installment loans with comparable terms (already beginning with Chase, Citi)?; (2) What happens if banks more prominently offer dedicated POS financing by themselves without relying on third-party platforms? (announcements in 2019 from both Visa [installment APIs] and Mastercard [Vyze] to enable banks at the POS)

Survey suggests that having clear and easy access to financing at the POS meaningfully increases conversion (n=520, June 2018)



Source: Company reports, PYMNTS.com, McKinsey, Transunion, Experian Citizens Financial Group, Inc., Credit Suisse research

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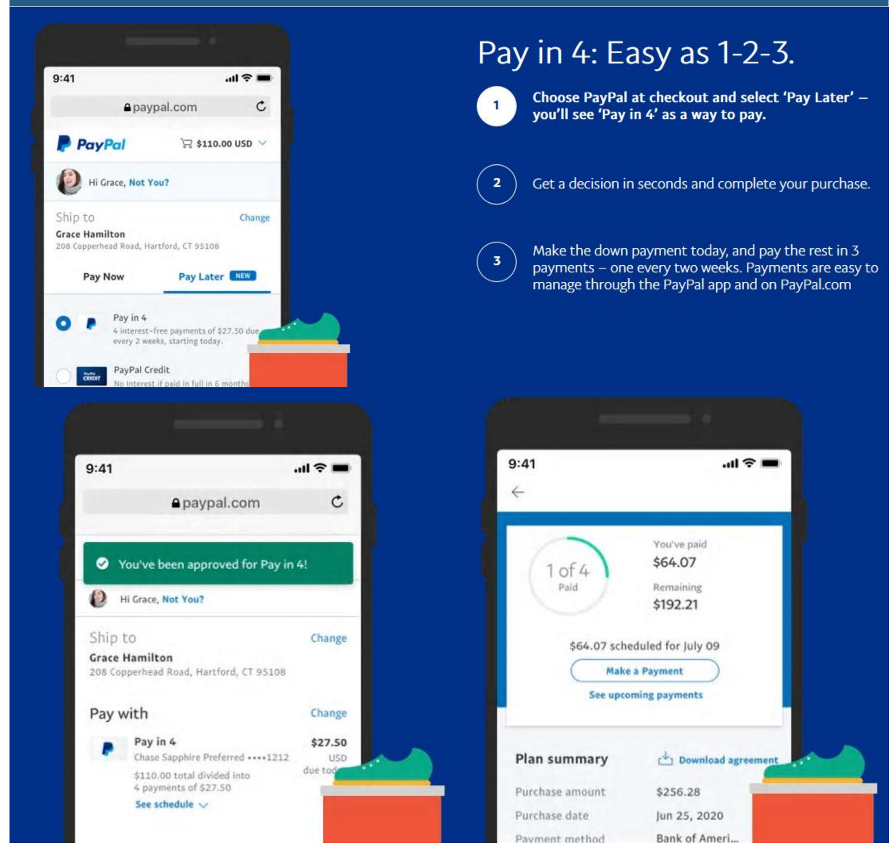
15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

How does BNPL work?

- Four primary methods of BNPL solutions:
  1. Consumer facing (B2B2C) technology – where provider coordinates with the merchant to provide the BNPL service, which consumers are able to access when shopping as a payment method (e.g., Klarna, Afterpay, Quadpay, Sezzle, others)
  2. POS Integrated installment via Networks – V/MA enabling installments at POS, with loans provided to the prospective customer real time by preselected partner lenders in a predetermined hierarchy (i.e., MA – Vzye, Visa has partnered with ChargeAfter)
  3. Traditional bank & non-bank Issuers – Traditional issuers (e.g., Bank of America, Chase, COF, Amex etc.) provide an installment pay option that can be elected during or after the purchase. Private label issuers also can provide financing.
  4. Merchant white-label – Allows the merchant to customize and offer their own BNPL solution, while the white label provider lends capital and holds risk on its balance sheet or is solely a facilitator of the transaction while partnering with bank funding option (e.g., Limepay, Bread Payments [ADS])
- Can take the form of a balance sheet light approach (selling whole loans to forward flow partners or securitizations), typically funded with a partner bank or a marketplace approach
- Product can vary in length and structure depending on the underlying provider

PayPal has introduced Pay in 4 for all merchants with the PayPal button (and for some with an explicit "Pay in 4" button)



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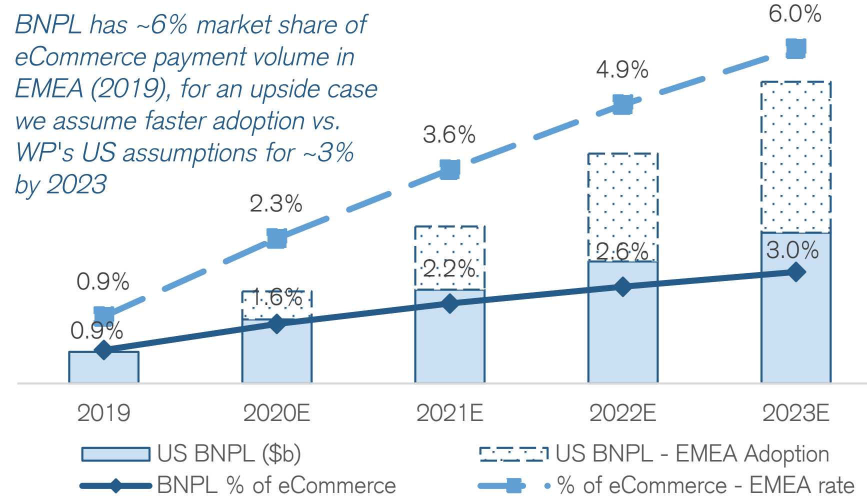
15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

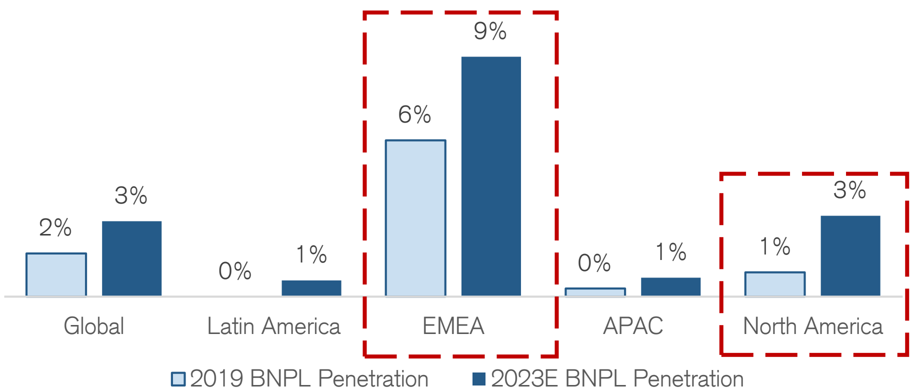
How big can BNPL get in the US?

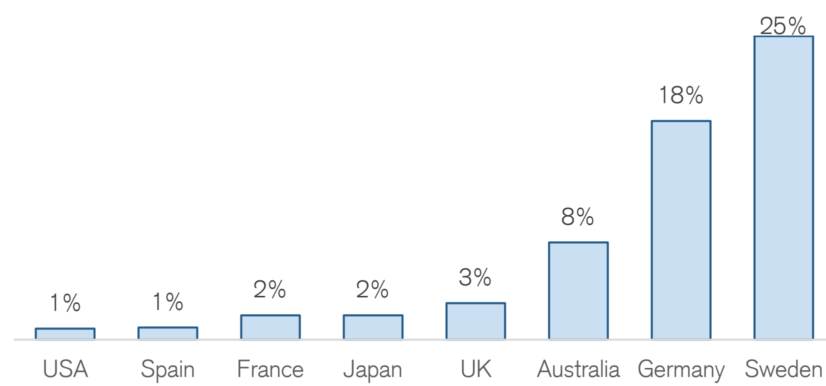
- Worldpay estimates guide us to ~$40b 2023E for US BNPL, assuming 3% penetration of US eCommerce volumes (+5x vs. 2019)
- Other geographic regions have seen faster BNPL adoption, with EMEA reaching ~6% BNPL penetration of eComm volumes in 2019
- Certain countries, such as Sweden at 25% penetration (where Klarna was founded in 2005, earlier than most other BNPL providers) have progressed to more widespread usage of BNPL
- Reasonable upside case for the US would assume it approaches the current ~6% EMEA BNPL penetration by 2023, growth which could be achievable given the high levels of private and public investment behind BNPL platforms in 2019 and 2020 and aggressive marketing to millennial/Gen Z consumers

BNPL is still in the early stages of growth, but has seen rapid adoption in foreign markets, signaling potential upside to US forecasts



EMEA is by far the leading market for BNPL, expected to reach 9% of eComm payments by 2023 (WP); It is not unreasonable to frame 6% BNPL eCommerce adoption as an upside case given several developed markets (i.e., Australia, Germany, Sweden) have well exceeded this number





Source: Worldpay Global Payments Report, Company reports, Credit Suisse research

15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

BNPL Competitive Landscape

	Afterpay	Klarna	Splitit	PayPal (Pay in 4)
Company	afterpay	Klarna.	splitit	Pay in 4 from PayPal
Valuation	ASX - ~$34b AUD (ticker APT AU)	Private - $10b+ (Sept 2020, $650mm raise)	ASX - ~$550mm AUD (ticker SPT AU)	New product within PayPal (PYPL US)
Countries of Operation	Australia, US, UK	US, UK, Germany, Sweden, Norway, Finland, Denmark, Austria, The Netherlands, Australia, Belgium, Italy, Spain	US, Australia, Canada	US launched Q4 2020, Germany, France, UK (Pay in 3 offering)
Product Offering	Quad pay (interest + late fees charged)	Invoices (try before you buy), Core installments (longer term), quad pay (56 day installment), Klarna card (revolving credit), savings accounts	Core installments via issuer - taking excess credit capacity and holding it	Available to all PayPal merchants (no additional integration and/or sign-up required), as product is part of the PayPal wallet
Range of Duration	~14 - 56 days	6-36 months	3-24 months	~6 weeks (down payment and three additional payments every two weeks)
Average AOV	~$150 (FY 2020)	~$130 (YTD 2020, assuming ~1mm transactions / day)	~$900 (YTD 2020)	TBD, but range of $30 - $600 allowed
Credit Risk	Yes - during FY 2020, gross losses reflected ~85bps of underlying sales or ~13.7% of the average receivables balance throughout the year	Yes - Bank in Europe, partner in US and elsewhere	No - sits with issuer via hold on credit line	Yes - currently kept on balance sheet (although could be sold off as part of asset light approach as program scales); Relatively lower AOV and short duration loans (less capital intensive vs. other PayPal Credit offerings)
GMV & Revenue	~$8.3b globally, with ~$3b US (FY 2020), Take Rate of ~4%	$35b GMV (YTD 2020, +43%), 1mm transactions per day; $753mm revenue (YTD 2020)	$65mm GMV 2Q 2020, $2.4mm rev	Low cost offering (no additional fee to merchants, included in existing ~3% on average PayPal merchant fees)
Merchants	55.4k globally, with ~11.5k US	235k retailers globally	1k	~28mm (Q3 2020, globally)
Active Users	9.9mm active globally, with ~5.6mm US as of end FY 2020, and now at ~7.5mm US	14mm monthly active users globally, 2mm in US (end of Oct); 85mm served (7.85mm US)	300k	~361mm (Q3 2020, globally, ~175-200mm US accounts)
Misc.	Core markets are for clothing, pets, jewelry, and entertainment; Does not run a credit check on its client (uses other metadata to triangulate, but not credit score); First payment for first time users ("down payment"); Late fee component; CSe ~79% revenue growth in FY 2021, followed by ~49% in FY 2022	Visa is an investor; 50k daily downloads in US (as of Nov); Acquired Italian BNPL provider Moneymour recently; In-store option live in 10 markets; Vibe loyalty program rewards consumers who pay on time (500k members as of Nov.); Late fees component (though has decreased 5-fold since 2013 as % of vol); Klarna Card ~500k outstanding (end Oct)	Does not use application or credit check; uses a debit or credit card to obtain authorization; does not charge interest, as is a pending charge on credit statement; Average AOV of ~$940 in June; Integration with Stripe Connect	Available to all PayPal merchants (no additional integration and/or sign-up required), as product is part of the PayPal wallet; No impact on credit score (soft check at time of purchase); First payment at time of shipping (down payment); Late fee component

Source: The Nilson Report, Company reports, Credit Suisse research

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15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

Selection of Personal lending FinTech platforms

Marketplace lenders	Comment
SoFi	• $8.65b valuation (per SPAC valuation) • ~$10b expected loan volume in 2020 across ~1.7m members • Offerings in student loan refi, private student loans, personal loans, home loans, SoFi Invest, and SoFi Money • Expanding into Neobank offerings and cryptocurrency trading (partnering with Coinbase) • Anthony Noto became CEO in early 2018 (former COO of Twitter, CFO of NFL, Goldman Sachs analyst & banker) • Received preliminary approval for US bank charter in October 2020 • Acquired digital payments platform Galileo for $1.2b in April 2020
Lending Club	• 3mm+ consumer borrowers and 200k+ self-directed individual investors, along with banks, institutions, and managed accounts serving as investors (banks are largest source of funds) • ~13% average APR on loans up to $40k (average loan $16k) • Publicly traded in the US (LC)
Avant	• $6.5b+ borrowed across 1.5m+ consumers; • Loan amounts of $2k to $35k, with APR range of ~10-36%, terms of 24-60 months • Also charges an administrative fee of up to 4.75%; Primarily a lower FICO score lender (and lending-as-a-service)
Prosper	• $12b+ borrowed across 770k+ consumers; fixed-rate, fixed-term loans of $2k to $40k, with terms of ~3-5 years
Marlette (Best Egg)	• $10b+ borrowed across 600k+ loans; loan amounts of $2k to $35k, with APR range of ~6% to 30%
Upstart	• $7.8b+ originated; loans from $1k to $50k; 3- and 5-year terms, with APR range of ~8-36%
Upgrade	• $4b+ credit extended across 12m card users and borrowers; loans from $1k to $50k; 36- to 60-month payback periods
Other personal lending FinTechs	**Comment**
Earnest	• Range of student loan refi, private student loans, and personal loans (up to $100k) • Acquired in July 2018 by Navient Corp., for $155mm
Marcus (Goldman Sachs)	• Loans up to $40k, with APR starting at 6.99% (range ~7-20%), terms of 36-72 months • Combines with online savings accounts (Marcus-branded) and Apple Card (credit card) to form basis of a nascent consumer business
Elevate	• Online credit products for non-prime consumers; $8.6b in volume, 2.5mm customers

Source: Company reports, Credit Suisse research

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15. FinTech Driven Credit & Buy-Now-Pay-Later Offerings

Selection of dedicated financing platforms innovating at the POS

POS financing platform	Valuation	Comment
AfterPay (AfterPay Touch Group)	~$35b (publicly traded in Australia, APT)	• Checkout button credit (installments), Afterpay and Touchcorp merged June 2017 • Merchant funded at ~4-6% plus $0.30 (free to consumers) • ~$25bn (A$) volume run rate (as of November 2020) • ~64k+ merchants (as of FQ1 2021)
GreenSky	~$1.1b (publicly traded in the US, GSKY)	• Emphasis on home improvement & elective healthcare • Partners with banks (Regions, Fifth Third, Synovous) • ~$6b+ volume run rate (as of Q3 2020) • ~16k merchants (Feldco, Danley's, Morgan Exteriors)
Klarna (Visa strategic investor)	~$10.65b ($650mm financing, September 2020)	• Range of repayment options (e.g., after delivery, over time, 30 days, 36 months, etc.), with shorter payment terms (e.g., 14-30 days) interest free • 200k+ merchants in 17 countries and 90m+ consumers • ~1m transactions per day
PayPal Credit (formerly Bill Me Later)	Part of PayPal (PYPL)	• Consumer offering in the US done via Synchrony Financial (SYF), but kept on balance sheet ex-US • ~$1.6b in consumer receivables (largely international) as of Q3 2020 • ~2% of PayPal total payments volumes is funded via PayPal Credit
Square Installments (Square Capital)	Part of Square (SQ)	• Launched October 2018 • Range of $250–10,000, fixed monthly payments (3, 6, or 12 months) at a range of 0-24% • Consumer funded, although merchant pays an installment-specific MDR on sale (e.g., 3.5% for in-store)
Vyze (Mastercard acquired)	Part of Mastercard (MA)	• A platform for lenders at the POS (allows merchants to offer credit from multiple lenders) • No credit risk to Mastercard (platform only) • Large-ticket item currently but expanding to smaller-ticket size

Source: Company reports, Digiday, Credit Suisse research

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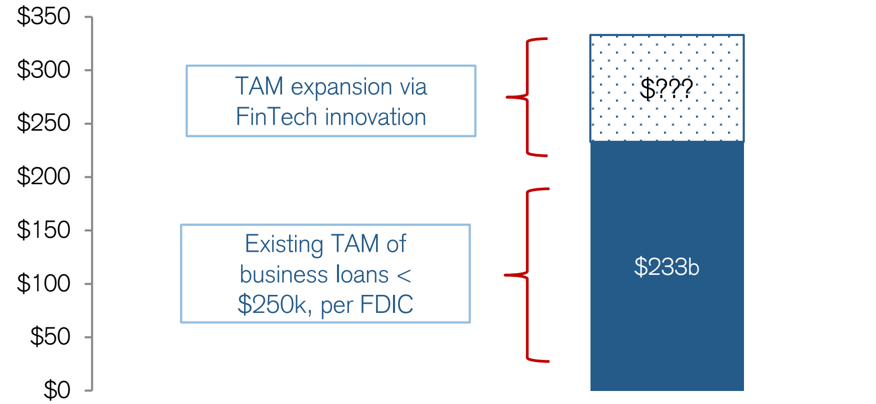
16. FinTech-driven credit for merchants (micro & SMB lending)
Expanding the addressable market for merchant credit

- FinTech platforms are in the process of expanding the addressable market for small business lending – similar to what Square has done for micro merchant payments; these platforms are able to offer loans that traditional banks previously avoided.
  - Cost prohibitive for many traditional banks to go after small loan sizes (e.g., Square ~$6-7k average loan size) in terms of customer acquisition, costs to review application, etc.
  - FinTech often already have acquired a heavily engaged customer, and the loan offering can be done via cross-sell through a dashboard with which the merchant interacts on a daily basis.
  - FinTechs often utilize additional and/or more real-time data that banks do not have, including sales trends through their payments or eCommerce platform (e.g., Square Capital, Shopify Capital, Amazon Lending) to reduce risk.
  - Alternative data sources used by FinTechs include accounting software linkages (inventory levels, receivables and payables data, hiring trends), social media accounts, linkage to all bank accounts (cash balance trends, outflows and inflows), website traffic, user reviews & ratings, and more.
  - FinTech platforms are often “paid first” via a percentage of payments volumes, further reducing risk.
- Numerous types of credit offerings (working capital loans, merchant cash advance, equipment financing, invoice factoring, other business loans, etc.); merchant cash advance offerings through payments platforms are not new, but expansion into smaller merchant is (e.g., Square Capital, PayPal Credit, Shopify Capital).

Business loan balances < 250k in the US stood at ~$233b as of year-end 2019, but FinTech’s are expanding the reach (new TAM)



FinTech SMB loan experience vs. traditional bank – easier application, faster approvals, and based on more than traditional credit metrics

Lower customer acquisition & processing costs, existing merchants	vs.	Often not economical (CAC, risk, etc.) to pursue smaller loans
Online application (including pushed pre-approvals in dashboard) and fast	vs.	Can be offline (brank branch) and time consuming (more requirements)
Automated review & approval (often times instantly or within minutes)	vs.	Reviewed by a person (weeks or more of application processing)
Funding available same-day or next day (perhaps directly via debit card)	vs.	Funding can take multiple days in some cases
Decisions enhanced with payments, accounting, social, & other data	vs.	Decision based on traditional credit analysis

Source: Company reports, OnDeck, Credit Suisse research

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16. FinTech-driven credit for merchants (micro & SMB lending)

Examples of Payments & eCommerce platforms offering merchant credit

Merchant credit offerings	Comment
Square Capital	• Cumulative ~$7b+ (Including $820m in PPP) volumes across ~850k loans since launch May 2014 • Repayment as a percentage card volume done through Square's platform • Loss rates consistently at less than 4%, despite smaller merchant size
PayPal Credit	• Merchant credit business remains on balance sheet for PayPal (US consumer sold to Synchrony Financial) • PayPal Business Loans ($5k to $500k range) & PayPal Working Capital ($1k to $125k range) • Total receivable ~$3b as of Q1 2020 • US & UK offerings (~95% of receivables)
Shopify Capital	• Cumulative ~$1.2b+ total merchant cash advances as of Q2 2020 • July 2019 expanded to non-Shopify Payment merchants in the US (expands TAM ~10%) • Supported by data within Shopify Payments and Shopify Fulfillment Network
Amazon Lending	• Invitation-only program that offers $1k-75k loans for sellers to purchase inventory for use on Amazon • Utilizes real-time sales data (and growth), customer reviews, profitability metrics, etc. • Terms on the loans tend to be 12 months or less (i.e., short term) • "Amazon Lending surpassed $3 billion lent to small businesses on Amazon since the program started in 2011" (January 2018)
Amazon.com Revolving Corporate Credit Line & Amazon.com Corporate Pay-In-Full Credit Line	• Credit line can only be used at Amazon.com • More flexible payment terms (i.e., pay-in-full or make minimum monthly payments only) • The Pay-in-Full Corporate credit line offers 55-day payment terms (no interest, no fees) and is marketed more toward larger businesses (e.g., libraries, schools, government organizations)
Global Payments (Evolocity Financial partnership)	• Up to $200k per loan • Repayment as a percentage of card volume • Cash advance and SMB loans • Additional TSYS offerings (cash advance up to $150k)
Clover Capital (Fiserv)	• Repayment as a percentage of card volume (but tends to be in the 10-20% range) • Available to any First Data merchant directly or through any ISO, partner, etc.
Worldpay Business Finance (Liberis partnership)	• Partnership with Liberis Ltd (Worldpay will receive a commission) • UK-based offering for businesses doing £1,000+ trailing-four-month volumes

Source: Company reports, Credit Suisse research

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16. FinTech-driven credit for merchants (micro & SMB lending)
Additional FinTech platforms innovating in merchant credit

FinTech Platform	Comment
Behalf (Visa strategic investor)	• Allows vendors to extend no-fee terms and 30-180 financing (30-180 days) to SMBs (line of credit) • Behalf customers can make business purchases (access credit line) via Visa virtual cards
BlueVine	• Invoice factoring, term loans, and lines of credit • Invoice factoring up to $5mm • $6.5+ cumulative funds delivered to 125k+ customers
FundBox	• Revolving lines of credit for SMBs • Connects to accounting software, business accounts, etc. • $50k annual sales ideally (average customer is > $250k)
Kabbage	• $6.5b in volume to 170k+ SMB since founding (2009) • Working capital lines of credit up to $250k, repaid in 6-, 12-, or 18-month terms • Pulls from multiple sources (bank accounts, sales channels, social media, accounting software, etc.) • $50k annual sales, or $4.2k per month average past three months • Launched SMB payments capabilities in Oct 2019 for instant A/R payments • Nations third largest PPP loan lender by application volume (209k approved for $5.8b+)
LoanBuilder (Swift Financial, acquired by PayPal)	• Business loans between $5k and $500k • $42k annual sales and a 550 FICO score required • The lender for LoanBuilder is WebBank (Utah based ILC)
Funding circle	• Peer-to-peer lending platform (investors lend to SMBs) • Business loans between $25k and $500k • UK, US, Germany, and the Netherlands
On Deck Capital	• $13b+ total originations across 100k+ SMBs • Term loans (~80% of business), line of credit, and equipment finance offerings • Publicly traded in the US (ONDK)
Payability	• Gives Amazon merchants access to ~80% of sales on a next-day basis (vs. up to 14 days) • Requires 90 days of sales history

Source: Company reports, TechCrunch, PitchBook, Credit Suisse research

17. Neobanks gaining scale
Definition and business model characteristics

- **Definition of a Neobank:** We define a Neobank to be a technology platform that offers financial services, built upon a foundation of a checking account and affiliated debit card enabling the business to expand into other free, reduced-cost, or enhanced services and functionality. We are cognizant that Neobanking platforms can and likely will continue to be built as adjacent services on top of another core financial services offering (e.g. trading platform or lending platform expanding into checking accounts), aligned with the theme of "rebundling" over the medium-longer term. Neobanks generally operate outside of the traditional banking regulatory system through partner bank arrangements in which they leverage the national or state banking charter of a fully-licensed and regulated financial institution, allowing the business to accept customer deposits and facilitate money transmission and payments. We note there are of course exceptions where Neobanks have opted to obtain a charter (e.g., Varo in the US).
- **Highly recurring, transaction-based, and largely non-discretionary revenue stream (SaaS-like):** Today, the vast majority of Neobank monetization (for the companies within scope for this 1st edition report) is derived from interchange earned on customer card spend (largely debit card, although select Neobanks have introduced credit card offerings). Direct deposit users are the most desirable as they tend to use the debit card as their primary spending vehicle, driving elevated, sticky, and predictable levels of engagement, resulting in a highly recurring, transaction-based, and largely non-discretionary revenue stream.
- **Cross-selling opportunities abound:** An important feature of primary customer account status, often associated with direct deposit accounts, is the opportunity to deepen the customer relationship, with this claim supported by a recent survey conducted by Chime that indicated ~75% of its users would like Chime to offer additional products in areas like lending, investing, insurance, etc.
- **Potential for attractive unit economics longer-term:** Neobank platforms are designed to operate (at scale) with low cost structures (vs. traditional banks), resulting in attractive longer-term unit economic profiles (with the potential for continued improvement as the platform further scales over time).

Source: Credit Suisse research

17. Neobanks gaining scale
Neobank Company Map

United States

Acorns	Current	Long Game	Qapital
Arrival	Dave	Lucky Card	Qube Money
Aspiration	Daylight	M1 Finance	Revolut
Azlo	Douugh	Majority	Robinhood
Bambu	Empower	Marygold & Co.	Sable
Bank Mobile	Envel	Meed Banking Club	Save
Bella	Extra	Mercury	Simple
Betterbank	Finch Money	MoneyLion	SoFi
Betterment	First Boulevard	Monzo	Stash
Braid	GoBank	N26	Step
Branch	Good Money	North Loop	Stilt
Bridge Money	Greenlight	NOVO	Transferwise
Capway	Greenwood	One Finance	Unifimoney
Cheese	Happy Money	onJuno	Varo
Chime	HMBradley	Oxygen	Wealthfront
Cogni	Ivella	Passbook by Remitly	Yotta Savings
Copper	Juno	Pinch	Zero
Cred.AI	Letter	Point	Zeta
Credit Sesame	Level	Purple	Zoro Card

Europe

220 Bank	Gimi	Monzo	Qonto
Alpian	Go Henry	Muniy	Revolut
Anytime	Hello bank!	N26	Rocket Bank
Aoin	Holvi	neon-free	Rooster Money
Atom Bank	Hype	Nest Bank	Shine
Bitwala	ImaginBank	Nickel	Soldo
Bnext	Indo	Nimbl	Starling Bank
BuddyBank	Kard	OakNorth	Tandem
Bunq	Knab	Orange Bank	Tide Bank
Coconut	Kontist	Osper	Tinkoff Bank
Countingup	Lintel	P.F.C.	Tomorrow
CSX by Credit Suisse	Lunar	Penta	Transferwise
Curve	manager.one	Pixpay	Vivid
Dozens	mBank	Pockit	Xaalys
EasyEuro	Monese	Prismea	Yapeal
Fidor Bank	MonoBank	Qapital	Zak Banque Cler
Fire			

South America

Agibank	Flink	NuBank
Albo	Fondeadora	Original
B89	Hey Banco	Oyster
Banco Inter	Klar	RappiPay
Banco Pan	Ligo	Rebanking
Broxel	Mach	superdigital
Brubank	meu pag!	Swap
C6 Bank	Nelo	Uala
Cuenca	Neon	Wilobank
Enso	Nequi	
Evva	Next	

Canada

Koho
Neo Financial
Stack
Tangerine Bank

APAC

811 by Kotak	Kakao Bank	TMRW by UOB
86 400	Kyash	Tonik
Airstar Bank	Livi Bank	Tyro Payments
Aspire	Mox by Standard Charterec	UP
BigPay	MYBank	Volt Bank
Digibank by DBS	Neat	Walrus
Douugh	NiYO	WeBank
Hay	Open	WeLab Bank
InstantPay	PAObank	Xinja
Jenius	Sony Bank	Yono by SBI
Jibun Bank	Statrys	YouTrip
K Bank	Timo	ZA Bank

Africa & Middle East

Bettr
Dopay
Hala
ila
Kuda
Liv.
Mashreq Neo
meem
Pepper
Xpence

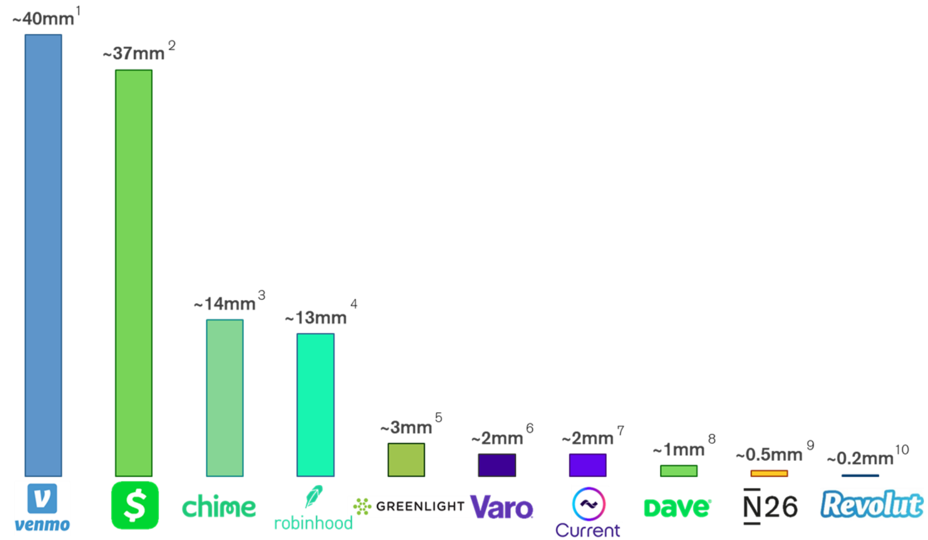
Source: Credit Suisse research, Neobanks App

17. Neobanks gaining scale

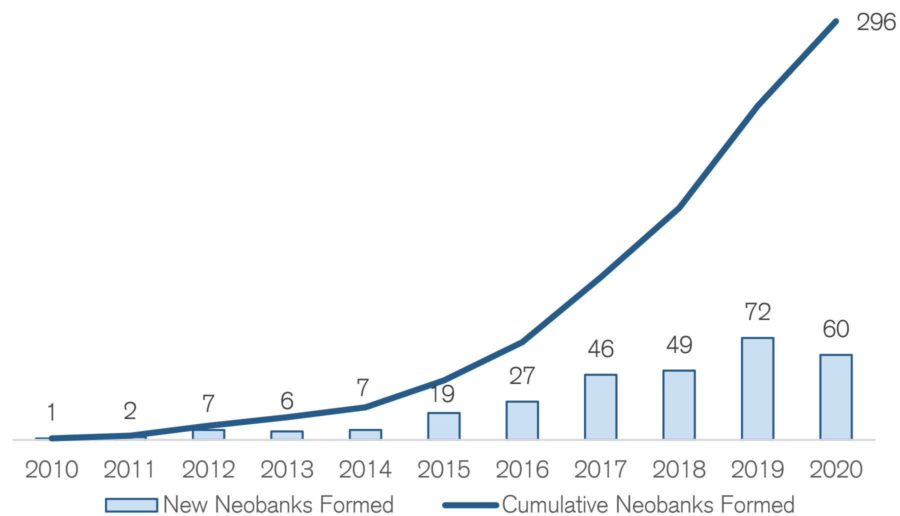
Neobank adoption accelerated in 2020 and new Neobank formations persisted

- Neobank user growth was accelerated in 2020 by COVID as physical bank branches were closed to the public and individuals desired more immediate access to funds and simplified management of personal finances
- New Neobanks continue to be formed at a rapid pace, with most outsourcing the vast majority of their technology and banking infrastructure to Banking-as-a-Service (BaaS) providers, bank partners, and other modern bank tech providers
- It is important to note that in many cases certain users are not monetizable, most notably in the cases of Venmo and Cash App in which many users are only taking advantage of free P2P services and are not utilizing debit cards, instant transfer, or other revenue-generating services

We estimate Neobanks in the US now have over 113mm+ cumulative users (although we believe there is likely substantial cross-over)



Globally, there are now ~300 Neobanks with an average of 5 new Neobanks opened each month in 2020

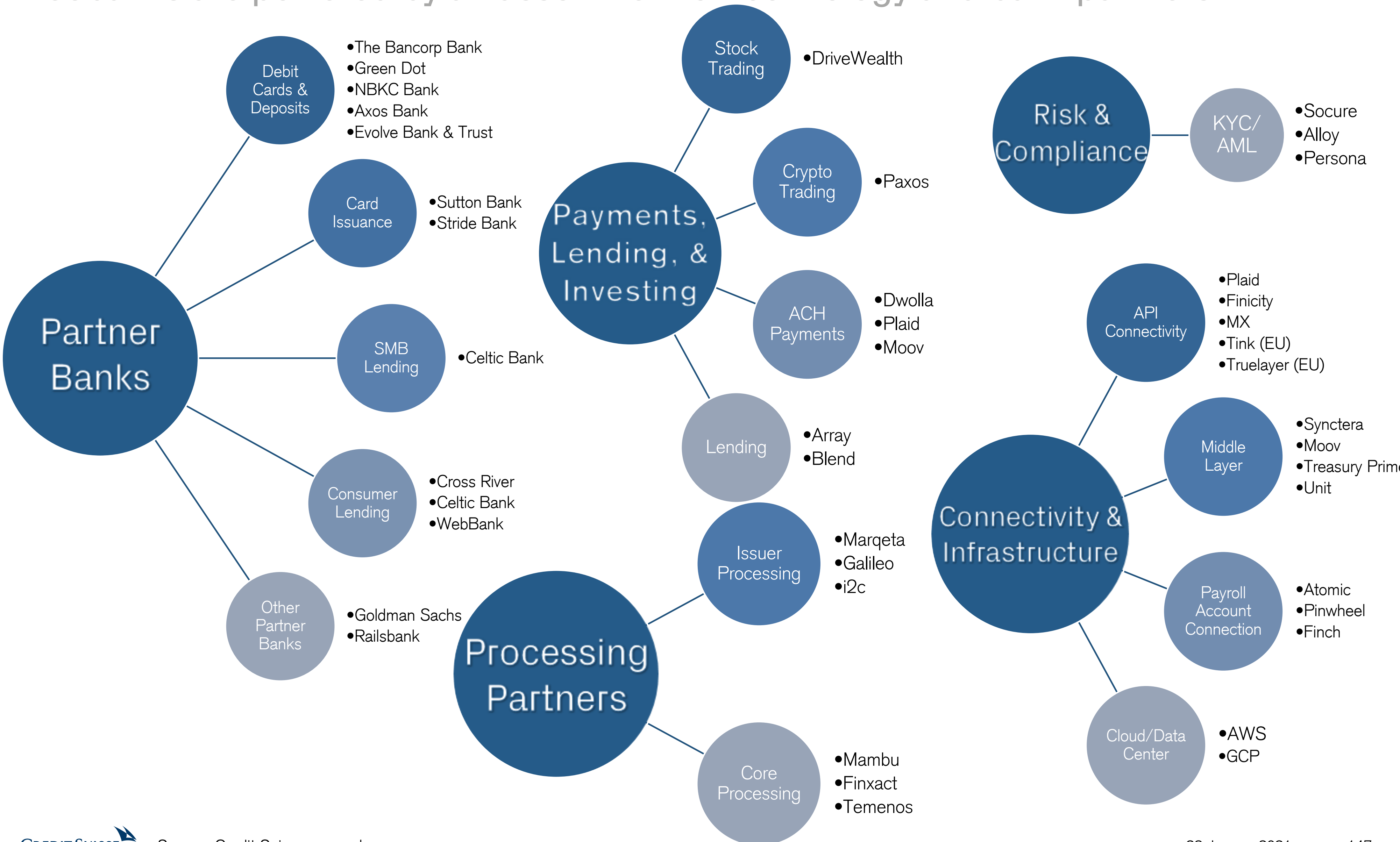


[1] CSe for Q4 2020 Venmo annual active users of ~67m (last disclosed number of 65 million in Q3 2020 earnings call) converted to monthly active users at a 60% conversion rate
[2] CSe for Q4 2020 Cash App monthly active users (last disclosed number of "over 30 million" in Q2 2020 earnings call)
[3] 8 million as of February 2020 (Business Insider); 5m as of September 2019 (Techcrunch); 3m as of March 2019 (Chime); assumes annualized user growth of ~100% from February 2020 to December 2020
[4] 13 million as of May 2020 (The New York Times)
[5] Nearly 3 million "parents and kids" per discussions with company management
[6] 2 million accounts as of June 2020 (Techcrunch)
[7] Over 2 million users as of November 2020 (Current press release on November 24, 2020)
[8] Completed rollout of Dave Banking to 2 million user waitlist in December 2020 (LinkedIn); On average 1 out of ever 2 waitlisted users signed up for an account as of July 2020 (CNBC.com)
[9] "Nearly 500,000 customers" as of August 2020 (N26 press release)
[10] 150,000 users as of October 2020 (CNBC.com)

Source: Company data, Credit Suisse estimates, SoFi

17. Neobanks gaining scale

Neobanks are powered by an assortment of technology and bank partners



17. Neobanks gaining scale

Tech and bank partners provide a range of services enabling Neobanks to quickly go to market

Partner Banks	• Shift banking regulatory burden from Neobank to partner bank • Enable deposits, card issuing, and loan origination capabilities
Issuer Processors	• Manage issuance of cards, and often physical card creation, packaging, & shipping • Transaction authorization and settlement via connection with card networks
Core Processors	• API integration, fraud detection, risk management, transaction processing, internal ledger, and loan management functionality
ACH Payments Providers	• Facilitation of ACH payments, and in some cases push-to-debit payments
Risk & Compliance Providers	• Digital identity verification and fraud/risk management • Ongoing KYC/AML compliance
Connectivity/Data Aggregators	• Establishes data connection between banks to enable balance checks, identity verification, and rapid account onboarding
Brokerage Infrastructure	• Cloud-based, API infrastructure to enable trading of stocks, ETFs, cryptocurrencies
Cloud Providers	• Scalability through cloud-based infrastructure vs. legacy on-prem tech stacks • Enable data analytics and business insights

Source: Credit Suisse research; Please note, categorization is often imperfect as providers frequently offer services that go beyond the broad labels above or provide services that fit in multiple categories; therefore, any categorization is by nature more limiting than reality

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17. Neobanks gaining scale

FinTechs are on one end of the "barbell", big banks are on the other

- Digitally native consumer expectations for mobile apps are set by the mainstream apps (Instagram, Amazon, YouTube, Uber, etc.) where Millennial & Gen Z consumers spend most of their time.

- High expectations for mobile apps favor banks that can keep up (investment, innovation) and/or lean on the more modern offerings from bank technology providers.

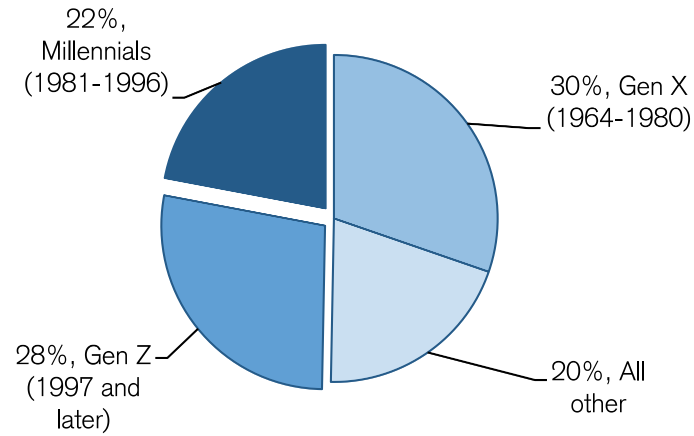
- Millennials & Gen Z are already ~50% of the US population (2017). We expect their preferences to influence winners and losers in consumer financial services.

  - Big banks – The top four banks in the US have the scale to compete with nearly 50% of industry assets, supporting annual technology budgets of over $40b in aggregate.

  - Sub-scale regional & community banks – These banks will continue to face pressure from both sides of the "barbell" with legacy systems that are expensive to maintain and built on programming languages that communicate less fluidly with modern tech.

  - Neo banks & Fintech platforms – Modern technology stacks (i.e., no legacy assets) allow for faster product development centered around feedback from their increasingly large users bases (lack of branch costs, e.g., personnel, real estate).

Millennials & Gen Z are already ~50% of the US population (2017) – we expect their preferences to dictate winners & losers



The "barbell" of financial services favors large banks (able to invest, scale offerings) and Neo banks (nimble, modern, lower cost base)

Neo banks
(modern tech stacks, no legacy tech "debt")

Sub-scale regional & community banks
(pressure from both sides)

Big banks
(scale, ability to invest, $40b budget)

Source: Statista, Credit Suisse research

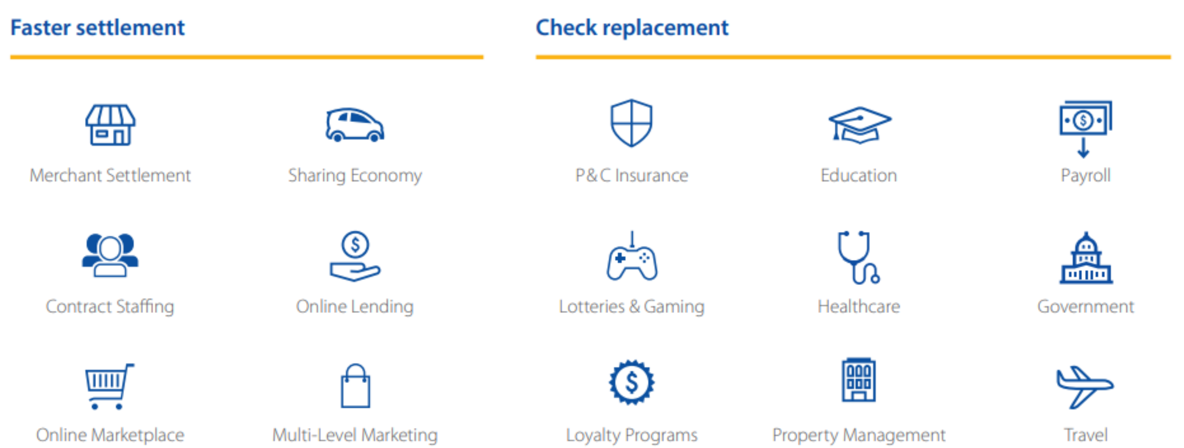
Drivers of Cash-to-Card Conversion

18. "Push-to-card" payments unlocking new payment flows

Visa Direct & Mastercard Send strategy and ecosystem benefits

- Both offense (priced to expand card-able TAM into larger, interchange-sensitive payments) & defense (race to scale before modern/fast ACH rails gain ubiquity), resulting in increased carded velocity of those same PCE dollars and further into B2B
  - Expands card-able TAMs into new payment flows (i.e., beyond PCE, into online & on-demand marketplace merchant payouts, insurance claim payouts, etc.)
  - Sends to card-based accounts, then re-spent on cards (increased consumer and business debit card usage as an indirect benefit)
- Revenue generation for both card networks (network fees) and issuing banks (interchange-like revenue stream for receiving banks)
- Slows modern/faster ACH rails from gaining ubiquitous adoption – Visa and Mastercard gaining scale – i.e., partners embedding these offerings – ahead of various emerging faster payments offerings (e.g., NPP in Australia, FPS in the UK, RTP in Canada, RTP provided by The Clearing House in the US, Zelle by Early Warning in the US)
- Beyond Visa and Mastercard, push transactions available via STAR (Expedited Transfer), NYCE (Money Transfer), & PULSE (A2A Transfer)

"Push-to-card" payments (e.g., Visa Direct, Mastercard Send) expand card payments into new market opportunities, beyond C2B and into B2B, C2B, and P2P



"Push-to-card" disbursements provide advantages to business and governments (senders)

82% More likely to work with a business that offers fast disbursements

72% Consider a debit card number to be more convenient than a bank account + routing number

88% Organizations that have cited efficiency as the primary reason to switch to electronic payments

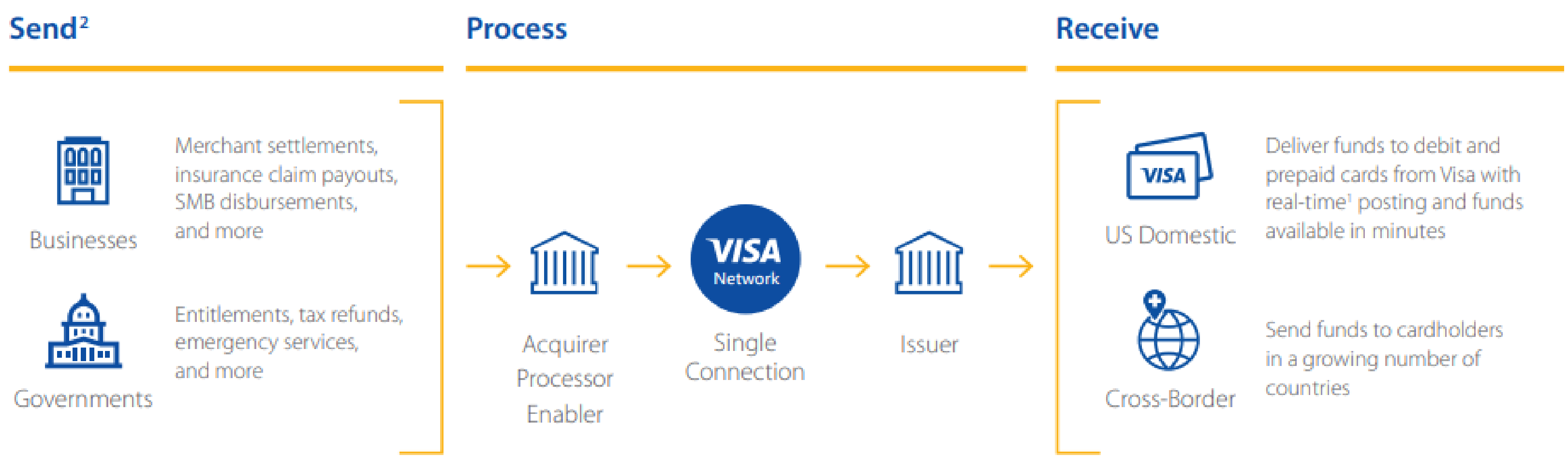
Source: Company reports, Visa, Credit Suisse research; Note: Digital Disbursements Consumer Preferences Survey was commissioned by Visa and conducted by SevenDesign via Ask Your Target Market, among 2,000 active U.S. debit card users (2017); [3] "2015 Payments Cost Benchmarking Survey," The Association for Financial Professionals (2015)

18. "Push-to-card" payments unlocking new payment flows

Visa Direct & Mastercard Send – Push payments using card rails

- Leverage existing card rails (debit card linkage to bank accounts) for all general purpose and prepaid cards, essentially reversing the payment flow within the payments network (i.e., born out of the returns/refunds process)
- Domestic and cross-border capable
- Visa Direct can send funds to Mastercard cards (and vice-versa)
- Can be "instant" or standard t+2 (instant requires "fast funds" posting requirement on the receiving bank – funds available within 30 minutes)

"Push-to-card" payments still require a facilitator function (e.g., merchant acquirer, payments service provider, processor, or other facilitator) to connect to the network



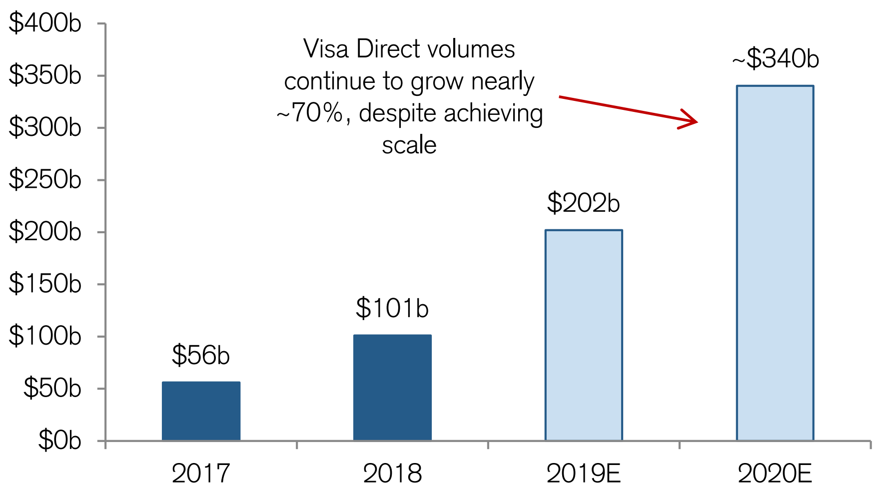
Source: Visa, Glenbrook Partners, Credit Suisse research; Note 2: Use cases are for illustrative purposes only; Program providers are responsible for their programs and compliance with any applicable laws and regulations

18. "Push-to-card" payments unlocking new payment flows

Visa Direct & Mastercard Send growth and pricing

- Network pricing (yields) vary by use case but are (on average) below traditional pull debit at the POS
  - Use case based network fees, priced to value, but on average tend to be lower than traditional debit (in part due to larger average dollar amounts per transaction, i.e., cents per transactions spread across a $1,200 insurance claim payout vs. $50 shirt)
  - Generally more fraud prevention and risk associated with a traditional C2B card transaction vs. a B2C/G2C disbursement
  - Visa generally refers to transaction growth vs. volumes (although recent disclosures allowed for backing into a volume measure)
- Interchange-like fees (not officially considered interchange and thus not a part of Visa's publicly available pricing schedule paid by sender to the receiver's bank); potential for this portion of the economics to be reduced or removed over the longer term (ACH push payments do not provide revenue for receiving banks)

Visa Direct continues to grow ~70%, and these volumes now make up ~3-4% of Visa's total payments volume; of the ~$100b in 2018, ~$42b was US (vs. ~$14b in 2017)



Visa Direct and Mastercard Send provide an "interchange" to the receiving bank, likely put in place to incentivize uptake

"Interchange" paid to receiving bank	~$0.10 per domestic transaction for Visa Direct
Network fees	Largely priced on a "cents per transaction" basis, and thus, appear mainly in "Data Processing Fees"; Use case based and still early days in the price discovery process (e.g., different prices for B2C vs. P2P, perhaps negotiable for large payers such as insurance companies with larger average send amounts); Generally amounts to a net yield for Visa that is below traditional debit
Other	Visa OCT is the transaction, while Visa Direct is the service; Mastercard Money Send is the transaction, while Mastercard Send is the service

Source: Company reports, Glenbrook Partners, Credit Suisse research

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18. “Push-to-card” payments unlocking new payment flows

Visa Direct & Mastercard Send vs. ACH-based alternatives

Aspect	Visa Direct & Mastercard Send	ACH-based (including faster payments, ACH-like alternatives)
Domestic vs. Global	Cross-border: Global by definition, with cross-border capabilities and access to ~3.5b cards and ~25k banks connected to Visa and Mastercard	Local (but evolving): ACH-based systems are (today) by definition local, and often country-specific; Examples include NPP in Australia, FPS in the UK, RTR in Canada, RTP provided by The Clearing House in the US, Zelle by Early Warning in the US, and the pending FedNow system (potential launch in 2023/2024) in the US; That said, it is possible that over time modern ACH systems could become linked/interoperable for use in cross-border payments (i.e., many are using ISO 20022 standards, making connecting various systems more feasible over time)
Account-access	Traditional bank accounts & prepaid cards: Broader access to the underbanked via prepaid cards; Can also access credit cards	Traditional bank accounts only: Generally does not have access to prepaid cards and credit cards, although there are country-specific examples that can access 16 digit debit and prepaid cards via ACH rails (e.g., FedGlobal via FedACH to SPEI).
Costs to sender	Higher, but priced to value: Use case specific pricing and still in the early stages of an evolving pricing strategy (emphasis on transactions at the moment)	Lower: Appropriate for many uses cases, but without the full scope of services provided by card network-enabled push payments
Costs to receiver (bank)	Banks earn money: Banks are compensated for receiving funds, earning "reverse interchange-like" revenue; Receiving banks earn $0.10 each time they accept Visa Direct	Banks have costs: Banks (sending and receiving) have costs associated with accepting ACH-based payments, typically paying the operator (e.g., NACHA, EPN) and a third-party service provider (e.g., Popmoney by Fiserv)
Risks	Chargebacks & dispute process: Card network rails come with processes around chargebacks & disputes; Originating bank bears the risk when accounts are taken over; These processes generally add costs to the ecosystem	No chargebacks & disputes: ACH-based payments cannot be reversed due to issues with a product or service delivery (merchant failure); The originating bank does assume risk when accounts are taken over (per Reg E)
Speed & availability	24/7 real-time (card rails are always on); Visa requires fast-funds enabled issuers to make funds within 30 minutes	Modern systems are 24/7, traditional are not: Modern faster payments systems (e.g., RTP in the US) are 24/7; Legacy ACH systems are not, and often operate under bank branch-like hours (batch processing)
Other	Long-standing real-time capabilities, consolidated into two known brands (Visa, Mastercard)	Numerous, more recent developed options

Source: Visa, Glenbrook Partners, Credit Suisse research

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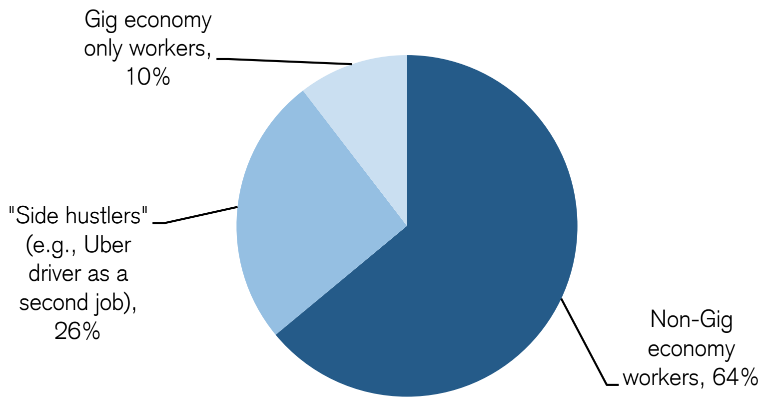
18. "Push-to-card" payments unlocking new payment flows

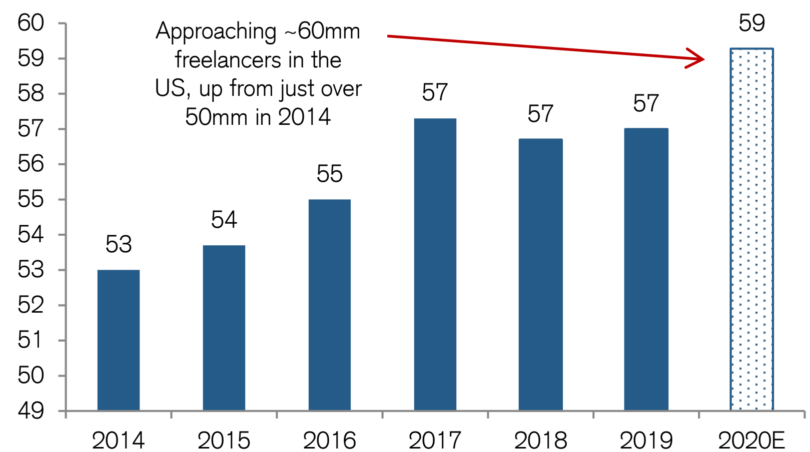
Freelancer ("Gig") economy & marketplaces growth…

- "Payouts" are funds disbursed by eCommerce marketplaces and on-demand platforms to sellers and freelancers, often leveraging local payments rails (ACH or an ACH/faster payments alternative), along with network capabilities (Visa Direct, Mastercard Send) and card issuance (attaching a card to seller account).
- The growth of the "Gig" economy (~$1.4tr in US earnings) along with the proliferation of eCommerce Marketplaces (roughly half of online sales) is increasing the importance of payout capabilities.
- Platforms provide value to consumers via increased selection of suppliers (sellers & freelancers) – two-sided network.
- Part of attracting suppliers is meeting their liquidity needs via instant payouts (e.g., Etsy seller use in purchasing supplies, TaskRabbit "Tasker", and/or Uber driver purchasing groceries later that day).

~36% of US workers are participating in the "Gig" economy



Approaching 60mm freelancers (vs. US workforce of ~160mm)



 Source: Fortunly, Edelman Intelligence, PayPal, Internet Retailer, Credit Suisse estimates

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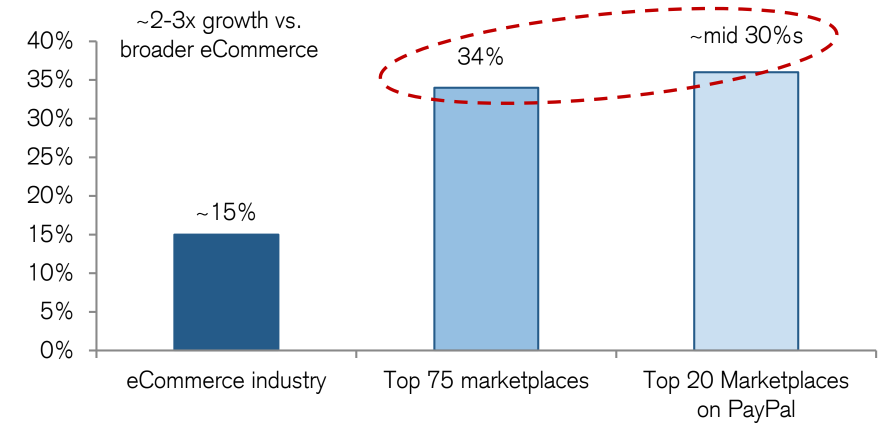
18. "Push-to-card" payments unlocking new payment flows

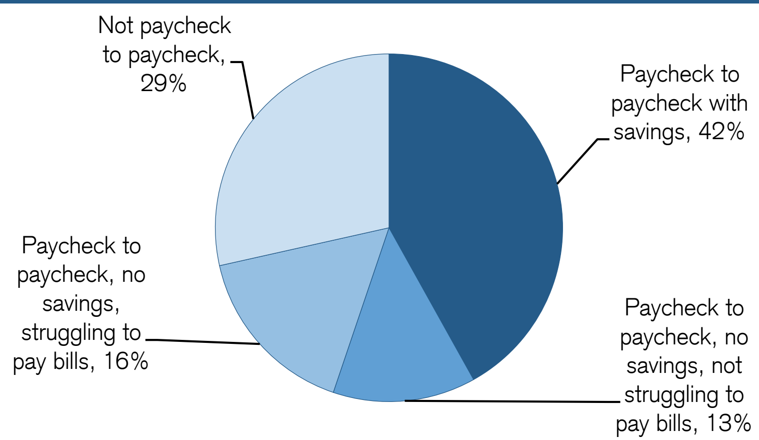
…driving an increasing need for platforms to pay out fast

- Approximately 70% of Gig economy workers live paycheck to paycheck and place a high value on timeliness of payment, which creates both challenges and opportunities for platforms and payments providers.
- On-demand platforms & marketplaces that can deliver early (pay advance) or timely (instant, same-day) payments are likely to gain share vs. those with a more offline or off-platform payout experience.
- Liquidity needs create an opportunity for payments providers to meet this demand and earn fees either via instant transfer or the issuance of prepaid debit cards.
- Gig economy workers are more likely to be "underbanked", representing a financial services cross-sell opportunity.

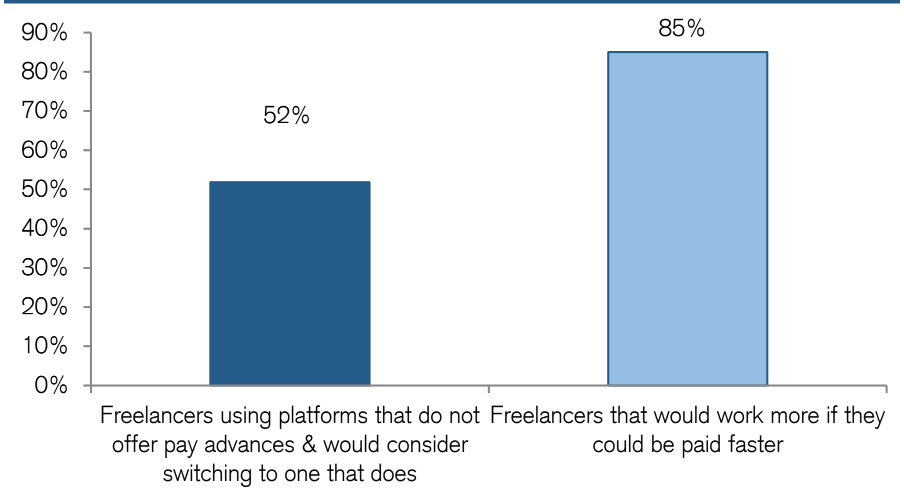
Marketplaces growth outpacing broader eCommerce growth



~70% of Gig economy workers (freelancers) live paycheck to paycheck and place high value on timelines of payment



Freelancers value timeliness of payments and would consider swapping platform or working more/less because of it



Source: Hyperwallet/PYMNTS.com Gig Economy Index, Edelman Intelligence, PayPal, Credit Suisse estimates

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18. "Push-to-card" payments unlocking new payment flows

Examples of efforts by various payments providers

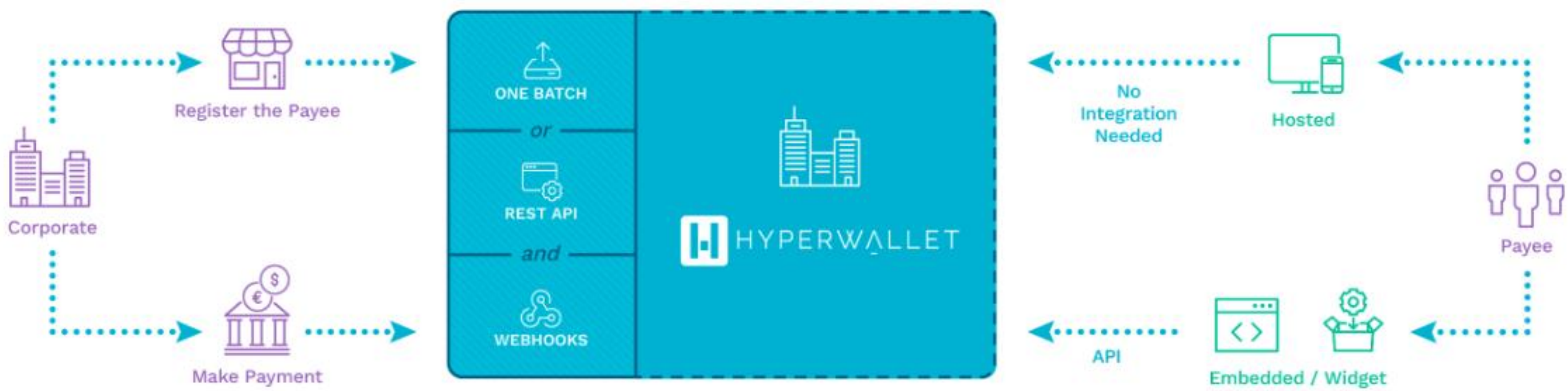
- Payments providers focused on serving on-demand platforms and marketplaces have developed payout capabilities (e.g., Stripe Connect, Adyen MarketPay, BlueSnap by First Data, WePay by Chase, etc.).

- PayPal acquired Hyperwallet for $400mm in November 2018 to bolster its payout capabilities, citing the fact that merchants and service providers using on-demand platforms and marketplaces desire fast and flexible access to their earnings.

- In addition to instant transfer to debit cards (Visa Direct enabled and with ~1% fees), PayPal launched two additional ways for small businesses, marketplace sellers, and freelancers to be paid faster. Rather than being fee-based, these offerings are available to only a subset of merchants in good standing.

- PayPal Funds Now, launched in September 2018, gives merchants access to funds they earned via sales or services within their PayPal account. PayPal Instant Transfer to Bank uses real-time payments rails via The Clearing House (followed the launch of Instant Transfer to Debit Card).

PayPal acquired Hyperwallet in November 2018 for ~$400mm to enhance its global payout capabilities to better serve merchants/platforms; Hyperwallet easily integrates its global payout technology into merchant/platform's existing infrastructure via APIs



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18. "Push-to-card" payments unlocking new payment flows

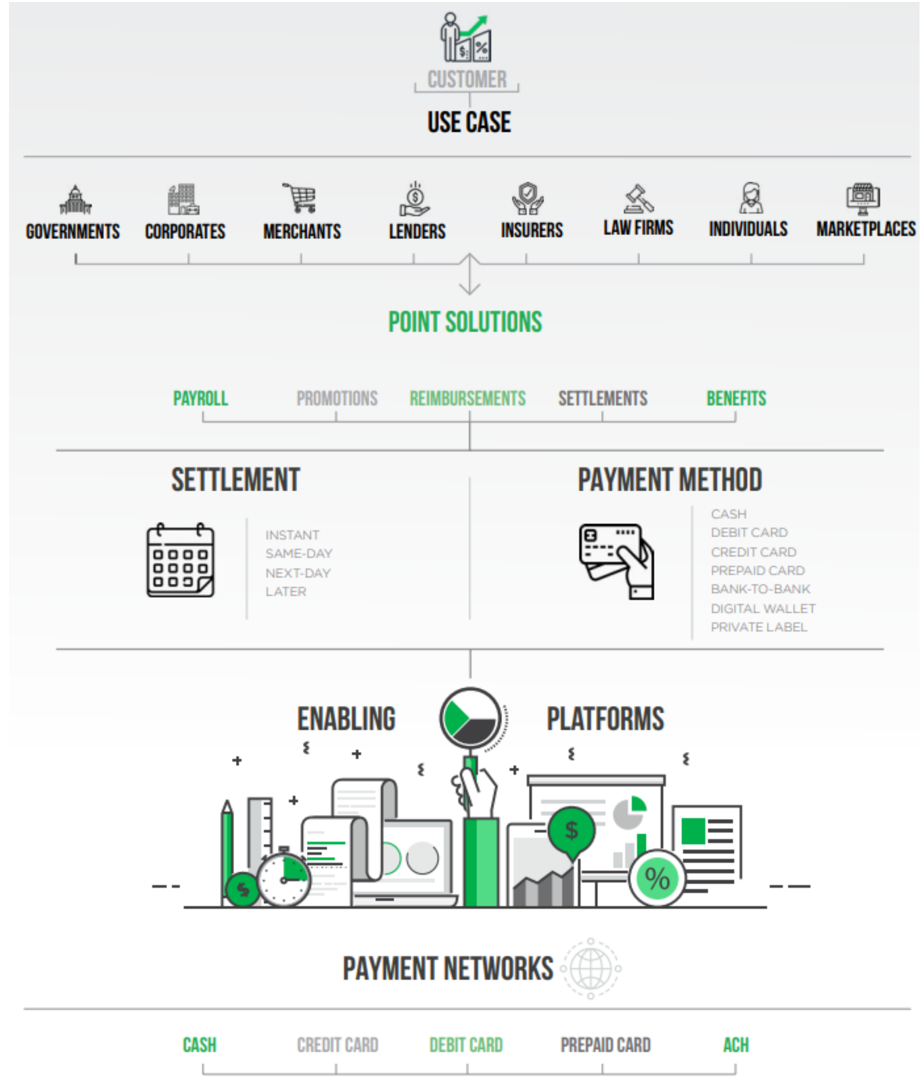
INGO Money modernizing push payments, B2B and B2C uses

- INGO Money Instant Payments focuses on enabling push payments for enterprises, sole proprietors and consumers via a rail agnostic approach (least cost, most time efficient / effective method)
- For card payments, the company pushes payments via reversing transactions over existing card rails (akin to chargebacks and returns)
  - Has 26 direct integrations in all including Visa Direct, Mastercard send, PIN Debit networks – Pulse, STAR, etc – Netspend, PayPal
  - The integrations enable payout to accounts, digital wallets (i.e. PayPal), or cash (MGI partnership)
- Overall the INGO vision is for customers to get paid in the way that they are able to pay – with plenty of choices and on-demand
- Initial use case for INGO specifically was pushing money to Gig economy workers (i.e. tips to bartenders, wait staff)
- Also enables on-demand Pull payments, allowing businesses to request payment via card or account (i.e. loan payment collections)

Offerings on the INGO Money platform, focused on enterprise clients

Enterprise and B2B Solutions			Consumer
Ingo Push	Ingo Check	Ingo Cash	IN GO
• *API Service* – enables payout on demand • *SAAS* – Push payments in a box • *iFrame* – processing + settlement	Enables mobile and branch / ATM check cashing for businesses	Turns cash received at register into push payments via APIs or web POS platform	An app store mobile application which allows consumers to cash checks remotely into various payout options, or across various methods

There are numerous use cases for push payments (i.e. Government, Insurers, etc.), enabling payout to various payment methods



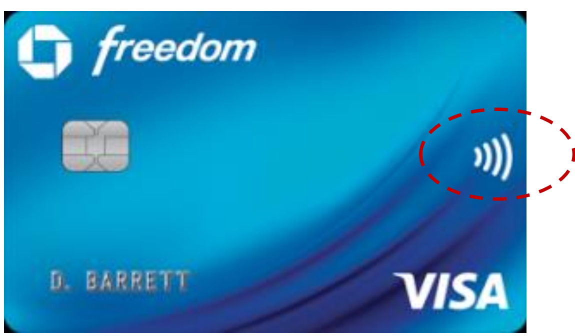
Source: Company reports, Credit Suisse estimates, Company Website, INGO Money + PYMNTS.com Disbursement Tracker

19. Contactless payments

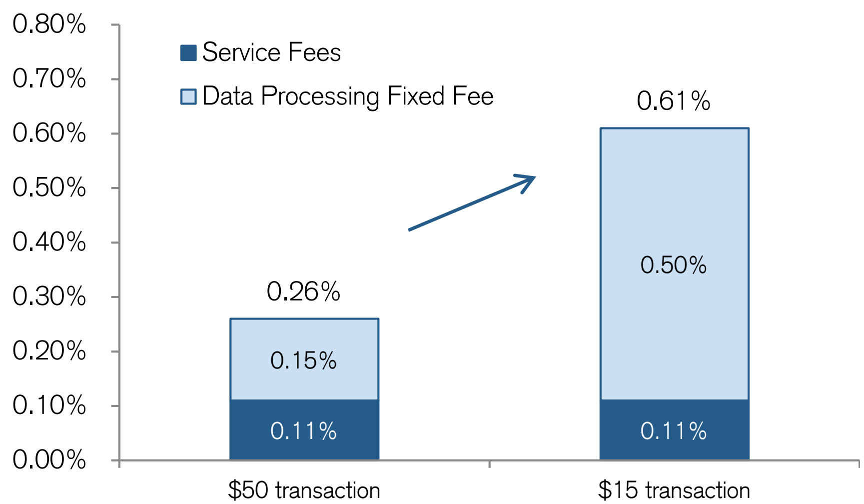
Driving penetration of small-ticket habitual purchases

- Contactless payments is a driver of transaction growth in mature markets with high card penetration, with key benefits such as:
  - Replacing cash, particularly in small-ticket items that are disproportionately still done in cash today (we note that this turns out to be yield accretive for the card networks given fixed data processing fees are spread over lower ticket sizes)
  - Increasing spend per active card by ~14-16%
  - Decreasing checkout time and improving customer experience
- Enablers of Contactless – Critical mass of acceptance and cards before taking off (chicken and egg)
  - Merchants need to have EMV-enabled terminals
  - Banks need to issue contactless-enabled cards (cost issuers at ~$5 per card vs. ~$2-3 per card without contactless capabilities)
  - Drive consumer adoption by habituating the use of contactless payments through daily use cases (e.g., transit)

Contactless logo on the front of the card signifies a contactless-enabled card, which should begin appearing more often in the hands of US cardholders in 2020 & 2021



Illustrative example: Visa's net revenue yield potentially could be more than ~2x higher on a small-ticket transactions (ex enhanced rebates & incentives)



Source: Visa, Credit Suisse estimates

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19. Contactless payments

US rolling out as we speak, experience elsewhere

- Consumer adoption in international markets bodes well for adoption in new geographies (particularly the US).
  - Visa has 50 countries where at least 33% of face-to-face transactions are contactless.
  - Acceptance in the US is improving. Currently 60% of Visa and Mastercard US payments volume is occurring at contactless-enabled merchants.
- Visa noted that as of end Q3 2019, eight of the top ten issuers are participating in contactless and that more than 100mm Visa contactless cards had already been issued (vs. expectation of 300mm by end 2020).
  - We expect an outsized benefit for V vs. MA in the US given mix (45% of volume vs. 35% for MA, skew to large issuers).
  - Visa noted that in Q3 2020 more than 50 countries improved tap to pay penetration by more than 5%, with more than 10 countries increasing by 10%+
  - In the first six months of 2020, Visa added more than 80mm contactless cards
- Mastercard noted at Q2 2020 that contactless penetration rose 10% YoY to 37% of in-person transactions

Contactless % share of face-to-face transactions; rapid consumer adoption indicates strong customer experience

	Australia	Singapore	Canada	UK
2014	52%	22%	14%	4%
2017	84%	52%	42%	44%

"… So where we've seen contactless come in, it has taken off like a rocket ship, and we've given you some of the statistics. It takes 2 or 3 years to build. And then within a couple of years, 90% of transactions are contactless. And what it does is 2 things. One, it allows you to go deeper and deeper into smaller and smaller transactions and so digitizes more cash. And secondly, it becomes so easy that people displace other modes they were using to pay like tapping phones…"

– Vasant Prabhu, CFO, Visa (December 2019)

Source: Company reports, Visa Investor Day, Credit Suisse research

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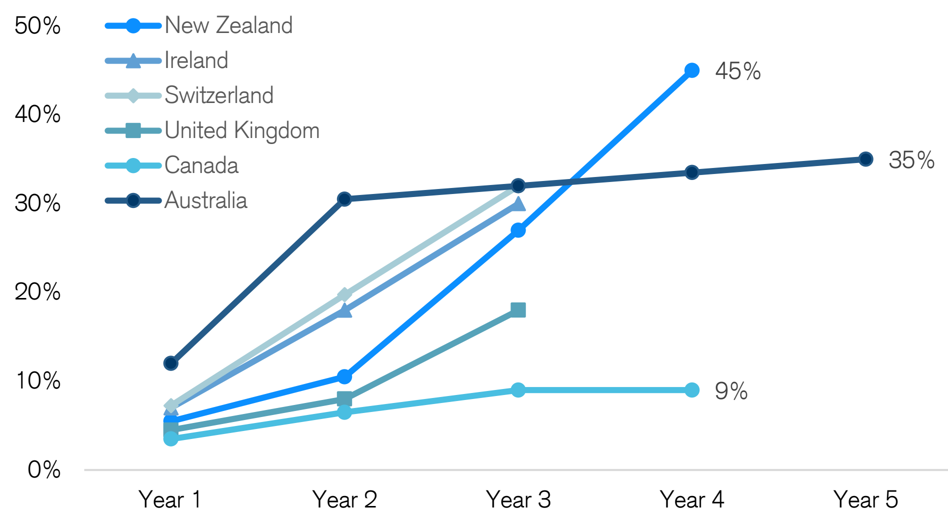
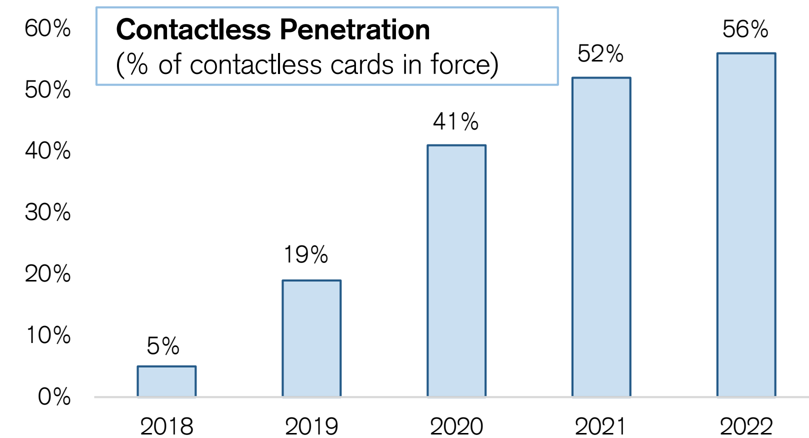
19. Contactless payments
US contactless rollout phasing and impacts

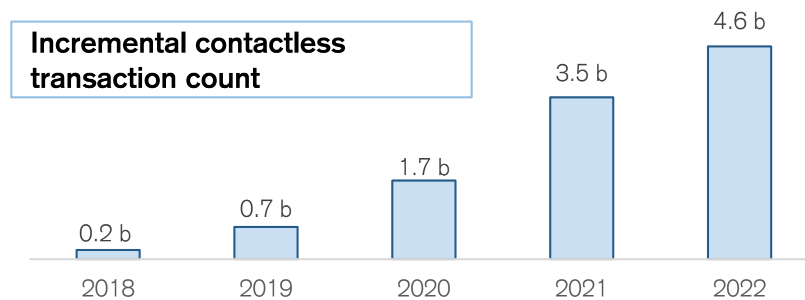
- Contactless payment methods are largely a new development (~5% penetration as of 2018) and should increase rapidly as issuers continue converting to contactless capabilities.
- Previously un-carded transactions should contribute incremental volume as contactless issuance ramps, further incentivizing issuers and merchant acquirers to put more resources into selling contactless terminals into merchants.

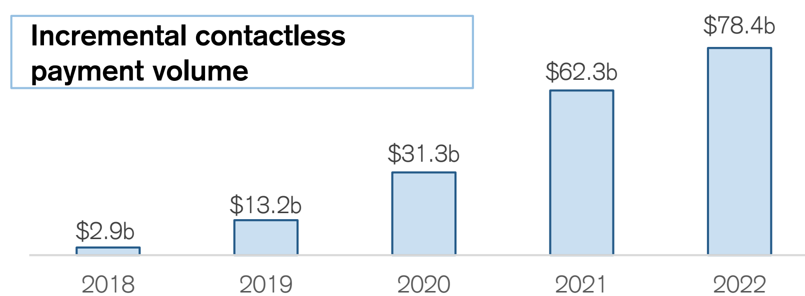
Contactless-enabled cards have shown transaction per card increases of 35-45% in card markets similar to the US (years 1-5 post rollout)



The US market for contactless cards is expected to ramp quickly, with incremental transactions reaching ~4.6b by 2022E







Source: Credit Suisse estimates, A.T. Kearney via Consulting.us

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19. Contactless payments

Top 15 economies' experience with contactless rollouts

Contactless cards began rollout in the early 2000s in select markets, with more recent rollouts in countries with payments markets (high card penetration) more similar to the US, experiencing meaningful adoption within 3-4 years

Country	Year of contactless cards deployment Year first card was issued, year of contactless acceleration	Drivers of contactless adoption (2016)		Contactless penetration (2016)	
		% point-of-sale transactions conducted using cards	% cards in force that are contactless	% total point-of-sale transactions that are contactless	% card point-of-sale transactions that are contactless
Australia	2009, 2012	45.00%	67.45%	12.44%	27.64%
United Kingdom	2007, 2015	54.00%	63.87%	12.56%	23.27%
Canada	2007, 2013	61.00%	66.40%	13.93%	22.84%
South Korea	2004, 2012	58.00%	95.91%	12.07%	20.82%
Spain	2012, N/A	13.00%	53.09%	2.48%	19.11%
China	2006, N/A	6.00%	59.25%	0.96%	15.94%
France	2007, N/A	37.00%	42.85%	2.47%	6.67%
Italy	2010, N/A	14.00%	38.24%	0.89%	6.39%
Russia	2013, N/A	18.64%	21.88%	1.13%	6.06%
Germany	2012, N/A	16.60%	58.73%	0.88%	5.33%
India	2015, N/A	7.00%	3.14%	0.04%	0.52%
United States	2003, N/A	56.00%	3.47%	0.18%	0.32%
Mexico	2012, N/A	15.64%	0.37%	0.01%	0.07%
Brazil	2013, N/A	40.00%	0.69%	0.03%	0.06%
Japan	2001, N/A	16.20%	0.03%	0.00%	0.02%

Low card penetration	High card penetration	High contactless penetration	Low contactless penetration

Source: A.T. Kearney, Credit Suisse research

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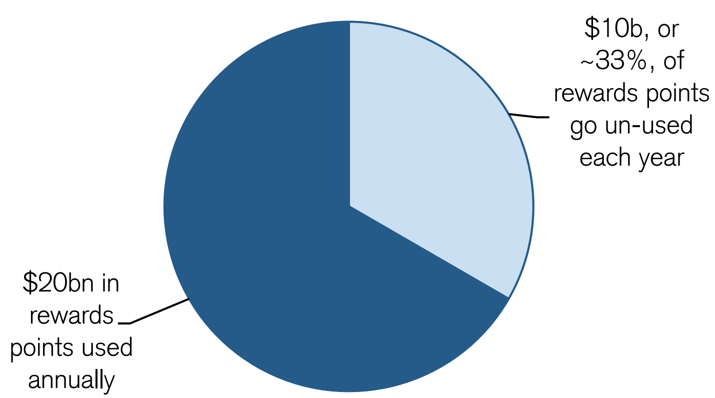
20. Loyalty and rewards becoming easier to spend

FinTechs entering the rewards and improving liquidity

- Opportunity for payments ecosystem to take friction out of using rewards points (provide an easy-to-spend, at the POS, instant access to rewards points vs. formally spending via a rewards program website), with various ways to provide this value (e.g., FIS, Square, PayPal programs)
- PayPal estimates 1/3rd, or roughly $10b worth, of reward points in the US go unused each year at the top 6 banks alone, while FIS suggests that there are more than 200b unused rewards points that are up for grabs
- Merchants that work with FinTechs to accept loyalty rewards benefit from providing an option that consumers find attractive (per survey results below, potentially leading to increased foot traffic), an additional payment method choice online (greater choice generally leads to increased conversion), and potentially reduced costs (in the case of FIS Premium Payback, merchants are not charged interchange on the rewards-funded portion of the transaction)

PayPal estimates that ~33% of rewards points go unused in the US each year



FIS Premium Payback-related consumer survey results point to the value proposition for merchants

56%	Consider Premium Payback a better value than other redemption options
88%	Would redeem their points again for purchase rebates
88%	Rated their experience (with FIS Premium Payback) as a four or a five

Source: PayPal, FIS, Credit Suisse estimates

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20. Loyalty and rewards becoming easier to spend

FIS Loyalty-as-a-Currency set to expand with WP merchants

- Thousands of financial institutions representing over 7,000 card loyalty programs are enrolled in the Premium Payback program
- Gas stations were the initial vertical (~24k US gas stations); the success of program had led to new vertical expansion
  - No action required by consumer (will be prompted at the POS with the option to use rewards points)
  - Merchant benefits from reduced interchange for the rewards points-funded portion of the transaction
  - Issuer is able to remove liability from balance sheet and convert the points at a slight discount
- FIS-WP benefits from creating a value-added service for both issuer and merchant partners, allowing for a degree of increased stickiness, price compression protection, and potential share gains via new client additions
- FIS went live with the first joint (FIS-WP) loyalty-as-a-currency customer in 1H 2020, with the integration work done for this first client paving the way for a more streamlined onboarding process for future new clients
- FIS-WP will extend this offering into eCommerce sites of Worldpay merchants (large and multinational retailers)

FIS Premium Payback is seamlessly enabled into the existing POS payment process

1. Shop
Premium Payback works for existing customers and drives new in-store traffic.

2. Pay
Customers are surprised and delighted at the checkout POS when given choice to redeem points for dollars off of the purchase price.

3. Accept
A frictionless experience allows customers to complete a transaction just as they would normally do.

Early consumer adoption stats suggest the offer resonates at the POS

37% Portion of consumers that accept the offer when prompted at POS (offer to redeem points as part of their current purchase)

10% Increase (YoY) in take rate experienced during the early innings of this new service

Source: FIS, Credit Suisse research

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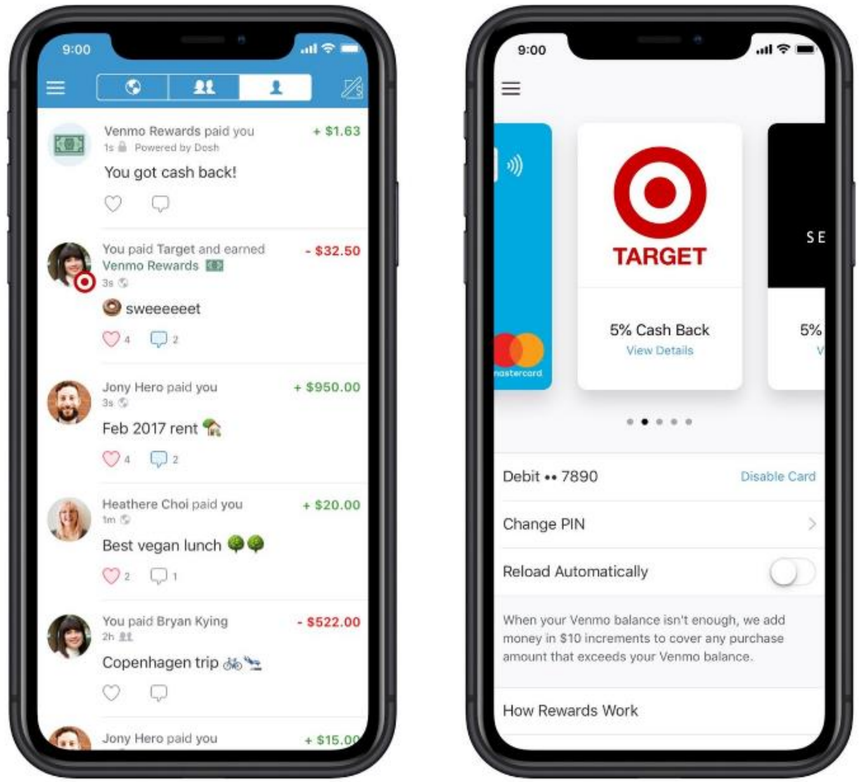
20. Loyalty and rewards becoming easier to spend

PayPal and Venmo leveraging their 2-sided networks

- PayPal provides instant rewards programs in two forms: PayPal Pay with Rewards and Venmo Rewards (cash back)
- PayPal Pay with Rewards
  - Enables consumers to consolidate points across accounts to use at PayPal's >26mm merchants globally
  - PayPal benefits from reduced funding costs (rewards a low-cost funding method, supportive of transaction margins)
  - Deepens bank relationships, with large US Issuers partnering (Chase, Amex, Citi, Discover, etc.) with PayPal
  - Banks improve their consumer value proposition and reduce reward points liability on balance sheet
  - Merchant benefit via increased conversion
- Venmo Rewards (cash back program)
  - Venmo is offering immediate Cash back on purchase at select merchants (when Venmo Card is used); funds entire Venmo account balance
  - We expect rewards to be used as an engagement lever for Pay-with-Venmo (PWV)
  - Unique (but similar to Boost from Square's Cash Card) in that attractive awards can be earned on a debit card (vs. credit card), given debit rewards have been meaningfully reduced since debit interchange became regulated for large banks after 2010

PayPal leverages its 2-sided network to drive value for the entire ecosystem (consumers, merchant, banks, and PayPal) via PayPal Pay with Rewards and the Venmo Rewards cash back program



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20. Loyalty and rewards becoming easier to spend

Square's Cash App Boost

- Square's Cash Card (card attached to Cash App account for consumers) provides consumers with instant cash-back rewards without an expensive annual credit card fee
- Unique (but similar to Venmo Rewards) in that attractive rewards can be earned on a debit card (vs. credit card, given debit rewards have been meaningfully reduced following the Durbin amendment)
- Delivers rewards immediately (i.e., instant gratification to users, funds delivered to Cash app balance); examples are 15% of Shake Shack, $1 off any coffee, 10% off Nike, 10% off DoorDash, etc.
- Drives incremental revenue for merchants (Square and non-Square sellers) via foot traffic, frequency of visits, higher ticket size, etc.
- Cash Boost (rewards) potential to turn from a cost center (currently a contra revenue item, serving as a marketing cost as Square funds the rewards) to a revenue generator (potential for merchant funding of rewards, paying for positioning within Cash App, etc.)
  - The targeting value within the Cash App is something we believe investors underappreciate (Location-based Boosts), given the ability to target by customer (known user), merchant (company-specific offers), or location (geo-location data) and on a real-time basis – attractive to digital advertisers with large budgets
  - The first step toward improving monetization of Boost has begun, with Square beginning to reduce some of the contra revenue costs by asking partners to contribute to funding of the offers – next step could be to ask for full merchant funding, followed by competition (bidding) for positioning within Cash App

Square's Cash App Boost has the potential to turn from a cost center (contra revenue item, with Square funding the rewards) to a revenue generating, hyper-targeted advertising platform

Source: Square, Credit Suisse research

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20. Loyalty and rewards becoming easier to spend

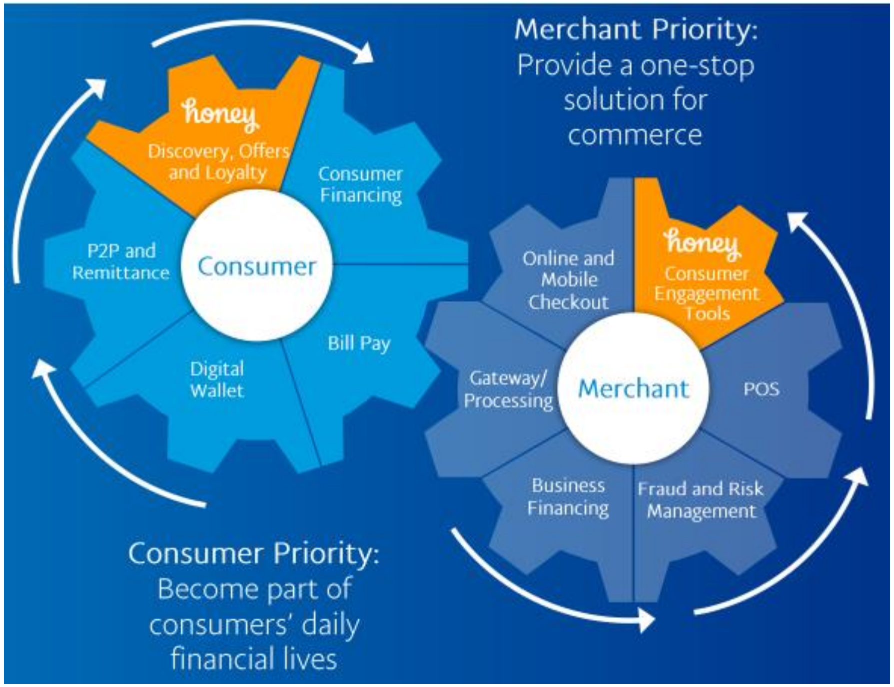
PayPal's Honey acquisition – Doing things other payments methods don't do

- In Nov. 2019, PayPal announced the $4b acquisition of Honey, an online shopping and rewards platform that works across more than 30k online merchants and ~17mm monthly active users, which PayPal can scale across its ~300mm users.
- ~40% of all eCommerce begins through a "trigger event", such as a personalized offer.
- It supports PayPal's pricing (i.e., transaction take rates) and will help to differentiate PayPal vs. alternative checkout methods (timely given the network SRC button launched in Q4 2019); simply stated, doing things other payments methods don't do.
- Honey will be embedded in the Venmo app and will be a significant driver of Pay with Venmo adoption, in our view.
- Honey enhances Venmo's push into online shopping through rewards, in a similar vein to earlier brand initiatives.
- We note the vast majority of rewards are merchant funded, an emerging tool for marketers to directly engage with consumers.

> *"…There are a lot of these direct-to-consumer brands that have launched, and one of the big ones that people know about is Allbirds…They came out and basically spent their entire marketing budget on Facebook ads and Instagram ads, and they're paying basically for eyeballs or clicks. What we just had the conversation with them about is it would be actually a lot more effective for them if they could just give 10% discount to a user who bought with Venmo as long as they shared their purchase.…"*
>
> *– Amitabh Jhawar, GM Venmo, PayPal (November 2019)*

Honey is a highly-strategic acquisition enabling PayPal to become involved with consumers at the beginning of the shopping experience (i.e., drives traffic to merchants, moving PayPal to top of funnel, a notable differentiator)

For consumers	For merchants
Helps save money by streamlining discounts and rewards, in addition to price-tracking tools and alerts	Expands PayPal's value proposition by enabling it to target specific consumer demographics with customized (personalized) offers, increasing conversion and sales



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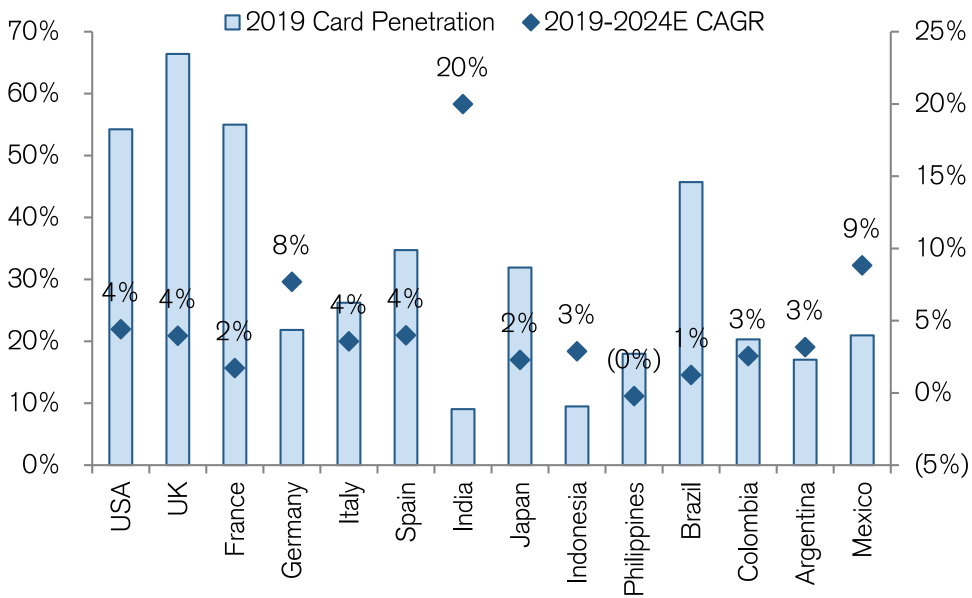
21. Long runway for card penetration in both EM & DM markets

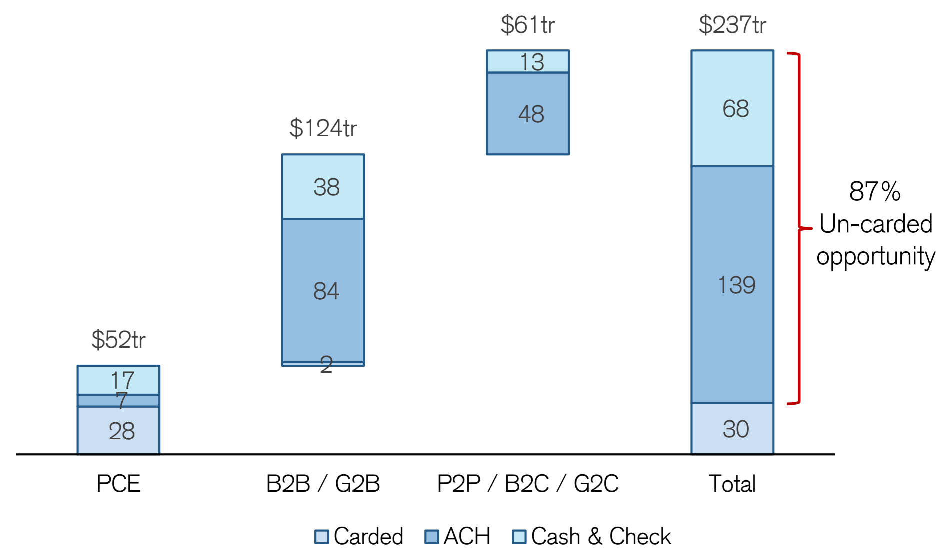
Emerging markets will be a key source of growth payments companies

- Emerging markets will be a key source of growth for global payments companies, with card payments growth in developed markets now below 10% (e.g., ~4-7% in the US) given now higher levels of PCE penetration.
- The Asia-Pacific region is the least penetrated, with a TAM of $6tr and meaningful opportunities for continued cash & check conversion in India, Japan, Indonesia, and the Philippines.
- Europe represents the next largest opportunity, with a TAM of $3.5tr in cash & check transactions yet to be converted, with still sizable opportunities in Germany, Italy, Spain, and France (for the card networks specifically).

Global card penetration of consumer spend remains low in numerous countries, with the US and the UK representing two of the more mature payments markets (both north of 50% penetrated)



Globally, Mastercard estimates there is still ~$7tr of cash & check within the Personal Consumption Expenditures (PCE), and ~$68tr in total globally



Source: Visa, Euromonitor, Mastercard, Credit Suisse research

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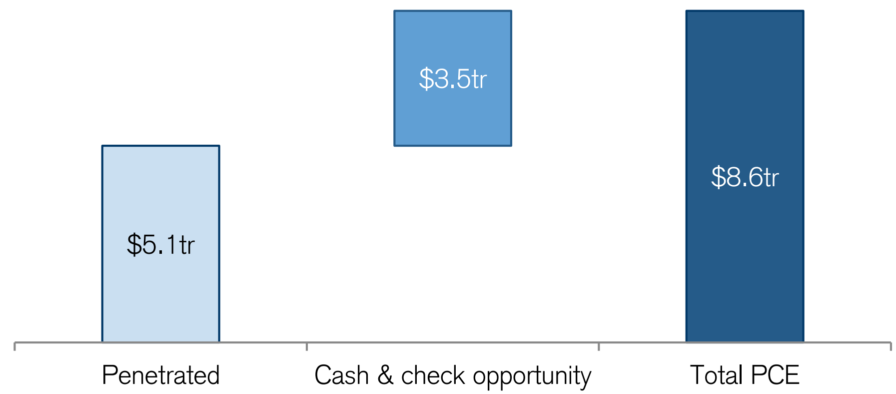
21. Long runway for card penetration in both EM & DM markets

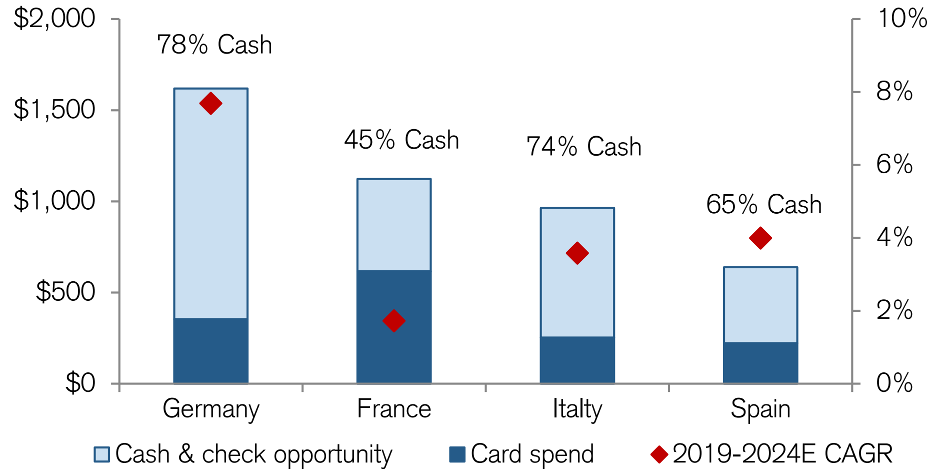
Europe a ~$3-4tr cash opportunity, drivers, country highlights

- Government influence has been a driver of the European payments landscape, highlighted by interchange caps and PSD/PSD2
  - Interchange Caps in December 2015 reduced acceptance cost and stimulates electronic payments penetration with SMBs
  - PSD/PSD2 aimed at fostering innovation and competition
- Debit-centric market – cultural preferences to not use credit
  - Low-interchange also limits card reward programs, with interchange generally viewed as funding those costs
- Network mandate for all POS terminals to be contactless-enabled
- Germany, # 4 GDP country in the world
  - Cash >55% of in-person payments, debit card ~25%
  - Girocard, national card scheme, >70% card share
- France, #7 GDP country in the world
  - Cash ~45% of in-person payments, debit card ~30%
  - Cartes Bancaires, national card scheme, >90% card share
- Italy, #8 GDP country in the world
  - Cash >60% of in-person payments, debit cards >20%
  - Bancomat, national card scheme, >40% card share

~$3-4tr cash & check opportunity remains in Europe



The key growth countries in Europe are still relatively cash heavy



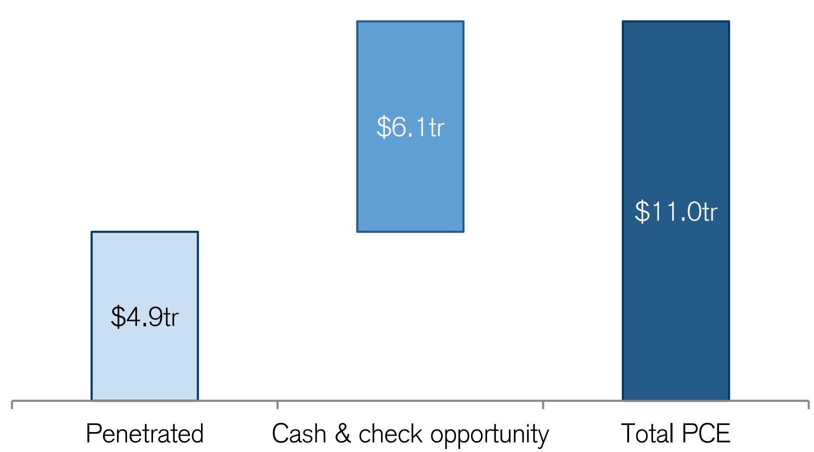
Source: Visa, Euromonitor, Credit Suisse estimates

21. Long runway for card penetration in both EM & DM markets

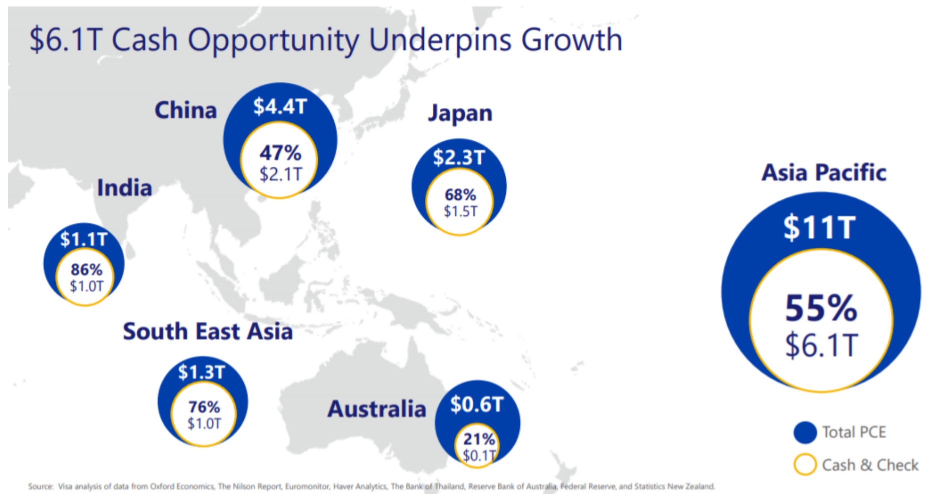
Asia-Pacific still ~50% cash & check, a favorable backdrop

- Government initiatives to reduce cash (India demonization, Japan Cashless initiative)
- High smart phone penetration (e.g., China at 76% in 2017, South Korea at 82%, and Malaysia at 73%)
- Prevalence of super apps with large user bases (meets ubiquity requirements for consumer adoption of new payment behaviors)
- Near greenfield opportunity to fill in financial services gaps from large underbanked populations (insert data point)
- QR codes lowers barriers for electronics payments – cheaper, lower infrastructure requirements

>$6tr cash & check opportunity to be brought onto electronic means of payments within emerging markets…



…with the opportunity in Asia-Pacific extending beyond emerging markets (e.g., Japan ~65% cash & check)



Source: GSMA, Visa, Euromonitor, Credit Suisse research

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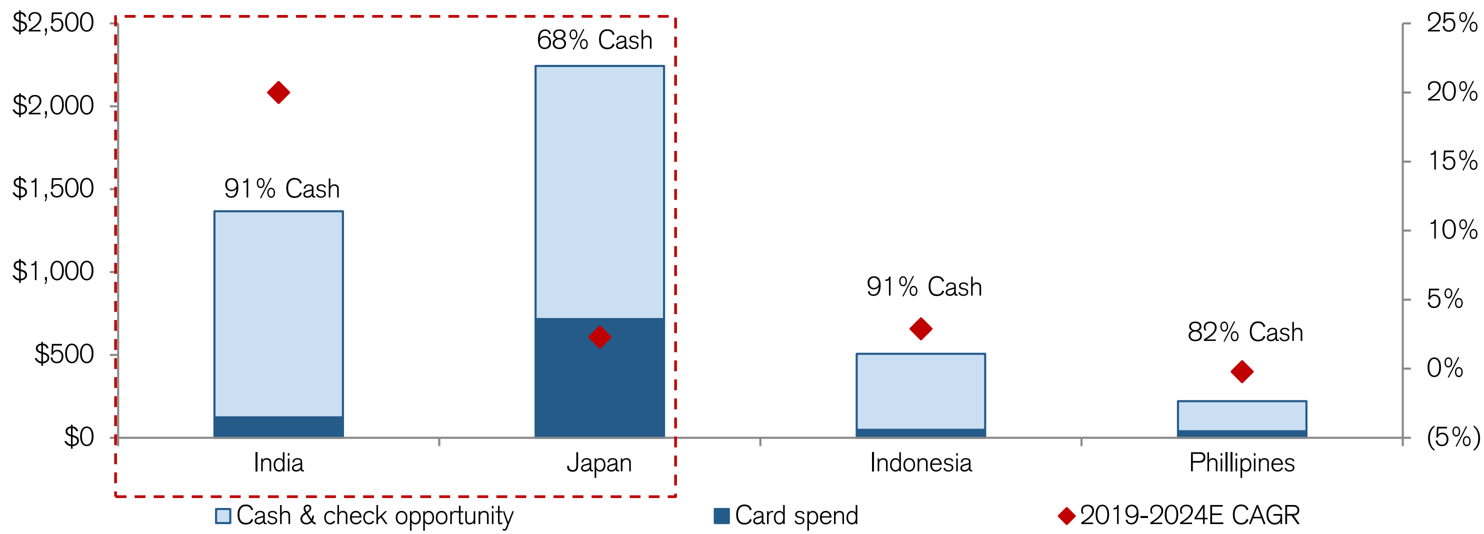
21. Long runway for card penetration in both EM & DM markets

Asia-Pacific opportunities in India, Super-Apps in the region

- India (#5 GDP globally, 2nd by population) along with Japan (#3 by GDP) represent the two largest addressable opportunities in Asia ex-China
- India – Government highly supportive of electronic payments and, in 2016, introduced demonetization efforts to reduce cash
  - Launched Unified Payment Interface (UPI) in 2016, utilized by Paytm, Google Pay, etc.; V/MA have ~70% share, along with Rupay (domestic network)
  - Paytm: largest payments wallet with >200mm users, ~60% owned by Alibaba (Alipay), payments bank license in 2018 to offer debit cards and investment products (Ant Group started with similar products)
- Indonesia & Philippines – super-app-dominated countries (unlocks large underbanked populations for payments ecosystem)
  - Go-Jek: super-app >25mm MAUs, leader in Indonesia, Visa invested in 2019 to promote 4-party payments model (Visa-credentials)
  - Grab: >130mm registered users, leader across Southeast Asia, first partnered with Mastercard in 2018 to issue pre-paid debit cards

Both India and Japan represent the largest addressable opportunities, sitting at ~70-90% cash dominant



Source: Visa, Euromonitor (September 2019 annual update), Credit Suisse research

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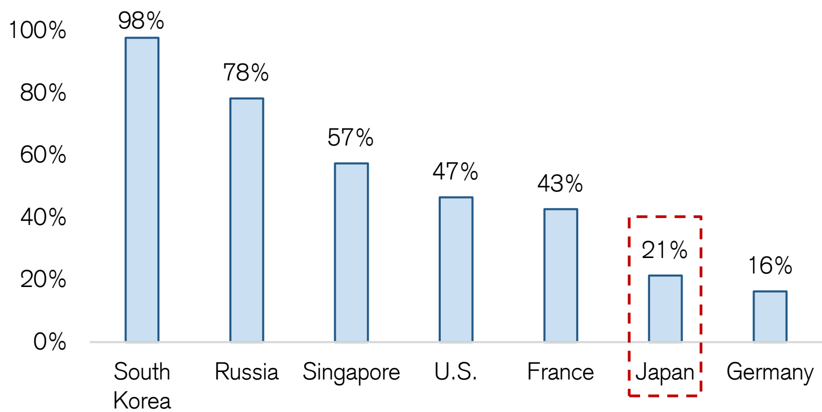
21. Long runway for card penetration in both EM & DM markets

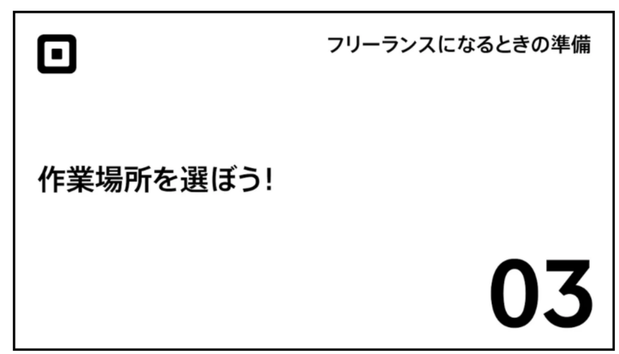
Japan Cashless initiatives aim to 2x penetration by 2025

- Japanese government's Cashless Initiative is expected to take electronic payments from ~21-22% today to ~40% by 2024
- Cash usage in Japan remains high, in part due to cultural reasons (including low crime rates/safety in carrying cash)
  - Incentives are provided to merchants for both acceptance and hardware costs, along with ~5% rewards (rebates) for consumers using cashless payments means at registered businesses (which are mostly SMB, given larger retailer are more likely to accept already)
  - As of November 2019, ~770kn SMB had installed cashless payment terminals with the support of government subsidies (~39% of the 2mm eligible businesses)
  - In 2012, only ~33% of Japanese households were using cashless payments methods – that number has risen to ~50% today
- Program could be extended (encouraged by The International Monetary Fund)

Japan's cashless payment ratio is among the lowest of development nations, sitting at ~20% (with government initiatives in place with an aim toward ~40% by 2024)



Square launched in Japan in 2013 and, more recently, began accepting JCB (local scheme); Management has highlighted the tailwinds related to government cashless initiatives



Source: Company reports, the BLOOMBERG PROFESSIONAL™ service, Japan Consumer Credit Association, Credit Suisse research

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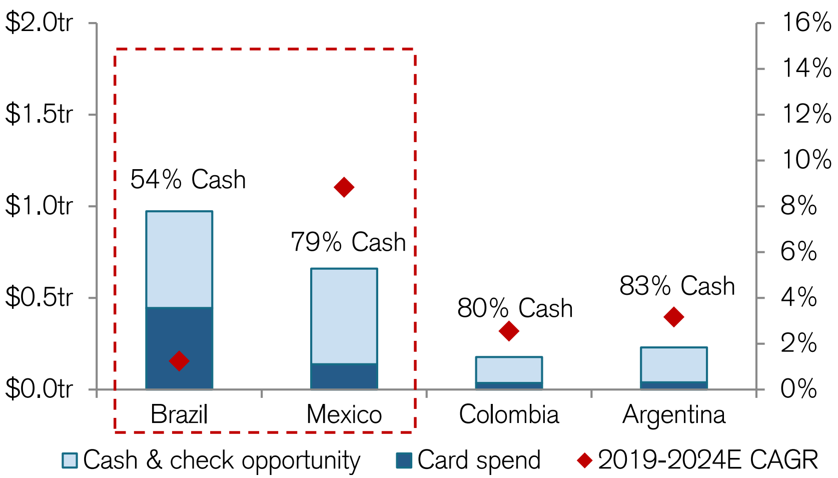
21. Long runway for card penetration in both EM & DM markets

Latin American opportunities greatest in Brazil, Argentina, Mexico

- Brazil (#9 GDP country in the world), Mexico (#15 GDP country), and Argentina (#26 GDP), along with acquiring markets opening, have made Latin America an attractive area of investment and growth (we focus below on First Data's entry and success)
- Brazil – until 2010, banks in Brazil were restricted to using only two incumbent acquirers:
  - (1) Cielo (previously VisaNet until 2010) had exclusivity on Visa acquiring; and (2) Rede, which had exclusivity on acquiring Mastercard transactions
  - Following the opening up of the Brazilian acquiring market, First Data seized the opportunity by building a greenfield merchant acquiring business in Brazil from scratch in 2014 that has grown rapidly, gaining share from legacy acquirers with antiquated technology platforms
- Argentina – similarly, regulators are ending card scheme exclusivity, but in a phased approach
  - Visa and 14 Argentinian banks owned the Prisma network, which will retain exclusivity to processing their existing Visa portfolios through 2022
  - First Data had 44% POS market share but only 15% acquiring share (2017) due to its inability to acquire Visa Cards (~80% of the market)
  - Next catalyst will occur in 2022 when the Prisma exclusivity agreement ends

Both Brazil and Mexico are healthy growing electronic payments markets, currently at ~45-80% cash dominant



First Data highlights the various acquiring markets that have opened up Latin America (Brazil in 2010, Argentina 2H 2018, Uruguay 2019, Chile)

Source: First Data, Euromonitor, Credit Suisse estimates

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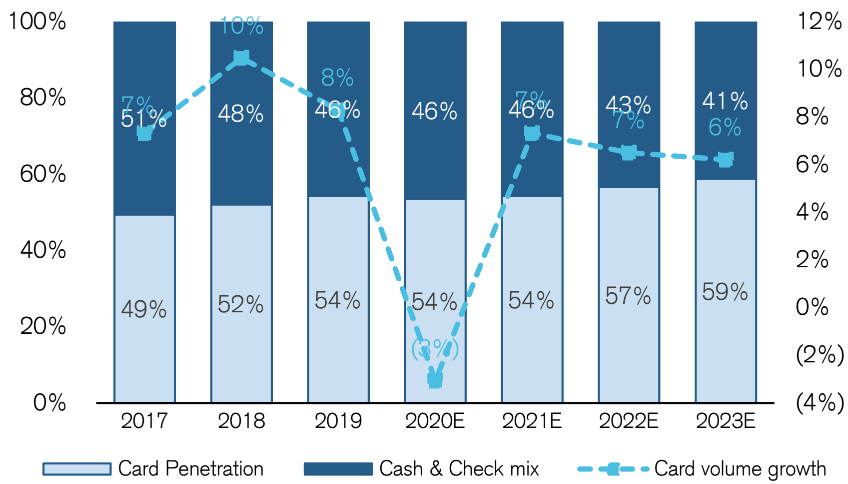
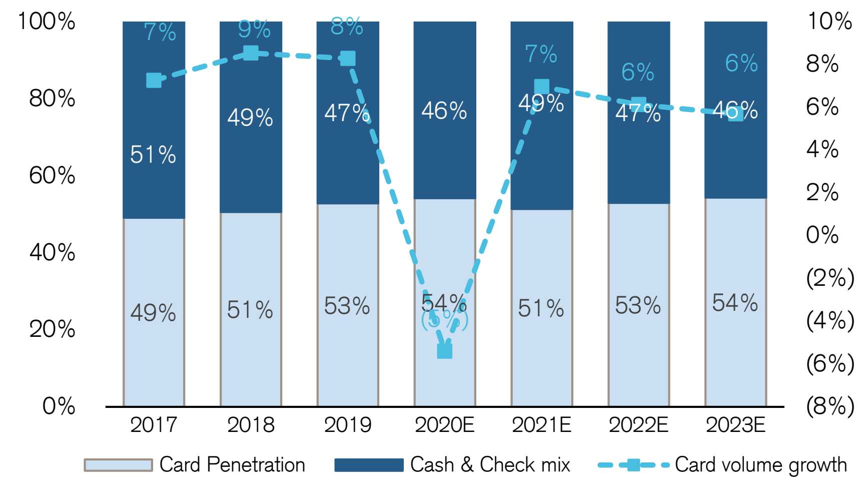
21. Long runway for card penetration in both EM & DM markets

Summary data for the US, Europe, AsiaPac, and LatAm

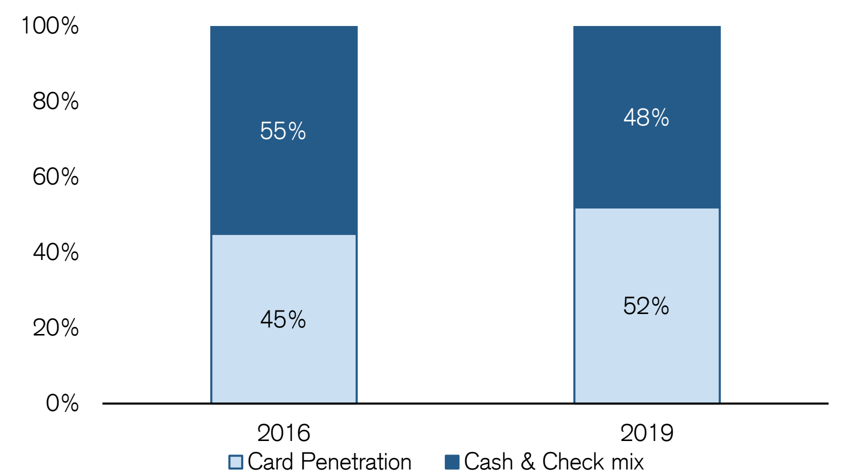
US



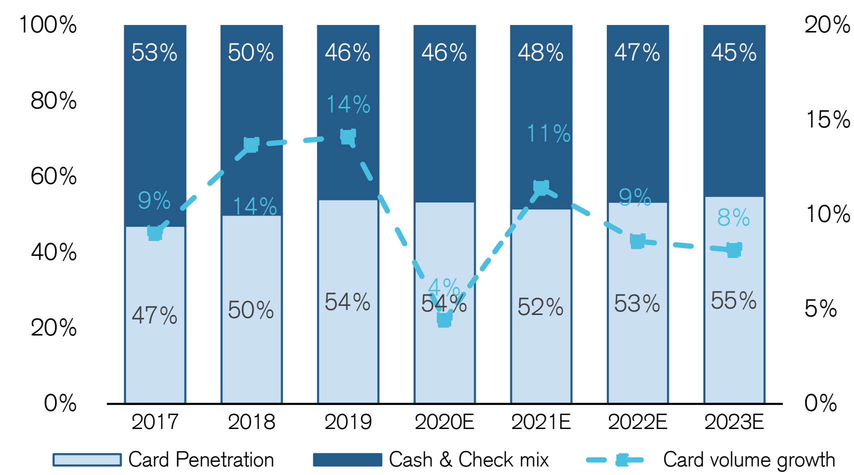
Europe



AsiaPac



LatAm

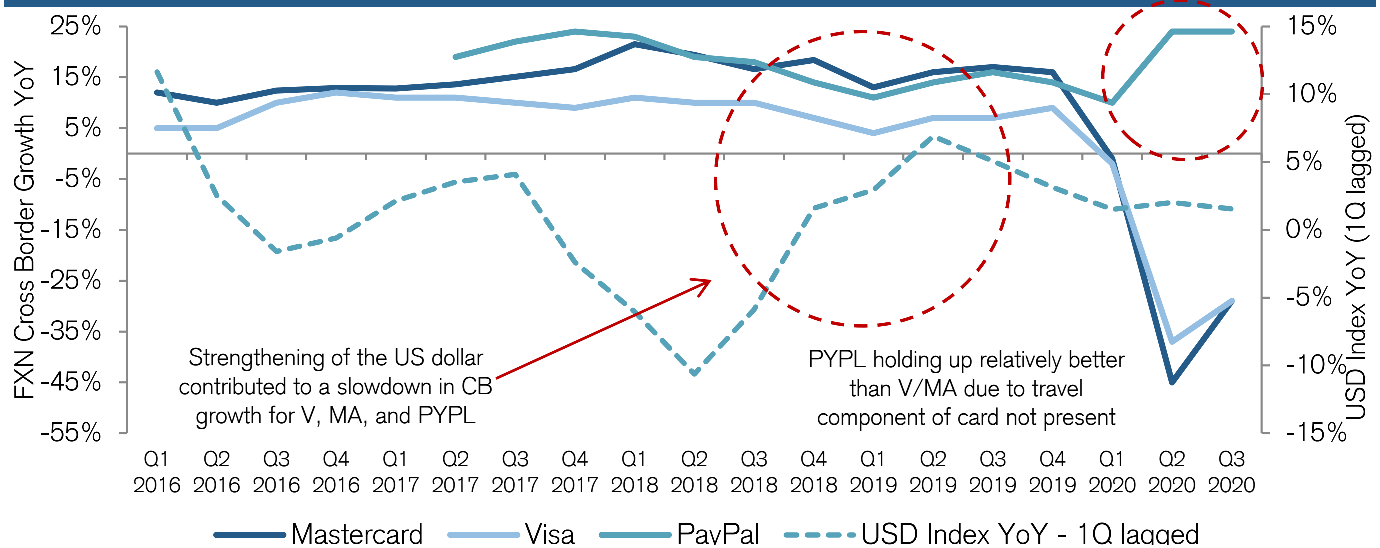


Source: Euromonitor, FactSet, Visa (for AsiaPac) Credit Suisse estimates

22. Cross-border payments volumes
Travel and eCommerce key drivers

- Cross-border payments volumes for the card networks pre-COVID was comprised of ~50-60% tourism spend (both consumer and corporate travel), growing roughly mid-single digits, and ~40-50% eCommerce (this would have been closer to ~70% travel just ~5 years ago, and ~90%+ travel 20 years ago), growing in the ~20-30% range.
  - Tourism spend is inherently discretionary and cyclical as well as more sensitive to geopolitical factors and exchange rates, particularly a strengthening USD given (1) the US is the largest inbound tourism market in the world, much larger than US outbound, providing only a partial offset from increased US outbound cross-border; and (2) 33 countries use US currency or are pegged to the US dollar.
  - eCommerce spend is more stable, which helps to reduce cross-border volume volatility for the card networks as it increases as a portion of the mix (this has been happening for years, a trend we expect to continue).

Cross-Border Volume growth on a currency-neutral basis vs. the USD Index (1Q lagged); Strengthening of the USD generally leads to slower growth in cross-border volumes



"…Start with the thinking of cross-border as both determined by the level of travel and tourism on the one hand at a consumer level, combined with corporate travel and commercial travel at a commercial level, combined with cross-border e-commerce. When you look at all 3 together, you get what the market is growing at in a secular way…"

– Ajay Banga, CEO, Mastercard (February 2019, Q4 2018 earnings call)

Source: Company filings, FactSet, IMF, researchandmarkets.com, Credit Suisse research

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22. Cross-border payments volumes

Strong US dollar weighs on cross-border revenue in 3 ways

A strong US dollar has three impacts on the financial results of the card networks and a selection of merchant acquirers (e.g., PayPal)

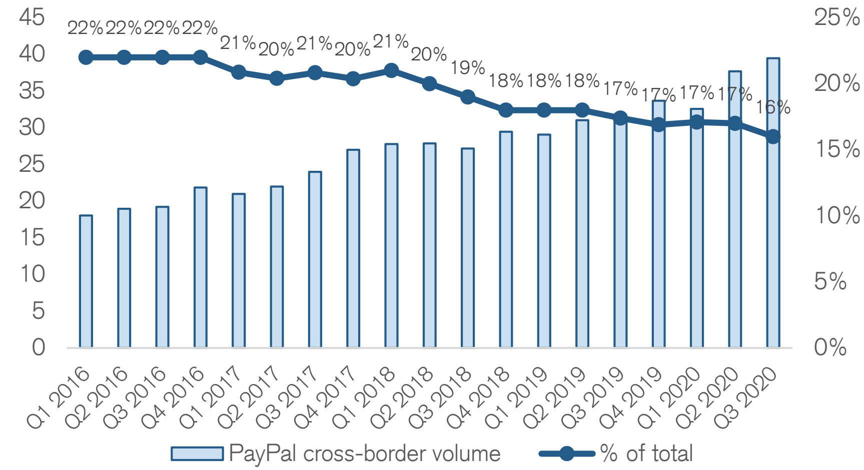
Demand destruction
Example 1: Brazilian consumers spend less on US-sourced eCommerce websites
Example 2: European consumer reduces vacation to the US in terms of total trip time, or in some cases, opts not to take the trip at all

Translational impacts
Example 1: US-based company (V, MA, PYPL) that reports in USD sees reduced reported revenue and earnings as a result of non-USD business being translated back to fewer USD as part of reported results

Amplified revenue & EBIT impacts
Example 1: Generally higher take rates and, thus, higher incremental margins associated with price-based flow through to EBIT and earnings

1. Demand destruction for tourism spend in the US given it becomes relatively more expensive – only partly offset by US outbound increasing given US has significantly more inbound spend (since US consumers travel less)
2. Translational impacts that reduce reported cross-border volume and revenue from when the USD is stronger
3. Amplified revenue impacts due to higher take rate nature of cross-border, meaning there is a disproportionately larger impact on overall revenue and thus margins (given the incremental margins on this higher take rate business are higher)

PayPal's cross-border volumes make up ~16% of total, which has trended down from ~22% in early 2016, in part due to increasing Braintree/Venmo mix (historically a more US-focused platform)



- We believe Visa and Mastercard's cross-border businesses are more balanced vs. PayPal's
- Visa and Mastercard have a greater mix of tourism vs. PayPal, which has a larger mix of retail eCommerce (meaning card networks may see increased cross-border outbound from travel spend when the dollar strengths as an offset to reduced inbound cross-border)
- PayPal has a greater mix of foreign consumers purchasing US goods vs. US consumers purchasing foreign goods (while Visa and Mastercard are more balanced in this sense, creating more of an offset as the USD strengthens and weakens)

Source: Company filings, Credit Suisse research

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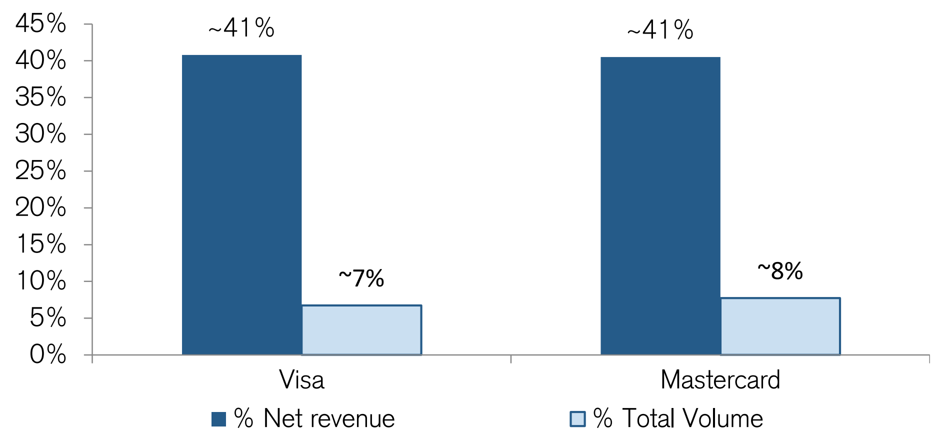
22. Cross-border payments volumes

Attractive economics for the networks and acquirers

- We believe card network cross-border transactions can earn ~6 to >8x the yield of traditional domestic transactions. Further, Visa and Mastercard process ~75% and ~56% of their transactions, respectively, although they process ~100% of cross-border transactions (further adding to the revenue gap when comparing cross-border and domestic transactions).
- While there are no clear disclosures that allow for the derivation of these estimates, we use a combination of card network financial results, tourism spend, eCommerce market sizing, and numerous industry discussions to arrive at rough estimates of cross-border volume and revenue contributions (i.e., not precise estimates, but directionally indicative of cross-border's importance to the business – we aim to refine these over time).
- Select merchant acquirers revenue yield can be ~1.3-1.5x higher on cross-border transactions (based on rack rate pricing, although large merchants that have lower negotiated domestic rates could see differing gaps)
  - Differentiate by helping merchants avoid high cross-border fees from the card networks, enabled by local acquiring licenses in a country
  - Local licenses allow acquirers to classify transactions as domestic (when the merchant maintains a business entity in the country), allowing the transaction to be processed in the local currency (avoids increased network fees, increased interchange, and improves authorization rates)

Revenue stemming from cross-border (yields higher than a traditional domestic transaction) vs. volumes for Visa and Mastercard; we est. ~M-HSD% of volumes &~40% of revenue (2019E, pre-COVID)



Source: Wells Fargo Merchant Services for US merchants, Credit Suisse estimates

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22. Cross-border payments volumes

Attractive economics for the networks and acquirers

- Some of the variances between Visa and Mastercard cross-border net revenues could also relate to issuer mix (larger issuers for Visa, on average), regional processing share on domestic transactions (i.e., Visa has higher share of domestic transaction processing vs. Mastercard, in part due to US and UK mix, where Visa processes the majority of its transactions), and intra-European mix (transactions priced more similarly to domestic transactions, though are cross-border technically).
- Generally speaking, we would expect Mastercard to have a slightly higher portion of cross-border volume (and higher travel mix within this portion, due to travel virtual card & regional mix), although a greater portion of that being intra-Europe vs. Visa.

Network	Reporting of revenue associated with cross-border transactions
Visa	Cross-border related revenue contained in "Service Fees" and "Data Processing" (including a processing premium), along with the bulk of the premium residing in the "International transaction fees" line item.
Mastercard	Cross-border related revenue contained in "Transaction Processing Fees" (at a premium), and also within "Cross Border Volume Fees"; Mastercard's "Domestic Assessments" revenue line item does not contain brand fees associated with cross-border transactions.

Source: Wells Fargo Merchant Services for US merchants, Credit Suisse estimates

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22. Cross-border payments volumes
Enabling global marketplace sellers and freelancers

- Marketplace sellers and freelancers are increasingly engaged on a cross-border basis, creating a need for cross-border currency management platforms such as Payoneer, EBANX, Airwallex, PingPong, and others, along with similar offerings via Transferwise and Revolut
- Platforms can be thought of as global treasury networks offered as-a-service to SMBs
  - Core offering involves multi-currency / "borderless" small business bank accounts, combined with the ability to convert back to the seller/freelancer's home currency within the provider's ecosystem (at a reduced rate vs. what might be charged by an eCommerce platform or what might be available via a traditional banking relationship)
  - Ability to pay out to local suppliers in local currency (further reducing FX fees given the currency remains local, often leveraging local payments schemes and/or faster payments rails for last-mile delivery); supplemented by cards attached to the borderless account, providing instant access
  - Additional services might include working capital products (lending), eWallets, VAT services, fraud combatting solutions, etc.

Company	Overview of cross-border platform and how it supports SMB merchants
Airwallex	• Hong Kong-based platform with strength in APAC • Customers include: JD.com, Tencent, and Shopify; investors include: Tencent, Sequoia, DST, and Mastercard • 130+ countries and 50+ currencies
EBANX	• Brazilian-based platform that offers payments for the entire eCommerce transaction • Allows global merchants to more easily reach Brazilian consumers
Payoneer	• International money transfer for marketplace sellers and freelancers, along with working capital offerings, payout capabilities, and fraud combatting solutions for marketplace partners • "Millions" of customers and "billions" of volumes annually, across 200 countries and 150 currencies • KYC, AML investment (automating as much as possible – i.e., in the US, 86% of accounts automatically onboard and get approved) • Provides solutions for marketplaces to combat fraud (~4% of revenues, with ~60-70% of fraud via by repeat users/opening new stores)
PingPong	• Hangzhou, Zhejiang, China-based platform with $10b+ in payments volume • Amazon-focused for sellers in China (also works with sellers on NewEgg, Wish, and others) aiming to reduce cross-border fees for 3P sellers
Transferwise & Revolut	• Offer borderless accounts that compete with other companies on this page (although core business is in P2P money transfer)

Source: Company filings, Credit Suisse research

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23. COVID-19 as a forcing factor
Industry leaders' recent commentary on COVID-19

A common theme amongst thought leaders in the payments industry is how the COVID pandemic has accelerated the movement to digital and Omnichannel interactions, it has accelerated plans for businesses, it has accelerated consumer adoption of remote commerce channels; and most importantly, many believe these changes will persist, recasting a new normal for the way for its users to interact with the payments ecosystem

"By many estimates, the pace of e-commerce penetration has accelerated by several years in a single quarter, and there is greater demand for contactless payments than ever before"

"We have more confidence in the sustainability of the elevated e-commerce trends we are seeing. What had first felt like a potentially short-lived phenomenon resulting from initial panic and pantry packing and even stimulus checks has become a much more durable and profound behavior shift. We've seen the strongest and most encouraging new customer volume and engagement trends in our history…. As we sit here today, the concept of normalcy is being redefined and at times feels elusive. What we do know is that this is a pivotal moment in PayPal's history. We believe that we've never been better positioned to realize our ambition for greater relevance, ubiquity and impact as a global payments leader"

– John Rainey, CFO, PayPal (July 2020)

"Institutions globally are not going to move backwards to legacy mainframe-based systems. The digitization of financial services will accelerate catalyzed by the pandemic. Issuers will increasingly move toward newer cloud data technologies over time that leverage the talent based prevalent in today's market, increasing resilience and compliance in light of the regulatory requirements in the marketplace now and in the future."

– Jeffrey Sloan, CEO, Global Payments (July 2020)

"According to our latest COVID-19 consumer impact study, over 70% of consumers plan to continue or increase their online purchasing. And approximately 60% believe they will use less cash even after the pandemic subsides."

– Michael Miebach, CEO-elect, Mastercard (July 2020)

"In the first half of 2020, the penetration of e-commerce as a percentage of retail sales outpaced prior external forecasts by an astonishing three to five years… Both consumers and merchants are rapidly moving towards digital payments across their online and offline experiences. This is an existential issue for merchants who realized that reopening their retail stores depends on touchless forms of payments to keep both their employees and customers safe and healthy."

– Daniel Schulman, CEO, PayPal (July 2020)

"I think the pandemic has accelerated everything people thought about digital. Maybe what people thought would take five years will take two years or less than that. You watched us build capability in digital much faster than maybe we would have thought it would have taken before, and our clients are fully engaged in it. So I think speed matters, and clients are completely committed to being digital-first, and we're committed to delivering digital-first for them."

– Frank Bisignano, CEO, Fiserv (Aug 2020)

"The crisis accelerated many favorable secular trends, the digitization of cash, the shift to e-commerce, and the penetration of tap-to-pay."

– Vasant Prabhu, CFO, Visa (July 2020)

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23. COVID-19 as a forcing factor
Utilization of online financial services increasing

- Closures and social distancing measures have driven many consumers to utilize online banking and mobile phone applications to conduct their banking activities as opposed to in-person
- FIS noted that April saw a 200% jump in new mobile banking registrations, with mobile banking traffic increasing 85%
- J.D. Power noted a 14% increase in digital banking usage among largest banks as of April 5, 2020
- We believe that COVID-19 has accelerated the adoption of online banking, with many consumers overcoming traditional hurdles (i.e. the comfort / trust of a personal relationship with your banker), we believe the customers will be relatively sticky due to the convenience factor; a recent study conducted by Novantas found that only 40% of respondents said they expect to return to physical bank branches post-COVID

"The COVID-19 pandemic has accelerated and solidified a transition in how customers behave and interact with brands that was already well underway, posing significant questions around how companies can best serve customers going forward"

– Beth Johnson, Chief Experience Officer, Citizens Bank (July 2020)

Of the ½ of respondents and ¾ of businesses stated COVID-19 had changed the way they interact with their financial institution…

50%	Believe COVID-19 changed they interact with their bank
67%	Feel these changes will be permanent
69%	Prefer banking online some or all of the time

Source: Citizens Bank, Company Reports, J.D. Power, Novantas, Company Websites

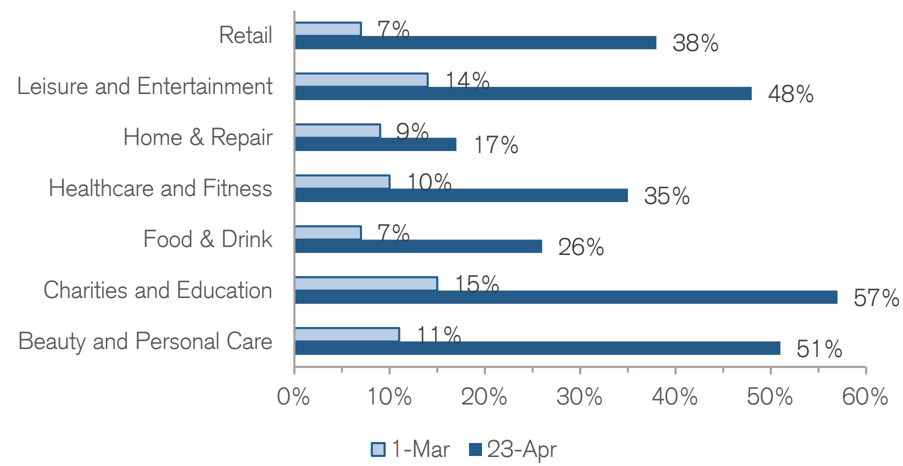
23. COVID-19 as a forcing factor
CDC guidelines and consumer preferences driving cashless

- Visa stated that Q1 2020 global tap-to-pay payments were up 40% YoY, with 60% of face-to-face transactions ex-U.S. being tap-to-pay
  - In the US, 80mm Visa contactless cards were shipped in the first six months of 2020, and the total outstanding contactless cards were noted as ~190mm (in June 2020) out of ~1000mm cards in the US (or ~20% penetration)
  - ~50 countries improved tap-to-pay penetration by more than 5%, and over 10 countries increased tap-to-pay penetration by more than 10%
- Mastercard noted a similar trend, with >50% of switched volumes in April being card not present and a 40% increase YoY in contactless transactions worldwide
- WHO and CDC recommended the use of contactless payment options as opposed to cash to reduce risk of transmission

"Tap-to-pay is likely to accelerate post-COVID, especially as consumers start going back to the office, where they tend to conduct smaller transactions for their commute, paying for public transit fares, and buying food and drinks."

– Alfred Kelly, CEO, Visa (July 2020)

From March 1st to April 23rd Square sellers skyrocketed from 8% cashless to 31% cashless; Led by Retail and Beauty



Source: Square company website, Company Reports, WHO, CDC

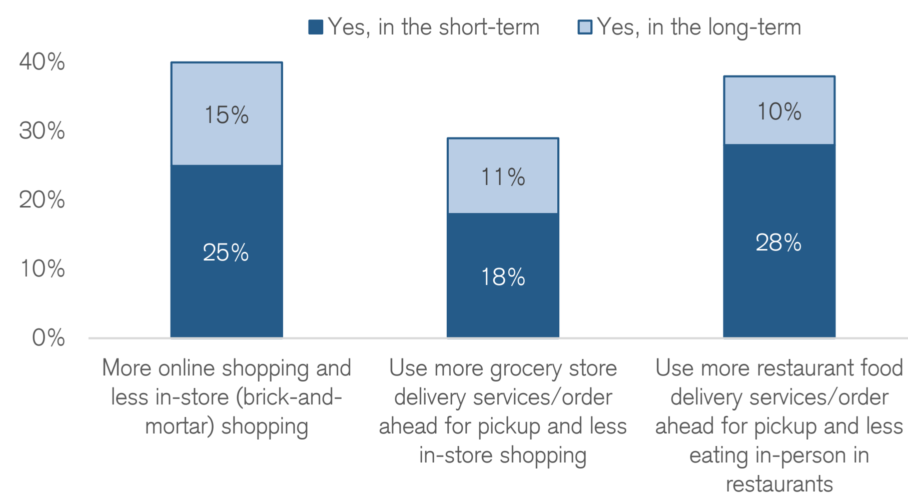
23. COVID-19 as a forcing factor
eCommerce absorbing offline retail sales

- Adobe Digital Insights estimates that COVID-19 accelerated the growth of e-commerce between 4-6 years
- Widespread social distancing and statewide store closures has begun accelerating ecommerce shopping
- U.S. online retail sales were up ~15% YoY in Q1 2020 U.S. Department of Commerce
- Adobe Analytics noted that U.S. daily ecommerce sales grew 49% from April 1-23 vs. March 1-11, and total online spending increasing 77% YoY in May 2020
- While we acknowledge that some retail sales will shift-back to in-person channels, we believe that many shoppers (who have developed preference habitually) will continue to utilize ecommerce options once restrictions have been fully lifted

"According to our data, it would've taken between 4 and 6 years to get to the [eCommerce] levels we saw in May if the growth continued at the same levels it was at for the past few years... We typically don't expect to see surges at this level, at any time outside of the holiday season."

– Vivek Pandya, Digital Insights Manager, Adobe (July 2020)

FIS Survey results indicate both short-term and long-term shifts in consumer behavior, notably with 15% of respondents expecting to conduct more online shopping in the long-term



Source: Adobe Analytics, Forbes, Adobe, Company Reports, FIS Performance Against Consumer Expectations Survey

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23. COVID-19 as a forcing factor

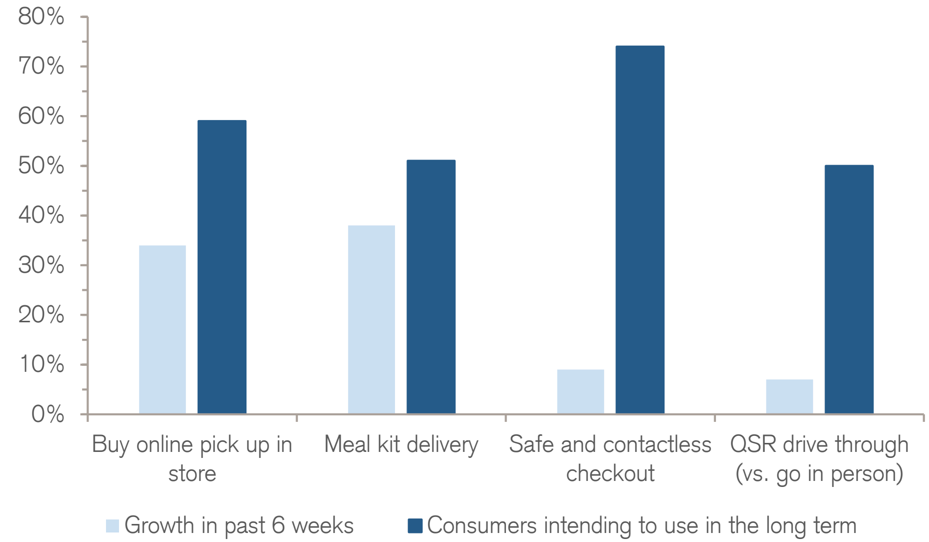
Omnichannel offerings are increasingly important for consumers

- Statewide social distancing and closures have increasingly driven consumers to leverage omnichannel to continue to shop safely (i.e., curbside pickup, delivery, eCommerce)
- Businesses which have predominantly conducted business in-store are finding success (and surviving) by shifting to omnichannel experiences to accommodate consumer demands
- Adobe Analytics reported that buy online, pickup in store (BOPIS) grew 259% YoY in August 2020 (up 59% MoM)
- As consumers begin to habitualize these services (i.e. curbside pickup, meal kit delivery, QSR drive through, etc.) and recognize their utility, we believe that many will continue to leverage these services even post-COVID

"We are seeing signs that online purchasing trends formed during the pandemic <u>may see permanent adoption</u>… While BOPIS (Buy Online Pick up In Store) was a niche delivery option pre-pandemic, it is fast becoming the delivery method of choice as consumers become more familiar with the ease, convenience and experience"

– Vivek Pandya, Digital Insights Manager, Adobe (July 2020)

McKinsey COVID-19 US Consumer Pulse Survey Indicates that buy online pick up in store has grown 34% in the past 6 weeks, with 59% of consumers intending to continue in the long term



Source: McKinsey & Company Consumer Pulse Survey, Forbes, Adobe, Company Reports,

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23. COVID-19 as a forcing factor

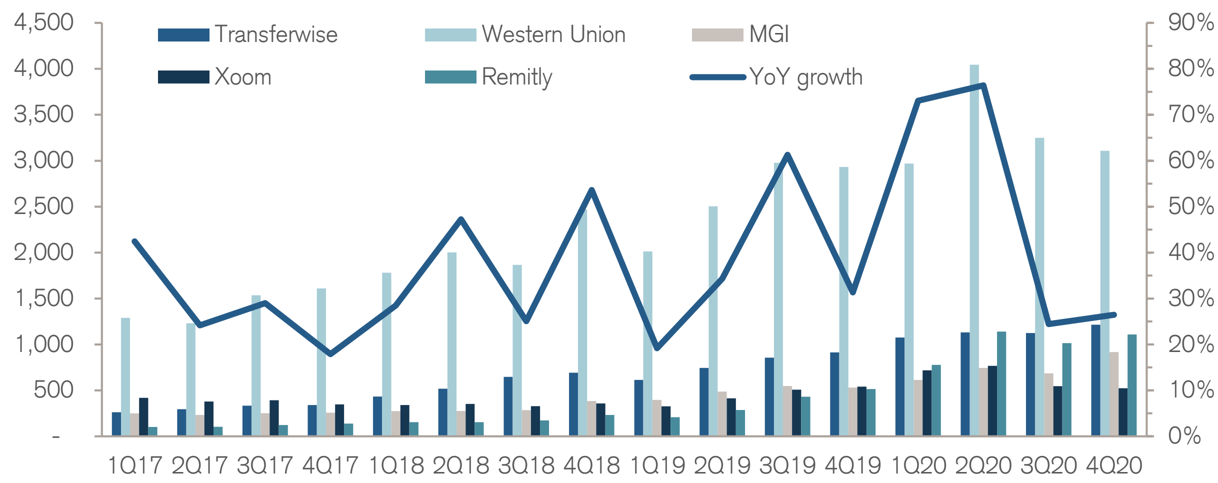
Increasing consumer adoption of online remittance offerings

- Due to statewide closures and increased social distancing guidelines, many consumers leveraged online or mobile applications to send critical cross-border remittances in lieu of traditional brick and mortar agent locations
- IMXI online transactions increased 142% YoY in Q3 2020 and number of customers using the app increased 48% YoY
- Western Union online transactions increasing 96% in both Q2 and Q3 2020
  - Digital transactions have grown from 15% of the C2C transactions in Q2 2019 to 31% in Q3 2020
- It is clear that COVID has forcibly removed a level of inertia from the remittance process, that level of trust and comfortability with in-person interactions (important when handling critical funds for the receivers [literal monthly income])
- We acknowledge that a certain subset of consumers which are unbanked or underbanked (~20% in the US) will be unable to move to digital, as in order to begin sending money, linkage to a bank account is required. This subset will continue to fuel B&M remittances

"The current environment has benefited the border digital money transfer market and not just from retail customer switching. It is also bringing in new consumers to the market, some from informal channels or banking system and others with recently developed needs. They keep the westernunion.com momentum going, we will continue to invest in acquiring new customers and enhancing services like real-time payments"

– Hikmet Ersek, CEO, Western Union (Aug 2020)

Monthly app downloads (thousands) for popular remittance apps were up ~47% YoY in 2020, led by Remitly, MGI, and Transferwise



Source: Sensor Tower, Company reports, Credit Suisse estimates

B2B/Corporate Payments

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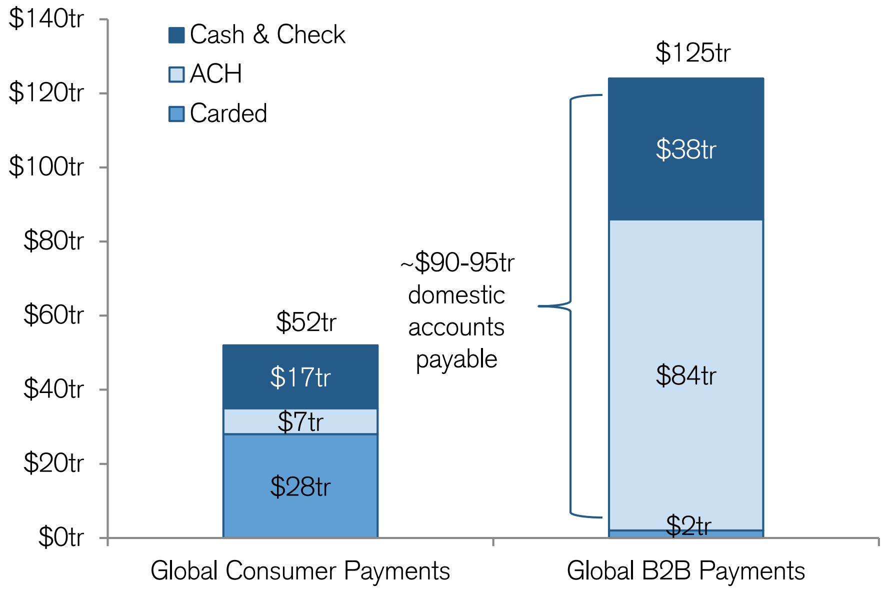
24. B2B payments coming of age
Underpenetrated growth market nearing inflection

- $125tr TAM that is so large it almost does not merit discussion; accounts payable (AP) payments between businesses represent ~$110tr (~90%) of the B2B opportunity, of which ~20% is "card-able" and ~$10tr is cross-border
- Card networks are enablers for the rest of the ecosystem by embracing alternative payment types in B2B (e.g., efforts in bill-pay, virtual cards, push payments, account-to-account)
- Public and private technology companies building software and workflows to unlock this opportunity (i.e., issue is less around the payments themselves and more on the processes, reconciliation, data, workflows, etc.)
- B2B pure-players, FleetCor and WEX, differentiated with comprehensive B2B capabilities targeted at SMBs – both can now handle the entire AP file and are building supplier networks to help address the pain points below

Global B2B TAM ~$125tr volume opportunity, although with various means of monetizing volume (*ad valorem* via virtual cards, cents per transaction on ACH, SaaS fees, etc.)



While the actual payments can be less of an issue, antiquated processes, reconciliation, data, and a lack of automation are common pain points

Highly manual (people-intensive) processes are slow and expensive, given a lack of automation, and error prone

Checks have hidden costs (e.g., checks can be in the ~$4-20 range vs. ~$3 per ACH transaction, per AvidXchange) and are not guaranteed good funds

Limited transaction data from payments make reconciliation difficult

Cash flow management difficulty – i.e., paying on the due date with certainty vs. mailing a check a few days ahead of time, lacking certainty

Lack of visibility into supplier payment preferences

Source: Mastercard, Visa, Credit Suisse, Rounding differences for B2B payments figure

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24. B2B payments coming of age
Companies under coverage with B2B exposure (V, MA, FLT, WEX)

Company	Overview of B2B assets
Mastercard	• Commercial business: corporate cards, travel and expense cards, fleet cards, and small business cards, representing ~11% of volume • Mastercard Track Business Payments to optimize B2B flows, acting as the switch and directory (~210mm registered entitles as of September 2019) • Leading provider of Fast ACH solutions (Vocalink & Nets), representing 67% of the addressable B2B TAM • Transfast, account-to-account payments platform, allows MA to reach ~90% of the world's bank accounts • Largest Virtual Cards business and push payment capabilities from Mastercard Send • Bill Pay Exchange (launched 4Q 2019), targeting a $4tr TAM in the US, and global capabilities gained from the Nets acquisition
Visa	• Corporate cards, also representing 11% of volume • Visa Direct, the company's rapidly scaling push payments product, growing +~75% YoY to reach ~$350b of volume in 2020 (CS estimate), which combines with Earthport's account-to-account payments capabilities providing Visa with access to 99% of bank accounts in the top 50 markets; currently working with all large remittance providers • B2B Connect, distributed ledger-based cross-border platform for higher-value transactions/larger merchants (FIS and Bottomline distribution partners) • Business Payments Network, payments directory that contains payments preferences (which suppliers take what type of payments)
FleetCor (Pure-play B2B)	• >80% of revenue derived from B2B payments: Fuel (45%), Corporate Payments (17%), Tolls (14%), and Lodging (7%) • Full suite of Accounts Payable products with ability to handle the full spectrum of payment methods (Nvoicepay acquisition in 2019), including cross-border (Cambridge acquisition in 2017) • Largest issuer of virtual cards (Comdata acquisition in 2014), and is building a vertical specific supplier network to accept virtual cards (separate integration required), consisting of ~1mm distinct businesses
WEX (Pure-play B2B)	• >85% of revenue derived from B2B payments: Fuel (66%), Travel (12%), and Corporate Payments (8%) • Pioneer of virtual cards first used in the travel industry, with the broadest virtual card issuance (Mastercard, Visa and JCB) • Complete accounts payable file servicing, with the ability to make payment by virtual card, ACH, check, or wire transfer • White-label virtual card management platform for banks, leveraging assets from the AOC acquisition – customers include AXP & PNC • WEX also white-labels its Accounts Payable product to banks (AXP, PNC), leveraging assets from the AOC acquisition in 2017 • Offers invoicing and bill-pay to corporates and consumers via capabilities gained from the Noventis acquisition in 2019

Source: Company reports, Credit Suisse research

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24. B2B payments coming of age

Additional B2B assets at various public companies

Company	Overview of B2B assets
FIS	• Legacy Worldpay expanded into B2B with the 2017 acquisition of Paymetric, which manages and automates payment workflows within enterprise systems (Oracle, Hybris, Sales, etc.) • FIS provides traditional B2B solutions to its bank customers, such as cash and treasury management • FIS is planning to create a broader B2B solution by combining its treasury management solutions with Paymetric
FISV	• Management sees the potential for increased B2B money movement by combining FISV cash management, CheckFree RXP (e-Billing solution) with some of First Data's payments capabilities • Leader in bank-based Zelle implementation and considers B2B a potential opportunity for the Zelle platform • Popmoney capabilities in B2B money disbursements
Global Payments	• Called out B2B as an opportunity from the TSYS acquisition with Netspend's payroll card • Global Payments views Netspend as a launch pad into B2B areas including invoicing and accounts payable automation (both in the US and on a global basis)
PayPal	• Bill Pay TAM expansion via the January 2019 partnership with Paymentus and more partnerships expected to be announced • PayPal's network with >26mm merchants positions the company well for further expansion into B2B payments
Square	• Initial step into B2B payments with its Invoices product, enabling sellers to send professional invoices • Launched Square Card in January 2019, a business debit card for Square merchants • Also offers Cash App for business, allowing merchants to accept payments via Cash App • We expect Square to launch additional B2B products, such as a business credit card through Square Capital, Square's lending arm that provides working capital loans to merchants with an average loan size of ~$7k, along with other features enhancing expense management
Repay	• Recent acquisition of APS Payments for entry into B2B vertical. followed by CPS and cPayPlus • Integrations into Sage, SAP, Adagio, etc. representing an immediate addressable opportunity of ~$80b in volumes vs. RPAY 2019 ~$10b • Will compete with Paymetric (among others) in this vertical
Bill.com	• Provides accounts payable and receivable solutions and accounting software integrations • Partnerships with FleetCor for virtual cards • SMB-focused platform, with likely some overlap with FleetCor in the lower-mid-market
Bottomline Technologies	• Offers Paymode-X B2B payments platform with 400k+ members in network and $200b+ annual volume • Included distribution through key banking partners (e.g., Bank of America)
Western Union	• Payment solutions for SMBs, mostly consisting of cross-border payments, and white-labels the solution to banks • Industry-specific solutions, customizing their offering by vertical

Source: Company reports, Digiday, Credit Suisse research

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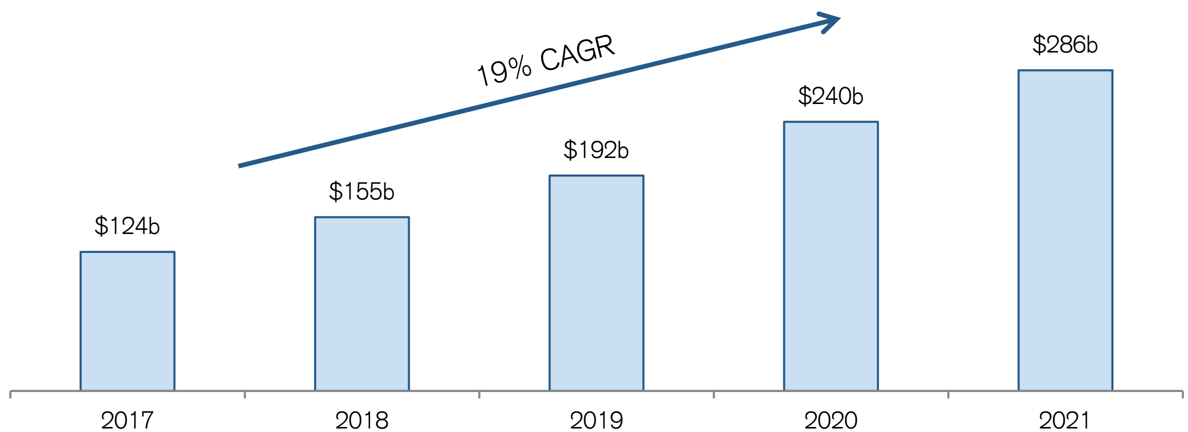
25. Virtual cards in B2B Payments
A key driver of card penetration in B2B payments

- First introduced in the early 2000s, primarily used in B2B travel and fleet management
- Now a key component in automating Accounts Payable/Accounts Receivable-related payments, replacing inefficient paper-based payments that require manual efforts for both sides
- Roughly ~20%-40%+ of an AP file can be addressed via virtual cards, although it may require individual supplier discussions to educate on the benefits, costs, etc. (companies like FleetCor and WEX do this when given a complete AP file)
- Virtual card numbers function like a token, serving as a substitute for the underlying account number
  - Single-use cards - good for only one transaction, enhanced safety/security
  - Lodge cards - reusable virtual card, typically stored with a trusted vendor

Virtual cards are one of the fastest growing areas in payments, expected to deliver a near ~20% CAGR 2017-2021E (roughly ~2-3x underlying industry growth rates)



Source: WEX, eNett, Mastercard, Credit Suisse research

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25. Virtual cards in B2B Payments
Virtual cards leaders FleetCor and WEX

- WEX is the pioneer of virtual card usage, focused on online travel.
- WEX and FLT have large acceptance (supplier) networks (WEX quotes ~2.5mm, while FleetCor quotes ~1mm), with WEX's scale enhanced by white-labeling its corporate payments product through financial institutions (e.g., PNC, American Express).
  - FleetCor offers Comdata Mastercard virtual cards for customers to pay invoices.
  - Both WEX and FleetCor have specific teams designated to signing up suppliers (i.e., gain an AP file, attempt to increase virtual card acceptance penetration within the suppliers that are to be paid).
  - eNett is WEX's primary competitor in travel payments with a strong presence in Southeast Asia (eNett is currently part of Travelport which was taken private in May 2019).

Key benefits of virtual card usage
Improve speed and simplification of AR & AP reconciliation processes
Reduce operating costs – scale from process efficiency, reduces errors, helps to avoid FX markups (up to 3%)
Increase control of corporate spend – limit a purchase to the amount, date, merchant, and MCC code
Revenue opportunity from financial incentives (rebates) on transactions
Reduce fraud – single-use virtual card numbers can only be used once with the controls above
Better reporting with enhanced data from card transactions

Source: WEX, eNett, Mastercard, Credit Suisse

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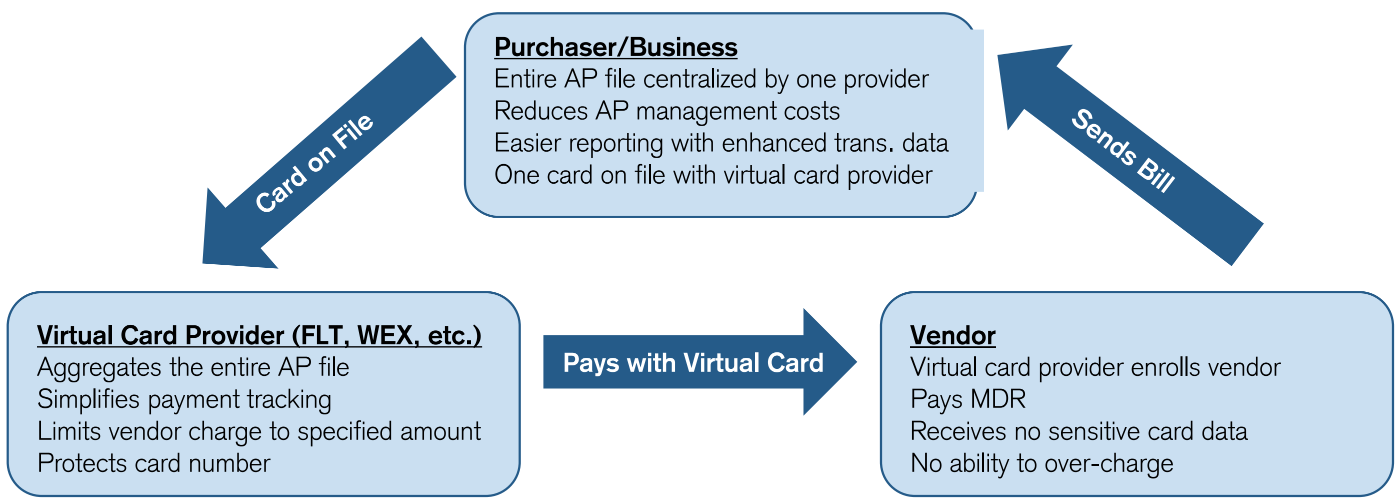
25. Virtual cards in B2B Payments
Virtual Card mechanics within traditional AP/AR

- Virtual cards can help to decrease check processing costs, reduce manual processing errors, and enable direct linking of payments to expenses.
- Beyond cost savings, virtual card usage can lead to rebates – to the point of turning AP functions into revenue generators vs. cost centers, adding to the value proposition around efficiencies, reconciliation, etc.
- Specifically, interchange earned on virtual cards can be (depending on the arrangement) shared back with the underlying payee, helping to reduce the total costs of AP operations.

Accounts Payable (AP) process overview with Virtual Card providers



Source: WEX, Credit Suisse research

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25. Virtual cards in B2B Payments
Virtual Card mechanics within the travel segment

- Virtual cards within travel are mainly utilized with hotels booked online via OTAs (key clients include Expedia and Booking.com), specifically when the OTA employs the merchant model (i.e., takes payments for the hotel from the customer, and later sends a virtual card payment to the hotelier upon stay).
- Booking.com was traditionally an agency model OTA but has more recently began utilizing the merchant model for both hotels and alterative accommodations (e.g., vacation rentals).
- WEX plans to focus on non-hotel travel markets (airlines, vacation rentals, tours & activities, and car rental), which make up two-thirds of online travel.

Online travel agency (OTA) virtual card process overview

Travel company makes reservation for consumer and receives payment → Travel company requests Virtual Card Number, WEX provides credit → Supplier charges Virtual Card Number → Transaction reconciles automatically → Travel company settles with WEX

Source: WEX, Credit Suisse research

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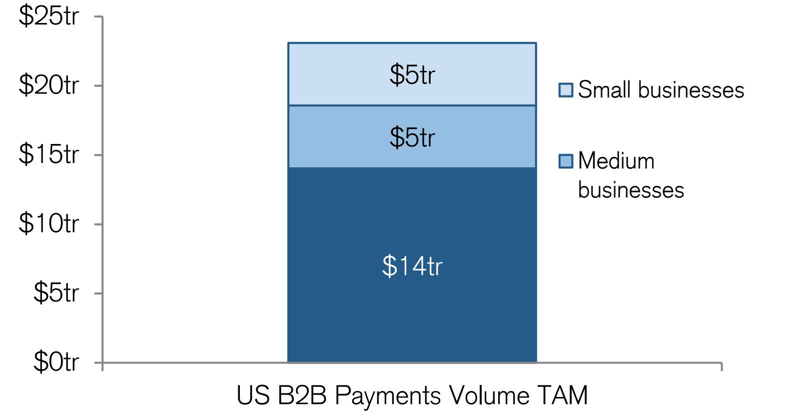
26. Next leg of B2B payments puts SMB services in focus

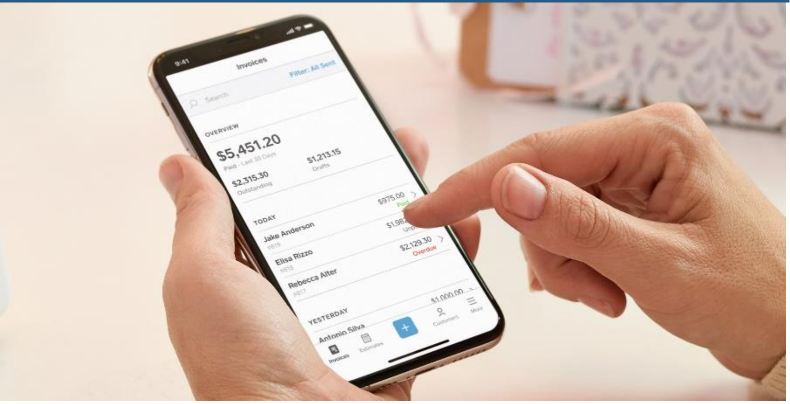
Whitespace opportunity created by historical distribution and tech issues

- **Whitespace opportunity created by small banks lacking distribution to profitably reach SMBs, along with underdeveloped product offering (e.g., primarily corporate cards), as the vast majority of these banks outsource their IT**
- We estimate 75% of the US $10tr SMB B2B payments TAM is addressable, with key areas including accounts payable/accounts receivable, corporate cards, and expense management
- Incumbents working with FinTechs to overcome hurdles:
  - Distribution - Multi-pronged approach leveraging current clients, a direct salesforce, and partners such as banks (WEX) and FinTechs (FleetCor, WEX, PayPal)
  - Technology and capabilities - Comprehensive product sets, the ability to make their products accessible to Fintech partners (e.g., APIs), and integrations into accounting software (e.g., QuickBooks, Xero)
- Square offers invoicing (Square Invoices), debit products today (Square Card), and Cash App for Business; we expect more B2B products to come, particularly around expense management and/or credit card offerings

SMB represents $10tr of the $24tr US B2B Payments TAM



Square offers Square Invoices, Square Card, and Cash App for Business; we expect more B2B products to come (i.e., expense management and/or credit card offerings)



Source: Company Data, Deloitte, Credit Suisse research

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26. Next leg of B2B payments puts SMB services in focus
Numerous fast-growing private companies developing solutions

Overview of a selection (not exhaustive) of private B2B payments companies serving the SMB and middle-market segment	
BREX	• Provides start-ups of all sizes with a corporate credit card • Helps businesses reach higher credit limits, expense management, automation and accounting integration • Launched BREX Cash, a business checking account in October 2019 that enables no-fee B2B ACH and wire payments
Divvy	• Business expense management and budgeting tools are free to customers, currently monetized via virtual card economics • Partners with WEX for corporate and virtual cards
AvidXchange	• Provides accounts payable and receivable solutions and accounting software integrations • Partnerships with FleetCor for virtual cards • SMB-focused platform, with likely some overlap with FleetCor in the lower-mid-market
Billtrust	• Provides an end-to-end payment cycle management solution, which automates every step of the invoice-to-cash process • Business Payments Network (BPN), a payments directory that contains payments preferences (i.e., details around which suppliers take what type of payments, various terms around timing, discounts, etc.)
MineralTree	• Focused on accounts payable automation • Emphasis on middle-market merchants • Recently hired (October 2019) Comdata (FleetCor) veteran Vijay Ramnathan
Veem	• Focused on accounts payable automation for cross-border payments ("consumerization" of cross-border experience) • Proprietary multi-rail technology, businesses can send or receive money in a click, track their payments end-to-end
Expensify	• Receipt management and expense tools for SMBs, along with Visa card offering attached • Competes with Divvy, Concur, etc.
Tipalti	• Provides accounts payable and receivable solutions and accounting software integrations • Works with both SMB and mid-market business

Source: Company Data, Deloitte, Credit Suisse research

Back-End Banking Innovation

CREDIT SUISSE

27. "Faster payments" & "RTP" become more real

Real-Time Payments ("Fast ACH") overview

- "Traditional ACH" systems were designed in the 1970s to replace checks, with no significant updates since
  - ACH systems are how banks send money to other banks domestically and make up the largest part of a country's payments system (ex-wires)
  - Process transactions 1-2 times a day in batches and can take up to 3 days for funds to be made available (closed on weekends)
- Fast ACH is the first overhaul of domestic payments (connecting banks); main advantages over legacy systems:
  - Speed & availability – Payments are authorized and (often) settled simultaneously, making funds available instantly, operating 24/7
  - Data – Utilizing ISO 20022 messaging standard (adopted in +70 countries)

Key drivers & enablers of "faster payments" and RTP globally
Central bank mandates to update national payments systems to reduce cash (increase taxes), financial inclusion, and innovation
Mastercard, the leading provider of Fast ACH globally with Vocalink and Nets (working with 11 of the top 50 GDP countries already)
Bank technology providers (FIS, FISV, JKHY, Finastra, ACI, etc.) will need to connect their bank customers to any new payments systems
Increasing consumer and business (B2B applications) demand for faster payments

Source: Mastercard, Credit Suisse research

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27. "Faster payments" & "RTP" become more real

Real-Time Payments ("Fast ACH") overview

- Adoption of RTP in consumer payments will vary by country (e.g., dominant in Denmark now), although we do not expect any meaningful market share gains at the expense of cards in core markets like the US over the medium term.
- We expect initial use cases will be targeted at traditional ACH/Check flows in B2B/P2P/G2C payments.
- We note that banks do not earn interchange on faster payments/ACH/RTP and, therefore, lack a direct monetary incentive to encourage adoption of RTP for retail payments (although incentives are driven by consumer experience and demands).
- Historically, payment infrastructure innovation has happened only on the card network side, but now, FinTechs can start building services off of these lower-cost rails.
- UK Faster Payments has been live since 2008 and has included P2P, P2B, B2B, B2P, G2B, and G2P transactions through mobile or online means.
- Vocalink (Mastercard) is the underlying system and operator.

UK Faster Payments has been live since 2008

UNITED KINGDOM

Name: UK Faster Payments

Year live: 2008

FPII score + = API: 4

Average daily volumes/value: Avg. volume = 5.914 M, Avg. value = 4.889 B GBP

Speed of posting to accounts: A maximum of 15 seconds

Maximum value: 250,000 £ depending on bank

Individual and/or batch payments: Individual and batch payments with Direct Corporate Access supported by some banks

Speed of settlement: Deferred Net Settlement 3x daily

Operating hours: 24/7

Open Access API interface: No

Payment applications and overlay services: P2P, P2B, B2B, B2P, G2B and G2P transactions through mobile or online.

Commentary growth, additions, changes, etc.: U.K. growth is steady at 20 percent and the New Access Model ensures service provider and new entrant participation without significant investment. New Payments Architecture under development will be ISO 20022-based.

Source: Mastercard, FIS, Credit Suisse research

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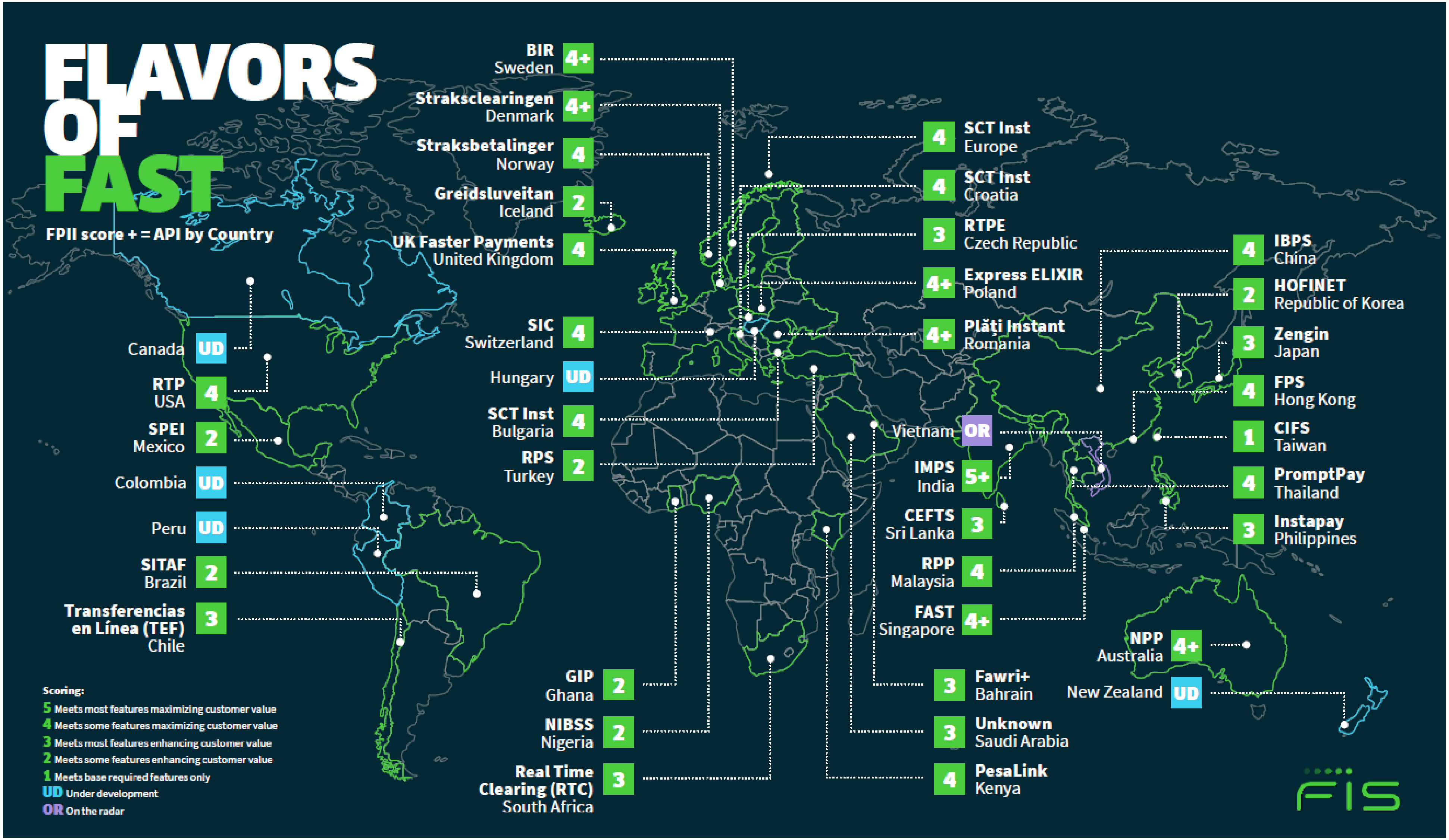
27. "Faster payments" & "RTP" become more real

54 schemes live vs. 14 in 2014 and 40 in 2018



Source: FIS (41 scored above)

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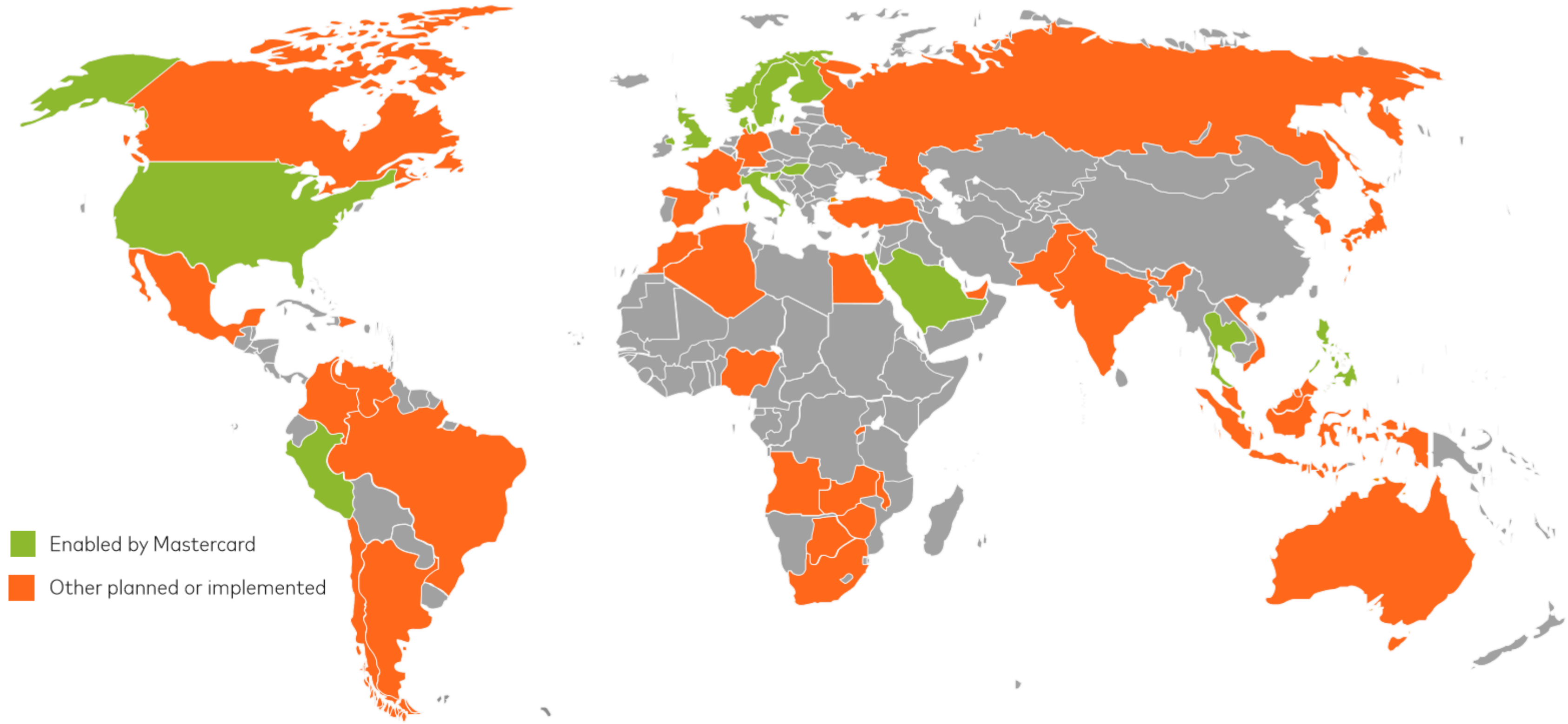
27. "Faster payments" & "RTP" become more real

Mastercard's role in RTP as an important global enabler

- Made possible in part by the acquisitions of both Vocalink (2016) and Nets interbank processing and billing assets (2019)
- Mastercard also has a leading (first-mover) position with Fintech companies that will use faster payment rails

Mastercard, the leading provider of Fast ACH globally with Vocalink and Nets (working with 11 of the top 50 GDP countries already); 54 countries in total now have real-time payments systems



Source: Mastercard, FIS, Credit Suisse research

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27. “Faster payments” & “RTP” become more real

Mastercard’s three-pronged approach (rails, apps, & services)

- Holistic approach on all three layers of RTP: (1) infrastructure (rails), (2) applications, and (3) services
  - Important because all three layers are necessary for the ecosystem to start utilizing RTP (i.e., infrastructure layer to enable FinTechs, while apps & services support incumbents)
  - For the first time, scaled industry incumbents are innovating on a new set of rails beyond just cards
- Global approach with regional hubs in each market will facilitate directly connecting domestic payment systems; numerous FinTechs were founded to solve inefficiencies caused by lack of global connectivity (Revolut, Transferwise, Airwallex)
  - Domestic payment systems not being connected globally is an advantage of card rails today (vs. traditional correspondent banking system)
  - Enriched transaction data from ISO 20022 messaging standard (in +70 countries), an important ingredient that will help empower FinTechs to create services that compete with the card rails (albeit today a non-perfect solution given numerous iterations of the standard, but potential to be fully interoperable in time)

Company	Vocalink	Nets	Mastercard
Infrastructure	• Larger markets • Sophisticated & customized	• Smaller markets • Fast deployment • Region-specific capabilities	• Extended global coverage • Industry-leading solutions
Applications	• US Bill Pay (C2B) • Transactis • Pay by Account (P2M)	• Europe Bill Pay • E-invoicing & new billing platform	• Proven applications (e.g., Pay by Account) • New flow penetration (e.g., bill-pay) • Extensive roadmap
Services	• Suite of services & analytics • Can be provided across technologies	• Additional market access	• Broad opportunity to sell suite of services & analytics

 Source: Mastercard, Credit Suisse research

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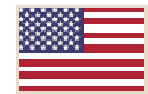
27. "Faster payments" & "RTP" become more real

A focus on progress being made in the US, RTP by TCH

- Where it stands today – roughly 50% of all US bank accounts are connected to TCH's RTP, expected to reach near ubiquity in 2020
- Utilizes a unique approach – "equity in a pooled account" at the Federal Reserve to allow for instant settlement
- Credit push only (no debit pull), with a request for payment feature (effectively a merchant or biller can ask for a push)
- Where will these faster payments rails be used?
  - Banks making B2B, P2P, B2C, and C2B transfers (24/7, 365)
  - B2B payments using this system can be thought of as "precision payments" given the known send/receive time (~15 seconds vs. up to three days for traditional ACH); RTP will include data important for B2B payments (e.g., invoice details via use of the ISO 200 22 messaging standard)
  - Instant deposit products for merchants and consumers (PayPal using RTP already as an alternative to card-based instant transfer)
- What rails will it replace?
  - Alternative to checks and the traditional "slow ACH" rails (which operate via batched or delayed payments) initially, expanding over time
  - These rails could also be used domestically as a substitute for Visa Direct and Mastercard Send when possible (likely due to reduced costs)
- Vocalink is the underlying system, but not the operator (licensing only)

RTP in the US has been live since 2017

UNITED STATES



Name: RTP

Year live: 2017

FPII score + = API: 4

Average daily volumes/value: Avg. volume = unknown
Avg. value = unknown

Speed of posting to accounts: Real time

Maximum value: $25,000

Individual and/or batch payments: Individual

Speed of settlement: Immediate/continuous

Operating hours: 24/7

Open Access API interface: No

Payment applications and overlay services:
B2B, B2C, C2B, P2P, A2A, G2C, etc. Consumers, businesses, and the government can use the RTP network

Commentary growth, additions, changes, etc.:
Clearing House ensures all U.S. institutions can access RTP network by 2020 but other schemes competing for real-time payments include Faster Payments Council, Zelle and the Federal Reserve's FedNow (live 2023).

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27. "Faster payments" & "RTP" become more real

A focus on progress being made in the US

System	Owners	Overview & Status
The Clearing House (TCH) Real-Time Payments (RTP)	25 large US commercial bank owners	• Launched in December 2017, now reaches +50% of US bank accounts • First new core US payments infrastructure to be built in over four decades, licensing Mastercard's technology (Vocalink) • Pricing structure consists of flat fees and no volume discounts, and only the originating bank pays for a transaction • Credit transfer sent costs $0.045 per transaction (e.g., P2P), request for payment sent $0.01 per transaction, and a $0.10 request for payment incentive fee paid by the bank that initiated the payment
Zelle (Early Warning Services)	7 large US commercial banks	• Initially launched by JPM, Wells Fargo, and Bank of America in 2011 as clearXchange, rebranded to Zelle in 2017 • US banks view Zelle as their antidote to compete with Venmo and Cash App • Participating banks represent 80% of bank accounts in the US • Zelle can reach any Visa or Mastercard debit card in the US, providing reach to consumers that don't have Zelle available through their bank, leveraging network push payment rails (Visa Direct, Mastercard Send) • Current use cases are for P2P and disbursements (government, corporate-like insurance payouts) • Potential to be used for consumer purchases, per comments from Fiserv • Real Time? For end users, transactions occur in real time via banks "fronting" the funds, but the actual funds settle overnight via ACH rails
FedNow (live in 2023-2024)	US Federal Reserve	• Similar to TCH's RTP network, but operated and owned by the Federal Reserve • Expected to launch in 2023-2024 and will increase competition in RTP, a net positive for the ecosystem • "*The U.S. real-time retail payment infrastructure stands to gain from competition, including through higher service quality and lower prices over the long run*," – Fed Governor Brainard

Source: TCH, Credit Suisse research

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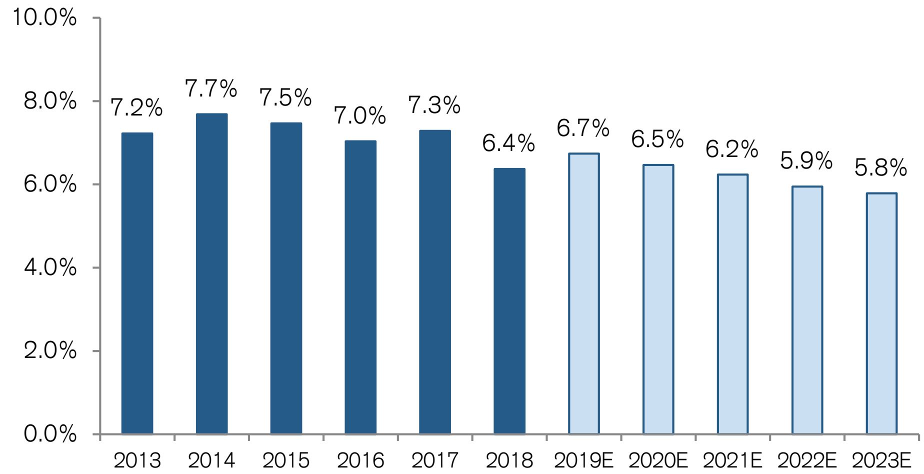
28. Issuer Processing key drivers and overview

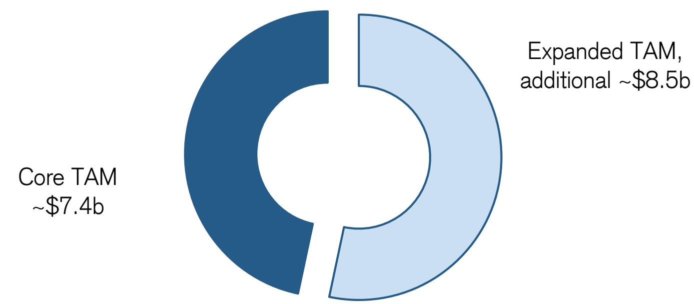
Card issuer processing seeing stable volumes and TAM additions

- Traditional issuer processors enable banks to approve card transactions and can provide end-to-end card services, with key functions including:
  - Outsourced authorization and settlement of card transactions
  - Card production, billing, and statement printing
  - Operating customer service call centers
- Key drivers of issuer processing revenues are (1) account growth and (2) transaction growth
  - Number of customer accounts: Receive monthly service fees based on the total number of active customer accounts
  - Card transaction growth is expected to remain in the mid-single digits through 2023E
  - Credit is generally more economically sensitive than debit
  - Note: This is how traditional issuer processing fees are earned – modern issuer processors (e.g., Marqeta) do not charge fees directly to their customers – rather, they share in the interchange earned (i.e., are not compensated by the issuer on a per account or transaction basis, rather via a revenue share)
- $15b+ traditional issuer processing TAM
  - Core TAM: ~$7.4b growing ~3% CAGR long-term, based on spend by card issuers on processing costs that are currently or can be outsourced
  - Expanded TAM: $8.5b additional value-added services that card issuers spend on digital experiences, self-service, digital marketing, and customer acquisition and commercial payments

US card transactions have grown in the ~6-7% range and are expected to sustain mid-single-digit growth (account growth & transaction growth are revenue drivers for issuer processors)



TSYS sizes the issuer processing market $15b+ when including expanded services that card issuers spend on digital, customer acquisition, etc.



Source: Company data, Euromonitor, TSYS, Credit Suisse research

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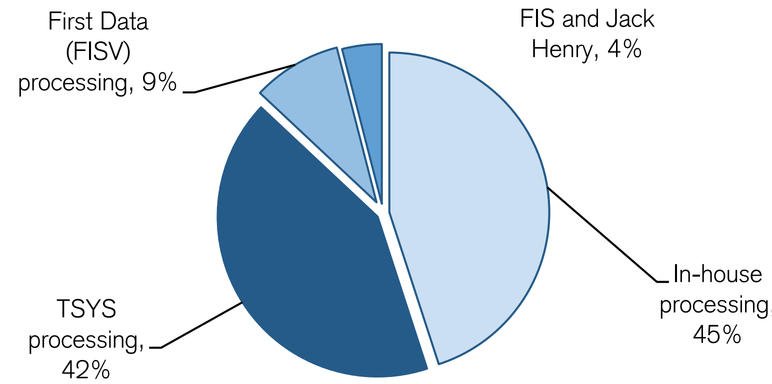
28. Issuer Processing key drivers and overview

Concentrated market in credit issuer processing, less so for debit

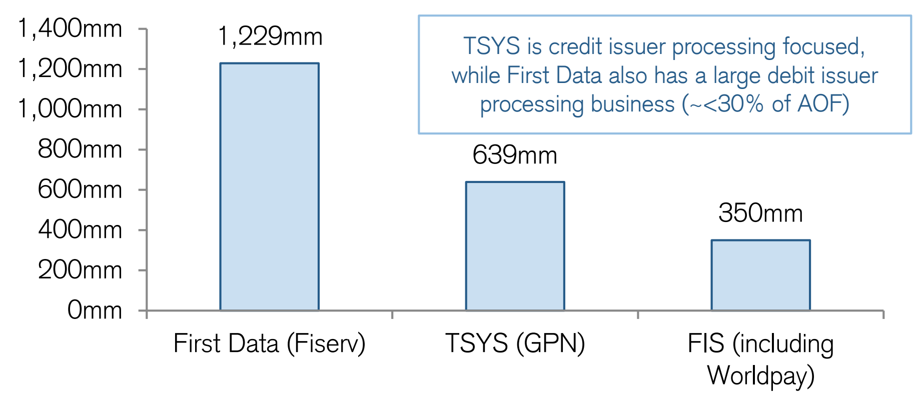
- Credit issuer processing is dominated by TSYS (Global Payments), which maintains ~40% share, processing ~40% of all US Visa and Mastercard accounts, including ~90% of their US commercial credit cards.
- For larger financial institutions, TSYS, First Data (Fiserv), and FIS (including the legacy Worldpay issuer processing) are the key players.
  - TSYS is focused almost exclusively on credit issuance and larger issuers (although we could see TAM expansion for TSYS further into debit and/or by engaging with smaller issuers on a select basis).
  - TSYS has dominant share in the US (8 of the top 10 issuers), Canada (7 of the top 10 issuers), UK (6 of the top 10), Ireland (4 of the top 5 issuers), and China (JV with China Union Pay), along with the second largest issuer processing business in Western Europe.
- For smaller community banks & credit unions, Fiserv (legacy Fiserv), Worldpay (legacy issuer processing), and Jack Henry are the more common providers.
- Additional players more in the "modern card issuance" category include Marqeta, i2c, Stripe Issuing, InComm, Galileo, CoreCard, and others.

Smaller bank/issuer skew | Larger bank/issuer skew

US credit card issuer processing market share data based on number of accounts (estimated), with TSYS the clear leader (largest competition being in-house processing)



By accounts on file (credit and debit) on a global basis, First Data is the largest base, while TSYS is the leader in US credit issuer processing (and in Canada, UK, Ireland, and China [JV with CUP] and is the number two business in Western Europe)



Source: TSYS, Company reports, Credit Suisse estimates

29. Bank Tech key drivers and outlook

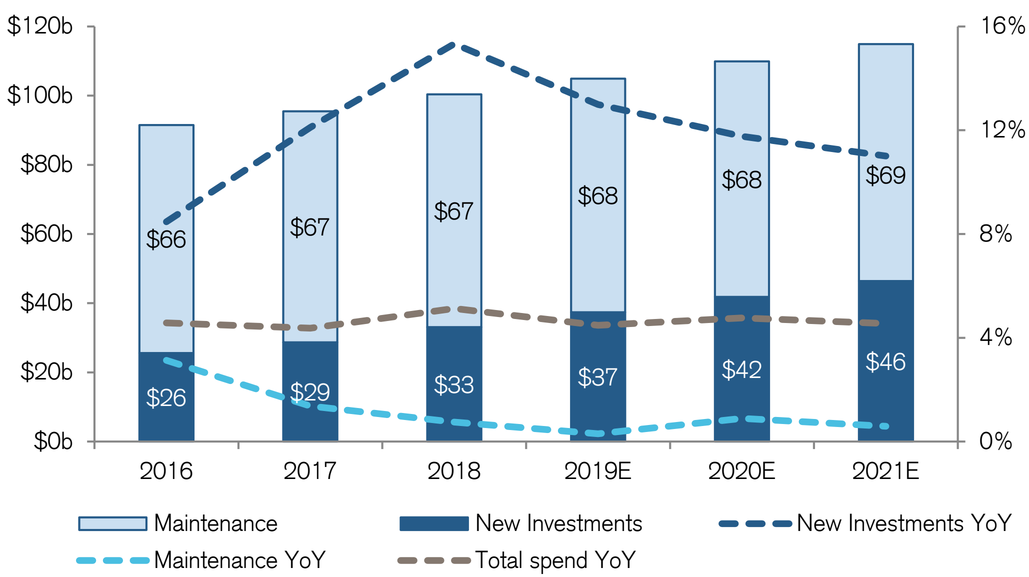
Healthy bank IT spend outlook driven by a need for banks to modernize

- Bank IT spend environment (+4.5% through 2021) is driven by an increasing need for banks to modernize their infrastructure by leaning on technology providers.
- Banking is increasingly becoming a technology business, with 73% of US consumer banking interactions now occurring digitally, lowering barriers to entry for FinTechs and large technology platforms (e.g., Apple, Amazon) on one side of the barbell and favoring large incumbents with the capital to invest on the other.

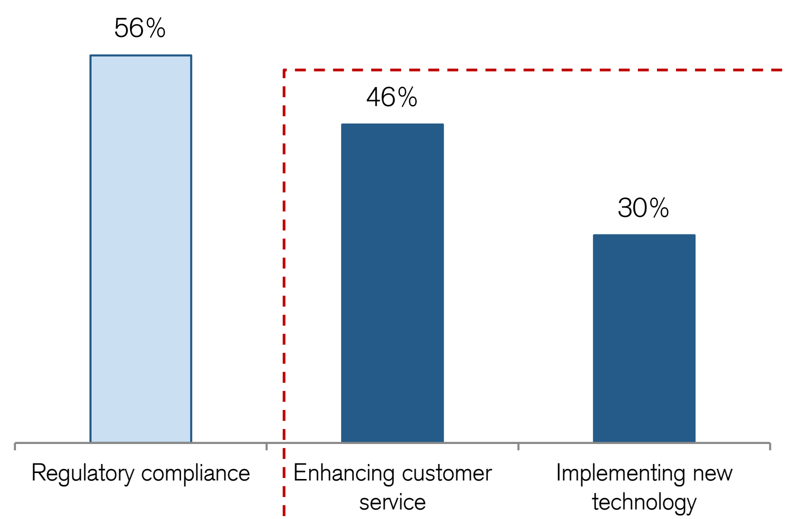
"It is a constant, never-ending set of investments that have to be made because as everyone in the audience knows our expectations change every day as we visit Amazon or Google or WeChat or whatever technology provider – Facebook – that you want to talk about, it changes the expectations that we have for our financial institutions. That puts pressure on the institutions to invest and that's good for us because it allows us to go into the market, aggregate services, deliver them both on a one-off and is scalable.."

– Jeff Yabuki, Fiserv CEO (March 12, 2019)

~2/3 of bank tech spending in North America is maintenance related, but 80% of the growth in IT spending is earmarked for new investments



The top three IT spending priorities of banks are regulatory, customer service, and implementation of new technology



Source: Celent, PWC, Company data, Credit Suisse estimates

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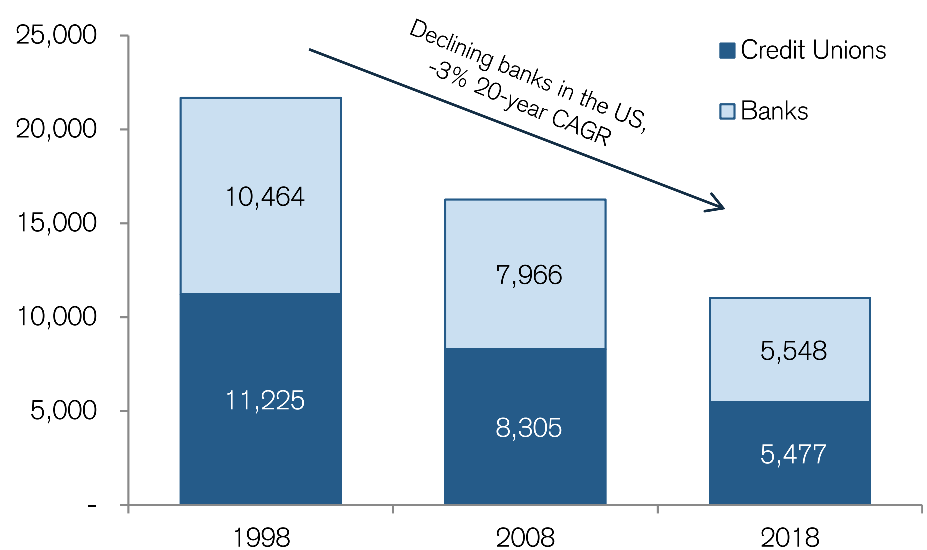
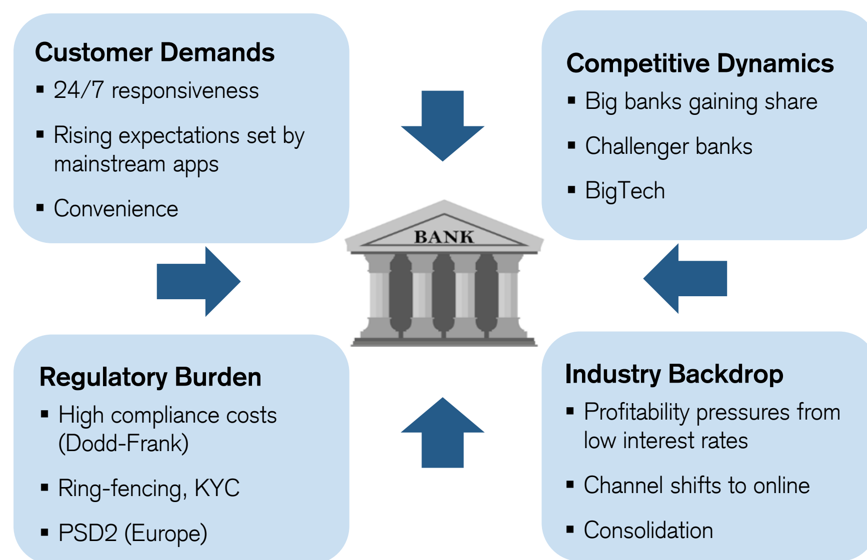
29. Bank Tech key drivers and outlook
Consolidation headwinds offset by shift toward digital

- Despite long-term consolidation trends, US retail banking remains highly fragmented with >10k institutions (~2x Europe)
- Consolidation among US banks set to continue, driven by:
  - Desire for M&A cost synergies to reduce spend given high costs of regulation and technology upgrades
  - Intensifying competitive pressures from both sides of the barbell (i.e., the larger money center banks and FinTechs/BigTech)
  - Exacerbated by profitability pressures from historically low interest rates (net interest margin pressure)
- Predominantly at the low end of the market (impacts Fiserv and Jack Henry most), leaves fewer bigger banks to serve

Consolidation trends in the US banking industry, with the number of banks decreasing ~3% per year (although both accounts & transactions continue to grow, more important near-term drivers of growth)



Banks seeing pressure from all sides (customer demands, regulatory, competition, industry consolidation, and profitability pressures)



Source: CUNA, Credit Suisse research

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29. Bank Tech key drivers and outlook

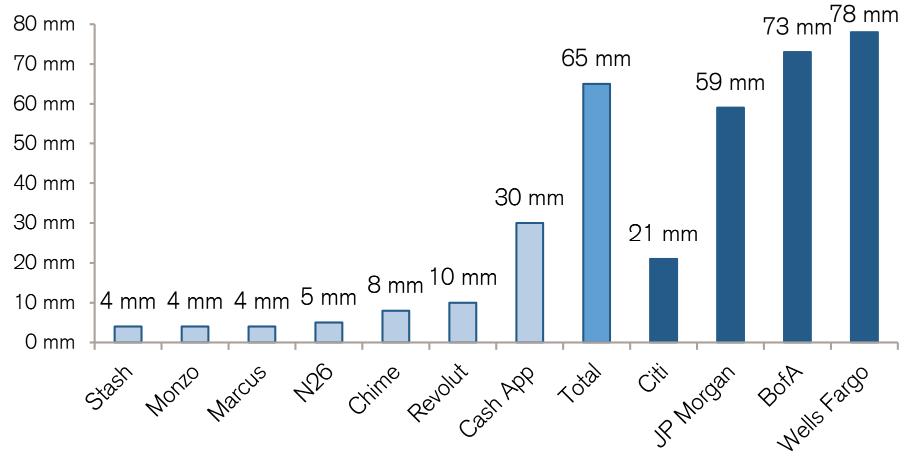
FinTechs are on one end of the "barbell", big banks are on the other

- Scale of the top four big banks in the US (which maintain ~63% of assets) allows for annual technology budgets of ~$40b, equivalent to the entirety of global FinTech funding in 2018 (per CB Insights).
- We estimate Fiserv and FIS spent a combined ~$10b in 2018 technology spend supporting their banking clients.
- As FinTechs (and BigTech) continue to gain new accounts, there is a longer-term potential for these platforms to pressure accounts and transaction growth at small- to mid-sized US banks (although we currently believe the majority serve as secondary accounts, and are thus, at least currently, incremental from an account basis and a rounding error in terms of transactions).

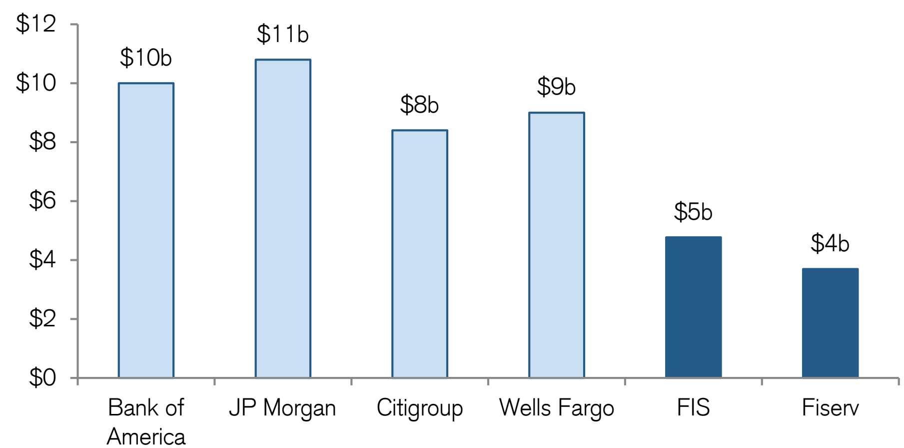
Both ends of the "barbell" are gaining share, in part due to better technology/user experience, along with tech & marketing spend

Neo/Challenger banks (FinTech) and large technology platforms (BigTech)	Regional banks, community banks, & credit unions (core FISV, FIS, JKHY customers)	Large US banks
Chime, Revolut, Monzo, N26, Uber Money, Google, Square Cash App, Varo Money, Apple, Marcus by Goldman Sachs, etc.	~10-11k US financial institutions	JP Morgan Chase, Bank of America, Wells Fargo, Citi, US Bank, PNC, TD Bank, Truist, Capital One

FinTechs in the US now have ~62mm users in aggregate; longer-term potential to pressure account growth and transactions



2018 estimated technology spend budgets show the big banks in a league of their own (annual technology spend of ~$40b) vs. FISV & FIS's combined ~$10b in spend

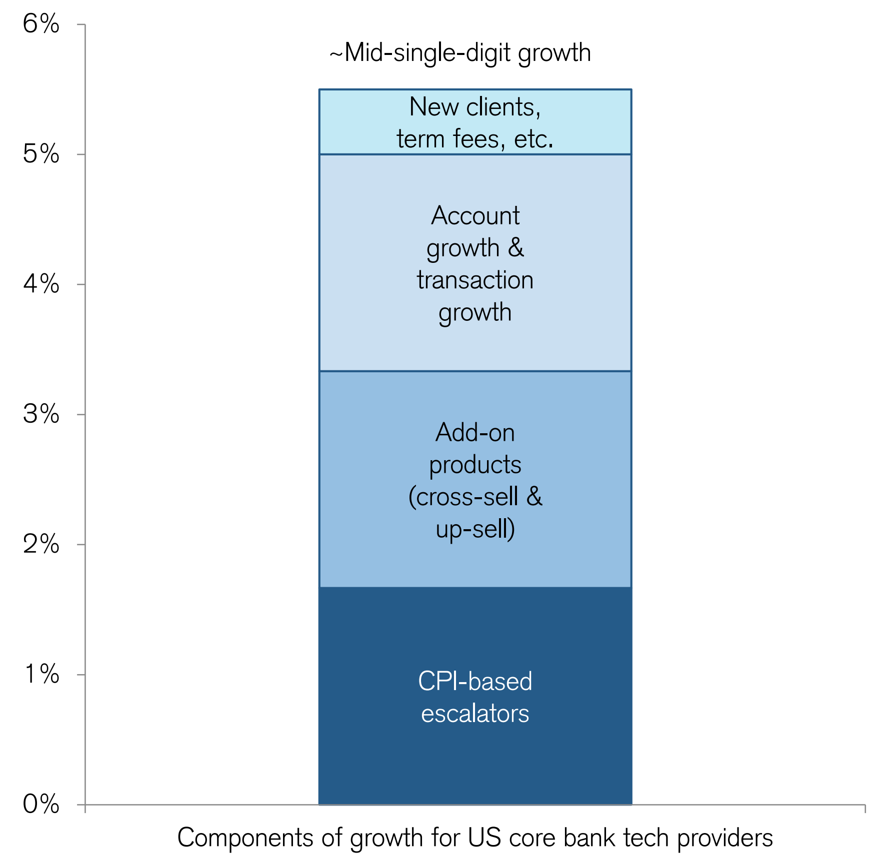


Source: Company data, Credit Suisse estimates; Note: FISV and FIS bank tech spend estimates are based on a combination of related 2018 operating expenses (ex-SG&A), capex, and acquisitions (fluctuates by year) and are meant solely to be directional indicators vs. precise figures

29. Bank Tech key drivers and outlook
Key drivers of growth for US banking technology providers

- US banking technology businesses (e.g., Fiserv, FIS, Jack Henry) are mid-single-digit growers, with the majority of growth coming from existing customers.
- Four components of growth:
  1. CPI-based escalators included in contracts
  2. Add-on product sales (e.g., bill-pay, Zelle, RTP, online banking, and other services sold by core providers and integrated into the core system), including upgrades to more dated versions
  3. Account & transaction growth (checking accounts, debit cards, transactions processed)
  4. New client additions (smallest driver), term fees, and other
- While there are potential headwinds to monitor in the longer term (traditional banks' potential to lose account & transaction share among digitally native generations, increased desire for and investment in third-party bank technology competitors, any acceleration in US banking consolidation trends), existing providers have meaningful moats with their bank customers (sticky relationships – with just ~1-2% of banks changing core providers per year, the ability to price ancillary bank IT services attractively given low incremental costs, a track record, and an increased capacity to maintain technology leadership organically and via bolt-on M&A, further supported by elevated FCF due to recent mergers and associated cost synergies).

Four key components to growth in US banking technology businesses (e.g., Fiserv, FIS, Jack Henry, etc.)



Source: Company reports, Credit Suisse research; Note: Growth contribution portions illustrative

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29. Bank Tech key drivers and outlook

Core conversions viewed as challenging and expensive IT projects

"…"And then finally, modern core banking system. Many of you know, this is something that we started working on about a year ago that's progressing very nicely. It's a multiyear project. But we've moved steadily through the due diligence phase. We know who we want to partner with, although we haven't announced that publicly yet. We expect that next year will be much about planning and testing for the conversion, which will then probably take place in 2021. So right now, that is on time, on budget. We're quite excited about how that's going. I can tell you this about the system that we'll be moving towards, it is a much more modular and much more open system than the one that we have now. It's tested, it's true, it's already in implementation. But we're delighted by the fact that it's got a lot more open APIs, it facilitates many more integrations, not only with their own modules, but with other partners, which will allow us to partner with FinTechs where we want to, with other providers, allows us to choose best-in-breed services and facilitate a true omnichannel experience. Because all of the transaction data comes into one place and can then be used to populate things like CRM systems or other means of tracking transactions and taking care of our clients."

– Jason Bender, COO, First Republic Bank (November 2019, at First Republic Bank's Investor Day)

Factors for Core System Replacement	Factors Against Core System Replacement
Legacy cores are expensive to maintain	Viewed as the hardest project a bank can undertake; it can be risky and take ~6 months to 2 years to complete
Faster time to market for new products	Expensive, with potential de-conversion and integration fees that often equal ~>90% of the remaining contract value
Need for more open platforms that remove friction from partnering with FinTechs	Long contracts (3-7 years), comfort with existing provider, and desire for a single vendor limit other options
Need for a centralized view of customer data across product silos, full access to customer data, and real-time transaction posting	Limited IT budgets and digital investment priorities
Legacy programming languages (Cobol) are not relevant for top tech talent and are inefficient	Different talent requirements: modern core platforms written in modern language

Source: Company reports, Aite Group, Credit Suisse research

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29. Bank Tech key drivers and outlook

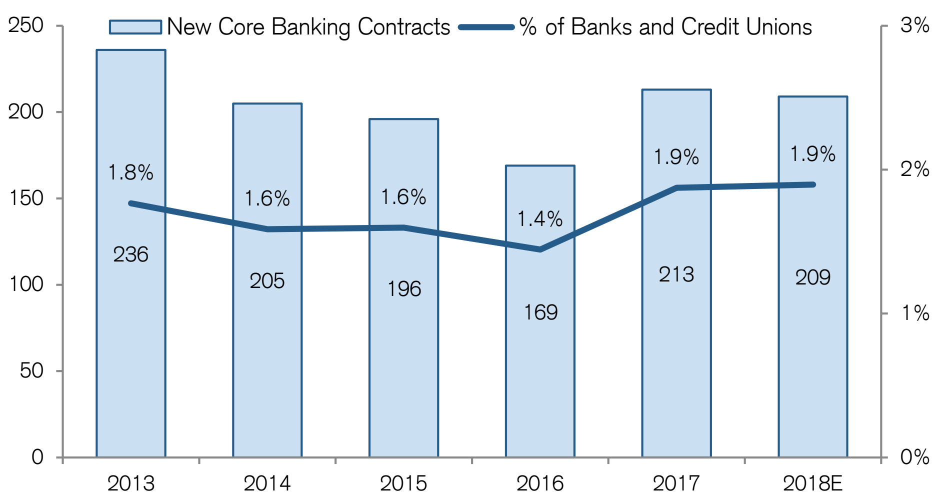
We estimate that only ~1-2% of banks switch core providers per year

- We estimate that only ~1-2% of banks switch core providers per year, with core conversions viewed as the most challenging and expensive IT project a bank can undertake.
- This dynamic alone makes it difficult for new entrants to gain meaningful market share.
- The ABA Core Platforms Committee (and ABA investment behind Finxact) suggests some degree of desire from a subset of banks and credit unions to at least consider alternatives.

"…I've heard time and again the desire to have a nimble and agile core so they can provide a customer experience served with efficiency and effectiveness.. I've discussed it with hundreds of bank CEOs.. A great portion of them are very excited about a future core dialogue that moves in this direction.."

– American Bankers Association CEO, Rob Nichols, in an interview discussing their Finxact investment

Only ~1-2% of US banks switch their core providers each year (vs. ~20% that come up for contract renewal given ~5-year average contracts)



US bank tech market share shows Fiserv as the leader by the number of banks, with FIS more skewed to larger-sized banks

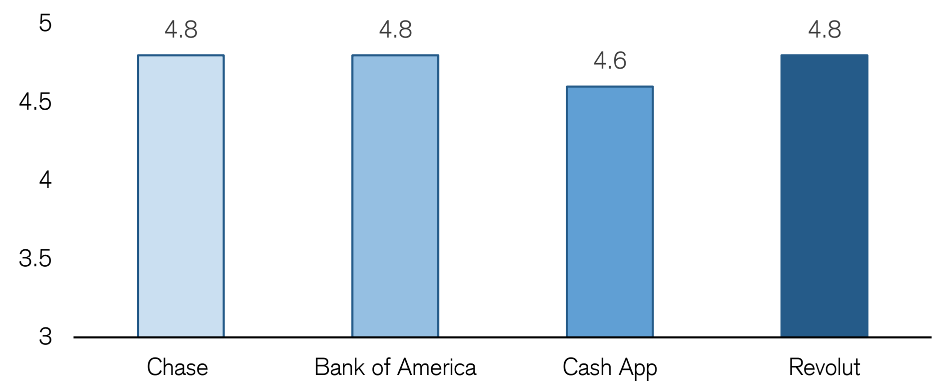
Banks by asset size	FIS	Fiserv	Jack Henry
Market share (# of banks)	*12%*	*38%*	*16%*
Large banks (>$30b)	41	7	1
Mid-size banks ($10-$30b)	37	19	6
Small banks ($5-10b)	37	24	14
Community banks (<$5b)	909	2,164	1,020
Credit Unions	239	1,886	695
Total	1,263	4,100	1,736

Source: Company reports, Aite Group, Credit Suisse estimates

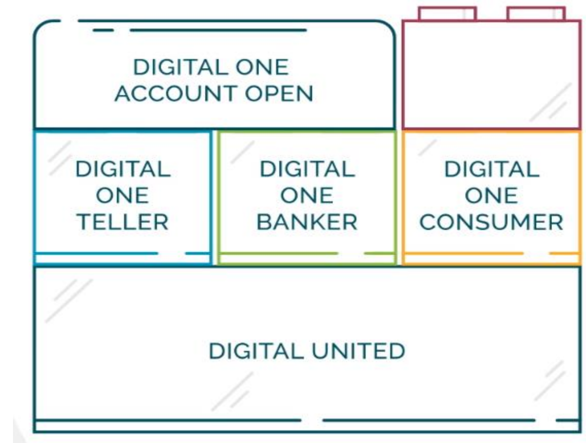
29. Bank Tech key drivers and outlook
Bank technology providers' mobile banking solutions

- Fiserv has experienced mobile-related growth of ~20% over the past ~4-5 years and plans to allocate a portion of its $500mm innovation investment (as part of the First Data merger) on digital enablement
  - Mobiliti, Architect, Corillian, and other services to a range of community banks and credit unions
  - Recently signed New York Community Bank (> $50b assets), which opted to use Fiserv's DNA along with ~40 additional solutions, including Mobiliti and OpenNow/FundNow (online account acquisition)
- FIS launched its 3rd generation digital banking in 2018
  - Digital One is an integrated digital banking platform that allows community banks to offer a consistent omnichannel experience
  - Includes Digital One Account Open, which allows for an online account opening experience that takes less than five minutes, specifically targeting customers that prefer not to visit a branch
- Jack Henry's mobile offerings are part of the Banno Digital Banking Suite, including digital account opening capabilities (JHA OpenAnywhere)

Mobile banking app ratings offered by larger banks within the Apple App Store are generally receiving high scores, creating a challenge for community banks and credit unions



FIS Digital One platform of integrated solutions delivers an omnichannel banking experience for both the customers and employees of the bank



Source: Credit Suisse estimates; Number of ratings per app: Chase (1.72mm), Bank of America (1.27mm), Cash App (218k), Revolut (7,870)

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29. Bank Tech key drivers and outlook
SaaS (hosted) vs. Licensed (on-premise)

- Generally speaking, break-even between SaaS and licensed can be reached at ~3-4 years (i.e., if a bank keeps its system longer than 3-4 years prior to upgrading to the next license, the math works on a direct basis).
- Legacy FISV's 85% recurring revenue (Q3 2018 earnings)
- Legacy FIS's revenue ~80% recurring (2018 Investor Day)

"…But generally, if you move from an in-house or on-premise to an outsourced, there is a multiple of long-term revenue. I'd call it probably 3x overall of what the revenue profile could look like versus just an ongoing maintenance stream. But it all depends on where they're at, how much is developed in-house, is it your technology versus -- just in-source versus outsource, or are they really going a different direction and taking an old in-house developed capability and moving to an outsource, which is all incremental there…"

– James Woodall, CFO, FIS (November 2019)

Aspect	SaaS	Licensed
Upfront fees	• Little to none	• Upfront perpetual license (with revenue recognition also upfront, which can create a degree of lumpiness)
Recurring fees	• Monthly or quarterly fees (and revenue recognized similarly) • No maintenance fees (monthly fees are all inclusive)	• Annual maintenance fees (~20% of total cost)
Data storage and processing	• Runs on a private cloud (not AWS, Azure) managed by the core provider (e.g., Fiserv, FIS)	• Typically runs on-premise, but banks can pay their core provider for a private cloud
Customization	• More likely to be out-of-the-box and less customizable, and tends to attract smaller banks • Fiserv and Jack Henry have a greater degree of this vs. FIS, due to smaller bank and credit union skew (i.e., Fiserv has more SaaS mix than FIS)	• Customizable and tends to attract larger banks that make these modifications • FIS has a greater degree of this vs. Fiserv and Jack Henry, due to larger bank skew

Source: Company data, Credit Suisse research

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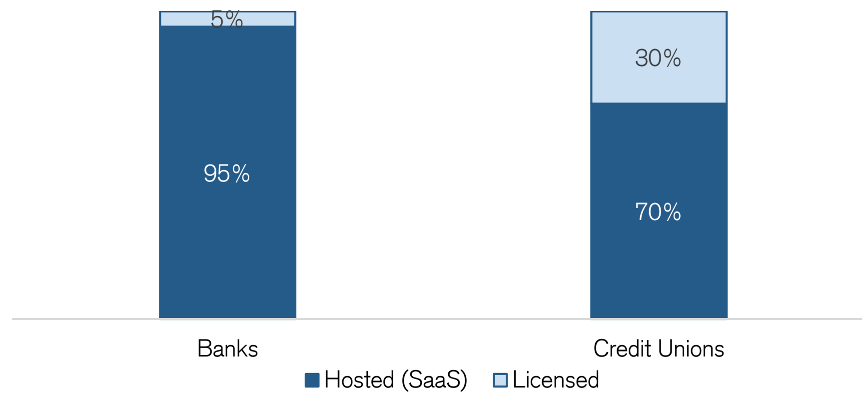
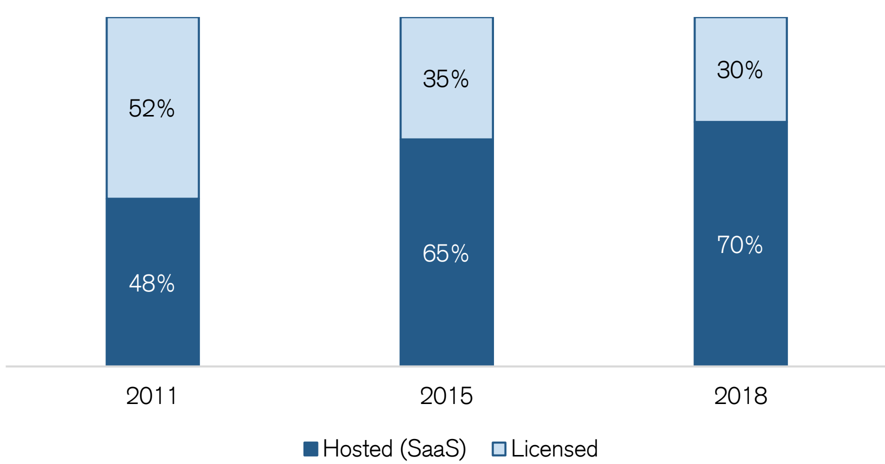
29. Bank Tech key drivers and outlook
SaaS (hosted) vs. Licensed (on-premise)

- Market shifts toward SaaS core deployments have been ongoing for the past decade with room
- Hosted deployments generally lead to faster time to market, reduced capital expenditures, and more frequent software updates
- We expect this trend to benefit the Bank Technology providers by increasing their ability to cross-sell new products and reducing revenue volatility from reduced license sales

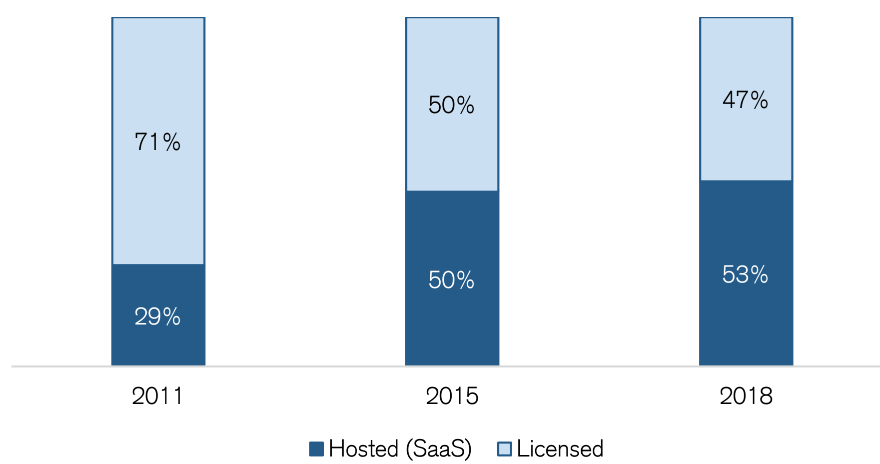
In 2018, ~95% of new core system contracts signed by banks were hosted vs. ~70% for Credit Unions



US Bank Core Systems deployment types over time



US Credit Union Core Systems deployment types over time



Source: Aite Group, Credit Suisse

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29. Bank Tech key drivers and outlook

Emerging vendors – Can they break through in the US?

- After a period of consolidation over the past 20 years, with the big three vendors now serving 66% of market (counted by number of banks), we are starting to see new vendors re-emerge.
- While the next-gen core banking platform providers are worth monitoring for investors, we believe that a meaningful portion of bank CEO/CTOs are reluctant to embrace due to (1) lack of client references (chicken and egg), (2) long-term strategic decisions that favor providers with balance sheets indicative of continued investment and longevity, and (3) preference for minimizing the number of vendors.
- We believe that next-gen core providers (e.g., Finxact, MAMBU, Nymbus, etc.) have the potential to be successful in their own right, accumulating more bank customers over time; however, even with a great deal of success, it is unlikely that any meaningful financial impact would be felt by FIS, Fiserv, and/or Jack Henry over the foreseeable future.
- We would also expect the legacy providers to consider acquiring next-gen providers (i.e., deliver their technology via vast distribution networks, reduce risk of market share loss), consistent with their historical approach.
- On the core banking side, we expect them to be competitive for digital-only De Novo banks (including Neo/Challenger banks) and with select mid-sized banks.

Finxact, as an example of a Core-as-a-Service model, was formed by a former FIS executive and recently received investment ($30mm) from the ABA, Accenture, First Data, and SunTrust

Ecosystem Partners are at various stages of integration.

Source: Finxact, Credit Suisse research

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29. Bank Tech key drivers and outlook

Not a near- to medium-term risk, but developments to monitor

2016
Incoming CEO of the American Bankers Association (ABA) spends first year on the job speaking with members:

"…met with roughly 3,900 bank CEOs…one narrative came up again, and again, and again…we're struggling with our core relationship – the core is not as nimble, it's not as agile, we're not able to offer the innovative customer experience that we'd like to with the same efficiency or the speed…"

May 2017
Finxact raises initial seed round of $12mm via Live Oak Ventures, First Data, Woodforest National Bank, and TNI

November 2017
Iowa Falls State Bank v. Jack Henry & Associates, Inc. related to access to the bank's data in context of a new vendor discussion

October 2018
ABA sends letter to "three major core providers" with an aim toward coming to a solution to what is a "significant problem"

Formation of the ABA Core Platforms Committee (of ~20 reps. from banks ranging in size from $150mm to $25b in assets) invested in improving relationships with core providers

January 2019
Finxact raises $30mm from strategic investors (American Bankers Association, Accenture, and SunTrust)

May 2019
ABA Core Platforms Committee meets with Fiserv, FIS, Jack Henry, and Finastra (to discuss three items): (1) contracts; (2) access to innovation (i.e., FinTech advances & API access to core); and (3) access to data (getting to a bank's owned data to better personalize)

July 2019
Monzo, a UK challenger bank (~2-3mm accounts) launches in the US

July 2019
N26, a leading European challenger bank (~3.5mm accounts) launches in the US with a 100k user waitlist

September 2019
Chime surpasses 5mm FDIC-insured accounts in < 5 years

September 2019
Revolut announces expanding global partnership with Visa, including the US, with plans to expand headcount from 1.5k to 5k during 2020

October 2019
ABA Core Platforms Committee publishes "Principles for Strong Bank-Core Provider Relationships"

October 2019
Chime looking to raise new funding at a $5b valuation (to be led by existing investor DST)

October 2019
Revolut looking to raise $500mm in equity and $1b in debt for global expansion in partnership with Visa

As of today
Traditional core providers are 0 for 10 with the top/fastest growing Neo/Challenger banks, i.e., so far not showing signs of involvement with the potential next generation of banks (although we note FIS won Atom bank in the UK, a meaningful challenger)

2016 | 2017 | 2018 | 2019 | 2020

Source: American Bankers Association (ABA), WSJ, the BLOOMBERG PROFESSIONAL™ service, Credit Suisse research

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29. Bank Tech key drivers and outlook
A selection of emerging bank IT vendors

Company	Year Founded	Description	Expertise	Customers	Investors
Alkami	2009	Provider of online and mobile banking for retail and business customers	Ancillary services	Nicolet National Bank ($3b), Oregon Community CU ($1.7b)	General Atlantic, S3 Investors, Argonaut
Apiture	2017	Vision to "redefine the digital experience across the financial industry..." 500+ customers, API-first mindset (i.e., build everything as an API vs. wrapping old technology in an API layer)	Ancillary services	SunTrust, Live Oak Bank	Canapi Ventures, First Data
nCino	2012	Modern cloud-based core banking system provider built on Salesforce with a particular strength in lending solutions	Ancillary services	TD Bank, KeyBank, Navy Federal Credit Union	T. Rowe Price, Salesforce Ventures, Bessemer Venture Partners, etc.
Synapse	2014	Modern provider of ancillary banking services including card issuance, brokerage accounts, and loan origination and servicing products	Ancillary services	Not disclosed	Andreessen Horowitz, Core Innovation Capital
Backbase	2003	Core overlay service, also offering omnichannel banking and digital solutions	Core overlay	ABN AMRO, Barclays, ING, KeyBank, Lloyds Banking Group	Not disclosed
Treasury Prime	2017	Core overlay service, also offering instant digital onboarding for account opening	Core overlay	Not disclosed	Not disclosed
Corelation	2009	Core provider focused on serving credit unions	Core platform	60+ Credit Unions	N/A
Finxact	2016	Core-as-a-Service banking system provider built on AWS with a curated ecosystem of third-party partners	Core platform	Live Oak Bank	First Data (now Fiserv), SunTrust Banks, American Bankers Association, etc.
Mambu	2011	Modern cloud-based core banking system focused on Europe with headquarters in Berlin, Germany	Core platform	ABN AMRO, Santander, N26, OakNorth, TBC Bank, new10	Bessemer Venture Partners, Acton Capital, CommerzVentures
Neocova	2019	Modern cloud-based core banking system provider focused on community banks and credit unions	Core platform	Not disclosed	Not disclosed
Q2	2004	Provider of digital and mobile banking, lending and leasing services, and cloud-based core banking systems	Core platform and ancillary services	Core customers: Sallie Mae, Qapital, H&R Block	Public company (QTWO)
Temenos (limited US presence)	1993	Switzerland-based provider with expertise in core banking, digital, payments, wealth management, and fund administration; international platform, with limited core banking traction in the US currently	Core platform and ancillary services	HSBC, PayPal Credit, EQ Bank, UBS	Public company (TEMN)
Nymbus	2015	Modern cloud-based core banking system with a particular strength in payments; acquired R.C. Olmstead in 2016 and gained 46 core Credit Union clients; also features NYMBUS SmartPayments real-time payments suite	Payments: NYMBUS SmartPayments real-time payments suite	~46 Credit Unions	Insight Partners, Home Credit Group, Venture Enterprises
Additional providers:		Thought Machine (core), Allied Payment (community banking payments), Fisoc (loyalty programs sold to banks and credit unions), Treasury Prime (core overlay), Mistral Mobile (mobile banking), Hydrogen Platform (platform helping financial institutions speed development and innovation)			

Source: Company data, Crunchbase, Credit Suisse research

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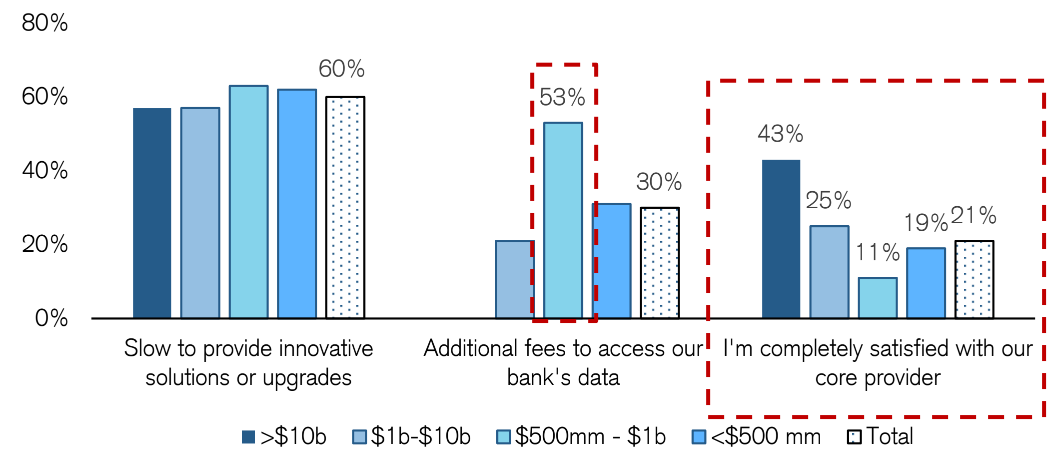
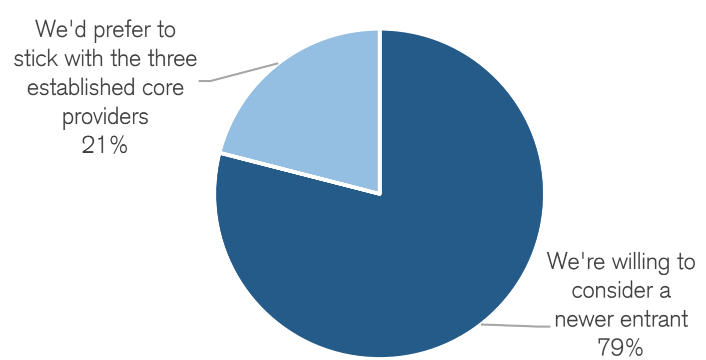
29. Bank Tech key drivers and outlook
2019 Bank Director technology survey

- Broadly, survey data suggest smaller banks appear to be less satisfied with their core providers, with banks from $500mm to $1b in assets and banks with <$500mm in assets satisfied with their provider at a rate of 11% and 19%, respectively, whereas 43% of banks with >$10b in assets are satisfied with their core.
- At the very least, survey data suggest banks appear willing to listen to pitches from new providers (~80% agreed they would consider it).
- Survey data suggest a rising consensus around a lack of innovation at the core providers, with infrequent update cycles for software/data solutions (small and large banks agreeing on this point, ~60% of respondents).

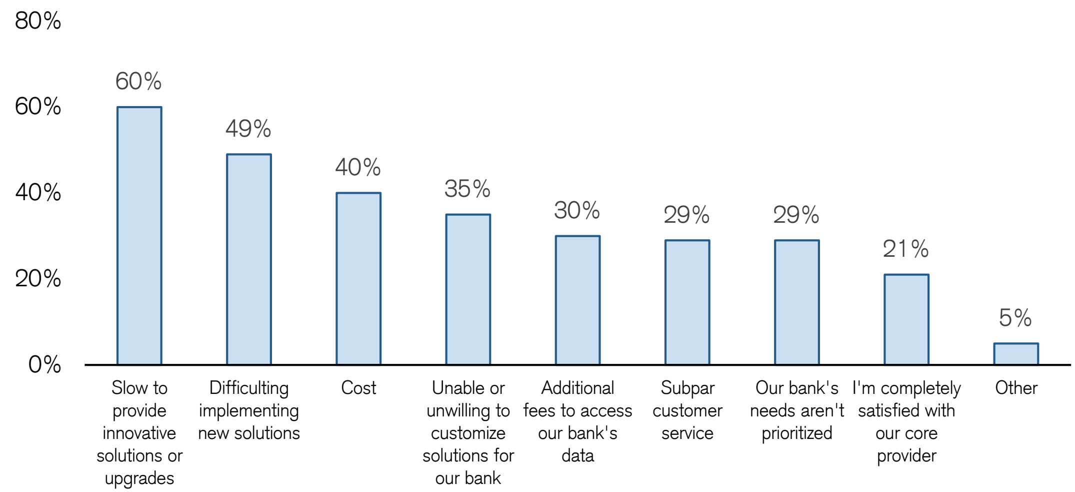
Survey data suggest satisfaction with core provider was limited to 21%, while most participants agree providers are slow to innovate or upgrade technologies



~80% of participants would be willing to consider a new entrant for core banking needs



Survey participants were asked about pain points with core providers, and most respondents feel core providers are not on the cutting edge of innovation



 Source: Bank Director 2019 Technology Survey – Sponsored by CDW (n = 150 bank executives, conducted June-July 2019), Credit Suisse research

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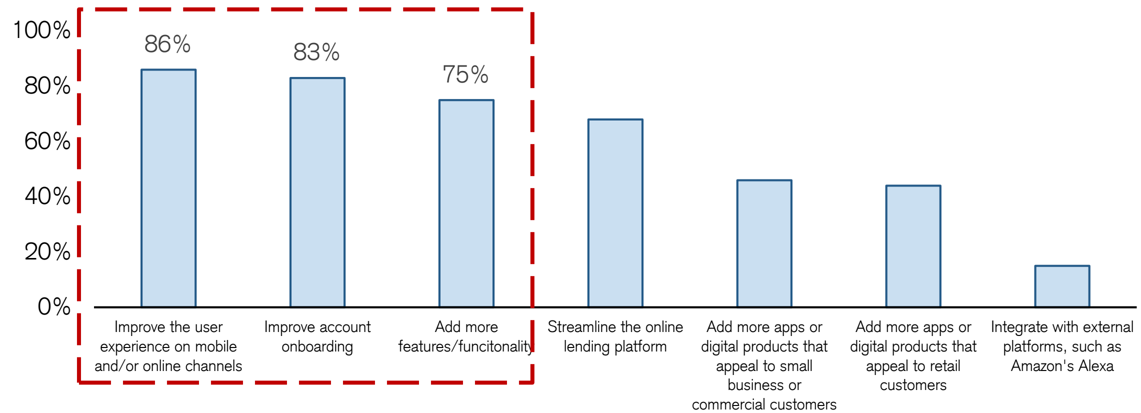
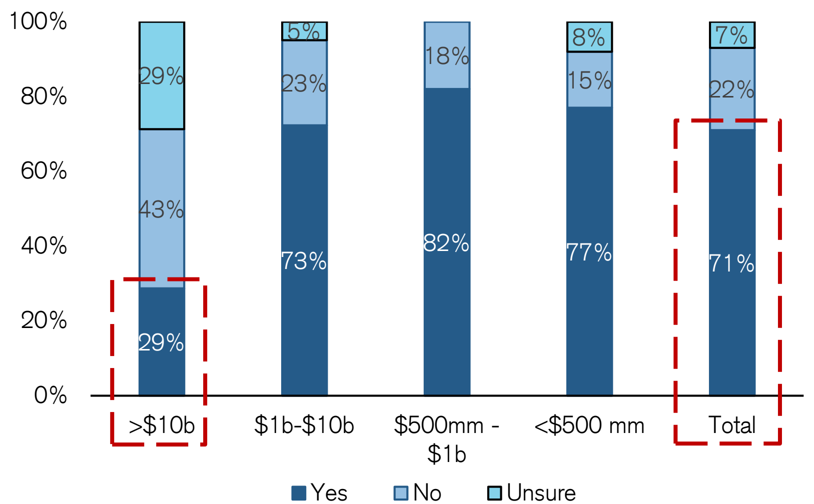
29. Bank Tech key drivers and outlook
2019 Bank Director technology survey

- Most survey participants noted they are looking to upgrade basic account functions, such as user experience, mobile & online banking applications, and account onboarding, along with adding more features and functionality.
- While larger banks (>$10b) may have the capital and support to implement these projects via outside providers and internal IT staff, most banks <$10b likely do not have the capital or are not willing to spend (i.e., costs to tie outside providers into existing legacy cores).

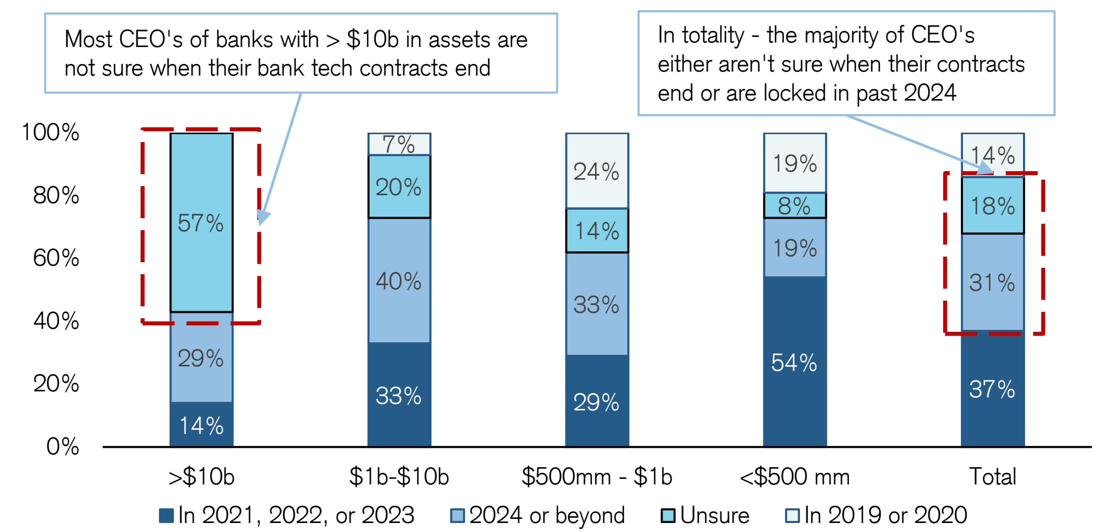
The majority of survey respondents are looking for improvements in user experience (mobile, online, account onboarding), along with adding features & functionality…



…and when asked if they would use a core provider to enhance digital, most larger banks would opt for outside parties, while smaller banks are more or less tied into updates with the core



Many participants did not even know when their bank tech contracts end (likely due to complexity, multitude of contracts) or are locked in for 5+ years



Source: Bank Director 2019 Technology Survey – Sponsored by CDW (n = 150 bank executives, conducted June-July 2019), Credit Suisse research. Rounding differences amount to <1%

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30. Modern Card Issuance platforms and BaaS

Enabling any platform, brand, or FinTech to issue cards

- Card issuance is no longer just for traditional banks (e.g., Chase, Bank of America, Capital One) and large merchant co-brands (e.g., Delta Airlines, Marriott , Costco).
- Platforms and service providers ("modern card issuance" technology companies such as Marqeta, Stripe Issuing, i2c, Green Dot, Galileo Financial Technologies, etc.) are now enabling any company or brand to issue cards across a wide range of use cases, including:
  - Employers (to employees for smart expense control)
  - On-demand platforms (for couriers)
  - Challenger banks ("Neo banks")
  - Core payments & P2P platforms (e.g., Square, PayPal, Venmo)
  - Additional FinTech issuers (e.g., Transferwise, Betterment, etc.)
  - Brands (for customers, i.e., loyalty, engagement)
- To date, modern issuer processing have been more focused on new channels of card issuance (FinTechs, brands, etc.) vs. traditional banks, although we believe that both could begin to win portions of larger traditional issuer portfolios.

Technology platforms and FinTechs are partnering with licensed card-issuing banks (typically smaller, Durbin-exempt) to issue cards (typically pre-paid debit cards) for employees, contracts, and customers

COMPANY	Betterment	wealthfront	STASH	acorns	N26	TransferWise	NOVO
PARTNER BANK	GBC	green dot	green dot	Lincoln Savings Bank	axos Bank	CFSB	Middlesex Federal

COMPANY	Square	Cash App	Uber	PayPal venmo	chime	Current	zero
PARTNER BANK	Sutton Bank	Lincoln Savings Bank	green dot	The Bancorp	The Bancorp	Metropolitan Commercial Bank	Evolve bank & trust

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30. Modern Card Issuance platforms and BaaS

The four roles (and key players) in modern card issuance

- Green Dot is the only player that has offerings across all four capabilities and expands beyond cards (BaaS).
- Often times, the issuer processor and program manager are the same.
- Additional players are the networks (Visa, Mastercard) and, at times, a distribution partner (e.g., Blackhawk).

Non-bank issuer	Issuing Bank	Issuer Processor	Program Manager
• Owns the cardholder relationship (e.g., employee, contractor, consumer) • Marketing and/or distribution of the cards (sometimes through a distribution partner)	• Holds an actual bank license • Final approval on account creation (i.e., risk tolerance on NSF, fraud) • Typically a more minimal role, but cobrand issuers (e.g., SYF, ADS) can be more active in marketing	• Routing of card transactions for approval (including advanced rules for case-specific approvals) • Account number & card generation • Offer APIs to developers	• Oversees P&L of program, along with fraud and compliance • Maintains relationship with issuing bank and card networks (V/MA) • Earns the largest portion of interchange on smaller programs
Examples: • DoorDash • PayPal & Venmo • Uber • Square • Green Dot • Walmart • Hyundai • Apple	Examples: • Green Dot Bank • Axos Bank • Sutton Bank • Cross River Bank • Lincoln Savings Bank • MetaBank • Evolve Bank & Trust • The Bancorp Bank	Examples: • Marqeta • Stripe Issuing • i2c • Green Dot • Galileo • InComm • CoreCard • Large-caps FISV, FIS, GPN/TSS	Examples: • Marqeta • Stripe Issuing • Green Dot • Galileo • Fiserv, FIS, & TSYS • NetSpend (GPN/TSYS-owned) • I2c • BREX

Source: Company reports, Credit Suisse research

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30. Modern Card Issuance platforms and BaaS
"Smart" controls on card transaction approvals

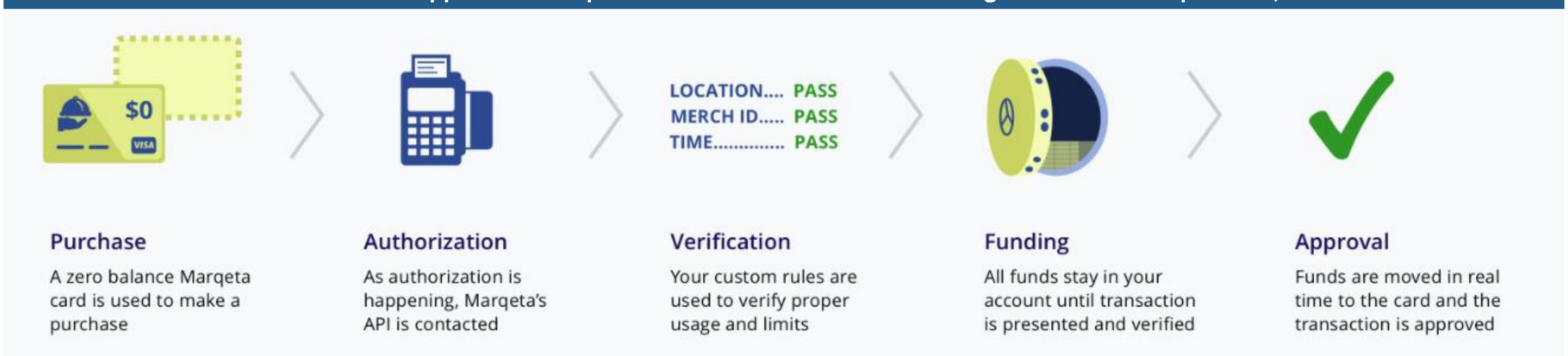
- An increasing use case provided by modern card platforms is the placement of smart controls on transaction approvals. Generally speaking, controls on cards can be placed at three difference levels:

  1. **At the network level** – Visa and/or Mastercard are able to stop a transaction before it reaches the issuer for an approval decision (e.g., "no international transactions").

  2. **At the issuer (issuer processor) level** – Certain Merchant Category Codes (MCC) can be turned on and off or purchase caps can be placed over a time period (e.g., a dollar amount that can be spent at a certain location over the course of a week). Fuel cards are another example (e.g., may enable only fuel, supplies, and vehicle maintenance-related MCCs). All issuer processors can restrict MCCs, although APIs allow co-brand partners to control these by making real-time and/or grouped changes to restrictions.

  3. **An additional layer of control – Just-in-Time (JIT) funding** – Auto-funding of card-linked accounts in real time, only after the transaction is approved through the custom evaluation process (e.g., approval rules based on the specific order, time, and merchant).

Marqeta JIT example: DoorDash uses JIT funding by Marqeta to help reduce fraud related to delivery courier order pick-up, allowing DoorDash to ensure couriers are paying for the exact orders (and only exact orders) at the right time and at the right merchant (e.g., transaction approvals are specific to the order that came through the DoorDash platform)



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30. Modern Card Issuance platforms and BaaS

Economics of pre-paid debit (majority of modern card issuance)

- **The vast majority of modern card issuance platforms are issuing prepaid debit cards**, with the economics on prepaid debit interchange generally ~20-40bps higher than on traditional debit.
- Bank partners used by FinTechs are typically exempt from Durbin debit interchange caps (unregulated) – e.g., The Bancorp, MetaBank, Green Dot Bank, Sutton Bank, Axos Bank, etc.
- Economics are spread across all four parties in the stack (non-bank issuer and/or co-brand partner, bank issuer, issuer processor, and program manager), with the program manager generally receiving the largest portion, although depending on volumes (tier-based contracts), the non-bank issuer may garner the majority of the economics.
- Example: Square Cash Card receives ~65% (CS est.) of the prepaid debit interchange, while its bank partner (Sutton Bank) and issuer processor & program manager (Marqeta) share the remainder.

Visa US Interchange (US Retail category)	Regulated debit	Exempt debit (unregulated)	Exempt prepaid (unregulated)
Illustrative transaction size	$39	$38	$38
+ Cents per transaction	$0.21	$0.15	$0.15
x Bps of volume	0.05%	0.80%	1.15%
= Total interchange ($)	$0.23	$0.45	$0.59
Total interchange (%)	***0.59%***	***1.19%***	***1.54%***

Rank	Pre-paid debit issuer	2018 purchase volume
1	The Bancorp Bank	$41.9b
2	MetaBank	$37.7b
3	Green Dot Bank	$26.0b
4	Comerica Bank	$19.6b
5	JPMorgan Chase	$18.7b
6	Axos Bank	$9.7b
7	Bank of America	$8.5b
8	MB Financial	$5.5b
9	US Bank	$5.4b
10	UMB Bank	$5.0b
11	Sunrise Banks	$4.6b
12	Sutton Bank	$3.2b
13	Webster Bank (incl. HAS)	$2.4b
14	Comdata	$1.7b
15	PNC Bank	$1.4b
16	KeyBank	$1.3b
17	Wells Fargo	$1.0b
18	Metro. Comm'l Bank	$0.7b
19	BB&T	$0.6b
20	Fifth Third Bank	$0.5b

Source: Company reports, Visa USA Interchange Reimbursement Fees, Board of Governors FRB, The Nilson Report, Credit Suisse research

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30. Modern Card Issuance platforms and BaaS

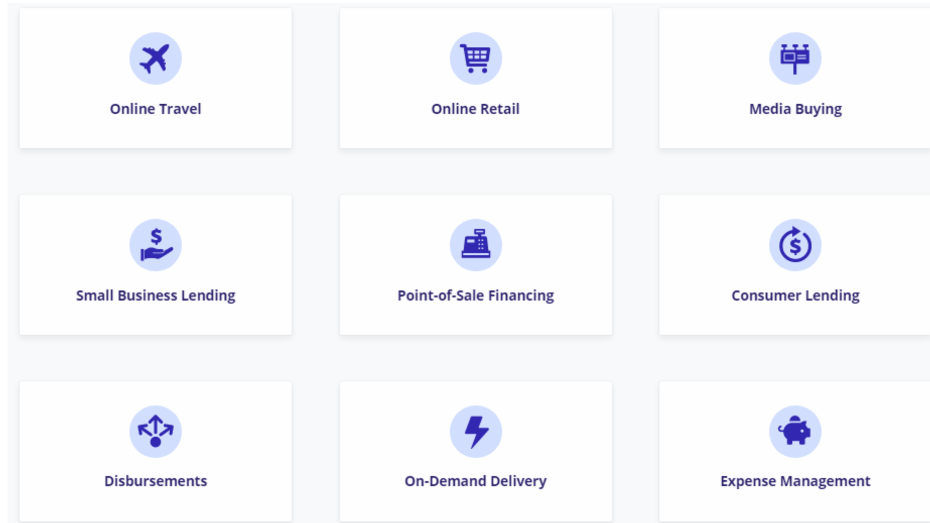
Marqeta 2019 update and highlights

MARQETA

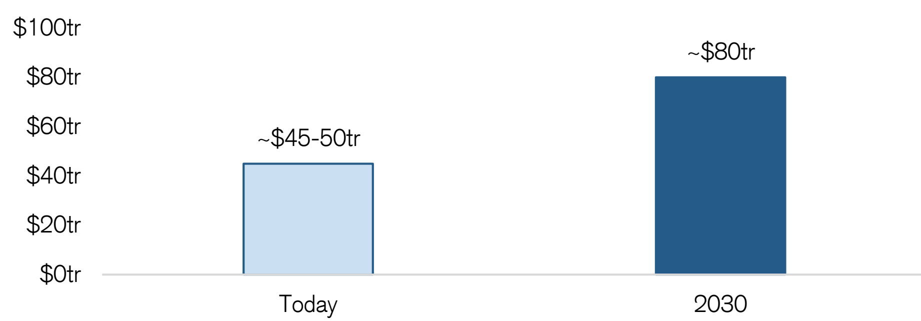
- Platform would now rank as a top 25 issuer of debit cards in the US (if consolidated as a single card issuer)
- Issued 140 millionth card & saw revenue double for the 4th consecutive year
- New offerings launched in 2019
  - Marqeta Reserve Financing - financing option that allows for seamless funding of reserve accounts
  - Push-to-Card – allows funds to be loaded on to virtual cards or tokenized into a digital wallet (used in lending applications and beyond)
  - One Sandbox Project – developer interface enhancement
- Additional highlights disclosed:
  - Added to premier customer list (naming Expensify, Lydia, YAPEAL, Twisto, Ramp Financial, ConnexPay, and Capital on Tap as examples of wins)
  - Extended Visa partnership to 10 Asia-Pacific markets (vs. most issuers active in three countries), as part of early global expansion efforts
  - Headcount ~400 (+175 YoY), with offices in Oakland and London
  - Valuation increased (~2x) to ~$4.3b, after closing a $150m raise in May 2020

> *"…We are in the midst of a transformation in card issuing around the globe," said Jason Gardner, founder and CEO of Marqeta. "When today's innovators are in need of modern payment solutions, they aren't turning to banks as their primary issuers anymore and want a platform built for their needs. We've been proud to power this transformation as the most advanced card-issuing platform built in over two decades. It has been exciting to see our customers embrace these new possibilities and build extraordinary products and services that have helped define markets in their own right.."*
>
> – Jason Gardner, Founder and CEO, Marqeta (May 2019)

Marqeta serves a range of issuers, with modern card issuance extending beyond the traditional bank issuers of the past (i.e., non-bank issuers)



Marqeta sees the global card issuance market reaching ~$80tr in volumes by 2030, increasing ~$30tr+ over the decade (per to Edgar, Dunn & Company)



Source: Company reports, Credit Suisse research

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30. Modern Card Issuance platforms and BaaS

Cards allow for a "recycling" of volumes (get paid 2x on the same business)

- Traditional fund access was done via ACH bank transfers, which are not only slow but come with a small cost (vs. card issuance, which is immediate and is a revenue generator).
- Example: Square Card for sellers
  - Square gets paid when a consumer makes a purchase at a seller's POS or website (~3% gross), and then Square gets paid again (~2% unregulated debit interchange) when the seller accesses the funds (spends) via card.
  - Fees earned by Square, PayPal, and Venmo (interchange share with partner bank and program manager) are roughly similar to the "Instant Transfer" and "Instant Deposit" fees earned today (which we consider to be at risk longer term due to increased usage of The Clearing House's RTP network and eventually FedNow, although not a near-term concern).
- Square is an example of a platform that has successfully monetized cards both from a consumer (Cash Card associated with Cash App balances) and merchant perspective (Square Card associated with seller account balances).

Square Card issuance to sellers allows instant access to seller balances (sales made that day) at no charge, yet Square still earns commercial debit interchange when card is used…

…similarly, Cash Card issuance to consumers provides instant access to Cash App balances at no charge, and Square earns prepaid debit interchange when the card is used

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30. Modern Card Issuance platforms and BaaS
"Recycling" examples in PayPal, Square, Stripe, Adyen, etc.

- While PayPal (both for core PayPal and Venmo), Square, and Stripe all offer forms of "instant transfer" to bank accounts or debit cards (i.e., Visa Direct or Mastercard Send), we believe card issuance could prove to be the better way to address supplier liquidity needs.
- It also increases seller stickiness via expansion into expense management (a payments platform's involvement was traditionally more limited to the revenue side of the business).
- Stripe Issuing was launched in July 2018, followed by Stripe Corporate Card in September 2019.
- Adyen announced a card-issuing program in November 2019, highlighting the access to faster funds for its merchant base (e.g., for marketplaces to provide to their sellers).

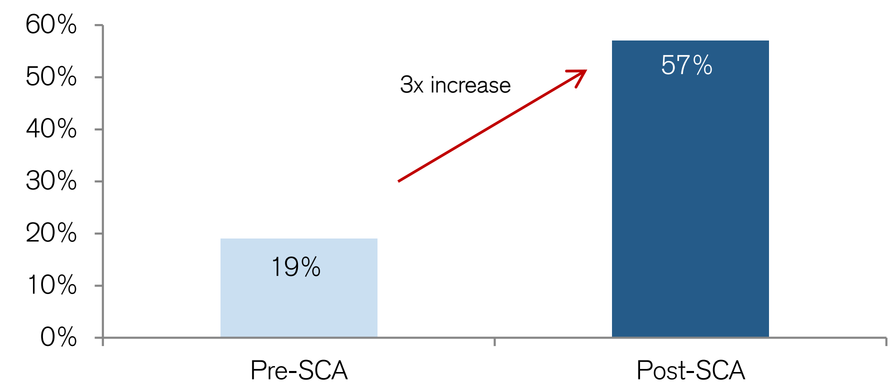
PayPal & Square business debit cards earn unregulated debit interchange and provide instant access to funds for sellers, while Stripe Issuing offers cards for employees (dynamic expense controls), contractors (on-demand platforms), and customers, along with a formal Corporate Card program

Regulation & Litigation

31. Two-Factor Authentication Implications
Customer experience and fraud prevention

- What is Strong Customer Authentication (SCA)?
  - Two-factor identity authentication is a requirement for online purchases in Europe (part of PSD2 regulation).
  - Card-issuing banks will be required to decline non-SCA compliant transactions.
  - SCA deadline was delayed to Dec. 31, 2020 (from Sep. 2019).
- Why is SCA important? SCA poses a significant challenge to eCommerce merchants by adding friction to online shopping.
  - Retailers in India experienced a 25% drop in online checkout conversion over night from two-factor requirements in 2014.
  - 451 Research estimates a €57 billion loss of eCommerce sales in the first year after SCA is enforced.

Mastercard estimates SCA will triple the number of online transactions requiring two-factor authentication from 19% to 57%



SCA requirements: 2 of 3 factors below

SCA exemptions

- Low-value transactions (< €30); SCA required after 5 transactions regardless of size or after €100 in cumulative spend
- Trust websites – first use required SCA
- Recurring payments
- Contactless payments
- Corporate payments
- Merchants are liable for fraud on exempt transactions that do not go through SCA

Source: Mastercard, Stripe, 451 Research, Credit Suisse research

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31. Two Factor Authentication Implications
3-D Secure 2.0 – Industry SCA Solution

- What is 3-D Secure (3DS)?
  - 3DS is an authentication protocol that enables issuing banks to verify the identity of cardholders during a CNP transaction
  - 3DS is the primary framework for addressing PSD2's SCA
  - Utilizing 3DS transfers fraud liability from merchant to issuer
  - 3DS specifications are governed by EMVCo
- Key benefits of 3DS 2.0?
  - Lower checkout friction (Visa claims a 70% improvement in cart abandonment rates)
  - Increased transaction approval rates (+5% lift in approval rates)
  - Reduced fraud rates
- 3DS 2.0 is big improvement but not a panacea for SCA
  - Optimizing for SCA exemptions is complex
  - Not all issuers will be able to support 3DS 2.0 by the SCA deadline

"…SCA will make or break Internet businesses. The urgency to get ready for it cannot be overstated…"

- Guillaume Princen, Head of Continental Europe, Stripe (June 2019)

Key differences between 3DS 1.0 and 3DS 2.0

3-D Secure 1.0	3-D Secure 2.0
Static passwords	Sophisticated authenticators (e.g., biometrics, one-time passwords)
Browser dependent	Mobile enabled
Limited dataset (supports 15 data elements)	Enriched dataset (supports 150 data elements, 10x the number of 3DS 1.0)
Enrollment required	No enrollment required
Merchant bound by issuer decision	Merchant opt-out option

SCA complexity favors tech-oriented merchant acquirers

Adyen
First to market its SCA-compliant 3DS 2.0 Solution to help merchants boost conversion rates and security

FIS (Worldpay)
Launched Exemption Engine for SCA in June 2019 to work with its 3DS 2.0 solution "3DS Flex"

Stripe
Launched 4 types of SCA-compliant merchant products in 2019 and acquired Touchtech to help banks prepare for SCA

Source: Mastercard, Visa, Stripe, 451 Research, Credit Suisse research

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32. Trends in Global Payments Regulation
Commonalities across Payments regulations worldwide

1. Centered around stimulating competition in financial services via Open Banking regulatory initiatives (practically every major developed economy has such regulations aside from the US)
2. Reducing card payment fees borne by merchants and consumers (indirectly) via Interchange caps
   - Australia – Caps on debit and credit interchange
   - Europe & UK – Caps on debit and credit interchange (IFR)
   - US – Caps on debit interchange for banks with over $10b in assets

North America

USA	▪ Ongoing US Merchant Interchange Fee Antitrust Litigation ▪ Anti-steering case with American Express deemed legal by US supreme Court (2018) ▪ EMV Liability shift (2015) ▪ Interchange caps on debit transactions (Durbin, 2011)
Canada	▪ Launched publication consultation on Open Banking merits (2019)
Mexico	▪ FinTech law effective (2018)

Europe

- Interchange reduction on cross-border transactions from consumers outside the EU spending inside the EU
- PSD2 regulation (2018-2020); Open Banking APIs & SCA mandated
- GDPR (2018); EU consumer data protections
- Interchange Fee Regulation (2015 and 2016), Interchange caps on credit and debit, Separation of Scheme and Processing, Co-badging, Anti-steering & Honor all cards relaxation, Un-blending of MDR

Asia-Pacific

Australia	▪ 2017 Interchange caps on credit and debit ▪ Open Banking mandated in July 2019
Singapore	▪ Open Banking support but not mandated ▪ Published API playbook for financial industry in 2016
India	▪ RBI expected to release Open Banking guidelines in 2020
Hong Kong	▪ Open Banking mandated in four phases from 2019 to 2020

Source: Company reports, Credit Suisse research

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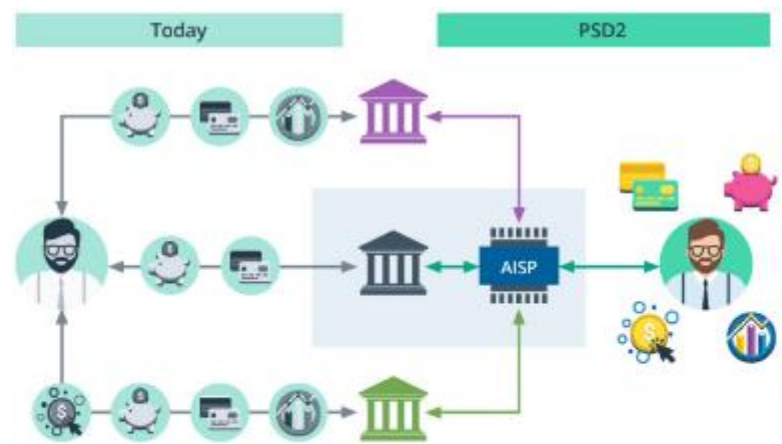
33. European Payments Regulation
PSD2 in Europe: Evolution, not revolution

- The Second Payment Services Directive's (PSD2) regulatory objective is to stimulate competition in financial services, reduce fraud, and increase consumer protection in the European Economic Area, with an emphasis on two key aspects:
- Open API mandates on European banks
  - Requires European banks to grant qualified third parties automated access to customer accounts (retail and corporate) via open APIs
  - Empowers new platform-oriented business models and pulls them into regulatory scope: (1) Account information service providers (AISPs) can provide a consolidated view across a consumer's financial accounts; and (2) Payment initiation service providers (PISPS) can initiate transactions payments directly from a bank account (e.g., PayPal) without relying on screen scraping
- Enhance customer security
  - Requires strong customer authentication (SCA), two-factor authentication when a consumer initiates an online payment or accesses bank account information online; detailed in Theme 32
  - Reduces consumers' liability for unauthorized payments
  - Prohibits surcharging

PSD2 Timeline – Key Dates	
November 2015	Final approval of PSD2 by European Council
January 2018	PSD2 becomes national law
February 2018	Regulatory technical standards (RTS) on open banking APIs and SCA published, giving European banks and merchants 18 months to implement
September 2019	RTS mandated to start (for open banking API requirements, not SCA). In June 2019, the EBA allowed for time extensions on an exceptional basis
December 2020	RTS enforced for SCA

Open Banking brings the platform model into financial services



 Source: Credit Suisse research, EY

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33. European Payments Regulation
Open Banking Perceptions from European Banking Executives

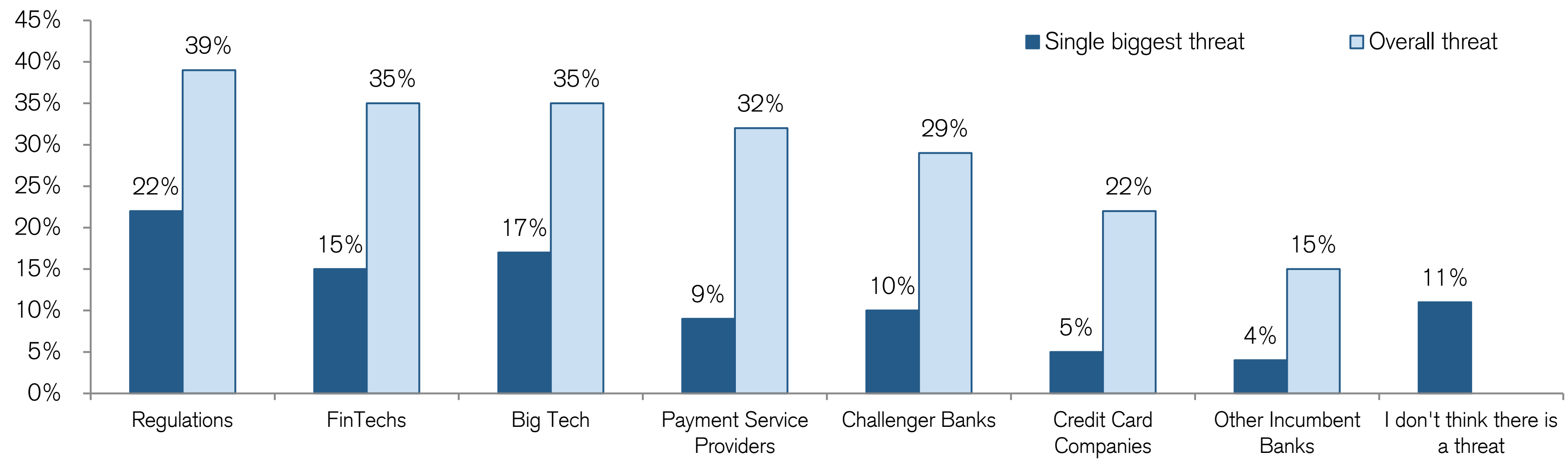
- 22% of European Banking Executives view regulations as the biggest threat to their business
- 17% view BigTech as the single biggest threat (Google, Amazon, Apple), given established customer relationships, large user bases, brand recognition, and technical talent
- 64% believe the financial services industry will significantly evolve as a result of open banking

Top Open Banking Challenges & Priorities from Tink's Survey of European Banking Executives

Top 3 Challenges
Modernize IT systems, comply with EU regulations, and finding the right talent

Top 3 Opportunities
Develop better digital services, increase customer personalization, and reduce costs of customer acquisition

Biggest Threats to Incumbents from Open Banking (European Banking Executives)



Source: Credit Suisse research, Tink Report "Inside the minds of European Bankers"

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33. European Payments Regulation
Europe Interchange Fee Regulation (IFR)

- Regulatory objective: Reduce the cost of card payments and increase competition
- Applies to all card-based payment transactions in the European Union as of June 2016 (aside from Interchange caps, which became effective in December 2015)

European Commission presentation on IFR regulation

IFR Articles	Description	Objective & Potential Impact
Interchange Caps (articles 3 & 4)	• Cap domestic interchange rates to 0.30% and 0.20% for credit and debit card transactions, respectively; also applies to intra-Europe cross-border	• Lower acceptance cost of card payments and stimulate merchant acceptance of card payments
Separation of Processing & Scheme (article 7)	• Card networks must separate their processing and scheme operations (accounting, organization and decision-making) • Bans price bundling for processing and scheme fees	• Increase competition in the processing market to reduce prices • Prevents card schemes from favoring their own processing by enabling choice for banks and retailers • Facilitated Mastercard and Visa's processing share gains in Europe
Co-badging (article 8)	• Restricts card networks from charging scheme fees for transactions made on co-badged cards that were not processed on the scheme's network	• Improves competition in cross-border payments among card schemes
Honor all cards relaxation & Anti-steering (articles 10 & 11)	• No longer required to accept all card types issued by a particular scheme (consumer prepaid, debit, and credit) • If a merchant wishes to accept one type of consumer card across the 3 categories, it must still accept all (e.g., if you accept 1 type of Visa credit, you must accept all Visa credit cards) • Prohibits card schemes banning merchants from steering consumers	• Allows merchants to decide if they want to accept various card types (consumer prepaid, debit, and credit)
Unblending (article 9)	• Acquirers required to separately list interchange fees, scheme fees, and the acquirer mark-up	• Improves transparency on card transaction fees paid by merchants

Source: ECB, Credit Suisse research

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33. European Payments Regulation
Cross-Border Europe Interchange Fee Regulation

- Regulatory objective: Reduce the cost of cross-border card payments in the European Economic Area (EEA)
- Each of the three regulations listed below brought more transactions occurring within the EEA into scope

Date	Description	Example of Cards/Transactions in Scope
December 2015	• Interchange Fee Regulation (IFR): Caps domestic interchange rates to 0.30% and 0.20% for credit and debit cards issued and used in Europe, respectively; also applies to intra-EEA cross-border	• Applies to all domestic and cross-border transactions for cards issued and used in Europe • For example, a French consumer making card purchases in France • And a French consumer making card purchases in Germany
~October 2019 (within 6 months of April 2019)	• Regulates/reduces interchange on cards used in Europe but issued elsewhere (tourists visiting Europe), by 40% on average • For in-store transactions (card present), caps interchange rates to 0.30% and 0.20% for credit and debit cards, respectively • For online transactions (card not present), caps interchange rates to 1.50% and 1.15% for credit and debit cards, respectively	• For example, a US tourist making an in-store card purchase in Belgium • And a US consumer making a card purchase at an eCommerce merchant in Belgium while in the US
December 2019	• Regulates/reduces interchange on cross-border card payments in euro, in non-Eurozone Member states (Bulgaria, Croatia, Czechia, Denmark, Hungary, Iceland, Liechtenstein, Norway, Poland, Romania, Sweden) to be the same as domestic payments (December 2015 IFR caps listed above) • These transactions account for ~80% of all cross-border payments from non-Euro area member states	• For example, a Polish consumer making card purchases in France

Source: European Commission, Credit Suisse research

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34. US vs. International FinTech regulations and market dynamics

A big opportunity in the US with big hurdles

Regulations

"Market-driven" approach in the US vs. Innovation-oriented regulations abroad

- Un-mandated consumer financial data rights vs. mandated consumer financial data rights abroad (mandated Open APIs)
  - Dodd-Frank mandates direct consumer access to data but not specifically data aggregators, meaning technically banks aren't required to allow companies like Plaid to connect (e.g., PNC turning off Venmo and telling customers to use Zelle in December 2019)
- Interchange unregulated (ex. Debit for big banks)
  - Interchange rate decisions left up to the courts in the US vs. addressed by regulators abroad
  - Unregulated Debit interchange enables US FinTechs to monetize at materially higher rates than FinTechs in regions where interchange is regulated (e.g., Europe debit interchange is 20bps vs. 150-190bps + $0.10 in the US), reducing their need to monetize via new products

"…the PNC-Venmo spat shows how much we need to adopt open banking that lets customers own their own data."

\- Karen Mills, Senior Fellow at Harvard Business School

Licensing

US FinTech licensing is fragmented across 50 states and 10+ federal agencies

- In the US, FinTechs must get money transmitter licenses in 50 states with varying requirements and interpretations of the same law, vs. significantly more fluid processes abroad
  - E.g., 50 licenses required for 1 country vs. 1 license for 31countries in Europe…
- CSBS' Vision 2020 initiative is working to harmonize/streamline the multistate licensing process:
  - Currently creating a model money services business (MSB) law given each State defines and interprets legal terms differently (26 states on board to-date)
  - This reduced application times by two-thirds in 2019
- US FinTechs subject to overlapping authority and jurisdiction from 10+ federal agencies, 50 state regulators vs. 2 in other countries (e.g., UK, Australia)
  - Insightful testimony to the Senate discussing this here

Banking Market Dynamics

US banking market is more consolidated at the top and fragmented at the bottom

- Top 4 big banks spend ~$40bn/year on IT, equal to total Global VC Fintech funding (in 2018, ~>2x in other years)
- Top 4 US Banks have 63% of assets, the next 11k have the remaining 37%
- Europe has ~50% less banks (~6k) yet ~50% more people (i.e., ~12 banks per million citizens vs. the US with ~34 banks per million citizens)
- Bank technology provider market for the majority of banks is led by Fiserv, FIS, Jack Henry, Finastra, and others

"Although it boasts one of the world's largest FinTech ecosystems, the US lags behind other major countries in providing a cohesive and consistent regulatory framework for FinTechs."

\- White & Case

Source: 2018 US Treasury Report: "A Financial System That Creates Economic Opportunities", CSBS, Credit Suisse research

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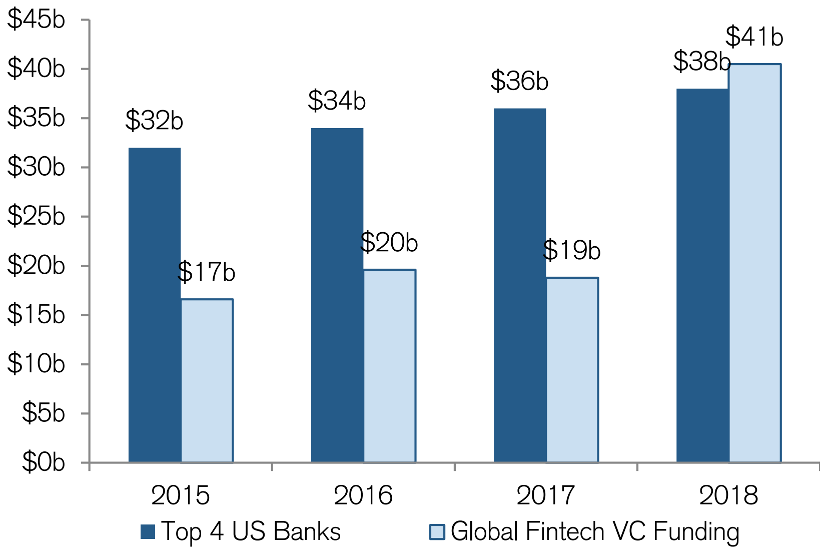
34. US vs. International FinTech regulations & market dynamics

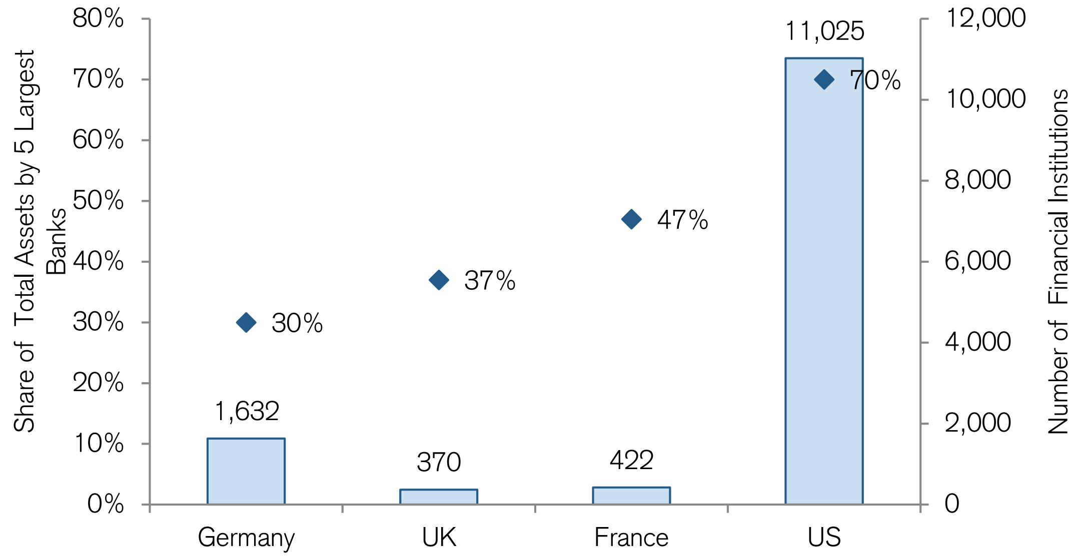
Fragmented US Banking Market

- ~6,000 financial institutions in Europe compared to ~11,000 in the US
- The US market is significantly more concentrated at the top and fragmented at the bottom
- This is evidenced by the scale and resources of top 4 big banks with annual IT spend of ~$40bn, equal to total Global VC Fintech funding in 2018 and ~>2x 2015-2017

IT Spend of Top 4 US Banks vs. Global Fintech Funding



Share of Total Assets by 5 largest Banks



Source: Credit Suisse research. CB Insights, CSBS, the BLOOMBERG PROFESSIONAL™ service

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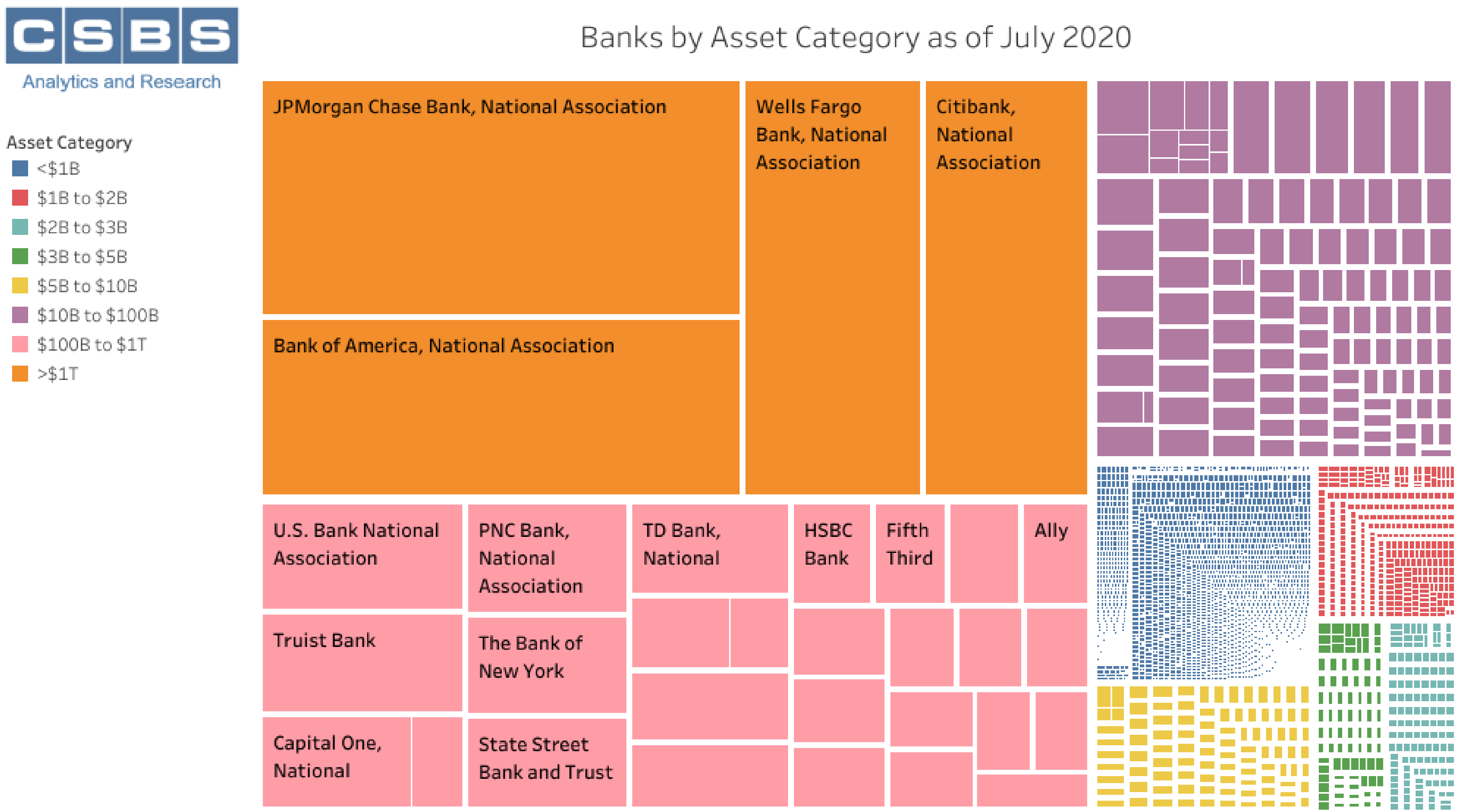
34. US vs. International FinTech regulations & market dynamics
Fragmented US Banking Market



Source: CSBS (only shows US banks, excludes credit unions), Credit Suisse research

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34. US vs. International FinTech regulations & market dynamics

Overview of US Payments Regulations

Regulation	Date	Description
US Interchange Regulation (MDL 1720)	Ongoing since 2005	• Case of all US merchants against Visa, Mastercard, and US banks, with the plaintiffs contending the defendants violated antitrust laws and caused merchants to pay excessive fees for accepting credit and debit • Detailed overview on the following page
Anti-Steering	June 2018	• Supreme court ruled AMEX's anti-steering practices that ban merchants from "steering" consumers to use alternative cards that have lower fees are legal and do not violate antitrust laws
Prepaid Accounts	April 2019	• Improved consumer protections for prepaid cards from fraud and unauthorized charges • Increased transparency on prepaid account fees and provide free ways to access account information
Dodd-Frank (Durbin Act)	October 2011	• Capped debit interchange at $0.21 + 0.05% for banks with >$10bn in assets • Issuers must enable at least 2 unaffiliated card networks on each debit card and allow the merchant to select to lowest-cost option

Source: Credit Suisse research

34. US vs. International FinTech regulations & market dynamics
US Merchant Interchange Case

Timeline	MDL 1720: Payment Card Merchant Discount and Interchange Fee Antitrust Litigation
2005	Merchants brought suit against Visa, Mastercard, and their card-issuing banks for: • Default interchange fees on every transaction • Honor all cards, requiring merchants to accept all cards regardless of the differences in interchange fees • Rules banning surcharging
2012	$7.25B settlement approved • Visa, Mastercard, and the banks agreed to pay a $7.25Bn settlement and allowed merchants to surcharge • In return, merchants (current and all future merchants) forfeit right to sue banks and card networks on these topics
2016-Present	case re-opened, settlement overturned • 2012 settlement overturned in summer 2016 because the future merchant class was “inadequately represented” in the settlement negotiations (given they were represented by the same counsel posing a conflict of interest) • 2 classes of plaintiffs: comprising all the merchants in the US that accept Visa and/or Mastercard 1. Current merchants (monetary relief class) who accepted Visa/Mastercard from January 1, 2014, through January 25, 2019; AKA monetary relief class, receiving a portion of the $6.24bn settlement amount; have option to “opt-out” of settlement and individually sue the card networks and bank 2. Rules relief (injunctive relief class) negotiations are ongoing
Recent Developments & Next Steps	• January 2019: Preliminary approval of $6.24bn settlement for the current merchant class • December 17, 2019: Court granted final approval of a $5.5settlement • The most important aspect of the case relates to any potential rule changes to the card networks business practices with Rules Relief class, with no major rule changes likely to occur in our view

Source: Credit Suisse research, PACER.

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35. Industrial Loan Company (ILC) bank licenses for US FinTechs

What are they and why are FinTechs applying?

- Can make loans and offer FDIC-insured deposits
- Parent company is not subject to Federal Reserve oversight
- Concentrated in 7 states, Utah contains ~60% of all ILCs (remaining ~40% in CA, CO, HI, IN, MN, and NV)
- WEX Bank is one of the 25 current ILCs; Square has an application pending; no applications approved since 2006
- Square's motivation? (1) speed (removing 3rd party), (2) economics (no revenue share), (3) low-cost funds, and (4) accept deposits
- OCC FinTech charter – proposed in 2015 as an alternative option; US District Court for the Southern District of NY ruled in October 2019 that the OCC does not have legal power to grant such a charter to non-banks ineligible for federal deposit insurance (currently in review)

Item	Industrial Banks	Commercial Banks
Make loans?	• Yes	• Yes
FDIC-insured deposits?	• Yes, but not demand deposits if assets are > $100mm	• Yes, including demand deposits
Interest on deposits?	• Yes	• Yes
Regulation of parent company?	• No, not a bank (as defined by the BHCA) • The bank itself is subject to federal (FDIC) & state banking regulators (e.g., Utah Department of Financial Institutions), but the parent company is not • License in one state allows for credit extension nationwide	• Yes, defined as a bank by BHCA • Parent company limited to banking and/or financial services • Cannot mix commerce and banking • Regulated by Federal Reserve and State regulators • National banks regulated by the OCC, while US State banks (non-member banks) are regulated by the FDIC
Additional	• Low-cost source of funds (discount window & deposits) • Can become a member of Visa & Mastercard • Two separate applications (Utah and FDIC), but state will generally accept the FDIC application • Utah DFI and FDIC generally review in close coordination • 25 current ILC in the US	• ~4.7k commercial banks in the US (vs. 12k in 1990)

Source: Utah Center for Financial Services (University of Utah), James Bart (Lowder Eminent Scholar in Finance, Auburn University), Pepper Hamilton LLP, FDIC, Credit Suisse estimates

Threats to Monitor for the Existing Ecosystem

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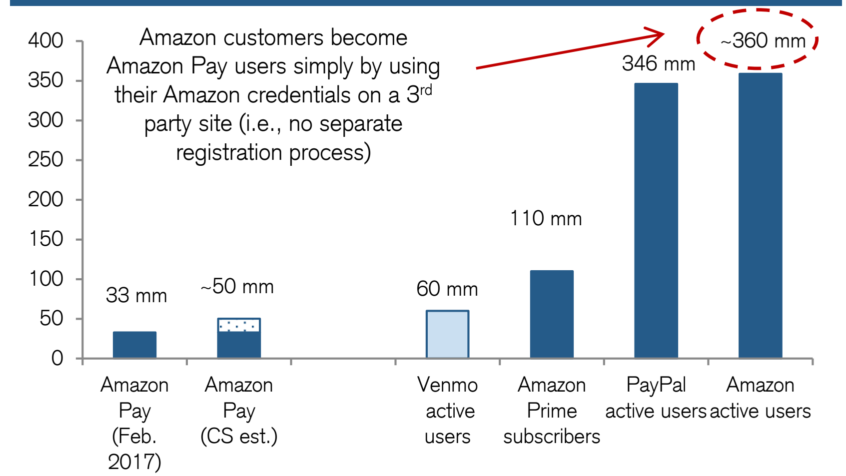
36. Amazon's building blocks in Payments & FinTech

All of the pieces are there, and the rationale is sound

- Rationale for Amazon in Payments & FinTech
  - Amazon "flywheel" benefits to both sides of Amazon's network (consumers, merchants), allowing Amazon to enter adjacent businesses without having to be directly profitable (e.g., Fulfillment by Amazon [FBA] not profitable on a direct basis, but adds product selection, an indirect, but meaningful benefit)
  - Large addressable markets (digital payments), including portions ripe for disruption and/or new TAM creation (SMB lending)
  - Monetizing existing assets in terms of users (~350mm), data (merchant sales history), trust (19% of cart abandonments due to lack of trust), and capabilities – i.e., payments honed internally ahead of extending to 3rd parties (the Marketplace, AWS, Logistics playbook)
  - Potential for reduced payments acceptance costs
- Consumer-side (~350mm buyers with cards in Amazon wallets)
  - Increased spending (credit extension, rewards & incentives)
  - Extends customer base into lesser-penetrated demographics (e.g., Amazon Credit Builder secured credit card)
- Merchant-side (~2-3mm 3rd party sellers on Amazon Marketplace)
  - Lending specifically for inventories to be placed on Amazon.com
  - Amazon Pay "button" on brand.com sites expands merchant relationships (increase stickiness)

Amazon Pay disclosures understate the true customer base



Amazon 3rd party sellers contribute more than half of units sold

Source: Company reports, Credit Suisse research *Amazon is covered by CS analyst Stephen Ju.

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36. Amazon’s building blocks in Payments & FinTech

Building a consumer ecosystem in-house and via partnerships…

Amazon Consumer Payments & FinTech offerings	Description	Partner	Pricing and/or Incentives
amazon pay	**Amazon Pay** allows Amazon customer to checkout at 3rd party websites using their Amazon credentials, accessing the payments methods already stored with Amazon, address & shipping preferences, etc. The trust of the Amazon brand is a key aspect of the offering, along with the customer-base that Amazon brings to bear. Worldpay as an acquiring partner reduces the integration work required by merchants to accept Amazon Pay.	None (although Worldpay is an acquiring partner for merchant distribution)	2.9% + $0.30 web & mobile; 4% on transactions done over Alexa; Cross-border an additional 1% fee
prime VISA	**Amazon Prime Rewards Signature Visa Card** is an open-loop card for Amazon Prime members only, with 5% back at Amazon and Whole Foods, 2% back at restaurants, gas stations, and drugstores, and 1% back on all other purchases. There is also a non-Prime version of this card (Amazon Rewards Visa Signature Card, which features 3% cash back at Amazon.com.	Chase Bank (J.P. Morgan Chase)	No annual fees, no foreign transaction fees; $50 Amazon Gift card sign-up bonus; ~16-24% APR
amazon.com STORE CARD	**Amazon.com Store Card** is a closed-loop card for Amazon customers, although Prime members earn 5% back. Provides no interest financing offers for 6, 12, and 24 months for purchases of above thresholds ($149, $599) and/or select items. Also, EqualPay allows for equal split of payments over time at 0% APR. There is also an Amazon Prime version of this card which earns 5% back.	Synchrony Bank	No annual fees; $60 Amazon Gift card sign-up bonus; APR is 28% if not paid off within agreed monthly plan
amazon.com STORE CARD	**Amazon.com Store Card Credit Builder** and Amazon Prime Store Card Credit Builder are secured card versions of the traditional store cards above (closed-loop cards). Customers make a deposit that becomes their credit limit, and allows for building or rebuilding credit. Provides access to the under-banked. A more recent offering, launched June 2019.	Synchrony Bank	No annual fee; Minimum deposit of $100 (max of $1,000); $10 Amazon Gift card sign-up bonus; Non-prime version has no rewards
reload	**Amazon Reload** and Amazon Prime Reload allow customers to earn a 2% bonus if they agree to provide both a debit card and checking account & routing number. Amazon sometimes routes the reloads through checking accounts instead of debit cards. Reloads occur when the balance drops below a set amount.	None (although the balance technically sits in a gift card, provided by ACI Gift Cards)	2% bonus for using these lower cost funding methods (debit, checking account) and reloading in bulk
amazon cash	**Amazon Cash** allows customers to add cash to an Amazon account at a physical retailer (e.g., convenience store, pharmacy) location. Allows Amazon to expand into an under-banked demographic.	Numerous retail partnerships (7-Eleven, CVS, Rite Aid, etc.)	No fees
amazon allowance	**Amazon Allowance** is a prepaid, reloadable, closed-loop card offering. Can add funds one-time or routinely (e.g., weekly as an allowance).	ACI Gift Cards issues the gift cards	No fees
amazon protect	**Amazon Protect and other insurance offerings** are insurance products for Amazon purchases (i.e., added coverage above and beyond those offered by the manufacturer). Can cover accident and theft as well.	London General Insurance Company Limited for UK; Asurion for US	By product and purchase price

Source: Company website

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36. Amazon's building blocks in Payments & FinTech
…and beginning to bolster the Business side as well

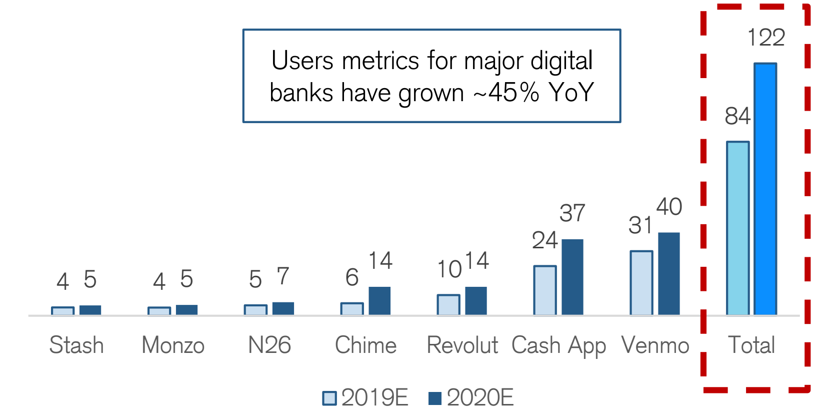
Amazon Business Payments & FinTech offerings	Description	Partner	Pricing
	**Amazon Business American Express Card** and Amazon Prime Business American Express Card are open-loop cards for non-Prime and Prime member business accounts. Standard Business card (non-Prime) features 3% back or 60 day terms, while the Business Prime card has 5% back or 90 day terms (on US purchases at Amazon Business, AWS, Amazon.com and Whole Foods). Also, both cards get 2% back at restaurants, gas stations, and wireless phone service, along with 1% back on other purchases. This is a more recent offering, having been launched by Amazon and American Express in October 2018.	American Express	No annual fee; $100-$125 Amazon Gift card sign-up bonus for; ~16-24% APR
amazonlending	**Amazon Lending** is an invitation only program that offers $1k-$75k loans for sellers to purchase inventory for use on Amazon's marketplace. Amazon has data that others (banks) don't, including real-time sales data (and growth), customer reviews, profitability metrics, etc. Amazon has the ability to be "paid back first" via topline earned by sellers on Amazon (similar to Square Capital). Amazon also can provide fast decisions (minutes), in part due to the invite only nature of the program pre-screening applicants. Further, these smaller business loans are often not profitable for traditional banks, which prefer to focus on larger dollar amounts. Terms on the loans tend to be 12 months or less (i.e., short term). In January 2018, Amazon disclosed that "Amazon Lending surpassed $3 billion lent to small businesses on Amazon since the program started in 2011."	Bank of America added as a partner in early 2018 (and the Amazon 2015 shareholder letter referenced bank partnerships ahead)	Range from 6-16%, but depends on the seller-specific offer made by Amazon
amazon CORPORATE PAY-IN-FULL CREDIT LINE; amazon CORPORATE REVOLVING CREDIT LINE	**Amazon.com Revolving Corporate Credit Line and Amazon.com Corporate Pay-In-Full Credit Line** offerings are made available to business accounts that want more flexible payment terms (i.e., pay-in-full or make minimum monthly payments only). Credit line can only be used at Amazon.com. Allows businesses to authorize multiple buyers/employees through Amazon Business US. The Pay-in-Full Corporate credit line offers 55 day payment terms (no interest, no fees) and is marketed more toward larger businesses (e.g., libraries, schools, government organizations).	Synchrony Bank	No annual fee; APR 12.99%

Source: Company website, Fundera, PYMNTS.com, Credit Suisse

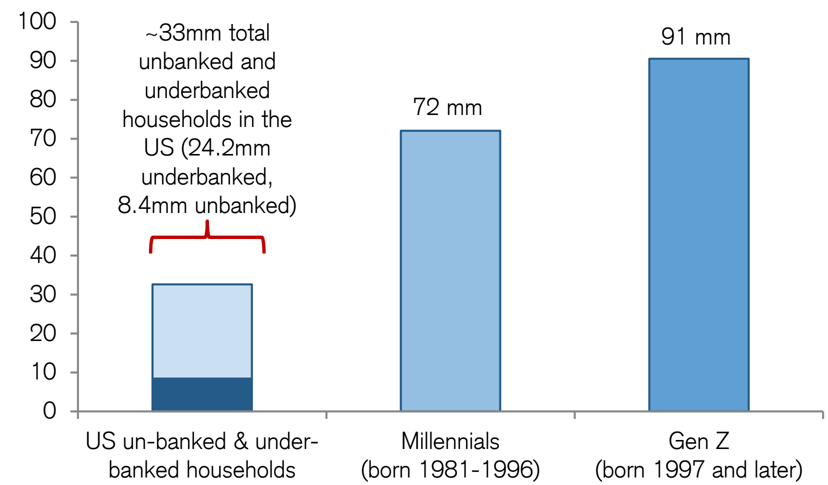
36. Amazon's building blocks in Payments & FinTech
Could a digital bank be a logical/potential next step?

- Neo banks are gaining users at an impressive rate by innovating faster, reducing fees, offering higher interest rates on savings, providing a hook (e.g., International P2P, robo-investing, savings analytics), and in many cases, targeting niche demographics (Millennials, GenZ, underbanked)
- Why not Amazon? Lower customer acquisition costs (brand, user base) and the fact that Amazon would not need to turn a direct profit
- A digital bank from Amazon would have the potential to:
  - Increase user engagement (account balance views, conducting other transactions, bill-pay, etc.), another reason to open Amazon app
  - Increase wallet share with account holders (funds kept within Amazon ecosystem) enhanced by even more purchase behavior information
  - Offer low or no fees, with monetization coming indirectly (flywheel effect)
  - Come with user-friendly and high utility saving and spending analytics
  - Target a combination of: (1) Amazon Prime subscribers and (2) underbanked consumers, which expands Amazon's customer reach (similar to the Amazon.com Credit Builder card offering)
  - Utilize a bank partner (we do not expect Amazon to pursue a bank license)
- Would also stimulate adoption of Amazon Pay on 3rd party merchant sites
  - Offer rewards on debit cards that can be spent on Amazon.com and Amazon Pay merchants (differentiated given debit interchange is now regulated for large banks, meaningfully limiting rewards offers on debit)
  - Offer discounts on Amazon.com and at Amazon Pay merchants when purchases are funded via checking or savings accounts vs. cards
- Concerns? Competing against existing partners (bank partners) and any consumer data privacy fears (even un-founded)

Leading digital banks are accumulating impressive user numbers



Underbanked, Millennial, and Gen Z populations in the US



Source: Company reports, 2017 FDIC Survey of Unbanked and Underbanked Households, Statista, Credit Suisse research; Digital bank user data based on most recent disclosures as of time of publishing; Venmo users converted to MAUs via 0.6x conversion rate of annual active users

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36. Amazon's building blocks in Payments & FinTech

What are some of the other logical/potential next steps?

- Additional incentives for consumers & merchants to use Amazon Pay
  - Amazon-funded discounts to expand the Amazon Pay network effect, both in the US and Europe (Amazon Pay is now in 18 countries)
  - We note that Amazon offered limited-time pricing that was ~36% below competitors for over a year (while ongoing pricing was ~9% below)
  - Opening up Alexa to 3rd party merchants using Amazon Pay; we suspect Voice-related payments apps will be an area where Amazon takes a leadership role
  - Competitor retailers may resist (Amazon Pay is on 25% of non-competitive travel & hospital sites vs. just 11% for toys, hobbies, & electronics sites)
  - Financial app relationship with consumers enables expansion of Amazon Pay in-store and potential to offer geo-targeted offers to drive foot traffic to merchants (e.g., similar to Square Boost driving Cash App users in-store, at greater scale)
- Digital bank offerings for Amazon Business customers
  - Potential to feature added SMB software (e.g., expense management, inventory, etc.), leveraging internal data and products, along with white-labeled offerings
  - Business debit card produces interchange revenue and expense management data
- Offering additional financial services within Amazon (or a digital bank app)
  - P2P, Wealth Management & Investing/Trading, high-yield savings, P&C Insurance etc.; some could be done asset light (i.e., lead-generation, similar to Ant Group and WeChat)
- Additional thoughts & broader expansion (and what we'll be watching for)
  - Furthering the JP Morgan partnership (as Apple and Goldman Sachs do the same)
  - Risk of Amazon becoming more closed (i.e., less reliant on the traditional four-party model, similar to Ant Group & WeChat-like), although given numerous bank partnerships and a desire to reduce friction (increased choice of payment method, keep conversions high), we think Amazon will generally play ball

Amazon Local Register (2014-2015) offered introductory transaction fees of 1.75%, meaningfully undercutting Square (2.75%), PayPal Here (2.7%), and others

Could Amazon and JP Morgan begin to partner on additional financial services, alongside the more recent partnership between Apple and Goldman Sachs?

amazon

JPMorgan Chase & Co.

Goldman Sachs

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37. Alipay & WeChat expand acceptance beyond China
Strategy that caters to Chinese outbound tourists

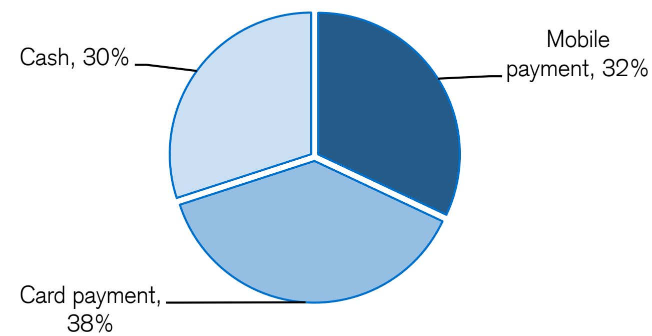
China outbound tourism is important to the payments ecosystem

- 140mm China outbound tourists in 2018 spent ~$280b, growing at a ~6.5% CAGR (2015-2020E), majority in the "4-hour fly zone" (e.g., Korea, Japan), but increasingly Europe; ~3.5mm Chinese visitors to the US
- ~1/3rd of transactions already done via mobile payments (despite nascent merchant acceptance), with Alipay and WeChat the dominant platforms (~1b users each, access to the majority of China consumers by dollar volume)
- 93% of Chinese outbound tourists state that they would increase their spending while travelling if mobile payments were more widely accepted
- Retail, restaurants, accommodations, tourist attractions, and in-market transportation (e.g., ride-share) are the largest areas of spend

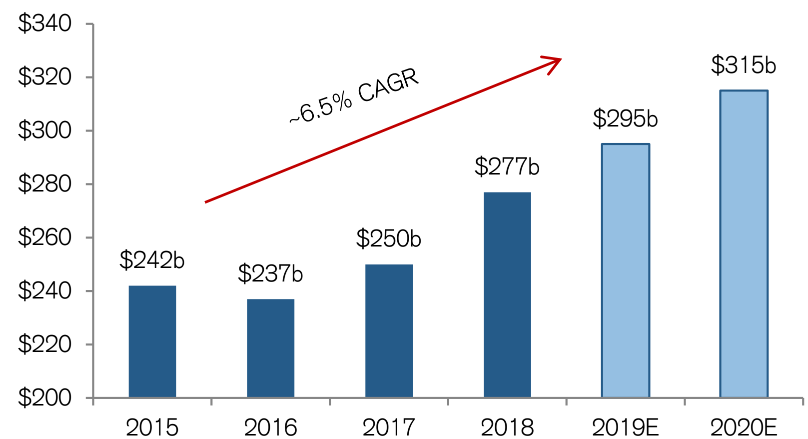
Alipay's strategy for expansion beyond China is currently focused on Chinese travelers' outbound spend (expanding global acceptance) and expanding the user base across Southeast Asia (not competing for users in US & Europe)

- Gain merchant acceptance in key international destinations (e.g., New York, Los Angeles, London, Paris, Rome) for Alipay users
- Leverage existing ecosystem to support direct distribution, working with various payments service providers and merchant acquiring (e.g., First Data, Adyen, Ingenico, Wirecard, Barclaycard, Citcon, Verifone, etc.)
- At least 9 local eWallet partnerships allow Alipay users to leverage acceptance network (e.g., Paytm in India, GCash in Philippines, Kakao Cash in the Korea, TrueMoney in Thailand, Line Pay and Paypay in Japan)
- Pitch to merchants? (1) Drive traffic and volume, including use of marketing platform ("drive to store"); (2) Lower acceptance costs for merchants vs. cross-border credit cards (price determined by payments partners, not Alipay)
- Recently enabled a version of its app for foreigners visiting China (Tencent also announced plans to allow foreigners to use international cards in China as well)

Mobile payments usage by Chinese tourists already surpassed cash in 2018, despite a still nascent acceptance footprint



China outbound tourism spend is approaching $300b, a figure that is ~10% the size of Mastercard's ex-US purchase volume



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37. Alipay & WeChat expand acceptance beyond China

Illustrative (2019E) sizing the impact within the ecosystem

- Our analysis suggests ~1% of volume (pre-COVID analysis, based on 2019E), ~4-6% of revenue could be exposed to increasing Alipay & WeChat acceptance expansion beyond China over the course of a multi-year period (i.e., at least 3-5 years, potentially more)
- As Alipay & WeChat, and to a lesser extent, China Union Pay, expand acceptance outside China, Visa and Mastercard should see modest pressure to their top lines. We note this has already been happening for years (gradually), but we attempt to quantify overall exposure to China below.
- Our analysis assumes ~40% of China outbound tourism is spent via bank cards, the majority of which are Visa and Mastercard branded (although we note that China Union Pay has a Discover network partnership), along with meaningfully higher yields (cross-border pricing vs. domestic).
- Alipay's current strategy is not to gain users outside China (i.e., risk to Visa and Mastercard is currently contained to China outbound tourism and eCommerce); the current focus is on broader APAC consumers, which likely eases cooperation with existing ecosystem.

Sizing China Exposure relative to V/MA	2019E	Comment / Rationale
Mastercard	$4,764	FY 2019A
Visa	$8,945	CY 2019A
Total	$13,709	
China outbound tourism	$295	McKinsey, which implies ~$2k per trip
% of combined V/MA volume	*2.2%*	Represents entire opportunity (card, cash, Alipay/WeChat) as a % of V & MA volume
China outbound tourism on card	38.0%	"2018 trends for mobile payment in Chinese outbound tourism" (Nielsen & Alipay)
Implied China outbound card volumes	$112	
Assumed V & MA portion	67%	Assumes China Union Pay (Discover network) & American Express have some share
Implied China outbound V & MA card volumes (via tourism)	$75	
Gross up assumption for eCommerce	70%	Assumes China cross-border eCommerce ~70% of tourism spend
Total implied China outbound V&MA card volumes (tourism and eCommerce)	$128	
% of V/MA combined volume	***0.9%***	**Represents est. V & MA volume exposure to China cross-border**
Multiplier	~5-6x	Meaningfully higher cross-border yield, offset by non-volume based revenue mix
% of V/MA combined revenue	***~5 - 6%***	**Implied contribution to combined V/MA revenue**

Source: McKinsey, Nielsen, Alipay, The World Tourism Organization (UNWTO), Credit Suisse estimates

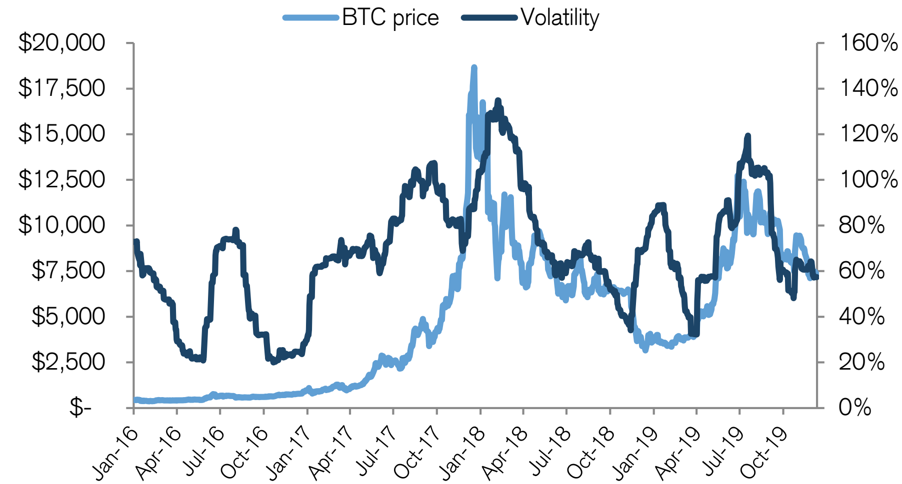
38. Cryptocurrency impact on the Payments ecosystem

Unlikely to gain C2B payments adoption at least for the medium term…

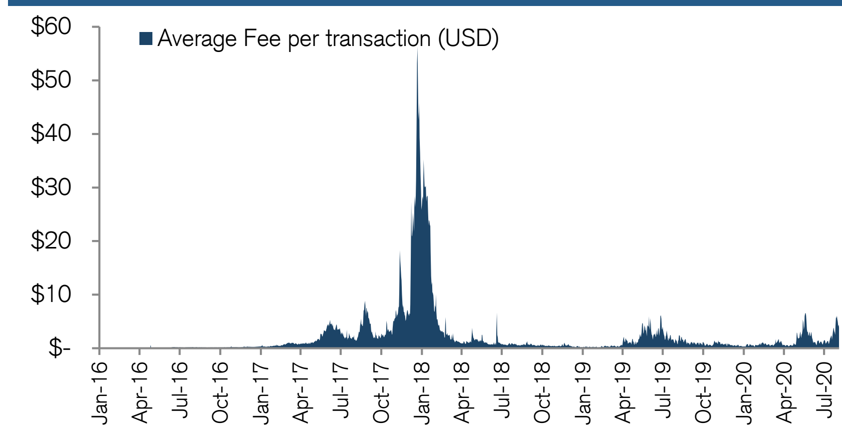
Reasons we believe cryptocurrencies will be challenged to make a meaningful impact on the existing consumer payments (C2B) ecosystem, **absent working with the existing ecosystem itself (e.g., attaching a Visa or Mastercard to a crypto-wallet, or via PayPal or Square, etc.)** over the near to medium term (i.e., minimal downside risk to our companies under coverage):

1. **Lack of chargeback & dispute process** – lack of consumer disputes mechanism, and adding such functionality would add costs (Note: merchants would welcome a system with no chargeback risks, but consumers would not, nor would regulators)
2. **Taxation** – each cryptocurrency transaction is a taxable (capital gain or loss) transaction; means for calculating vs. cost basis, tax reporting, etc. yet to be solved
3. **Regulatory uncertainty** – lack of regulatory certainty creates a "holding pattern"
4. **Price volatility** – elevated levels of volatility bring additional risk into the merchant acceptance equation (absent a third-party aggregating such risk)
5. **Requires merchant adoption** – Visa & Mastercard cards are accepted at 46mm+ merchant locations with an established distribution channel (e.g., banks and acquirers)
6. **Requires consumer adoption** – Visa & Mastercard have gathered ~3.5b (Visa) cards worth of consumption power, along with incentive systems (rewards on credit)
7. **Transaction costs** – absolute levels under normal circumstances are not challenging, but the transaction cost volatility is – costs can prohibitive at times of congestion, particularly for smaller transaction sizes (fees are decoupled from transaction size)
8. **Debit-only substitute** – lack of credit extension mechanism exists in cryptocurrency
9. **Vast number of coins** – approximately 1.6k competing coins as of 2018
10. **Speed** – Bitcoin can process ~7 transactions per second vs. ~65k capacity for VisaNet, with time spanning up to 10 minutes (or more, with backlogs), albeit with an understanding that other (non-Bitcoin) cryptocurrencies are meaningfully faster (e.g., Dash, EOS, Litecoin, Bitcoin Cash, Bitcoin SV, Ripple, etc.)

Bitcoin volatility creates challenges in payments for both merchants (acceptance risk) and consumers (taxable events)



Average fees per Bitcoin transaction can be volatile, particularly under times of congestion (a challenge for payments acceptance)



Source: CoinMetrics, Credit Suisse research

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38. Cryptocurrency impact on the Payments ecosystem

…but there are nascent and niche use cases we plan to monitor…

Select innovations could alleviate some of the drawbacks of using crypto in C2B payments

- Numerous examples of innovations that effectively solve for one or many of the status quo challenges (i.e., speed, volatility/certainty to merchants accepting payments, costs), but not all (i.e., taxation remains an issue, along with regulatory uncertainty and lack of chargeback and dispute processes)
- A key rationale for crypto is decentralization – which appears unlikely for C2B payments given a need for taxation, instant conversion, consumer protection, etc.

We see select C2C remittances use cases for more volatile and lower-volume EM markets

- Existing platforms (e.g., Transferwise, Remitly, Western Union, Ria) already have developed global treasury operations and innovations (matching) that effectively enable real-time C2C cross-border payments at reasonably low fees
- While matching (netting) can "match volumes" across high-volume developed market currencies (G10), and use traditional banking rails for the remaining amounts, challenges remain in lower-volume EM currencies

Cross-border B2B is the most meaningful, medium-term use case for crypto payments

- Up against an existing bank wire transfer (SWIFT messaging) system that is viewed as less than ideal and utilizes multiple correspondent banks per transaction, resulting in uncertain timing (3-5 days), high (and also uncertain) fees, and high failure rates
- Platforms like Ripple have the potential to reduce settlement times (from days to seconds) and provide savings (low bps, but large absolute dollars)

C2B innovation will have a higher bar for adoption, given the status quo works well…	
The Lightning Network	Additional layer on top of the blockchain, using payments channels between parties; when the channel is closed, the transactions are added to the blockchain
BitPay	Bitcoin payments processing for merchants at a fee of 1%; removes volatility issue for merchants (by promising a $ amount at the time of the transaction) and aggregating the volatility risk on their end
Stable Coins	Less volatile due to linkage to either one (e.g., USD Coin by Coinbase and Cirlce) or many (e.g., Libra) fiat currencies
Libra	Potential example of a stable coin, backed by a basket of fiat currencies

…while cross-border C2C (remittances) solves a problem for volatile EM currencies…	
MGI-Ripple	MoneyGram and Ripple are partnering to introduce XRP into the MoneyGram platform. This 2-year agreement allows for XRP (and xRapid, which is a platform for utilizing XRP) to be used in MoneyGram-sourced cross-border transactions. In addition to a $50mm investment from Ripple, MoneyGram also hopes to improve its working capital (i.e., reduce need for funds in foreign banks).
Transferwise	Evaluated various blockchain technologies (including Ripple), but have yet to find a solution that enables them to improve on their current speed, costs, etc.
Western Union	Also evaluating Ripple, although initially was less bullish, trials continue

…cross-border B2B payments are an actual pain point (i.e., a problem to be solved)	
Ripple	~300 financial institutions using platform (RippleNet), which provides an option to use XRP cryptocurrency
JPM Coin	JP Morgan's stable coin (USD backed) for use in B2B payments, securities transactions, and treasury applications
IBM World Wire	Cross-broder solution that uses the Steller protocol and a multi-digital asset approach (e.g., stable coins, centeral bank coins)
R3	Offers Corda Settler, which supports XRP (but intended to support multiple options); Partnering with SWIFT on standards, Global Payments Innovation (Swift gpi); Bank of America recently joined MPN

Source: Ripple, BitPay, Credit Suisse research

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38. Cryptocurrency impact on the Payments ecosystem

…along with crypto-related activities for our covered companies

Company	Cryptocurrency-related activity
Square	• Launched Bitcoin buy/sell capabilities within Cash app in Q4 2017, and likely to earn ~$90mm in net revenue in 2020E (via trading platform; CSe) • "*It's not an if, it's more of a when and how do we make sure that we're getting the speed that we need and the efficiency*." – Jack Dorsey, CEO in speaking about integrating the Lightning Network into the Cash app (February 2019)
FIS	• Worldpay is the acquirer for Coinbase, a leading cryptocurrency wallet (i.e., Worldpay benefits when users load fiat currency into their Coinbase account)
PayPal	• Launched cryptocurrency trading Q4 2019, and also announced that it will enable cryptocurrency as a funding source for consumer purchases in 2021 (converted to fiat currency immediately prior to transaction and settled in fiat currency) • In terms of payments acceptance outside the wallet offering, PayPal currently does not support cryptocurrency (does not see demand for it from merchants) • Initially Braintree-enabled Bitcoin acceptance in 2014, but pulled it back due to lack of demand/usage • Originally announced as part of the original Libra Association (although later removed itself)
Visa	• Partnered with Coinbase on the issuance of a Visa card • Originally announced as part of the original Libra Association (although later removed itself)
Mastercard	• Recent hiring in areas of cryptocurrency (payments, wallets) • Originally announced as part of the original Libra Association (although later removed itself)
Western Union	• Testing and considering use of Ripple (XRP) for cross-border (Ripple has made a $50mm investment in Western Union competitor, MoneyGram)

Note: We do not plan to express views on cryptocurrencies themselves. The scope of our research interest is limited to the potential to impact (benefit or harm) the financial results and stock prices of the companies we cover.

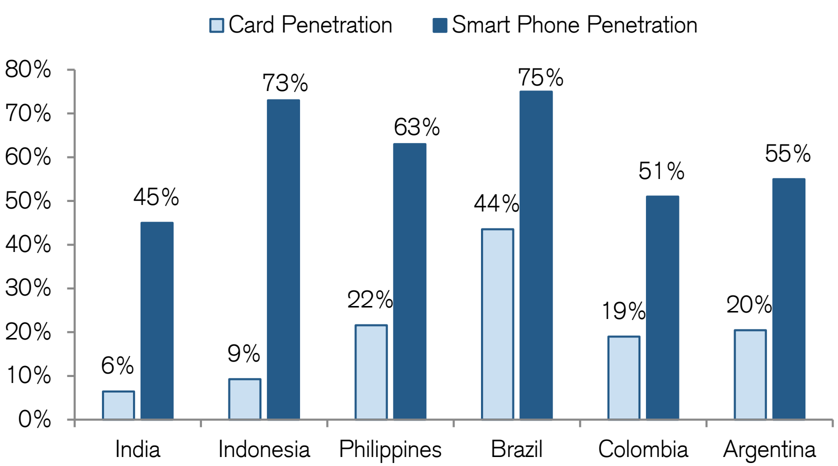
Source: Company reports / public commentary

39. Emergence of modern platforms in EM

Tech platforms & super-apps represent important partners for 4-party incumbents

- Ingredients are present to create "super-apps" in emerging markets (large population, high smart phone penetration, low credit card penetration, underbanked populations, fast-growing eCommerce markets).
- Smartphone penetration is north of 50% and approaching 75% in many markets, while credit card penetration remains low (~5-40%) – i.e., cash payment still dominant.
- Mastercard estimates 75% of Southeast Asians are underbanked, providing opportunity to increase card adoption while consumer electronic payment preferences are still being formed (i.e., Visa and Mastercard partnering with emerging platforms to avoid cards being leap-frogged in a similar manner to China with Alipay and WeChat).
- For e.g., Argentina-based MercadoPago has a large user base in Central/South America and issues Mastercard prepaid debit, while Columbia-based Rappi has ~4mm users recently launched Visa pre-paid cards in 2019

Emerging Markets characterized by high smart phone penetration but lower card penetration



Southeast Asia ingredients for the creation of "super-apps"

~75% underbanked

Fast-growing eCommerce markets

Low card penetration (~5-40%);
i.e., cash payment still dominant

High mobile penetration (~50-75%)

Source: Company Reports, Contoxo, CNBC, Credit Suisse research

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39. Emergence of modern platforms in EM

Grab and Go-Jek as examples in Southeast Asia

- Fundamentally different business models vs. western platforms like PayPal – monetizing off across numerous revenue lines (e.g., ride-sharing, delivery, Ads, banking products, etc.) leads to a different approach to payments
- Payments as the "glue" to their ecosystems, justifying rationale to undercharge merchants to grow their platform
- Southeast Asia's rapidly growing super-apps: Go-Jek and Grab
  - User base includes ~1/3 of the regions ~>640mm population, representing ideal distribution partners for payments companies
  - The opportunity for the card networks is predominately cross-border spend on prepaid cards given these platforms utilize closed-loop payments in-country
  - Mastercard and Visa partnered with Grab and Go-Jek, respectively, to provide prepaid debit cards and global acceptance
- Grab's GrabPay and Go-Jek's Go-Pay are leaders of digital payments in the region online and offline
  - QR codes enable merchants to accept electronic payments with as little as a piece of paper (no terminal costs / integrations)
  - QR payment through Super Apps could offer attractive incentives to build consumer habits (e.g., QR wallets linked directly to banks, offering 10% off promotions), although not a longer-term sustainable approach.
  - Limited rationale to build platform via legacy 4-party model given high hurdles for merchant adoption

Grab's GrabPay and Go-Jek's Go-Pay are leaders of digital payments in Southeast Asia online and offline

Grab

gojek tech

Source: CNBC, Credit Suisse research

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39. Emergence of modern platforms in EM
Grab: Southeast Asia's leading offline-to-online platform

- Founded in 2012 as a ride-hailing app – similar to Uber, expanded into delivery (2015), and launched GrabPay (2016), leveraging the power of its two-sided network
  - Operations in a market of >640mm consumers in 8 countries (Malaysia, Singapore, Indonesia, Thailand, Vietnam, Cambodia, the Philippines, Myanmar)
  - Now one of the largest employers across Southeast Asia with ~3mm drivers and >100mm users
- 2018 revenue exceeded $1bn and expected to double in 2019, according to Fortune
- Key investors include: SoftBank, Toyota, Experian, Microsoft; acquired Uber's operations in March 2018 in exchange for a 27.5% stake

On-demand Transportation
Largest player in the region – ~3mm drivers vs. ~2m for Uber (globally) – ~6mm rides per day – Offers monthly subscription ride packages
Offerings include: – GrabTaxi – GrabBike – GrabCycle – GrabShuttle – Offers car rentals

Financial Services	
Grab Financial	– Loans and insurance services
GrabPay	– In-app mobile payments analogous to Alipay with online and offline capabilities through QR codes – Adoption supported by 2-sided network of drivers & users of ride-hailing feature – For merchants, powers online and offline storefronts, taps on Grab's large user base, access to partner-exclusive online promotions & campaigns – Mastercard prepaid card for cross-border spend
GrabRewards	– Earn points for spend on platform to be used at any Grab merchant

Market Place	
GrabExpress	– On-demand delivery for users to send items such as documents, parcels, and gifts to business partners, family, and friends – Addresses local challenges of last-mile delivery in congested cities
GrabFood	– Food delivery platform similar to UberEats

Source: Company reports, Fortune, Credit Suisse research

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39. Emergence of modern platforms in EM

PayPal becoming the Super App Equivalent in DM; partner ecosystem

Incumbent ecosystem partners

- Drives customer acquisition and payments volume growth (e.g., 40 bank-led marketing campaigns in 2018)
- Provides PayPal with in-store card network tokens and necessary acquiring bank relationships

Traditional eCommerce (Large & Small)

80% of Internet Retailer 500

~23mm Merchants

PayPal venmo Braintree

~300mm Consumers

Platforms & Market Places

Other market places post eBay agreement

Social Networking

- PayPal powers Facebook Pay and also allows Venmo users to sync their Facebook friends list
- PayPal also powers Instagram Shopping

Travel Commerce

Ride-Sharing & Food Delivery

- Daily use case spend categories, aids consumer engagement
- Plans to power Uber's mobile wallet - direct distribution channel to underbanked driver's globally

Source: Company websites, Credit Suisse

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40. National payment schemes, alternatives to V and MA

Payments is the most local, global business

- Nationalism related to payments schemes can make for an uneven playing field for Visa & Mastercard in some countries
  - Varying degrees of regulations supporting government-sponsored domestic payment schemes and/or mandating that processing (authorization, clearing, and settlement) be performed by local entities
  - China, India, Indonesia, Russia, Thailand, and Vietnam are examples where some form of government support or mandate exists
  - Some countries are mandating data localization, which aside from increasing operating expenses (a lesser concern), limits the use of the data in informing risk models
  - Additionally, there are certain countries where either the government itself or consortiums of local banks own domestic processing assets

Sample list of competing domestic networks, the majority of which are by definition sub-scale relative to Visa & Mastercard, and thus have a lesser ability to invest, innovate, etc.

AsiaPac	Eftpos (Australia), Eftpos (New Zealand), BC Card (South Korea, Smartlink (Vietnam), VNBC (Vietnam), Bancnet (Philippines), MegaLink (Philippines), NEPS (Nepal)
North America	US PIN debit networks (STAR, Accel, NYCE, Jeanie, Presto, Shazam, etc.), Interac (Canada)
Europe	Girocard (Germany), Carte Bancaire (France), PostFinance (Switzerland), Multibanco (Portugal), Eufiserv (Pan Europe ATM), BCC (Belgium), Nets (Nordic/Baltic), UPC (Ukraine), DIAS (Greece)
Latin America	Elo (Brazil), Prosa (Mexico), Redcompra (Chile)
Middle East & Africa	GCC Net (pan-Middle East), BENEFIT (Bahrain), UAE SWITCH, OMAN NET, KNET (Kuwait), NAPS (Qatar), InterSwitch/Verve (Nigeria), Monetique (Tunisia), EthSwitch (Ethiopia)

Source: Company reports, Reuters, Infosys, Credit Suisse estimates

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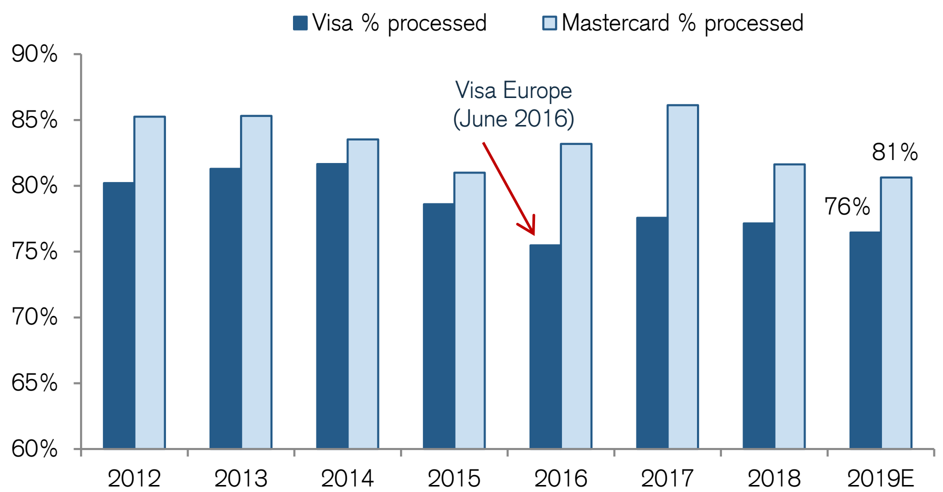
40. National payment schemes, alternatives to V and MA

Payments is the most local, global business

- What are some of the offsetting forces for Visa & Mastercard?
  - Global scale and the ability to invest & innovate in an increasingly complex payments ecosystem (e.g., security & fraud management, global acceptance, eCommerce, tokenization); local schemes are challenged to keep pace given they are sub-scale, at times non-profit entities, and they often lack cross-border capabilities
  - For balance, almost every country has some form of local or domestic payments scheme that V/MA must compete with (this is not new), and despite this, V/MA have maintained processing share of their own transactions
  - We believe the widening gap between global card networks and domestic schemes will aid continued share gains for V/MA

V & MA process ~75-80% of their transactions (i.e., transactions where V/MA earn processing revenue)



Source: Company reports, Reuters, Infosys, Credit Suisse estimates

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40. National payment schemes, alternatives to V and MA
European example, and the moat around Visa & Mastercard

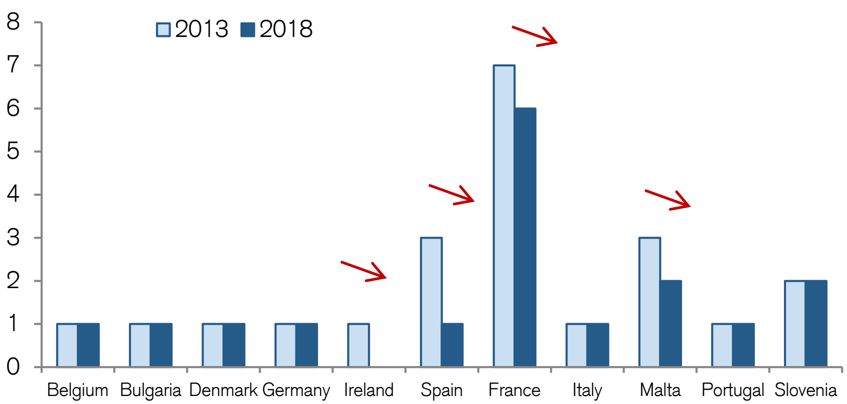
European domestic schemes continue to lose share to V & MA, partially driven by a lack pan-European acceptance without co-badging. European regulators are committed to unifying the domestic schemes:

- We believe this is likely the next focus of completing the SEPA vision (that lead to the euro, PSD2, IFR, etc.) and is a risk we plan to monitor, although past initiatives have failed
- Large upfront investment required to capture a smaller portion of transactions (~8% of European card transactions are cross-border)
- V/MA are partially hedged given; 1) their networks would be required for acceptance outside Europe; 2) incumbent banks increasingly need help from increasing competition with PSD2; and 3) SEPA for cards is "market-driven"
- The ECB believes a connected instant payment systems may be a viable solution, positioning MA best to help realize this objective (global networks have non-card capabilities that could be helpful to select domestic schemes, although case-by-case to avoid improving a competitor network)

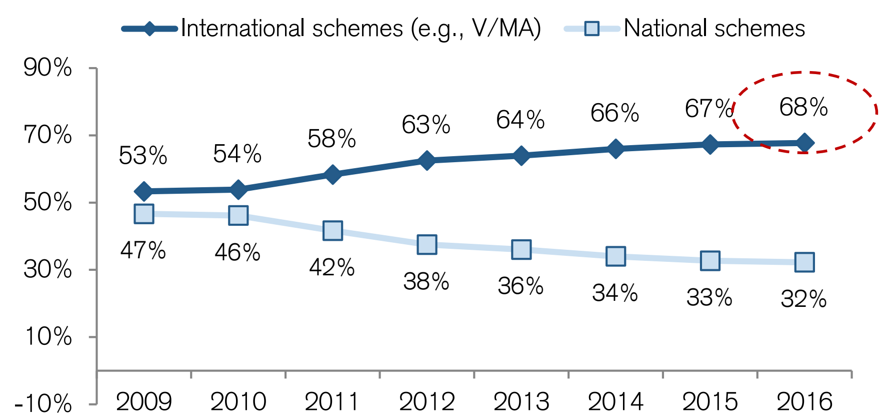
Reasons we believe V & MA will maintain/increase share in Europe (in addition to a greater ability to invest/innovate – e.g., online, tokenization, contactless, etc.) relative to comparatively sub-scale domestic schemes:

- FinTech issuers ("Challenger banks") will continue to pick V/MA due to: 1) pan-European & global acceptance vs. single country; 2) card monetization is a main source of monetization, and thus best-in-class capabilities from V/MA are crucial: and (3) V/MA have invested in programs specifically to onboard FinTechs (i.e., why would a FinTech waste time with onboarding with each domestic scheme when they could get fast, global acceptance with V or MA?)
- Interchange has already been capped in Europe (both domestic and cross-border), removing the prior total MDR advantage for national schemes
- Co-badging is a solution that has worked for pan-European acceptance (i.e., domestic scheme for in-country, V or MA for cross-border)

According to the ECB, in 2013, there were 23 active national card schemes in Europe – that number dropped to 17 by 2018



International schemes have gained share, reaching ~2/3 of transactions on European-issued cards (2016 vs. ~half in 2009)



Source: European Central Bank, Credit Suisse research; SCT Inst is SEPA Instant Credit Transfer, launched November 2017

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40. National payment schemes, alternatives to V and MA

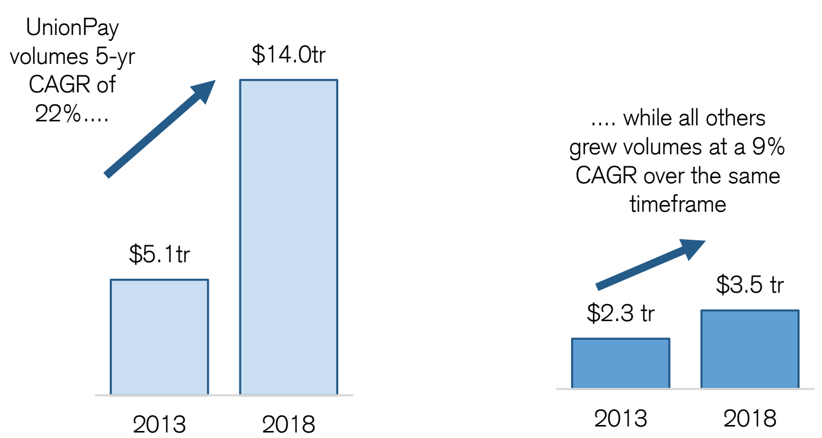
Payments in China, Union Pay the single domestic network

- Currently, the only network allowed to handle renminbi-denominated settlement and clearing is China UnionPay (majority owned by the People's Bank of China - PBOC).
- Visa and Mastercard offer single-badged and co-badged cards (through Chinese issuing banks) for use when travelling outside China.
- China Union Pay has ceded mobile payments share to both Alipay and WeChat (which combine for 90%+ share).

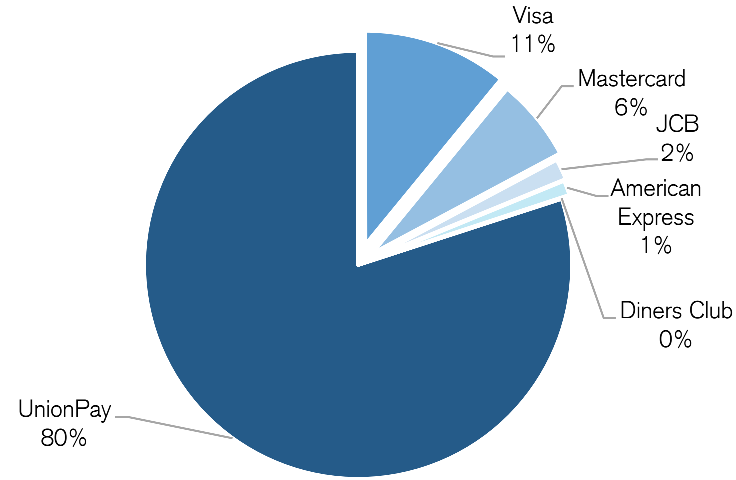
"… Alipay and Tencent -- Tencent's WeChat in the last 18 months has been able to really drive a Mac truck through payments in China. And the reality is that…they certainly have had the advantage of not being regulated as a bank, and I don't think that's going to be the case as they ultimately migrate out of China. But also I think CUP took their eye off the ball as they probably put more emphasis on looking at growing acceptance outside of China. And as a result, we've seen what happens…"

– Al Kelly, CEO, Visa (May 2017)

APAC general purpose card (GCP) payments volume



APAC card network volumes are dominated by China Union Pay, making up ~80% of the entire region



Source: The Nilson Report, Credit Suisse research

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40. National payment schemes, alternatives to V and MA

Payments in China – 20 years of history since China joined WTO

- PayPal recently announced that the PBOC approved its acquisition (70% equity ownership) of Guofubao Information Technology Co (GoPay).
- China is the largest digital payments market in the world, forecast to represent nearly $2tr, or >50%, of global online retail sales in 2019 and ~40% of cross-border eCommerce by 2021 (>500mm Chinese consumers).
- PayPal believes this opportunity has the potential to be material in the medium to longer term (2021 and beyond) but acknowledges a relatively high degree of uncertainty (see timeline below).
- GoPay has a license enabling it to process online and mobile payments in China and issues UnionPay-branded debit cards.
- PayPal will not have the ability to clear and settle transactions.
- American Express was the first US-based network to enter China through its JV with China-based LianLian Group (November 2018). In January 2020 the PBOC announced it accepted American Express' application to start a bank clearing card business in China (final approval is still required)

PayPal announced intent to acquire 70% of GoPay in September 2019

PayPal

GoPay

2000

2001
China admitted to the World Trade Organization (WTO)

2006
China mandated to allow payments access to US providers (but no agreement was reached)

2010
WTO asked by US Trade Representative to create a panel to discuss "discriminatory and restrictive" treatment of US payments networks prohibited from operating in China

2017
People's Bank of China (PBOC) issued Bank Card Clearing Institute (BCCI) license regulations – in order to clear and settle payments on renminbi-denominated cards

2017
Mastercard and American Express entered agreements with joint venture partners to pursue a BCCI license; Visa has not publicly announced any partners

2018
After the US gov't placed tariffs on Chinese goods, the approval process for Visa and Mastercard was suspended and has not resumed since

2019
PayPal acquired majority stake in GoPay – a small Chinese payments company

2020
The PBOC accepted AMEX's application to start a bank card clearing business in China which would make it first US network to enter China if final approval is granted

2020

Source: Company reports, Credit Suisse research

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40. National payment schemes, alternatives to V and MA

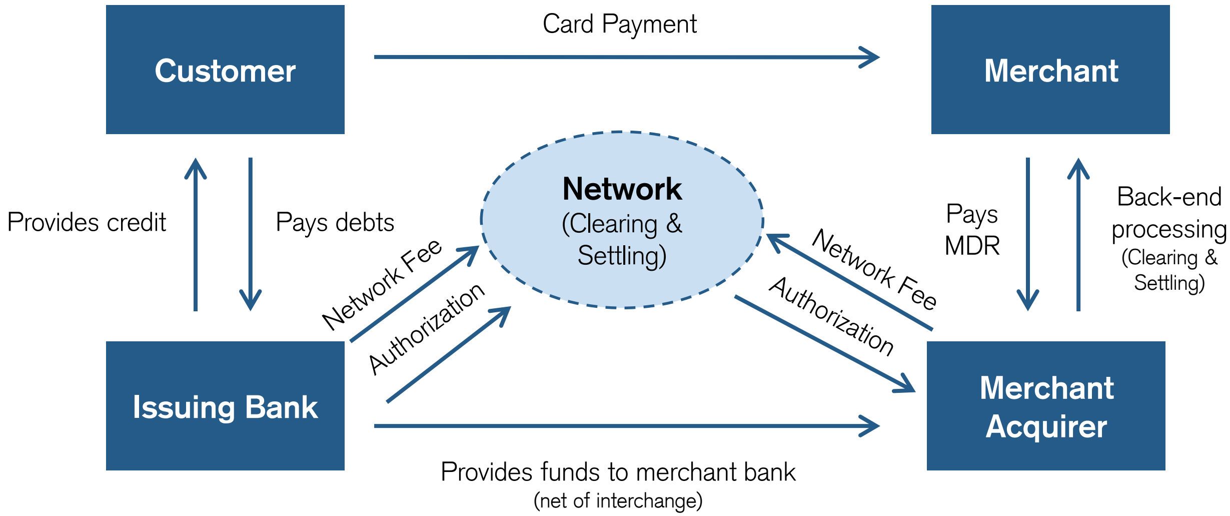
Examples of government and/or local preferential treatment

Country/Region	Benefiting domestic network	Government and/or local operating preferential actions
China	China Union Pay	• Only China Union Pay (CUP) is able to process domestic transactions • Both V & MA have filed applications via the People's Bank of China (PBOC) requesting a Bank Card Clearing Institution (BCCI) license, the applications have yet to be "recognized" • CUP (and Mir, below) have expanded acceptance outside their home countries, which puts a distant risk on the table around the networks' international routing rule (requires international transactions be processed by V & MA)
Russia	Mir	• Mir was created in 2014 and favored by Russia's National Card Payment System (NSPK) • Government disburses payments (e.g., pension, unemployment benefits) on Mir cards • Effectively prevents V & MA from processing domestic transactions (all domestic transactions run through NSPK)
India	RuPay	• RuPay is owned by the National Payments Corporation of India (NPCI), which is in turn owned by a group of state banks (along with private and foreign banks) • Publicly supported by Indian Prime Minister Narendra Modi • Demonitization (removing high-value paper notes) efforts in 2016 have led to increased digital payments and thus the importance of any potential favoritism • RuPay (similar to CUP) has a partnership with Discover to allow for more global acceptance
Indonesia	Gerbang Pembayaran Nasional	• Local regulations require processing be done domestically, per National Payment Gateway (NPG), via Gerbang Pembayaran Nasional • Switching companies must be at least 80% owned by a domestic entity
Thailand	Thai Payment Network	• Domestic processing mandate by the Electronic Transactions Commission (for debit)
Vietnam	Smartlink, VNBC	• Smartlink, VNBC are the domestic networks
Europe	All domestic schemes	• As of 2016, new regulations mandated that Visa and Mastercard could no longer earn fees on domestic European transactions if the processing was done by a domestic network • Card networks previously earned a small brand assessment in select countries (those fees were eliminated)

Source: Company reports, Reuters, Infosys, Credit Suisse research

Payments Primer Materials

1. The 4-party model
Diagram and economics



Issuing Bank:	**Customer:**	**Network:**	**Merchant Acquirer:**	**Merchant**
+ 205bps – interchange	- $100 – payment	+15bps – merchant fee	+ 250bps – MDR	+ $100 – sale
- 10bps – network fees	- $100 net	+10bps – issuer fee	- 205bps – interchange	- 250bps – MDR
- 3bps – issuer processing		- 6bps – rebates	- 15bps – network fees	= + $97.50 net
+ 3bps – rebates		+19bps net	+ 3bps – rebates	
= + 195bps net			= + 33bps net	

Transaction notes:
- Customer inserts card into POS terminal (data capture), then the merchant acquirer routes the data to the network, which then queries the issuing bank for authorization (sufficient funds, fraud checks, etc.)
- Then the authorization flows back through the system to the merchant acquirer, allowing the transaction to close
- Then the issuing bank settles the outstanding balance with the merchant's bank, and the funds are deposited net of fees

Source: Company reports, Glenbrook Partners, Credit Suisse research

1. The 4-party model

Description of parties with examples (illustrative economics)

Merchant	Network	Merchant Acquirer		Card Issuer	Issuer Processor
		Front-end processor	Back-end (acquirer processor)		
Accepts payments from consumers and pays the merchant discount rate (MDR) to the merchant acquirer	Acts as the hub for card payment transactions, relaying authorization and settlement messages between issuing and acquiring banks (earning fees from both in the process)	Signs up individual merchants, underwrites a merchant account for them at the underlying acquiring bank, and enables merchants to accept card payments; captures card/transaction data, routes the message to appropriate network for authorization (in real-time); earns the majority of the acquiring spread[1]	Handles settlement and clearing messages received from the card network, and deposits funds net of fees into the merchant's account; receives fixed fee per transaction, a minority portion of the acquiring spread[1]; chargebacks come to the merchant via the back-end processor	Provides consumers and businesses with bank accounts, credit extension, and cards; earns interchange on card transactions, the largest portion of the MDR. Interchange rates are set by V/MA	Sits in front of the issuing bank to receive authorization request messages from the card network, and relays decision back to the card network (in real time); then, clears and settles transaction for the issuing bank; earns account and transaction fees, outside of the MDR (indirectly funded by the issuers' portion)
Target, Home Depot, McDonald's, Lululemon, Reebok, Safeway, WaWa	Visa & Mastercard (open-loop); American Express & Discover (closed-loop); STAR, Accel, NYCE, Pulse, Interlink, Jeannie (PIN debit)	FIS (Worldpay), Global Payments & TSYS, Adyen, Chase Paymentech, Fiserv (First Data), Repay – all technically operate as ISOs in the US, sponsored by an acquiring bank		Chase, Barclaycard, Bank of America, Wells Fargo, US Bank, Capital One, Citi, Synchrony Financial	TSYS, FIS, Fiserv (First Data), Marqeta, Galileo, i2c, or in-house for larger banks (TSYS is the share leader among banks that outsource)
		Square, PayPal, Stripe	Acquiring banks (BIN sponsor): Wells Fargo, BMO Harris, BBVA USA, MetaBank, etc.		
Sample economics on $100 eCommerce credit card transaction					
+ $100 Customer payment - $2.50 (250bps) MDR = + $97.00	+ $0.15 Merchant network fee + $0.10 Issuer network fee - $0.03 3bps rebates (acquirer) - $0.03 3bps rebates (issuer) = +$0.19 net	+ $2.50 MDR - $0.15 Merchant network fee - $0.05 Back-end processing fee - $2.05 Interchange = + $0.25 acquiring spread - $0.05 back-end acquiring fee + $0.03 Network rebates = + $0.23 net	+ $0.05 Back-end acquiring fee (~25% of acquiring spread ex-rebates, which was $0.20 in this example)	+$ 2.05 ($0.10 + 195bps) Interchange - $0.10 Issuer network fees - $0.03 (flat charge) Issuer processor fee + $0.03 network rebates = + $1.95 net	+$0.03 (flat charge) issuer processor fee Note: Issuer processors also charge fees based on the number of accounts, along with other services like statement printing, card production, customer service, etc.

Source: Glenbrook Partners, Credit Suisse research, [1] Acquiring spread refers to the portion of the MDR the acquirer retains after all other parties receive their fees (networks, back-end acquiring processor, and the issuing bank); depending on the contract, these fees are fixed (cost +) or variable (in which case the spread is dictated by the level of interchange associated with the specific type of card), generally for smaller merchants without pricing power; merchant acquirers also pay small fees to their sponsoring acquiring bank for BIN rental (~1-3bps)

1. The 4-party model

Step 1. Authorization (illustrative example, credit cards)

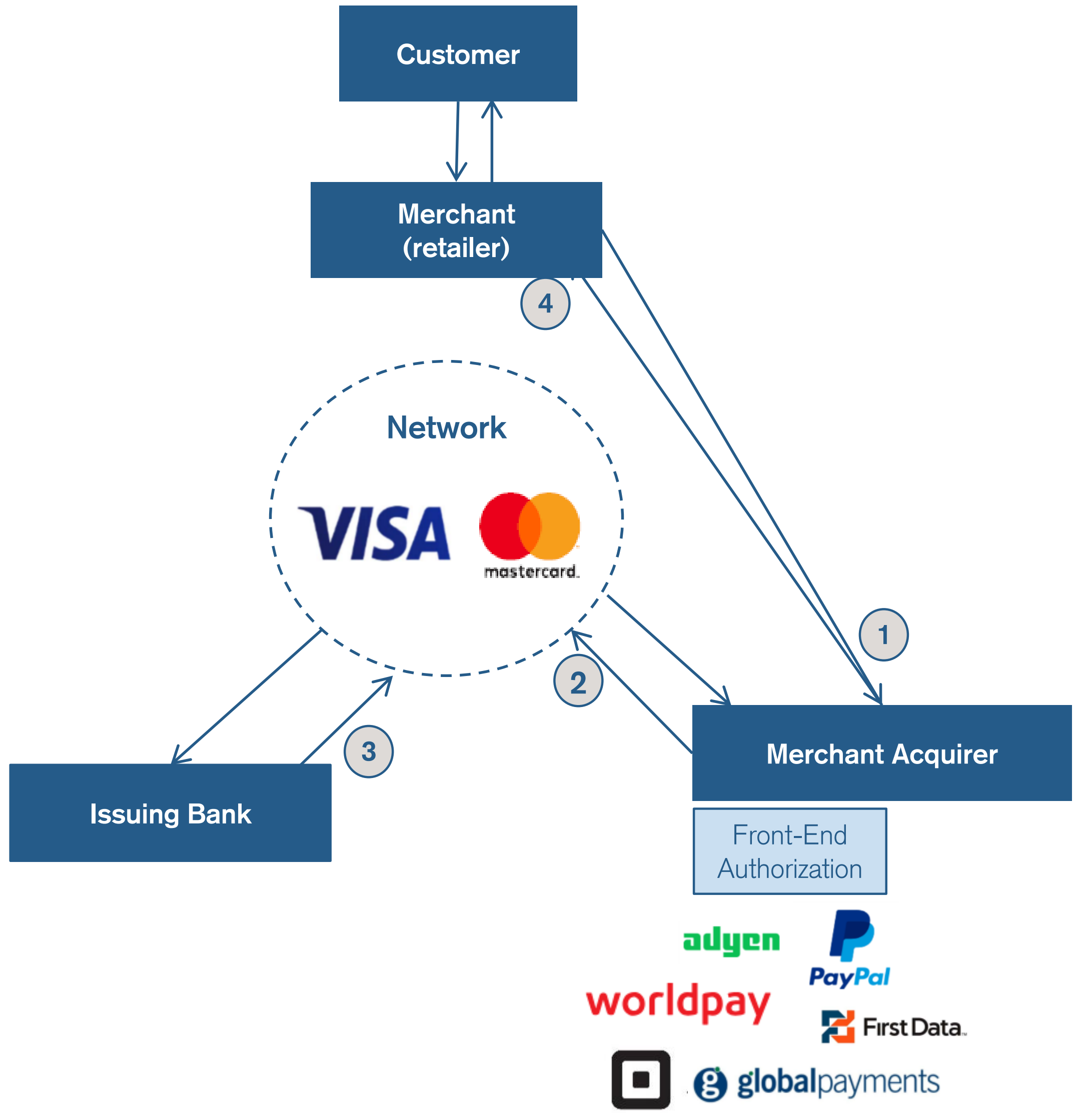
1. Data Capture – The customer inserts the credit card into the merchant's POS (online or in-store). Card credentials and transaction data are captured (and if prompted, the customer provides 2-factor authentication).

2. Authorization Routing - The merchant acquirer sends the authorization request through the network (e.g., V, MA) for the card being used, which is ultimately received by the issuing bank (that issued the card).

3. Once the issuing bank has authorized the transaction (sufficient credit available, fraud, risk analysis, etc.), it will communicate a confirmation back through the network to the merchant acquire in real time.

   Note: Europe – if a non-exempt issuer transaction, then issuer must verify using 2-factor authentication (PSD2 SCA)

4. The merchant receives confirmation (from its merchant acquirer) that the transaction is authorized and completes the sale.



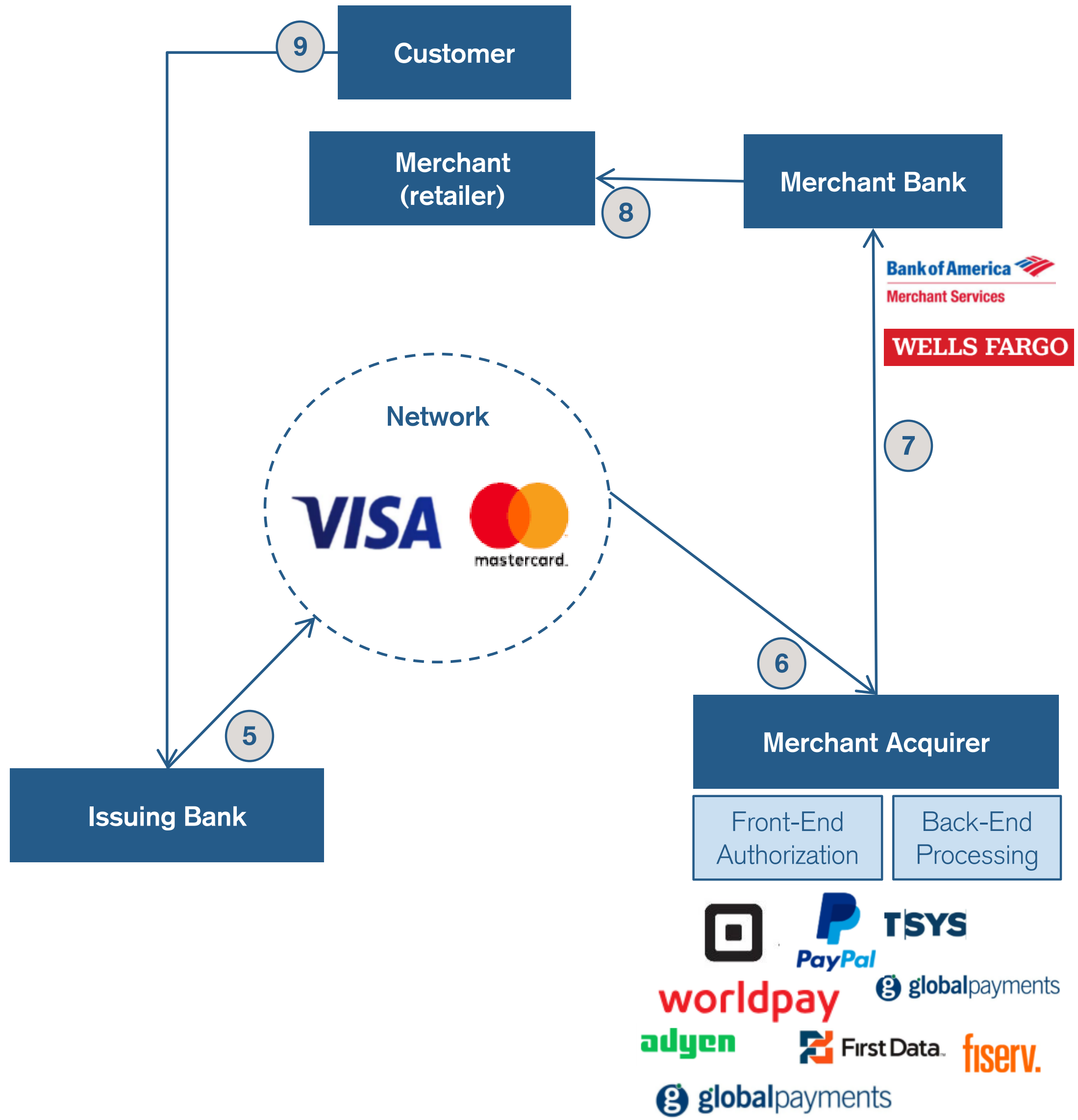
1. The 4-party model

Step 2. Payment and settlement (illustrative example)

5. To initiate the payment process, the credit card issuing bank will front credit on behalf of the customer to settle the transaction, which is then routed through the payments network.
6. The network passes the transaction to the merchant acquirer's back-end processor (which may be handled by a third-party) for settlement.
7. Ultimately, the back-end merchant processor will settle the net outstanding balance between the card-issuing bank and the merchant acquiring bank (where the merchant has its merchant account).

   The settlement bank sits between both the merchant bank and the issuing bank and settles daily via a netting process by account (facilitated by V, MA).

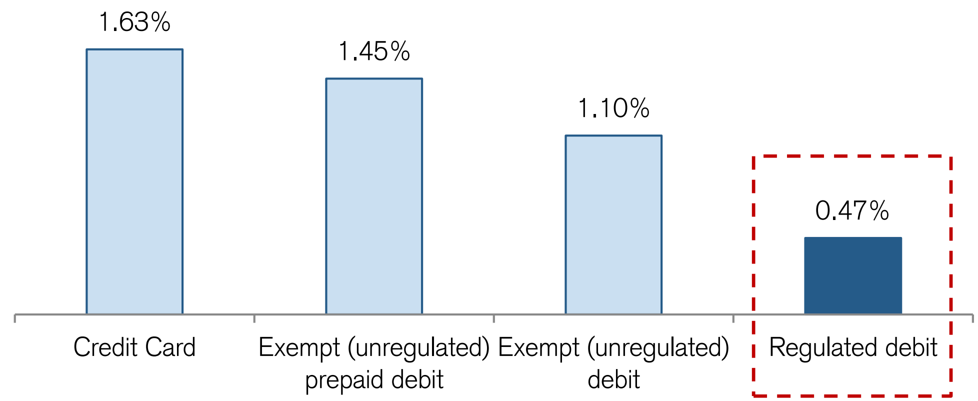
8. The merchant bank will then credit the merchant's account for the amount of the purchase, less fees charged for facilitating the transaction across multiple parties, such as:
   - Interchange ~150-300bps paid to the issuing bank,
   - Acquiring spread ~10-100bps (wide range) paid to the merchant acquirer (majority to front-end processor if separate),
   - Network fees ~15-20bps paid to the networks (net of rebates and incentives).
9. Credit card statement comes due, and the cardholder must pay the bill (interest on unpaid balances earned by issuing bank, which can represent the majority of total credit card economics).



1. The 4-party model
Interchange fee economics

- Interchange fee dynamics
  - Interchange fees differ by type of card used (credit, debit, prepaid debt, Durbin-exempt debit) and by transaction type, merchant type, domestic vs. cross-border, etc.
  - Interchange fees are set by the card networks (Visa, Mastercard) but earned by issuing banks
- Interchange rate caps
  - Generally increased over time due to increased mix of premium cards (e.g., Platinum rewards programs)
- Durbin Amendment (Dodd-Frank Act of 2010)
  - Reduced interchange fees earned by debit issuers with greater than $10b in assets
  - Non-Durbin exempt debit capped = 5bps + $0.21
- Interchange fee caps in Europe (IFR regulations)
  - ~20bps for debit
  - ~30bps for credit

Various US Interchange fees paid to issuers for a sample $50 Visa retail transaction; regulated debit cards carry significantly lower interchange rates



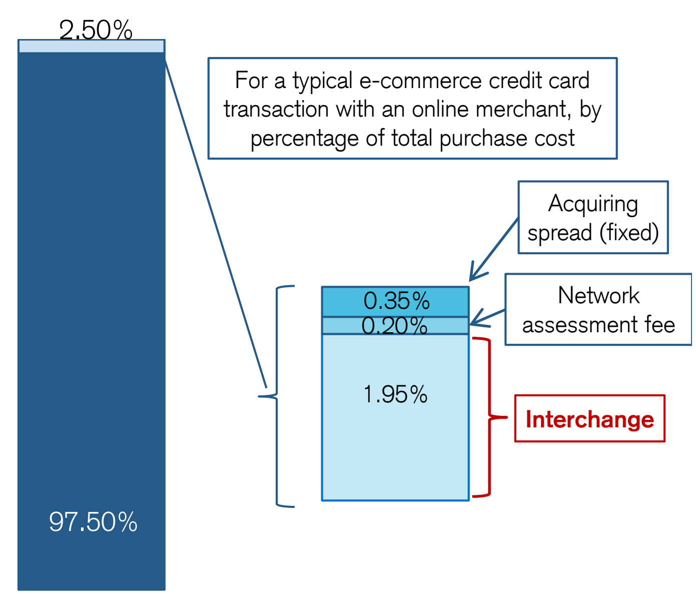
	e-Commerce	Retail			
Visa US interchange (US Retail category)	**Credit Card**	**Credit card**	**Exempt (unregulated) prepaid debit**	**Exempt (unregulated) debit**	**Regulated debit**
Illustrative Transaction Size	$50	$50	$50	$50	$50
+ Cents per Transaction	0.10	0.10	0.15	0.15	0.21
x % of volume	1.95%	1.43%	1.15%	0.80%	0.05%
= Total Interchange ($)	$1.08	$0.82	$0.73	$0.55	$0.24
Total interchange (%)	**2.15%**	**1.63%**	**1.45%**	**1.10%**	**0.47%**

Source: Credit Suisse research

2. Merchant Acquiring Pricing
“Interchange plus (+ +)” pricing

- The merchant acquirer charges a fixed spread on top of interchange (paid to issuing bank) and card network fees (Visa, Mastercard)
  - Merchant Discount Rate (MDR) ~250bps (variable by definition) – Fee paid by the merchant accepting a transaction to the merchant acquirer
  - Interchange ~195bps – Fee paid to issuing bank based on a combination of card type (rewards level, gold card, platinum, etc.), merchant type, domestic vs. cross-border, etc.; largest component of MDR
  - Network fees ~10-30bps – Fee paid to the card networks (Visa, Mastercard)
    - Brand / service fee (assessment), *ad valorem* charges
    - Data processing fees (processing), cents per transaction charges
  - Acquiring spread (fixed under interchange ++, although likely associated with tiered volume discounts) but can range ~10-40bps – Set by and paid to merchant acquirer (and perhaps is shared with a third-party back-end processor) in exchange for acquiring, processing, and settling the transaction; Acquiring spread is inversely related to merchant size (higher volumes gives larger merchants pricing power)
- Price transparency considerations for merchants:
  - Larger merchants demand and receive greater price transparency versus smaller merchants (larger are more likely to use interchange ++ model)
  - European Union laws require greater pricing disclosures vs. US

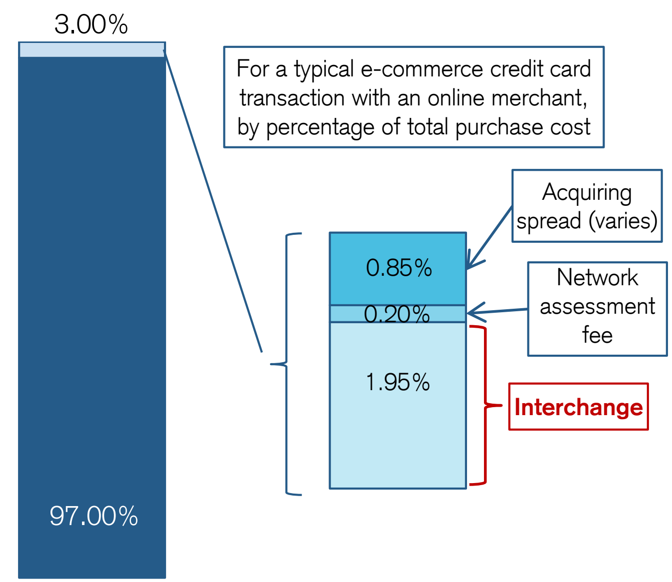
e-Commerce Typical Interchange + Pricing for a Mid-Size Merchant



2. Merchant Acquiring Pricing
Bundled fee model

- The merchant acquirer earns a variable spread but charges a standardized fee per transaction (acquirer then absorbs all other transaction-related fees)
- Example: Square's rack rate pricing is bundled fee
  - Flat 2.60% + $0.10 for each merchant transaction (card present, in-store), allowing Square to earn this amount less interchange, network fees, and any back-end processing fees (including sponsor acquiring bank fees)
  - Larger merchants are able to negotiate lower pricing based on volume levels and/or card mix (e.g., higher debit would allow the merchant to negotiate the bundled fee slightly lower)
  - Interchange ~195bps – Fee paid to issuing bank based on a combination of card type (rewards level, gold card, platinum, etc.), merchant type, domestic vs. cross-border, etc.; largest component of MDR
  - Network fees ~10-30bps – Fee paid to the credit card networks (Visa, Mastercard
    - Brand / service fee (assessment), *ad valorem* charges
    - Data processing fees (processing), cents per transaction charges
  - Acquiring spread ~30-100bps (variable) – Set by and paid to merchant acquirer (and perhaps is shared with a third-party back-end processor) in exchange for acquiring, processing, and settling the transaction; smaller merchants typically sign up for bundled fee pricing
- Simplified pricing model for merchants (pay one rate on all purchases vs. interchange++ varying by card type, transaction type, etc.), but less transparent as to underlying cost components (merchants cannot tell how much money goes to acquirer on each transaction)

Typical Bundled Pricing for a Small Merchant



3. Roles in merchant acquiring
Front-end processing and back-end processing

- POS Vendor
  - A device at a physical store location allowing a merchant to accept card payments
  - Can be supplied by a merchant acquirer/ISO
- Independent Sales Organization (ISO)
  - Signs up merchants for card acquiring capabilities
  - Receives a portion of the acquiring spread (commission)
  - Merchant of record only in “wholesale” relationships
- Gateway
  - Receives transaction data from POS and transmits it to the network via front-end processor for authorization
  - Earns a fixed fee per transaction (lowest share out of 4 front-end roles)
  - eCommerce a frequent use case (bridging merchants to the front-end processor)
- Payments Services Provider (PSP)
  - Sometimes referred to as a front-end processor
  - Handles authorization message communication for merchants, earning a fixed fee
  - Gateways may allow a merchant to connect to multiple payment services providers

- Back-end Processor
  - Receives and processes batched settlement and clearing messages, earning a fixed fee
  - Nets interchange from transaction proceeds, routing the settlement amount to the merchant
  - Creates bill and reporting for underlying merchant
- Acquiring Bank
  - Acquiring license (from the card networks) is needed to be a merchant acquirer
  - In the US, non-acquiring banks achieve this capability via partnership (“renting a BIN” from a sponsor acquiring bank)
  - In Europe and other parts of the world, payments service providers can more easily directly obtain an acquiring license
  - Responsible for merchant’s and processor’s adherence to rules of the network

Source: Glenbrook Partners, Credit Suisse research; Note: often larger acquirers and ISO fulfill many or all of the roles above, while others specialize in certain aspects and outsource others to third parties

3. Roles in Merchant Acquiring
Local acquiring

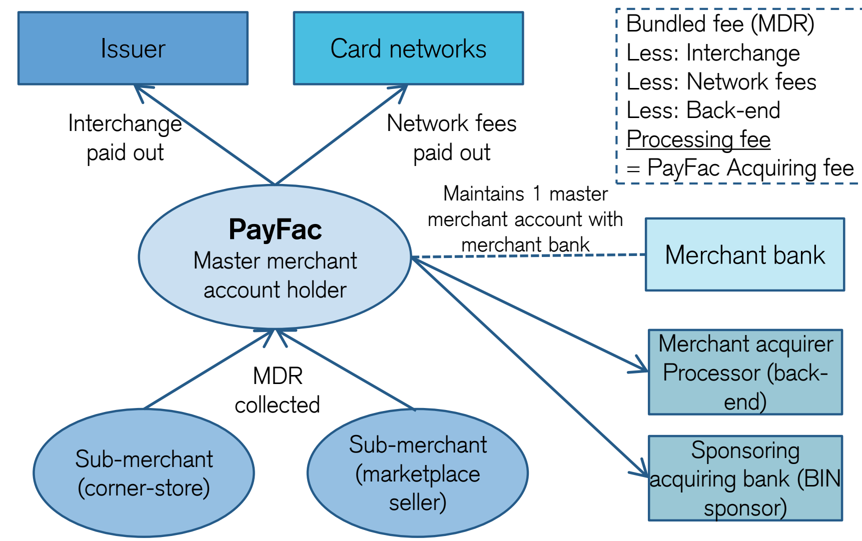
- Acquiring licenses allow merchant acquirers to underwrite merchants, accept payments, and settle funds back to the merchant through the processing platform. The acquirer takes on the merchant default risk for situations in which the merchant has chargebacks and for any number of reasons it is not able or willing to pay (e.g., no funds in account, goes out of business, was fraudulent).
  - **Increased Authorization Rates** - When a payment processor is operating with a local acquiring license in the same market as the issuing bank, the risk associated with approving that transaction is perceived to be lower and, thus, results in a higher approval rate. This is of particular importance in eCommerce (card-not-present) environments, where authorization rates average in the mid-80%s and can be materially lower in certain markets.
  - **Reduced Interchange and Network Fees** - Local acquiring allows the acquirer to classify transactions as domestic (vs. cross-border), which results in reduced interchange (charged by issuing bank) and network fees (charged by the card networks). In "interchange + +" models (interchange + network fees + acquirer spread), this means the ability to provide reduced costs to the merchant.
  - **Faster Settlement of Funds** - Allows for the clearing and settlement process to be done over the local clearing solution.
  - **Local Merchant Accounts** - With a domestic license, the merchant acquirer can offer a domestic merchant account to its clients. This means the merchant can receive payments in the local currency and simply hold (or use) them in that market.
  - **Local Payment Methods and Experience** – Adding more locally relevant payment methods by country and/or region, provides for an increased choice at checkout and makes for a more familiar and local feel for the in market customer.
  - **Control of Data and Offering** - End-to-end ownership of data (not having to be exported to a partner) allows for control of how transaction details and card numbers are presented to issuing banks for authorization. This also means not having to wait for a local partner to begin accepting new forms of payment (e.g., Apple Pay, Google Pay) but can control the timing and availability itself.
- In markets where a payments provider does not have a directly owned acquiring license, an alternative is to rent a license from another acquiring bank (i.e., "bin sponsor"). Generally speaking, this works just the same as owning a license, and often comes down to a decision around the level of volumes expected vs. the required investment to achieve a license.
  - Many countries require BIN sponsorship to be done with a regulated bank, while others allow for acquirers to self-sponsor
  - Achieving a local acquiring license typically involves establishing a local business entity, establishing connections to the local banking system, meeting local regulatory requirements, and ultimately, applying for a license
  - Addition of an extra party (generally a local bank) can at times potentially impact control of the data, restrict merchant categories (e.g., airlines, gaming), merchant onboarding practices, and overall authorization rates (depending on bin sponsor arrangement)

Source: Adyen, First Data, Credit Suisse research

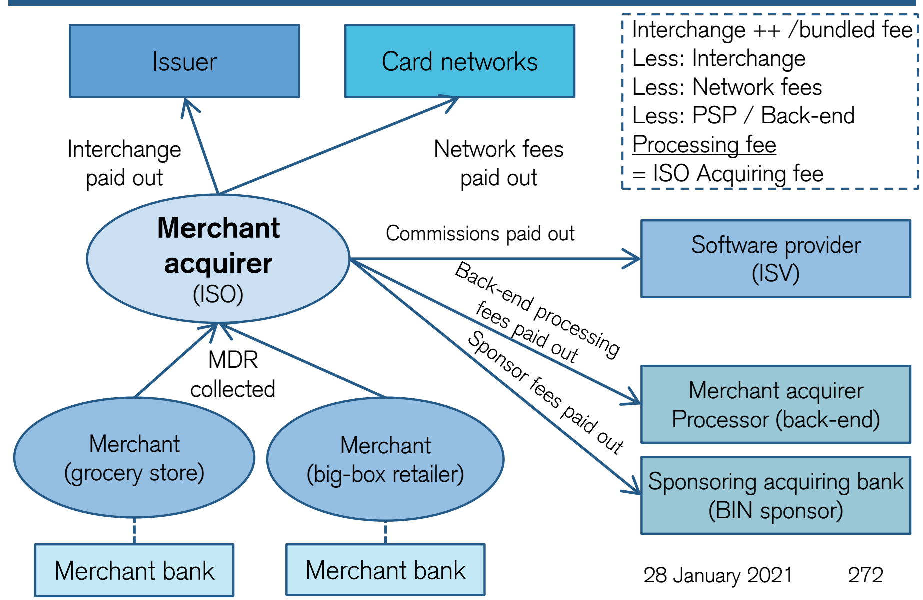
3. Roles in merchant acquiring
What is a Payment Facilitator?

- PayFacs, often referred to as merchant aggregators, sign up and process payments for small merchants as “sponsored merchants” or “sub-merchants” that reside under the PayFac’s merchant account.
  - Visa has referred to PayFac’s like Square as a single merchant when describing merchant acceptance location numbers.
- The PayFac handles all aspects of a payments transaction on behalf of the sub-merchant, including PSP/back-end merchant processing, and maintains sub-merchant accounts under their master account.
  - Facilitation allows for easy onboarding of sub-merchants, often done via an in-house proprietary underwriting program.
  - If a sub-merchant achieves > $1mm in annual volume, network rules (Visa, Mastercard) dictate that they cannot be a sub-merchant anymore and must have their own merchant account opened.
  - Merchants with volume beyond these thresholds must be onboarded under the Independent Sales Organization (ISO) model, a more lengthy, rigorous application process (numerous forms, days/weeks vs. instant).
- Companies that become PayFacs can be grouped into three buckets:
  1. Core commerce platforms/payments companies (e.g., Square, Stripe, PayPal, BlueSnap, PagSeguro, SumUp), although even within this group, both PayFac and non-PayFac models can be employed (e.g., Stripe can serve as both PayFac and ISO);
  2. Integrated Software Vendors (ISVs) with verticalized SaaS offerings (e.g., to operate a restaurant or fitness center), which have a payments aspect to their software/workflow (e.g., Toast, Mindbody, Lightspeed); and
  3. Marketplaces and related technology platforms that “take payments in-house” (e.g., Etsy, Shopify, Wix, Yapstone).

Typical PayFac structure, where the PayFac aggregates many sub-merchants (typically micro & SMB) under its master merchant account



Typical ISO structure (each merchant has its own account) integrated payments example shows merchant referral commission paid to ISV



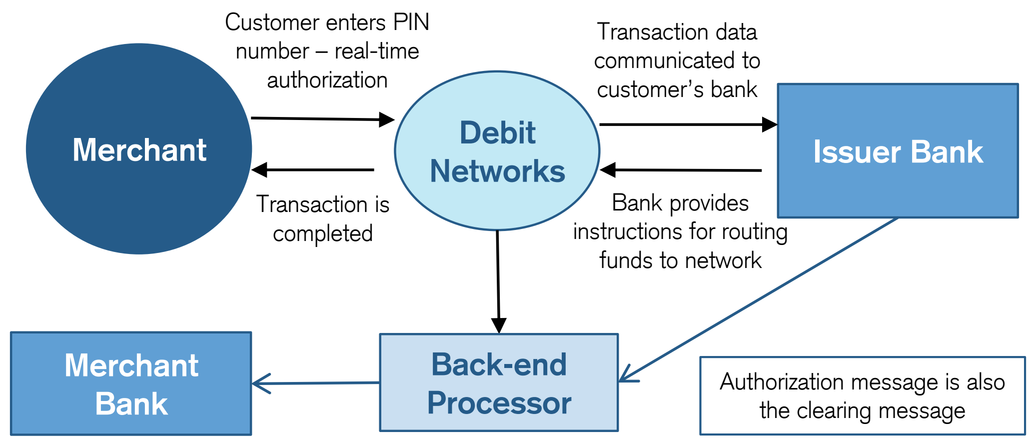
Source: Company reports, Glenbrook Partners, Credit Suisse research

4. Debit card network mechanics

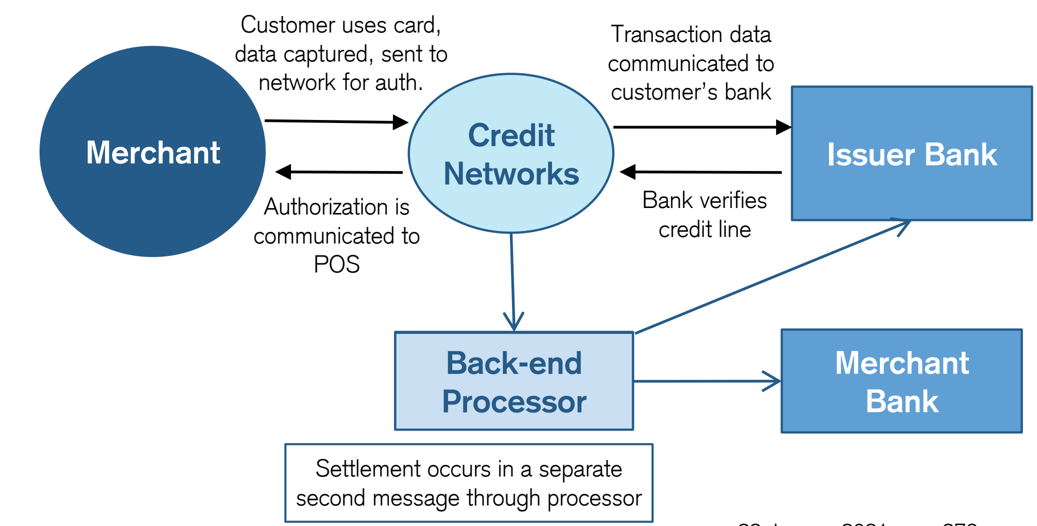
Single and dual-message

- Single message – Initially created for ATMs, where authorization & settlement are handled at the same time
  - Generally, a Personal Identification Number (PIN) is required to complete the transaction
  - PINLess debit allows for usage of single message but does not require a PIN entry (allowed for transactions under $50)
  - Allows customer to take cash back at point of sale
- Dual message (e.g., credit card rails) – 2 messages, 1 for authorization and 1 for settlement
  - Signature debit transactions flow similarly to credit transactions
  - Captured data gets routed over credit card rails
  - Signature debit use cases:
    - Recurring payments (utilities, car loan, phone bill, rent)
    - Pre-authorization requirements (e.g., in order to tip at a restaurant, the settlement amount has to be different than the initially authorized amount)
- Transaction funding differences
  - PIN - Money is pulled directly from the bank account linked to the debit card to fund the transaction
  - Signature - Transactions are posted in 1 day to the account after settlement occurs through back-end processor

Single Message Illustration (PIN Debit)



Dual-Message Illustration (Signature Debit)



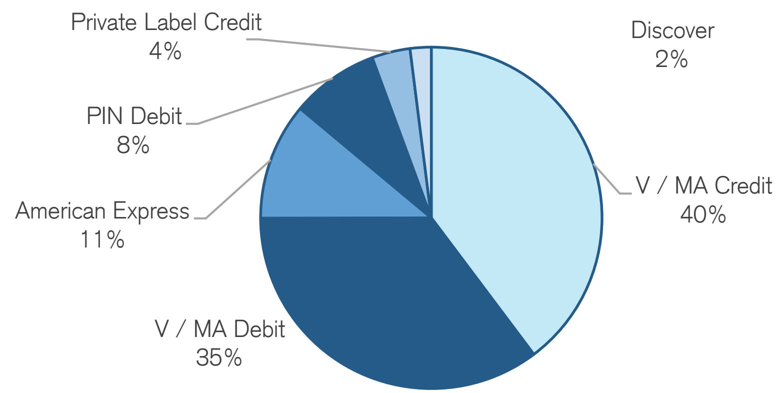
Source: Glenbrook Partners, Credit Suisse research

4. Debit card network mechanics

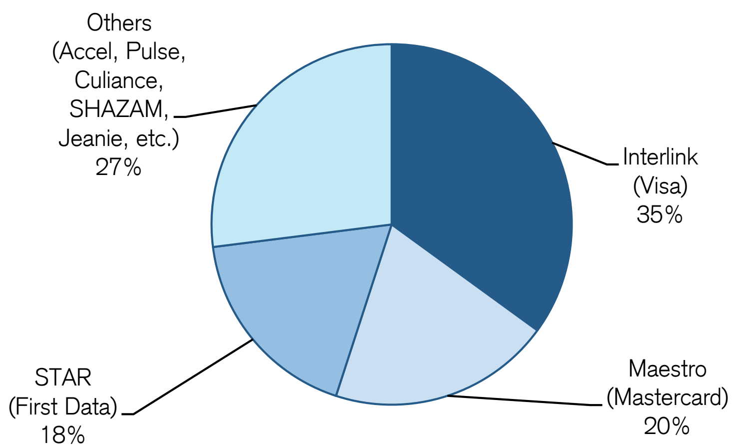
Competitive overview

- PIN debit usage has decreased in the past 5 years, while signature debit and credit card usage has grown HSD.
- After a period of consolidation beginning in the 1980s, the majority of debit networks are owned by scaled incumbents in the payments industry.
  - Visa – Interlink
  - Mastercard – Maestro
  - First Data – STAR
  - FIS – NYCE
  - Fiserv – Accel
  - Discover – Pulse
  - Worldpay - Jeanie
- Network fees are lower for PIN debit transactions vs. signature debit transactions.

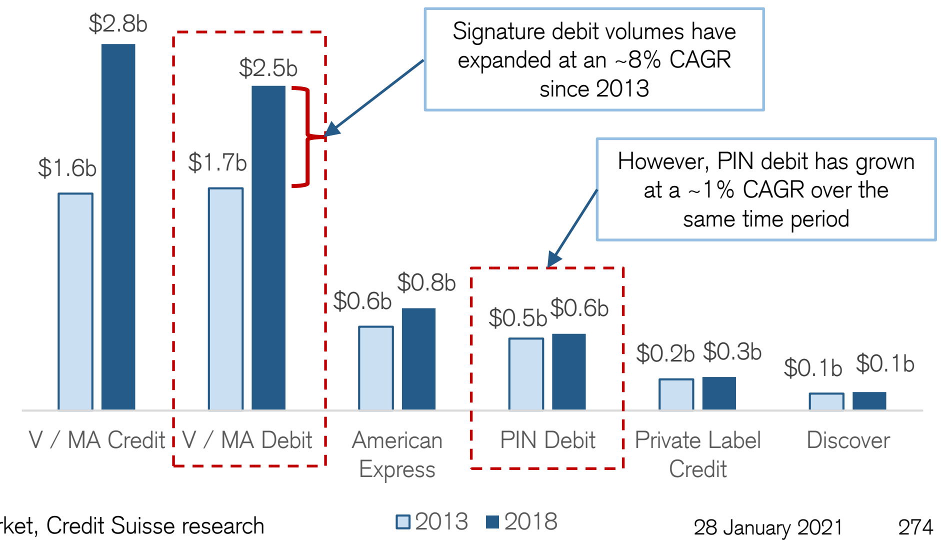
US general purpose purchase volume market share, showing Visa and Mastercard credit and debit as the lion's share of total volume



US PIN debit share leaders are Visa (Interlink) and Mastercard (Maestro), with STAR (Fiserv/First Data) a clear number three



US general purpose purchase volume ($b) suggests signature debit has grown at a much faster rate (2013-2018) vs. PIN debit



Source: Company reports, The Nilson Report (2018 Merchant volume), Mergermarket, Credit Suisse research

4. Debit card network mechanics
ACH vs. debit, key differences and use cases

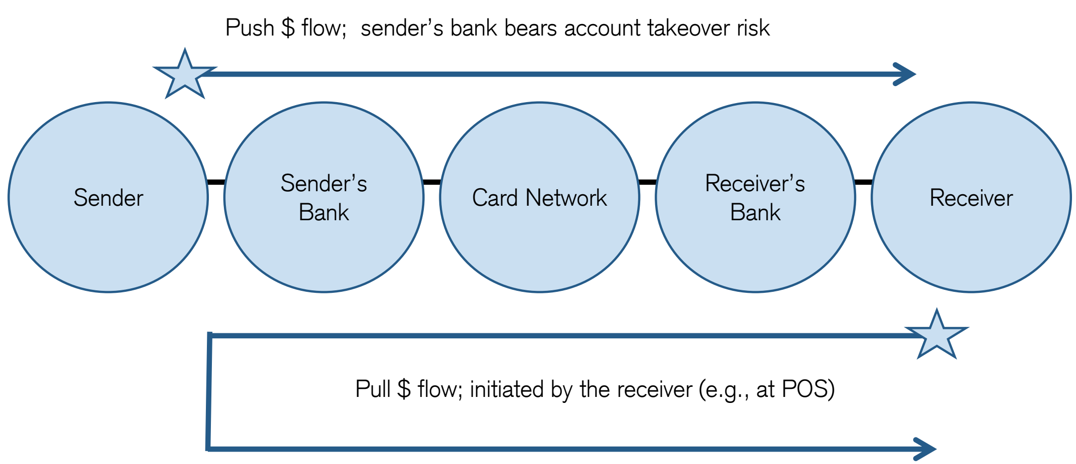
Aspect	Traditional debit (Visa, Mastercard, PIN debit networks)	ACH-based (including faster payments, ACH-like alternatives)
Costs to merchant	Interchange fees, network fees, and merchant acquiring fees; regulated interchange when card issued by bank with > $10b assets (21bps + $0.05), or Durbin-exempt, unregulated interchange when issued by smaller banks	Fees paid to NACHA (bank-owned association that makes the operating rules), fees paid to the operator: (1) EPN by The Clearing House (TCH) and (2) FedACH by the Federal Reserve, and fees paid to a third-party service provider to access ACH systems (e.g., Dovetail by Fiserv, UPP by FIS); priced on a cents per transaction basis (i.e., meaningfully lower cost than traditional debit)
Good funds	Immediate authorization and guarantee of good funds (debit cards will not authorize if funds are not in the account), although there is a risk of chargebacks; cannot bounce, as authorization is a binding commitment by the issuing bank per network rules	Good funds not guaranteed – risk of insufficient funds (2-day window where banks can pull back funds for insufficient funds, account closed, wrong account number, etc.); even on a same-day basis, ACH payments can bounce due to lag in authorization and settlement (can send more money than in account, which catches up upon settlement time)
Chargebacks and disputes	Chargebacks & dispute process: Card network rails come with processes around chargebacks & disputes; originating bank bears the risk when accounts are taken over; these processes generally add costs to the ecosystem	No chargebacks & disputes: ACH-based payments cannot be reversed due to issues with a product or service delivery (merchant failure); in practice, banks at times reimburse their customers, but only legal recourse is small claims court
Account take-over	Network rules protect for signature debit, Reg E protects for PIN debit and signature debit	Reg E protections only (out of scope of card network rules); the originating bank does assume risk when accounts are taken over (per Reg E)
Domestic vs. Global	Cross-border: Global by definition, with cross-border capabilities and access to ~3.5b cards and ~25k banks connected to Visa and Mastercard	Local (but evolving): ACH-based systems are (today) by definition local and often country-specific. Examples include: NPP in Australia, FPS in the UK, RTR in Canada, RTP provided by TCH in the US, and the pending FedNow system (potential launch in 2023/2024) in the US; that said, it is possible that over time modern ACH systems could become linked/interoperable for use in cross-border payments (i.e., many are using ISO 20022 standards, making connecting various systems more feasible over time)
Speed & availability	24/7 real-time: Card rails are always on	Modern systems are 24/7 (e.g., RTP in the US), legacy are not; legacy ACH systems use batch processing (i.e., all transactions end of day) and often operate under bank branch-like hours
Other	Long-standing, real-time capabilities consolidated into two known brands (Visa, Mastercard)	Numerous, more recently developed options; use cases typical for services that can be turned off by the merchant (e.g., phone bill, electric bill, college tuition)

Source: Visa, Glenbrook Partners, Credit Suisse research

4. Debit card network mechanics
Push vs. pull payments overview

- Pull Payments – Traditional card payments where the recipient (merchant) instructs their bank to pull funds out of the consumer's account
  - Traditional card payments are by definition debit pull payments, ACH debit pull (e.g., recurring utility bill debited from bank account)
- Push Payments – Sender instructs its bank to send (push) money to the recipient's bank
  - Traditional ACH credit push (e.g., direct deposit of payroll pushed from employer's account to employee)
  - Real-Time Payments from The Clearing House are exclusively credit push, although they have a request for payment feature
  - Other examples include: Visa Direct, Mastercard Send, and Zelle
  - Authorization message from sender's bank to receiver's bank (asking permission to send vs. granting permission to pull in a typical transaction)
  - Generally not reversible due to fraud or service issues (whereas pull payments can be disputed if not happy with the product or service)

Payment flows for push vs. pull payments

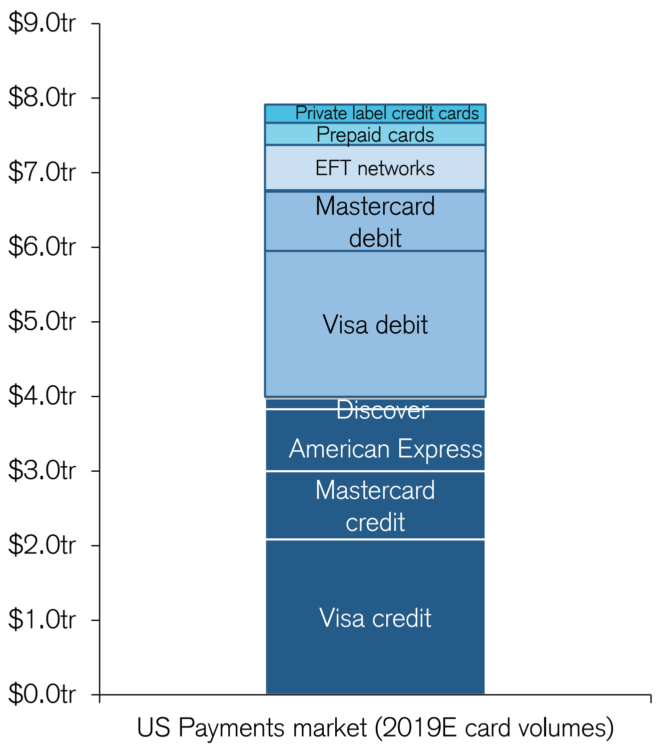


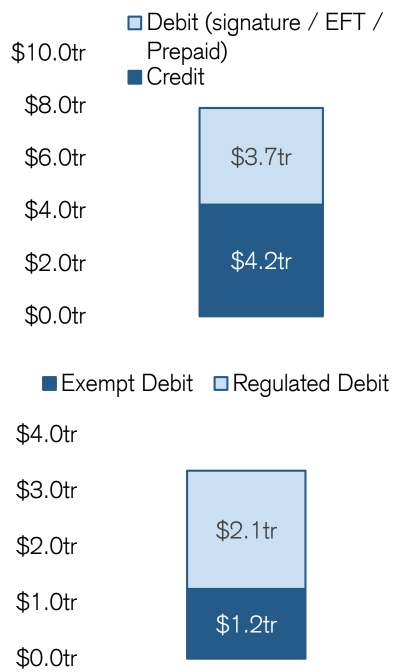
Source: Visa, Glenbrook Partners, Credit Suisse research

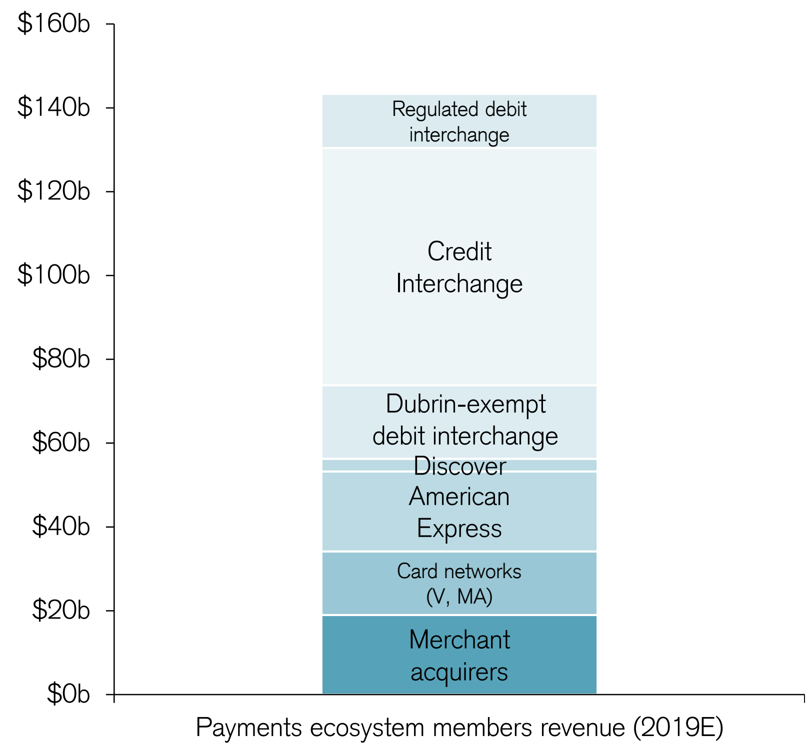
5. US Payments market revenue pools

Merchant discount rate components (opportunity for acquirers, networks, & issuers)

- US payment card volumes are approaching $8tr in total, with the vast majority touching Visa and/or Mastercard networks.
- Visa and Mastercard are not the largest revenue beneficiaries though – banks are (the card issuers themselves), with card issuers earning interchange on each transaction equivalent to ~130bps on average (vs. Visa and Mastercard earning network yields that total come to roughly ~26bps)







Source: Company reports, The Nilson Report (US Purchase Volume from The Nilson Report for 2018 base, and 2019E represents Credit Suisse estimates), The Federal Reserve, Credit Suisse estimates

Appendix

Framework for "at-a-glance" view of companies

Credit Suisse framework and snapshot

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
V	◕	◕	●	◑	◕	◑	◕	◕	●	◕	◕
MA	◕	●	●	◕	◕	◑	◕	◕	●	◕	◕
PYPL	●	◕	◕	◕	●	◕	◑	◕	◑	●	◑
SQ	◕	◔	◕	●	●	●	◕	◑	◑	◕	◕
FIS	◕	◕	◕	◑	◕	◕	◑	◕	◑	◕	◑
FISV	◕	◕	◕	◑	◕	◕	◑	◕	◑	◑	◑
GPN	◕	◕	◕	◑	◕	◑	◕	●	◕	◕	◕
ADYEN	●	◕	◑	●	◔	◑	◑	◑	●	◕	◕
RKT	◕	◑	●	◕	◕	◕	◑	◕	◕	◑	◑
FLT	◔	◕	◕	◕	◕	◑	◕	●	◕	◕	◕
WEX	◑	◑	◕	◕	◕	◑	◕	◕	◕	◕	◕
LSPD	◕	◕	◑	◑	◕	◕	◕	●	◕	◕	◔
NVEI	◕	◕	◕	◑	◕	◑	◕	◑	◑	◑	◕
FOUR	◕	◑	◕	◕	◕	◕	◑	◑	◕	◑	◕
RPAY	●	◔	◕	◕	◑	◑	◑	●	◕	◕	◑
VRRM	◔	◑	◕	◕	◕	◑	◕	◕	◑	◑	◑
WU	◑	◕	◕	◔	◑	◑	◑	◔	◑	◑	◑
IMXI	◔	◑	◕	◑	◕	◑	◑	◑	◑	◕	◑

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
V	◕	◕	●	◑	◕	◑	◕	◕	●	◕	◕
	- eCommerce transactions come with meaningfully higher carded rates and represent a channel growing ~4x that of traditional off-line commerce (in-store); further, cross-border eCommerce is growing ~2x that of domestic, an added tailwind from a yield perspective	- Of the two large networks, V has greater debit volume mix (~45% for V vs. 35% for MA) and greater US volume mix (also ~45% for V vs. 35% for MA); said differently, V has great debit and US mix vs. MA	- Visa's strong distribution is bolstered by its leading position with the largest card issuers in developed markets (e.g., JPM, Bank of America). Visa extended its partnership with JPM through 2029, solidifying its position as the leading US network	- Sourced from both in house (e.g. Visa Direct, B2B Connect) and acquisitions (e.g. Earthport), recent example (June 2019) around installments (in beta, where issuers can offer installments to their Visa cardholders directly through merchants)	- By definition card issuance capabilities and the global acceptance network enabled by Visa/Mastercard enable their core customers (issuing banks) to earn money (via interchange directly, and via interest earning on outstanding credit balances indirectly)	- With the technical migration in Europe complete, Visa has begun to offer add-on services (e.g. risk services, loyalty solution) to European clients; we expect subtle (but positive) continued "pricing" (net yield) increases in Europe	- Contactless transactions skew lower ticket, implying higher yields (due to "cents per transaction" data processing fees), although we expect a meaningful portion of this increased yield to be paid-away via incentives to help ramp contactless adoption in the US	- Generating ~$12b in annual FCF (2019), allowing for consistent bolt-on acquisition to enhance technology and service offerings to banks & merchants/acquirers (e.g., Earthport, Verifi, Payworks, CardinalCommerce, amongst others)	- Incremental margins in theory in the ~90-100% range, although investment behind innovation, acquisition of technology & services, etc. have kept margin expansion in check (~57% 2010 vs. ~mid-high 60%s today)	- Visa Direct "push payment" expands the existing rails into new market opportunities, beyond C2B and into B2B, G2C, and P2P; Both offense (new payment flows opened up) & defense (race to scale before modern/fast ACH rails gain ubiquity)	- Interchange regulation risk (e.g., Australia, Europe, and the US [debit only] have capped interchange), although little credible evidence to suggest that interchange regulation has resulted in reduced network fees
	- Visa owns CyberSource, an eCommerce gateway connected to ~100 processors in 190+ countries (recently acquired PayWorks for in-store payments and will combine with CyberSource to form a fully integrated solution)	- Relative to Mastercard, Visa is more skewed towards developed markets with 10% larger mix in the US and the majority of Visa Europe volume from the UK, a primary driver of Visa's slower payments volume growth in recent history	- Visa Direct is the engine fueling many existing instant payout options such as P2P (Venmo, Zelle, PayPal), instant disbursements (Square, Worldpay), and bill payment (Paytm, banks in Singapore), but works with all on a white-labeled or partnership basis	- Visa has various in-house incubator environments (e.g., "Fintech Fast-track" program), where it partners with various players in the ecosystem to streamline partnerships for FinTechs (e.g., issuing bank partners, issuer processing services, program managers)	- Visa Direct (and Mastercard Send) as both offense (priced to expand card-able TAM into larger, interchange-sensitive payments) & defense (race to scale before modern/fast ACH rails gain ubiquity)	- CyberSource (and authorize.net) global eCommerce gateway and Payworks (former strategic partner, recently acquired), a provider of next-gen gateway software for in-store POS systems, will allow Visa to offer unified acceptance platform for merchants and acquirers	- Visa Europe yields were initially below those of Mastercard, although a combination of commercial agreements, additional product/service sales, and processing share gains have led to increasing European yields	- Both V & MA have ramped competition in faster payments via non-card assets that can handle B2B cross-border (Earthport acquired by Visa); Earthport will be a fit with Visa's B2B Connect (and is indicative of a willingness to capture non-card flows)	- Visa has the ability to evaluate and potentially reduce expenses in the event of a downturn, providing a degree of protection to EPS (we note that reduced volumes in a downturn also turn into reduced incentives, another balancing factor)	- Visa is working on B2B Connect, and the focus right now is building nodes in 60 countries that Visa has approvals to operate in. B2B Connect will handle the high-value low-volume B2B transactions of large enterprises	- Numerous potential/longer term risks to monitor, but none materializing near-medium term (e.g., regulatory [PSD2], national schemes, Alipay & WeChat [and CUP] expansion, added "super-app" platforms in EM, Amazon and other BigTech efforts, etc.)
	- SRC initiative aims to make the online checkout process more seamless; We expect the merchant acquiring community to support SRC (e.g., higher conversion, potential to capture economics on transactions otherwise lost to alternative methods/wallets)	- Tencent's announcement to allow international card schemes to be added to its mobile wallet for China inbound commerce is a positive for the card networks, along with other super-apps leveraging the global networks for broader/open-loop acceptance	- While Mastercard began earlier (and is advantaged as a result) vs. Visa in partnering with FinTechs (e.g., European Neo banks), Visa has more recently gained ground (e.g., Revolut global expansion partner)	- Visa and its issuer partners have started to roll out contactless cards in the U.S., which we expect to drive transaction growth and possibly be yield accretive longer term (and could compete with mobile tap-and-pay as the next form factor for payment)	- The Earthport acquisition doubles the number of accounts (to 3.5b) that can be reached via the Visa network by connecting Visa to various real-time payments and ACH networks (allowing it to connect directly to bank accounts, including those not connected to Visa network)	- Visa also operates and issuer processing businesses (Visa DPS, which provides services across debit, prepaid, and credit), which Mastercard does not offer	- Gross yields ~34bps vs. net yields ~27bps (with ~22% of gross revenue paid away as incentives); Yields had been higher (~29bps FY 2016) prior to the Visa Europe acquisition, which re-set total company averages in the mid-20%s	- Visa offers a small dividend (which has averages in the ~50bps range over the past years and grown ~20% over the past 5 years)	- Over the long term, we expect Visa to continue to benefit from operating leverage as more transactions run on largely fixed-cost infrastructure (and greater scale overall relative to Mastercard)	- We expect Visa to be an outsized beneficiary (vs. Mastercard) of the contactless rollout in the US given mix differences (45% of volume for Visa sourced in the US vs. 35% for MA, along with a skew to large issuers that are likely to be faster to re-issue contactless cards)	- Blockchain technology is a theoretical threat to the existing 4-party system (although a number of limitations lead us to believe use cases will be niche and outside core C2B over the medium term)

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
MA	◕	●	●	◕	◕	◑	◕	◕	●	◕	◕
	- SRC initiative aims to make the online checkout process more seamless; We expect the merchant acquiring community to support SRC (e.g., higher conversion, potential to capture economics on transactions otherwise lost to alternative methods/wallets)	- Mastercard has greater credit volume mix (~65% for MA vs. 55% for MA) and greater International volume mix (also ~65% for MA vs. 55% for V) relative to Visa; said differently, Mastercard has greater credit and International mix vs. Visa	- Early start (and lead) vs. Visa in partnering with FinTechs (e.g., Neo banks, particularly in Europe/UK, issuing cards as part of their digital banking or other FinTech offerings); although Visa has more recently gained ground (e.g., Revolut global expansion partner)	- New products & innovation via in-house developments (e.g. Mastercard Send, Bill Pay Exchange, Mastercard Track) and acquisitions (e.g. Ethoca, Vyze, Transfast, Vocalink, Transactis, Nets, etc.)	- By definition card issuance capabilities and the global acceptance network enabled by Visa/Mastercard enable their core customers (issuing banks) to earn money (via interchange directly, and via interest earning on outstanding credit balances indirectly)	- Numerous investments to support security (Ethoca, Brighterion, NuData Security), innovation at the POS (Vyze POS financing platform), and additional value-added services (Mastercard Payment Gateway Services, Applied Predictive Technologies)	- Contactless transactions skew lower ticket, implying higher yields (due to "cents per transaction" data processing fees), although we expect a meaningful portion of this increased yield to be paid-away via incentives to help ramp contactless adoption in the US	- Generating ~$6.5b in annual FCF (2019), allowing for consistent bolt-on acquisition (e.g., Transfast, Transactis, Vyze, Brighterion, amongst others) and more meaningful acquisitions (e.g., Vocalink and Nets)	- Incremental margins in theory in the ~90-100% range, but investment behind innovation, acquisitions (e.g., Vocalink, Transfast, Nets, etc.), investment behind services, etc. have kept margin expansion in check (low ~50%s 2010 vs. ~mid-high 50%s today)	- B2B payments, particularly around Mastercard Track Business Payment System (expansion beyond the trade directory and B2B Hub services previously offered under the Mastercard Track brand)	- Interchange regulation risk (e.g., Australia, Europe, and the US [debit only] have capped interchange), although little credible evidence to suggest that interchange regulation has resulted in reduced network fees
	- eCommerce transactions come with meaningfully higher carded rates and represent a channel growing ~4x that of traditional off-line commerce (in-store); further, cross-border eCommerce is growing ~2x that of domestic, an added tailwind from a yield perspective	- Tencent's announcement to allow international card schemes to be added to its mobile wallet for China inbound commerce is a positive for the card networks, along with other super-apps leveraging the global networks for broader/open-loop acceptance	- Mastercard Send in the gig economy (workers preferring to be paid in real time); The service should also continue to see growth in corporate disbursement use cases (payroll, insurance claim) - partners Mastercard Send include Zelle, Google, Facebook, and others	- Mastercard has various in-house incubator environments, such as its Start Path and Accelerate program, which allowed for an early "first mover" advantage with FinTechs relative to Visa	- Mastercard Send (and Visa Direct) as both offense (priced to expand card-able TAM into larger, interchange-sensitive payments) & defense (race to scale before modern/fast ACH rails gain ubiquity)	- Mastercard Track Business Payments Service goes beyond payments rails, enabling rich data exchange, a directory of payments preferences for ~210mm entities, credit rating monitoring, supplier management, and various compliance applications	- New addressable payments volume likely comes at a reduced yield vs. current company average (i.e., B2B, P2P, G2C), with Visa Direct a recent example (lower yield than debit on average, although varies by use case, with the majority of fees priced as cents per transaction)	- During 2019, spent more than $350mm for minority stakes in two (at the time) pre-IPO companies, i.e. Network International & Jumia, and announced the acquisition of assets from Nets for ~$3.2b (largest acquisition on record)	- 2019-2021 guidance calls for "low-teens" revenue, EBIT margins of at least 50%, and an EPS CAGR of "high-teens" (off a $6.49 2018 base); Revenue growth algorithm of PCE (+4-5%) + penetration + services + mix + pricing + share	- While PSD2 is a potential threat, it is also an opportunity in consumer authentication (i.e., could provide a connectivity hub); Mastercard can also provide fraud monitoring services that help FinTechs and banks with compliance, amongst other Services offerings	- Numerous potential/longer term risks to monitor, but none materializing near-medium term (e.g., regulatory [PSD2], national schemes, Alipay & WeChat [and CUP] expansion, added "super-app" platforms in EM, Amazon and other BigTech efforts, etc.)
	- Identity Check (for merchants), which passes ~200 data elements to the issuing bank (vs. 8 data elements for SecureCode), allowing improved issuers risk assessment (resulting in more authorizations, citing +13% increase in approval rates in the early days)	- Mastercard is growing faster than Visa in developing markets like Latin America and Asia; these markets also tend to have a greater portion of cross-border volumes and more attractive underlying cash-to-card opportunities	- Mastercard extended their global agreement with Citi (largest issuer of Mastercard) for additional 5 years through 2029, and will remain Citi's exclusive global partner in consumer credit, debit and small business cards	- Mastercard and its issuer partners have started to roll out contactless cards in the U.S., which we expect to drive transaction growth and possibly be yield accretive longer term (and could compete with mobile tap-and-pay as the next form factor for payment)	- Transfast acquisition will help Mastercard increase worldwide reach in the account-to-account space (covers more than 125 countries with a proprietary network consisting of direct integration with 300+ banks)	- Mastercard's Bill Pay Exchange allows banks to offer a multi-rail bill-pay service to its underlying customers (with bills paid via ACH, card, real-time payments, etc.); currently ~135k billers with plans to expand meaningfully (supported by the Transactis)	- Gross yields ~50bps vs. net yields ~35bps (with ~33% of gross revenue paid away as incentives), with net pricing generally up ~3-7% over the past four years	- Mastercard offers a small dividend (which has averages in the ~50bps range over the past year and grown ~20-30% over the past 5 years)	- Mastercard has the ability to evaluate and potentially reduced expenses in the event of a downturn, providing a degree of protection to EPS (we note that reduced volumes in a downturn also turn into reduced incentives, another balancing factor)	- To the extent Mastercard is able to migrate clients and credential users to beyond just card payment and card services (e.g. new payment flows, new payment services, beyond payment services), MA will further the moat around its ecosystem	- Blockchain technology is a theoretical threat to the existing 4-party system (although a number of limitations lead us to believe use cases will be niche and outside core C2B over the medium term)

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
PYPL	●	◕	◕	◕	●	◕	◑	◕	◑	●	◑
	- Clean pure-play on eCommerce, particularly on mobile (Braintree, core PayPal, Venmo), which makes up >40% of TPV and growing ~35-40%	- 45% of revenues ex-US, although about 1/4 of that exposure is UK-based (i.e., UK makes up ~11% of total company revenues); all other countries are < 10%	- 40+ partnership agreements since 2016, with the key early agreements coming with Visa and Mastercard; a more recent, notable partnership in Paymentus (opening the bill pay vertical)	- Venmo's attractive highly-engaged >40mm Millennial user base and social aspect (newsfeed) provides a direct engagement platform for merchants	Two-sided global payments platform with unrivaled scale, consisting of ~300mm consumers and ~24mm merchants	- POS software via iZettle (inventory management, invoicing, staffing tools, etc.), expanding PayPal's in-store TAM	- When viewed as a customer acquisition partner, suggests pricing upside remains (industry-leading conversion rates and ~300mm users); SMB eCommerce players enabled with tools of larger tech players	- $6b cash (post Honey acquisition in Q1 2020E), $5b debt, ample room for continued M&A, share repurchase and minority investments (e.g., $750mm invested in MercadoLibre, $500mm invested in Uber)	- Non-transaction expense base is largely fixed (~75%), and is guided to grow ~5-8% vs. revenue growth in the high-teens (3-5 year guidance)	- iZettle in offline payments and software for SMB (in 12 ex-US markets)	- Any capping (regulation) of interchange serves to lower funding costs (a positive for PayPal margins)
	- Approaching 20% of TPV from non-eBay, fast growing eCommerce marketplaces (e.g., Facebook, Instagram, AliExpress, Grubhub, Airbnb, etc.)	- MercadoLibre commercial agreement provides for added exposure to fast growth/low penetration Latin American payments and eCommerce (also Itau partnership in Brazil)	- In addition to V/MA, partnerships with large tech platforms (e.g., Google, Facebook), retailers (e.g., Walmart), banks (e.g.,. Citi, BofA, Itau), and others (e.g., FIS, América Móvil)	Smart checkout buttons (now re-tooled to not rely on browser cookies) and enables users to pay with issuer rewards points at PayPal's ~23mm merchants	Consumer reach extended to new geographies and contexts via partnerships. In-store (V/MA, Walmart), Facebook (contextual commerce on Instagram), MELI (230mm users in Latin America)	- PayPal Credit offerings for both consumers (via SYF in the US, on balance sheet ex-US) and merchants (PayPal Business Loans, PayPal Working Capital), benefiting from the Swift Financial acquisition	- Cross-border capabilities (global two-sided network) suggests ability to increase price in certain corridors over time (took a meaningful cross-border price in crease in 2017)	- Honey (close Q1 2020E, $4b in cash), has potential to move up PayPal to the beginning of the shopping experience from purely a checkout button at the end. iZettle (acquired 2018, $2.2b) benefits still to come	- Transaction expenses are variable and gross margin trajectory has been/will be down	- Venmo monetization and deepening relationships with millennials via Pay with Venmo, Venmo Card (Debit and Credit), and Instant Transfer	- Alternative checkout options such as the Secure Remote Commerce (SRC) "single button" from networks, which we expect to be supported by acquirers
	Industry leading checkout conversion rate of 89%, on average ~60% higher than other digital wallets and 80%+ higher than all other payments types (comScore study, April 2018)	- GoPay controlling stake acquisition (expected to close in Q4 2019) would make PayPal the first non-Chinese payments company licensed to provide online payment services in China. Potential to be material to longer-term growth (2021 and beyond)	- Minority investments (e.g., MercadoLibre, Uber, Acorns, Monese, Raisin, etc.) suggest potential for additional integration and/or partnering	Differentiated set of capabilities for marketplaces (PayPal Commerce Platform): expertise from powering eBay, OneTouch seller sign-up, relationships with existing sellers and consumers, trusted brand	- Partnership approach provides PayPal's merchants with access to north of 380mm additional consumers (150mm Baidu users and 230mm MELI users)	- Payout tools enhanced by Hyperwallet acquisition (important for marketplace customers)	- Approaching ~300mm users with increasing engagement makes it difficult for a merchant to opt out of PayPal acceptance	- 3-5 year guidance includes ~150bps growth contribution from acquisitions	- Top line growth drives margin expansion (due to fixed non-transaction costs, despite large and variable transaction expenses)	- Opportunity to provide consumer financial services to Under-banked (1.7b people globally and 70mm in the US); Xoom money remittances provides an inroad to consumers in emerging markets	- Additional efforts by large cap tech companies, namely Amazon, but also Google, Facebook, Samsung, Apple, etc. (although many are partners, reducing risk)

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
SQ											
	- Two broad buckets 1) First-party commerce enablement (Square Online Store (powered by Weebly) and Weebly; 2) Developer Platform-related efforts with Marketplaces, eCommerce enablement platforms, and a set of APIs and SDKs	- ~5% of revenues International although likely to move higher (more complete feature set rolling out globally, accompanied by brand campaigns)	- 80% of large sellers (and ~100% of micro merchants) self-onboard to Square's easy to use, intuitive platform. Leading cross-sell capabilities, which also reduces incremental CAC	- Continued new product innovation (> 50% of adjusted revenue from products launched in past 5 years)	- Crucial to the operations of its sellers and regular engagement drives cross-sell (i.e., daily usage and dependence via dashboard/analytics, CRM, inventory management, payroll, business debit card, etc.)	- > 50% of adjusted revenue from products launched in past 5 years outside of Square's core payments business, the highest amongst its merchant acquiring peers	- "Rack rate" pricing increased in September 2019, increase for a subset of its sellers (with those merchants that were still being charged a 2.75% flat rate moving to 2.60% + $0.10 per transaction)	- Not part of Square's strategy to acquire customers and seek cost synergies; focused on technology and talent acquisitions (e.g., Weebly, Zesty)	- Incremental margins (ex-investment) are in the ~50%+ range, making the longer term EBITDA margin target of 35-40% reasonable (previously communicated and potential to be updated at the March 2020 investor day)	- Additional financial services being added to the Cash app (consumer lending, asset management, insurance, etc.), along with additional Cash card adoption (unregulated debit interchange monetization)	- Intensifying competitive landscape from incumbents launching similar products and moving up market into larger merchants (FISV's Clover, GPN's Vital, PayPal's iZettle, etc.)
	- Developer Platform APIs and SDKs allow developers to use Square services (and access the full ecosystem) in a customized way, for websites, mobile apps, and in-store	- Japan business benefiting from government incentives in digitizing payments (longer term, and ahead of the 2020 Olympics), new product rollouts, and SMBC distribution partnership (bank branches)	- Square hardware available at 24k+ physical retail stores (including Apple, Amazon, Best Buy, Staples, Target, and Walmart)	- Unique ability to rollout and scale new products quickly (Instant Deposit, Cash App features, Square Capital, etc.), partially due to daily use of dashboard for merchants	- Direct relationship with >15mm Cash App users makes Square a two-sided network. Enhances value for both sides: drive Cash App users to Square Sellers and reward Cash App users for this (Boost)	- Installments product allows sellers to increase their sales by offering credit extension at the POS to their customers (via Square Capital); integrated into Square Invoices as well (larger ticket items)	- When viewed as "total take rate" vs. "net transaction take rate", revenue on a per unit of GPV basis increased from 1.4% in 2016 to 2.0% in 2019E (Instant Deposit, Square Capital, along with other services)	- Weebly acquisition meaningful in expanding on 2/3 strategic priorities (omnichannel and international, Weebly 40% of customers outside the US, learning ahead of any potential geographic expansion)	- Seller adjusted EBITDA margins of ~30% in 2019E up from -9% in 2015 reflect efficient seller payback periods of 3 quarters; Efficient payback economics are enabling Square to extend this to 4 quarters in 2020 to enhance reach	- Any further move into B2B payments, with Invoices and Square Card the first two products in this area (we expect more, including AR/AP software, card issuance potentially, etc.)	- Any capping (regulation) of interchange serves to lower funding costs (a positive for Square margins)
	- Weebly acquisition & Square Online Store (powered by Weebly) aligned with omnichannel strategy but still a di minimis portion of mix today (sellers never have to think about where customers are from, single platform across channels, etc.)	- While brand recognition may not be the same as in the US, Square has Net Promoter Scores ranging from 60-80 in the UK, Canada, and Australia	- Third-party developers through the developer platform (APIs, SDKs, Developer Platform)	- Order API provides integration with Postmates, DoorDash, and Chowly (reducing the "tablet farm" at restaurants)	- 80% of large sellers (~100% of micro merchants) self-onboard given high net promotor score and strong brand	- Automated chargeback dispute process (no chargeback rebuttal letters to author, no fees to handle disputes); previously offered $250 per month in chargeback protections, but recently ended program (accretive to margins)	- Demonstrated by Square's planned Feb. 2020 price increase of Instant Transfer to 1.5% from 1% after testing the increase before the broader rollout; likely afforded by the value of Square's product ecosystem	- $1.6b cash (post the ~$400mm cash incoming from the sale of Caviar), $0.9b in convertible debt; Provides room for continued bolt-on M&A and minority investments	- 2020 guidance calls for EBITDA margins to be down YoY due to investment behind marketing and additional operating expenses associated with the new Oakland office (this could prove conservative given recent pricing actions)	- Cash Boost (rewards) potential to turn from a cost center (marketing costs as Square funds the rewards) to a revenue generator (merchant funding of rewards and paying for positioning within Cash App)	- Local competition and lower awareness (relative to the US home market) in International markets

Source: Company reports, Credit Suisse estimates

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
FIS	◕	◕	◕	◐	◕	◕	◐	◕	◐	◕	◐
	- Leading eCommerce acquiring platform, accepting 300+ payment methods across, ~150 countries and serving 1mm+ merchants	- Combined company ~70% of revenue US-based (FIS was ~75% US, WP was ~67% US), with FIS local presence in Brazil, India, and certain parts of Asia to accelerate Worldpay EM-expansion	- Direct salesforce of 3k+ (local market presence), supported by relationships with 14k financial institutions (including 45 of the top 50 global institutions) and the ISV business partnerships (1k+ partners, 3k+ integrations)	- Early pioneer in integrated payments (bolstered by Vantiv's Mercury acquisition in 2014), with 3k+ integrations, taking a predominantly partnered approach (vs. hybrid partner + owned software approach used by Global Payments)	- Long-term, privileged relationships ~1.2k core banking customers in the US empowers FIS' to capture a majority of client wallet share and supports differentiation potential with increased access to underlying consumer account data	- Core bank technology business drives annual wallet share gains via additional product sales (e.g., laying on additional risk products, digital, payments, billing, etc.; 34 additional non-core products per bank at FIS vs. 16 at FISV)	- Legacy FIS offerings (e.g., core account processing) generally associated with long term contracts (~4-5 years) that include annual pricing escalators	- Transformative deal acquiring Worldpay increases organic growth profile from ~4% to ~6% immediately, with potential upside in the ~8-9% range (over a 3-year period) via cross-sell, revenue synergies, and mix shifts to faster growth areas	- Expectation for ~500bps of EBITDA margin expansion over a 3-year period as an output of the revenue and cost synergy program (~$500mm revenue, $400mm operating costs, along with another $100mm in non-operating, interest expense savings)	- Expansion of Worldpay's acquiring (and in particular, eCommerce) business into Brazil, India, and other EM where FIS has a local presence, relationships, knowledge, etc.	- Modern banking core and ancillary technology competitors emerging, with potential to take small portions of incremental share/growth, although di minimis concern near-medium term
	- Local acquiring in ~58 countries, allowing for reduced costs (for those on interchange ++ and for merchants with an entity in the foreign country) and improved authorization rates	- Global eCommerce acquiring allows for serving multi-nationals (e.g., Apple, Google, Expedia) and to benefit from merchants consolidating relationships to fewer, global providers (vs. ~10+ including regional players)	- Long-term, privileged relationships with ~1.2k core banking customers in the US combined with FIS' "mass enablement" cloud-based distribution for outsourced customers facilitates cross-sell efforts of ancillary services	- FIS Core on Demand allows financial institutions to quickly and cost-effectively launch a direct-to-consumer digital bank in as little as 90 days	- Legacy Worldpay's strong integrated payments business reduces churn and facilitates cross-sell of additional services (with similar ambitions to increased software revenue like Square)	- FIS sells core processing to financial institutions, then upsells ancillary services/products such as digital solutions (back office automation), fraud/risk mgmt, EFT & network services, issuer processing, bill-pay, corporate liquidity, etc.	- Legacy Worldpay Merchant Solutions business (~15% of FIS revenues) has meaningful exposure to US big box retail (low yield, low growth, albeit a unit that provides meaningful scale benefits to the overall platform) and slower growth UK retail	- Leverage somewhat elevated at ~3.5x post-deal, but with clear view toward getting back to targeted ~2.7x after 12-18 months (enabling future M&A and share buybacks)	- Legacy FIS data center consolidation (~$250mm run-rate savings, now just ~15 data centers vs. 53 in 2015) along with legacy WP/VNTV cost synergy efforts ($250mm program) that was ahead of schedule at time of FIS-WP deal	- Increased data (FIS issuer processing & banking relationships) to aid in increasing authorization rates (management expects ~200bps potential increase, from mid-80%s to high 80%s)	Consolidation trend of small banks (negative 4% CAGR, albeit with overall assets and accounts growing), potentially compounded by "barbell" pressures (large bank IT budgets at one end, FinTech challenge banks at the other)
	- Building repositories of data (via FIS financial institution data, along with Worldpay existing data) should enable differentiated eCommerce authorization rates (aiming toward ~2-5% better than the eComm global average of ~85%)	- In addition to each pre-merger company's global reach, the combined co. should see revenue synergies, by cross-selling merchant acquiring and core processing businesses into geographies where clients are not overlapping	- Worldpay became the first acquirer to partner with Amazon, adding the Amazon Pay button into its payments options (prior, merchants would have had to directly integrate with Amazon Pay, but now can simply enable via Worldpay)	- 80%+ of digital applications delivered via private cloud, allowing FIS to guarantee availability/downtime of less than 15 minutes (vs. industry standard ~24+ hours)	- Legacy Worldpay's eCommerce acquiring offering lacks direct consumer relationships via unbranded online checkout capabilities, leading to lower yield's relative to acquirers with consumer networks (e.g., PayPal, Square)	- Unique loyalty redemption program ("loyalty-as-a-currency"), with roots at gas stations, and recently expanded to retail and restaurants (with further expansion ahead via the Worldpay merchant relationships)	- Due to the overhaul required to upgrade/switch core processing systems (time, dollars, training of staff, etc.), banks rarely make full core transitions (we estimate ~1-2% turnover annually)	- Legacy FIS strategy also includes divestitures of non-core business, demonstrating this discipline with the sales of various solutions/geos (e.g., SunGard Public Sector, SunGard K-12 Education, CAPCO, Kingstar)	- Both legacy FIS and WP business characterized as high fixed-cost, high recurring revenue (e.g., ~80% combined across IFS, GFS in legacy FIS), high incremental margin businesses (ex-investment for future growth)	- Potential for a more meaningful contribution from B2B payments over time (combining Paymetric, which was acquired by Vantiv [Worldpay] in 2017, with FIS cash management and treasury services)	- Modern competitors in acquiring (Adyen, Stripe, Square) and issuer processing (Marqeta) gaining greater scale; unlikely to disrupt core business near-term, but on the margins takes away a portion of would-be growth opportunities

Source: Company reports, Credit Suisse estimates

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
FISV	◕	◕	◕	◑	◕	◕	◑	◕	◑	◑	◑
	- Underappreciated eCommerce business, operating with 50+ countries with 250+ payments methods accepted (including local license that allow for reduced interchange and improved authorization rates all else equal)	- Combined company ~85% of revenue North American-based (FISV was ~95% North America, while FDC was ~78%), with First Data having exposure to high-growth Latam and APAC regions	- First Data acquiring JVs with large banks (e.g., Citi, Wells Fargo, PNC, with BAMS terminating June 2020) along with ~1500 referral/distribution partners (e.g., TD Bank, SunTrust, KeyBank, BBVA Compass, etc.)	- Dedicated $500mm innovation investment pool (funded by $900mm in cost synergies), aimed at digital enablement, advanced risk management, eCommerce, next-gen merchant solutions, and data-focused solutions	- Long-term, privileged relationships ~4.5k bank customers in the US empowers Fiserv to capture a majority of client wallet share and supports differentiation potential with increased access to underlying consumer bank account data	- Bank technology business drives annual wallet share gains via additional product sales (e.g., laying on additional risk products, digital, payments, billing, etc.; 16 additional non-core products per bank at FISV vs. 34 at FIS)	- Fiserv traditional offerings (e.g., core account processing) generally associated with long term contracts (~4-5 years) that include annual pricing escalators (CPI-based and/or linked to CPI, although at times negotiable alongside rest of contract)	- Transformative deal acquiring First Data produces a platform with unrivaled scale within the broader Payments, Processors, & FinTech segment, with pro-forma revenues approaching ~$15b (vs. FIS-WP ~$13b)	- Guided to $900mm in annual run-rate cost savings (~$700mm technology and duplicative corporate costs) and $500mm in revenue synergies (including $200mm from merchant acquiring distribution enhancements) over a 5-year period	- More nascent, but fast growing ISV channel (via CardConnect & BluePay acquisitions); adding ~20 ISV partners per month, with $5b volumes & $50mm revenue (~100bps net take rate pre-commissions) as of 2018 investor day	- Modern competitors in acquiring (Adyen, Stripe, Square) and issuer processing (Marqeta) gaining greater scale; unlikely to disrupt core business near-term, but on the margin takes away a portion of would-be growth opportunities
	- Domestic acquiring in ~50 countries (last disclosed at First Data's 2016 investor day), allowing for reduced costs (for those on interchange ++ and for merchants with an entity in the foreign country) and improved authorization rates	- Dovetail (payments platform for allowing banks to handle various ACH, real-time, and wire-based money movement) has the potential to increase distribution more globally via First Data financial institution relationships	- Long-term, privileged relationships with ~4.5k core banking customers in the US facilitates cross-sell efforts of ancillary services (banking and now merchant acquiring)	- Clover POS platform combining hardware, software (including app-store populated by 3P developers), Clover Capital, etc.; $70b+ payment volume +45% in 2018 (vs. Square ~$85b, +30%); Expanding digital signup via clover.com and bank partner sites	- Clover's expansive integrated payments and business software ecosystem reduces churn and facilitates cross-sell of additional services	- Fiserv has many incremental "add-on" services it can offer banking clients, such as risk management, bill pay, wealth management, loan servicing, and others, allowing for opportunities to cross-sell and upsell its existing core banking clients	- Due to the overhaul required to upgrade/switch core processing systems (time, dollars, training of staff, etc.), banks rarely make full core transitions (we estimate ~1-2% turnover annually)	- Leverage at ~3.9x, with an aim toward returning to historical levels ~2.5x ~18-24 months post close (deal all stock, but took on $17b FDC debt); Share repurchase program not terminated (but suspended majority of 2019)	- Both Fiserv and First Data characterized as high fixed-cost, recurring revenue, and incremental margin businesses (ex-investment for future growth); although topline growth profile has been in the L-MSD, reducing ability to realize full benefits	- First Data acquiring business in Latin America has been achieving strong growth 2016 - 2018, with markets such as Brazil, Argentina, and others recently opening up their acquiring markets, supported by lower card penetration levels	- Announced its JV with BAMS would dissolve in June 2020, with clients being split according to the JV ownership (51% for First Data), noting minimal short-term impacts (and reduced BAMS-specific costs), but longer term EPS dilution
	- Potential for data residing within Fiserv's DDA base to better inform risk engines (i.e., improved authorization rates and reduced fraud, which is of particular importance in eCommerce acquiring)	- Argentinian acquiring opportunity expanded in 2019 with initial opening of the market, with PRISMA exclusivity for Visa fully ending 2022 (First Data ~44% POS share, but just ~15% acquiring share, a gap we expect to narrow)	- Clover POS distribution enhanced by digital onboarding initiatives in addition to referral partners and a direct website - is expected to contribute meaningfully to revenue synergies ($200mm+ via cross-selling into Fiserv's banking clients)	- Leader in P2P enablement for bank customers, via both Popmoney (Fiserv-owned account-to-account P2P capability) and Zelle implementations; acquired CashEdge in 2012 to accelerate P2P capabilities	- Portion of volumes are related to back-end processing only (e.g., PayPal, Stripe, JVs) where yields are lower and pricing considered to be more commoditized	- First Data brings the 3rd largest debit network in the US (STAR), which could be combined with Accel (Fiserv-owned) to form a more formidable competitor for debit volumes (PIN, PINless, and signature)	- Banking technology contracts (core account processing, issuer processing, etc.) tend to come with termination fees (often triggered by consolidation, i.e., ~4% CAGR for depository institutions in the US, although still ~10k+ remain)	- Combined company to generate ~$3.6b in pro-forma FCF (2018 including run-rate synergies), allowing for both debt pay down and continued M&A (technology assets would be preferred, e.g., Clover-like deals)	- Both legacy Fiserv and First Data business characterized as high fixed-cost, high recurring revenue, high incremental margin businesses (ex-investment for future growth)	- Fiserv traditionally skewed more toward smaller banks (community banks, credit unions) vs. FIS with greater exposure to larger banks (relationships with 45 top 50). Potential to move up-market, supported recent wins (e.g., NY Community Bank, $50b assets)	- Modern banking core and ancillary technology competitors emerging, with potential to take small portions of incremental share/growth, although di minimis concern near-medium term

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
GPN	◕	◕	◕	◑	◕	◑	◕	●	◕	◕	◕
	- Large eCommerce & Omni business, sized at ~$900mm (approaching $1b in 2020E, but ~$800mm ex-network fees), with an emphasis on SMB and multi-national merchants	- Combined business will have the majority of its revenue sourced via North America (~80-85% of total revenue), given both business had large US businesses and meaningful exposure to Canada (~7-9% each, historically)	- Sizeable (~3.5k person) direct salesforce, including ~3k from Global Payments and another ~500 from TSYS (vs. ~2-2.5k for large competitors FISV and FIS); combined team will enable cross-selling of Global Payments & TSYS merchant offerings	- 58 local/domestic acquiring licenses, "unrivaled" relative to competitors, which aids in Global Payments' ability to provide reduced interchange (for those on interchange plus pricing) and higher authorization rates for its merchant clients	- Via owned software and integrated payments (integrations into ISV software platforms), Global Payments is more central to the entire business operation, particularly in owned verticals	- Addition of Consumer Solutions (Netspend) provides for new/expanded opportunities in payroll (synergies of PayCard business with existing Global Payments Payroll offerings), as well as other B2B,B2C, & P2P payments	- Owned software approach provides for enhanced price protection, given payments are often delivered as part of a broader business/software solution (i.e., payments pricing can be rolled into software pricing)	- TSYS acquisition done purposefully as an all stock deal to allow for continued flexibility for investment and room for continued M&A; leverage ~2.5x pro-forma (vs. FIS at ~3.5x and FISV at ~3.9x following recent acquisitions)	- Merchant acquiring & issuer processing business both tend to have high incremental margins (ex-investments for growth); Global Payments had guided to ~75bps of margin expansion per year, while TSYS was expecting ~25-75bps	- Additional bank JV partnerships, above & beyond stated $100mm+ revenue synergies; previously challenging for Global Payments (acquiring only) & TSYS (merchant business was US only) to form bank JVs (formation can require upfront investment)	- Integrated payments (~12% revenue) could see competitive pressure on ISV commission (revenue share) levels (although GPN has a degree of protection given high levels of service and global reach); software-led (~10% of revenue) is insulated, via software ownership
	- Combination of merchant acquiring & issuer processing business will allow for increased authorization rates, particularly within eCommerce/CNP transactions (i.e., proprietary SCA, known issuer customers transacting)	- Addition of TSYS reduces revenue exposure to the UK, which had been ~9% (per 2018 10-K), and on a pro-forma basis will be ~4-5% of total company revenue	- With the addition of ~820k merchant location relationships from TSYS, Global Payments will have ~3.3mm+ (SMB-focused) merchants (2.5mm Global Payments pre-acquisition)	- The combination of issuer (at scale) & acquiring businesses allows for the replication of the benefits of owning a debit network (via technology) without owning a branded network. This allows for "on-us" routing (globally & cross-border)	- Integral to the operations of customers, particularly in owned software verticals (via AdvancedMD, Xenial, SICOM, Heartland Restaurant, ACTIVE, Gaming, education, universities, etc.)	- Xenial/SICOM provide enterprise SaaS for QSR & food service, with front of house POS, mobile ordering, back-office analytics, loyalty, payroll, scheduling, etc.; has 21 of top 40 QSR as clients (e.g., Burger King, Taco Bell, Wendy's)	- Integrated payments pricing (acquiring spreads) tend to be higher (can be ~2x a typical payments business on a like-for-like merchant size basis) given integration into software (ISVs), albeit with potential pressures on ISV revenue shares	- Future M&A possibilities are open to: 1) horizontal (along the lines of Heartland and TSYS); 2) vertical software (likely share leaders in fragmented markets, with a payments aspect); and 3) geographical expansion	- At least $300mm in cost synergies as part of the TSYS merger to be realized by year three (key areas being merchant business operations, tech infrastructure, corporate cost, scale efficiencies, etc.), with minimal execution risk	- Potential for enhancing the Vital POS & cross-selling it into the Global Payments/Heartland merchants, with ambitions to make the product more attractive than both Square and Clover; and potential to further reduce attrition	- eCommerce competitors are also focused on expanding local presence (Adyen pursuing mid-market, Stripe expanded domestic acceptance at 31 countries with plans to reach 40 by end 2019, Worldpay-FIS working on geo-expansion)
	- Have capabilities in hard-to-serve markets (e.g., Taiwan, Singapore, Malaysia, Brazil, China, etc.) where competitors in RFP processes are either more limited to just 1-2 players (likely Worldpay and Adyen) and/or local acquirers (e.g., Oct. 2019 Citi win)	- Leadership position in issuer processing in key markets outside the US (e.g., # 1 share in Canada, UK, Ireland, China, # 2 share in Western Europe)	- Global Payments previously had 500+ global financial institution relationships (largely in the form of merchant referrals), while TSYS more than doubles this with an additional 800+ (largely in the form of issuer processing)	- Netspend is a pioneer of prepaid and the 2nd largest US prepaid program manager. We expect Netspend to launch outside the US in late 2020, with added growth from new products (e.g., DDA, loyalty, co-brands, virtual accounts)	- Global Payments has benefited from attrition rates that have generally been at the low end of industry range (~10% overall, and at the industry low in the US vs. industry averages more in the ~10-20%+ range)	- Partner with 60+ lenders (connected via APIs) to provide merchant cash advance offerings to merchants (functioning similar to offerings from Square Capital, PayPal Credit, etc.); lending is not on balance sheet (i.e., no credit risk)	- Contactless card rollout in the US (beginning in 2H 2019, into 2020-2021) represents a meaningful revenue opportunity (i.e., ~640mm+ accounts on file, ~50% of issuer business in the US, ~$3-5 per contactless card)	- Successfully integrated 3 vertical software acquisitions in 2017-2018 (ACTIVE Network September 2017, AdvancedMD & SICOM September 2018), increasing the mix toward technology-enabled vs. relationship-based	-Increasing exposure to SaaS/software-based revenue (faster growth, higher margin, M&A focus) produces mix-shift based margin expansion, albeit with a preference to re-invest upside into future growth vs. all flowing into margin expansion	-Increased issuer processing clients via Global Payments' FI relationships; management noted early interest from bank partners, likely ex-US (given Global Payments uses bank partners in parts of Europe, Canada, & Asia)	- Local operating presence in ~38 countries (and 58 local/domestic acquiring licenses) necessitates additional oversight, compliance, and regulatory knowledge/costs vs. more focused providers

Source: Company reports, Credit Suisse estimates

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
RKT	◕	◑	●	◕	◕	◕	◑	◕	◕	◑	◑
	- Other mortgage companies outsource the technology platforms that are needed to effectively underwrite and write mortgaes, RKT developed tech in-house, creating more efficient and seamless proccessing and closing times	- RKT's business is largely US-focused. It is the largest mortgage originator in the US, yet with only 9% market share, its scale and platform positions the company to continue to take share from smaller less tech-enabled competitors	- The rapidly scaling Rocket Professional network (a B2B origination app on the Rocket platform) allows RKT to leverage "influencers" or individuals involved in or referring clients to home purchase, but are not lenders (i.e. real estate agents)	- RKT technology platform is best in class, and has led to the highest recapture rates in the industry - customers are retained in the RKT system through multiple mortgage refinancings, as well as other ancillary services (auto, consumer lending).	RKT owns retail customer relationships, as the majority of origination occurs through RKT's DTC channel, which also has higher GOS margin. RKT has more DTC exposure than other peer mortgage platforms which we view as a positive	Outside of the core mortgage platform, RKT also runs a capital-light business in auto and personal loan area. The company helps facilitate the use of used cars and originates personal loans which are then sold to investors	- The current spread between primary and secondary mortgage rates is 50 bps wider than LT averages, leading to full origination pipelines and robust margins as refinancing demand remains high	- Leverage on both a gross and net basis sits below 1.0x, using warehouse facilities with an average maturity of < 1 month to fund the majority of originations	- With a ~60% fixed cost base (primarily marketing, SG&A), generating operating leverage, benefitting from centralized operations ("assembly line" for mortgages)	Rocket Auto is a fast growth business that is expected to outgrow the rest of RKT's business in the years to come. This business still has a lot of upsides given RKT currently only has single digit bps share in the market	- Fluctuations in mortgage market - mortgage volumes are very sensitive to interest rate movements, which affect refinance activity and volumes. A large increase in lending rates could lower refinance volumes significantly.
	- Rocket Mortgage has a long history of online innovation, pivoting from its 24 in-person branches in 1999, to create Rockloans.com for online mortgage applications, and again pioneering innovation by creating Rocket Mortgage in 2016 (and associated mobile app)	RKT is also expanding in Canada ($400 Bn market) through its 2 mortgage start-ups Lendesk & Edison. These aim to provide loan origination platform for lenders. RKT could use its technology to serve the Canada market which is less tech-enabled	- RKT marketing partners (i.e. Intuit, Charles Schwab, American Express) where their website, brands, and advisors push potential borrowers through to the Rocket platform; This portion of the partner platform has been around since the early 2010s	RKT has been a pioneer in the mortgage industry, embracing technology and a specialized origination process (vs legacy one-person-does-everything). This has helped the company achieve scale, win market share and establish itself as a top brand for consumers	Owning the customer relationship allows RKT to cross-sell other financial products to its core mortgage customers. Combined with best in class technology, this also allows RKT to have higher recapture rate	Rocket Auto is expected to outgrow the core business in the years to come, driven by currently low penetration in the auto market. Rocket Loans would also benefit from the fast growing yet underpenetrating personal loan industry	- As refinance pipeline works through the system, margins should compress somewhat as originators lower mortgage rates in order to spark additional volume. RKT's scale and cost to originate positions them to generate attractive returns even with lower margins	- Completed various acquisitions in the last 5 years extended or complementing existing business lines, such as Core Digital Media (marketing), LowerMyBills.com, ForSaleByOwner, Lendesk and Edison (Canada mortgages)	- When volumes scale (i.e. rapid uptick in ReFi), SG&A does not necessarily ramp with the same velocity given the siloed origination functions allow a limited corresponding increase in salaries & benefits	Additional new products could be launched on the Rocket Platform in order to bolster the platform's image as a one-stop shop for customers' financial needs	- The unhedged MSR portfolio is subject to mark-to-market adjustments that could negatively impact GAAP earnings and book value during periods of interest rate volatility.
	- Rocket has been working for years to take a historically paper-based business and digitize it, the company was the first major independent online mortgage originator	- The company has been able to centralize operations allowing it to scale across the US, utilizing a mortgage "assembly line" instead of the traditional mortgage officer structure which limits the number of loans processed	- RKT primarily distributes loans through the retail channel (100% direct), while its competition most frequently originates through the correspondent channel (committing to purchases off of 3rd parties)	- RKT has enabled a speedy closing process (with a rate lock in as little as ~15 mins) driven by ingenuity such as integrations with banks to pull financial information, integrations with credit scoring applications, etc.	RKT originates through the Partner network. with lower GOS than DTC, but is ramping fast, and the opportunity is still nascent with RKT penetrating ~9% of its more addressable 185k influencer network, and < 1% of the ~2mm+ influencer network	The goal of having additional products to the RKT platform is to reinforce the value of the platform to consumers as a one-stop shop for financial products, which would allow for cross-selling given RKT's technical capabilities	- While the level of interest rates determines ultimate pricing power for RKT, its funding source (secondary MBS market) is the second largest fixed income market in the world, and gives RKT certainty of execution and funding.	- The company has plenty of capacity for incremental M&A, and also would consider product extensions or the potential to accelerate geographic expansion	- Marketing makes up ~$1b in expense (~20% of total), and could be scaled back to further expand margins (either on the variable or fixed portion)	Leveraging its success in the U.S., RKT is expanding in the mortgage market in Canada ($400 Bn TAM). As the Canada market is less tech-driven, RKT has the advantage to leverage its technology and experience in the US to drive efficiency in Canada	- Any disruption in the US economy could adversely affect the mortgage market as unemployment and other macro factors are tied to originations. Additionally, government programs created as a response to any widespread disruption could affect business.

Source: Company reports, Credit Suisse research

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FLT	◔	◕	◕	◕	◕	◑	◕	●	◕	◕	◕
	- Roughly 40-50% of sales come via or are originated from a digital channel (vs. 10 years ago 100% was via a direct salesforce); digital provides leads to salesforce	- The US makes up ~60% of revenue, with Brazil (~16%) and UK (~11%) the next largest exposures; Brazilian business is the Tolls segment (and "Beyond Toll")	- FleetCor's best-in-class distribution (SMB segment) is a key differentiator, helping the company build and scale new businesses, driving its 24% revenue CAGR from 2010-2018	- Beyond Fuel expands the use case of a traditional fuel card (e.g., supplies, maintenance, materials, etc.), while still providing analytics, cost controls, etc.	- Owning the network (closed loop) makes for direct contracting and relationships with accepting merchants (e.g., fuel stations, supply shops, etc.)	- Across all business units, a common theme, regardless of payment method or type, is to add software/services that help the client control spend, reporting, compliance, analytics, etc.	- Relatively high-degree of pricing power by serving SMBs with limited pricing leverage in niche payments markets (e.g., core Fuel segment >50% smaller fleets)	- FleetCor has acquired 75+ companies since 2002, having shaped FleetCor into the diversified B2B payments company it is today	-Fixed costs make up about 60% of the cost structure (when including corporate costs)	- Beyond fuel initiative in the US, already contributing ~100bps of growth with the potential to persist and/or increase over the coming 4-8 quarters	- Credit risk exists, but is minimal (i.e., bad debt runs in the 6-7bps of billed revenue); As purchasing capabilities expand in the core fuel card business ("beyond fuel"), focus is on existing customers where they are comfortable with creditworthiness
	- eCommerce enabled booking of hotels within the Lodging segment (recently refreshed the brand and mobile experience), with total segment contributing ~7-8% of revenue	- High relative exposure to fast growing, underpenetrated international fuel card markets (~33% of segment revenue) compared to WEX (~10% of Fleet segment revenue)	- Partnerships core to strategy, with emphasis on expanding the corporate payments business (e.g., AvidXchange, Bill.com), cross-selling opportunities, and geographic expansion (e.g., oil outsourcing portfolios)	- Built a differentiated corporate payments over ~5 years with an unmatched, comprehensive suite of products (domestic and international AP/AR) on all major payment rails	- Sem Parar tags are attached to automobile and essentially "on" whenever the car is in transit (for use at gas stations, parking lots, McDonald's and soon-to-be other fast-food outlets)	Beyond Fuel increases client wallet share from existing fleet customers by capturing spend in new areas related to business expenses (e.g., supplies, maintenance, materials, etc.)	- Owning the network (closed loop) means FleetCor is not subject to V/MA rules, and allows for their own contracts and terms with merchants (vs. taking interchange levels set by V/MA)	- Strategy focus M&A around tuck-in acquisitions, new categories of spend, and additional geographies (aim is to deploy $1b per year in M&A, further penetrating existing markets or entering new ones)	- Inherently higher fixed cost structure allows for continued margin expansion, although somewhat tempered by consistent M&A integration and re-investment for organic growth	- Beyond toll initiatives in Brazil (car rental, fast food, parking, gas stations), leveraging installed base of 5mm tag holders, and building the network effect/utility for existing tag holders and merchants	- Long-tailed risk related to Electronic Vehicles (EV), although one where FLT could adapt and/or provide management services across mixed fleets (consolidating spend, reporting, analytics, etc.)
	- In FleetCor's full AP automation efforts, the digital channel is used to drive traffic and set up appointments rather than closing deals	- FleetCor's mix (less US, less OTR) supported a more healthy SSS result vs. WEX (e.g., Q3 2019), in part due to strength in Mexico, Russia, Australia, etc. (Note: FLT vs. WEX SSS are not like-for-like, but even absent corporate, lodging, etc., FLT underlying trends are stronger)	- Operates as the partner (card processor) with many customers in Corporate Payments, although goes direct to merchants via Nvoicepay (full AP automation software); creates a degree of optical channel conflict	- Beyond Tolls, scaling a new vehicle tag-based payments network in Brazil with new use cases (fast-food, parking, fuel, car rentals, and car wash) with quick consumer adoption and partner interest to participate (e.g., McDonald's approached FleetCor)	- FleetCor's direct (and indirect) relationships with customers across all business units affords its best-in-class distribution capabilities	- Beyond toll initiatives in Brazil (car rental, fast food, parking, gas stations), leveraging installed base of 5mm tag holders, and building the network effect/utility for existing tag holders and merchants	- Purchasing power ($1.4b) within lodging segment allows for hotel discounts for members of the network, further bolstered by Travelliance (~25%+ boost to segment revenue, immediate revenue synergy of ~$10mm via virtual cards)	- Near-term (virtual card migration within Nvoicepay) and longer-term (opportunity to house all B2B assets under Nvoicepay) benefits from the 2019 acquisition, along with ongoing growth from prior deals (Comdata and Cambridge)	- The natural ~200-300bps of margin expansion accompanied by ~10% organic revenue growth can be higher or lower depending on M&A (i.e., integration costs and/or lower margins initially vs. synergies and increasing margins longer term)	- Addition of Nvoicepay opens the door for a full-service, full AP file corporate payments business, encompassing all payments types (virtual card, ACH, check, cross-border, etc.) via a cloud-based platform	- Two revenue sources are sensitive to fuel prices, discount revenue related to fuel (~14%) and revenue tied to fuel spreads (~5%) for a combined exposure to fuel of ~20%

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	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
WEX	◐	◐	◕	◕	◕	◐	◕	◕	◕	◕	◕
	- Online travel virtual cards business (~15% of revenue), an underlying market generally growing at GDP+ along with gains in online penetration; leader in OTA virtual card business	- Mainly US-based business (i.e., less FX exposure), but also has business in Australia, Canada, New Zealand, Brazil (beginning to lap headwinds), and within Europe	- Contracts with 9 of the 10 major oil companies in the US (recently won Chevron from FleetCor); More recently announced Valero, which begins to contribute revenue Q2 2020	- Essentially created the virtual card market in the online travel industry, and has been deploying the tech/approach for ~20 years with its OTA clients (leader in the market)	- Fuel card controls and analytics crucial to daily operations and cost avoidance of Fleet segment customers (including EFS SecureFuel, Driver-Dash, and ClearView analytics)	- New digital fleet products contributing to contract wins (Chevron) and gaining wide adoption from customers (Clearview Snap analytics at 6k customers, Driver Dash pilot with large merchant)	- Relatively high-degree of pricing power by serving SMBs customers in niche payments markets (e.g., core Fuel segment ~50% smaller fleets), typically underserved by traditional banks (i.e., some banks lacking focus or expertise)	- Longer term revenue growth target is +10-15%, with an expectation of +8-12% organic growth (with the remaining 200-700bps via acquisitions)	- Longer term adjusted EPS target of +15-20% (vs. revenue of +10-15%) implies a degree of margin expansion (given buy backs are not a key component of cash deployments)	- Further expansion in the large B2B corporate payments market (less than 10% of revenues today) via continued M&A, partnerships, and a potential move further up-market (current focus is more SMB); potential to add cross-border capabilities longer term	- Long-tailed risk related to Electronic Vehicles (EV), although one where WEX could adapt and/or provide management services across mixed fleets (consolidating spend, reporting, analytics, etc.)
	- Online dashboard and analytics available to Fleet solutions customers (ClearView Analytics & Reporting), which contributed to recent success with Chevron and Shell	- Lower relative exposure to fast growing, underpenetrated international fuel card markets (~10% of Fleet segment revenue) compared to FleetCor (~33% of Fleet segment revenue)	- Go-to-market in all businesses typically involves both a direct approach (salesforce) and a partnership approach, which necessitates a degree of proactive channel management to avoid conflicts	- New digital fleet products contributing to contract wins (Chevron) and gaining wide adoption from customers (Clearview Snap analytics at 6k customers, Driver Dash pilot with large merchant)	- Direct relationship with over 28mm consumers on the WEX Health Cloud platform (mobile app and desktop)	- WEX Telematics for real-time vehicle conditions, fleet performance and GPS tracking	- Owning the network (closed loop) means WEX is not subject to V/MA rules, and allows for their own contracts and terms with merchants (vs. taking interchange levels set by V/MA)	- M&A has helped to drive fuel price senility down (~35% of our revenue non-Fleet, ~20% impacted by fuel prices vs. ~70% revenue exposed to fuel prices at time of IPO/2005)	- Inherently higher fixed cost structure allows for continued margin expansion, although somewhat tempered by consistent M&A integration and re-investment for organic growth	- Potential to expand card usage categories (MCC expansion), allowing a subset of core fuel card holders to spend in adjacent categories of business purchases (e.g., supplies, maintenance, etc.)	- ~20-25% of WEX revenue is sensitive to the price of fuel (every $0.10 move in fuel prices impacts revenue by about $14-$15mm, or ~$0.20 in EPS)
	- Suite of HSA-related online and mobile-based spend management tools (e.g., product eligibility check) for underlying consumers	- Does not hedge currency risk, but acknowledges that if the ex-US business were to increase in size they could consider changing course (i.e., investing in hedges)	- Digital distribution investments in marketing tools supporting growth in Fleet business (particularly in harder to reach smaller fleets)	- WEX Health Cloud (mobile app and desktop) provides a comprehensive consumer solution for managing healthcare related accounts and expenses	-WEX has benefited from attrition rates that have generally been at the low end of industry range (~3% overall, vs. FleetCor at ~8%)	- WEX Bank allows for lower cost of capital, issuing capabilities, etc.; WEX Bank is an Industrial Loan Company (ILC)	- Product innovation across all three segments supports pricing power	- Leverage target of 2.5x - 3.5x, but willing to take above these levels for right acquisition (i.e., through a lens of diversifying away from fuel price sensitivity, growth, de-risk, or technology that can reduce costs/in-source functions)	- Fuel sensitivity either creates (higher fuel prices) or eliminates (lower fuel prices) high incremental margin revenue (i.e., close to zero added cost for incremental transaction, but interchange impacted by fuel price)	- Potential to win fuel card portfolio outsourcing deals with European oil companies (still managed in-house)	- WEX Bank adds a degree of regulatory oversight (primary regulators are Utah DFI and the FDIC)

Source: Company reports, Credit Suisse research

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	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
LSPD	◕	◕	◑	◑	◕	◕	◕	●	◕	◕	◔
	- Lightspeed's core product offering is its cloud-based POS software integrated with an assortment of payment providers and its own PayFac service (Lightspeed Payments) which was rolled out in early 2019 and has since been gaining share of the company's GTV	- 58% of locations are in North America with the remaining 42% of locations in Europe and the rest of the world, on a pro forma basis post-Upserve acquisition	- Lightspeed offers 55+ third-party integrations for retail merchants and 75+ integrations for restaurants to help businesses manage employee scheduling, accounting, marketing, customer service, appointments, etc.	- Lightspeed's core product offering consists of its verticalized POS software platform built for retailers, restaurants, and golf establishments, built as a fully cloud-based product with greater access to real-time data and functionality not offered by legacy POS solutions	- POS platform used by ~110k customer locations (as of December 1, 2020), with an added touchpoint for merchants that also use Lightspeed Payments	- In addition to Payments, Lightspeed has introduced Lightspeed Capital for US retailers to help SMBs gain access to financing (up to $50,000 per location)	- Cloud-based modern POS providers that offer integrated payments tend to offer a flat rack rate for Payments with relatively limited ability for merchants to negotiate on payments pricing	- Recent acquisitions of ShopKeep and Upserve added ~27k customer locations across the United States and $13b+ GTV, adding upside for further Lightspeed Payments penetration	- Significant operating leverage in the business model, with non-IFRS operating expenses forecasted to decline from ~84% of revenue in FY2021E to ~56% in FY2024E, bringing it closer to breakeven on adjusted EBITDA basis	- Lightspeed Payments penetration of total GTV estimated to be only ~8%, leaving ample opportunity for further penetration of the PayFac offering	- Alternative modern, cloud-based restaurant POS options in the full-service restaurant space (TouchBistro, Brink, etc.) are highly competitive
	- Normalized retail GTV ex-COVID expected to be 85-90% in-store GTV and 10-15% eCommerce GTV, with restaurant eComm currently at a minimal level given recent launch of restaurant eComm platform in August 2020	- Lightspeed Payments is currently available in US (retail and hospitality) and Canada (retail only), with plans to roll it out to Europe and Asia by the end of FY2021	- The majority of Lightspeed's business is acquired through the direct sales channel, although the company utilizes partner relationships with companies such as Specialized (bikes) and Anheuser-Busch to gain referrals as well as indirect sales through resellers	- Lightspeed Payments is the company's PayFac offering with better economics than other ISV relationships, and the company has begun to expand beyond Payments with Lightspeed Capital, Subscriptions, and talks of payout and issuing services in the future	- Lightspeed Payments and additional modules (eComm, accounting, loyalty, analytics) offer numerous cross-sell opportunities	- eCommerce solution can be used to help construct an eCommerce store for retailers, and in August an eComm offering was added for restaurants to help build out online ordering optionality	- Offer incentives to adopt Lightspeed Payments (which often charges a higher MDR than other payment processing options) such as reduced hardware costs and lower SaaS fees for POS software	- Following the acquisitions of ShopKeep and Upserve, we believe Lightspeed will remain in a net cash position, leaving ample room for further M&A activity (along with possibility of stock and/or cash & stock transactions)	- Due to lower gross margin yet higher growth of Lightspeed Payments revenue (reported on a gross basis), we see companywide gross margin decline ~1,000bps from FY2021E to FY2024E, but note better operating margins than software side of the business	- Looking beyond payments to other monetizable financial services including financing (Lightspeed Capital), subscriptions (Lightspeed Subscriptions), and possible future opportunities such as card issuing, payouts, and treasury/bank services.	- Legacy retail POS systems (NCR, JWI, RDS, IBM) remain dominant given the greater number of ERP system integrations that are available for the legacy systems, which aren't available for the cloud-based systems
	- While payments is the fastest-growing part of both revenue and gross profit, software accounts for nearly 80% of Lightspeed's gross profit in FY2021E and >70% in the next few years	- Recent acquisition of iKentoo, Kounta, and Gastrofix have expanded the company's presence in Europe and Australia, while also providing further opportunity for Payments penetration	- Direct sales force focuses on North America, Europe, and Australia, and is supplemented by indirect sales channels (resellers) that support sales in other countries across the globe	- With capabilities including loyalty, analytics, and eComm, Lightspeed solutions are optimally suited for mid-sized merchants with relatively more complex inventory management needs, a large number of SKUs, or the need to manage restaurant orders	- With direct sales being the primary channel for new business, nearly all relationships are directly through Lightspeed, with the company managing customer relationships and handling customer service for all of their products	- Lightspeed's platform allows users to choose up to six modules available (POS, Payments, eCommerce, Accounting, Loyalty, and Analytics), addressing the complexities in the merchants' specific business needs while also providing flexibility	- Larger merchants with higher volumes tend to use other payment providers that offer more competitive, variable MDRs depending on the level of payment volumes, and may thus be able to negotiate lower than standard rates if they choose Lightspeed Payments	- Since IPO in early 2019, Lightspeed has made 6 acquisitions, a key driver of growth in its GTV, customer locations, and revenue	- Lightspeed targets a ~3-4x LTV:CAC ratio	- Lightspeed seeks to enter new industry verticals through potential acquisitions, which could further expand its TAM; e.g. its 2019 acquisition of Chronogolf added a niche vertical in golf course management with a ~$100b TAM	- Lightspeed expects more consolidation in the fragmented market and seeks to be an active consolidator itself, with recent acquisitions having bolstered its footprint in the US, Europe, and Australia

Source: Company reports, Credit Suisse research

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	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benefitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
NVEI	◕	◕	◕	◑	◕	◑	◕	◑	◑	◑	◕
	- ~70% of NVEI's volume is exposed to higher growth eCommerce / Card Not Present end markets, with a significant portion acquired via SafeCharge in 2018 (regulated online gaming, regulated financial services, tech & business services, travel, retail, etc.)	- Originally a primarily North America business, the acquisition of SafeCharge expanded NVEI into Europe and other geos, volume mix is ~45% EU, ~40% US, ~10% CA, and rest LATAM and APAC (and expanding there)	- ~1/3 of the company's volumes come via its partner channel, which include relationships with ISOs, ISVs, VARs, and marketplaces, where NVEI earns on average a revenue share of ~50-60% (towards the higher end of the industry range of 25-75%)	- Using its Smart Routing technology, NVEI will (using algorithms) if authorization is declined, will then re-route to the next highest-probability acquirer; NVEI also has partial authorization, in which it will suggest a smaller approved amount	- NVEI's direct sales channel consists ~2/3 of volumes, and is expected to grow ~40% in the next few years as it plans to ramp this channel; Direct sales also means local support, in local languages, and in certain jurisdictions local acquiring	- NVEI supports global pay-outs (often a service requiring multiple partners to complete a transaction), which can be done globally in 150+ currencies nearly instantaneously - this service is used in its online gaming business	- NVEI has a ~35% / 65% gateway / acquiring volume mix, respectively, but still reports a ~100bps take rate (on a net basis); This is partially driven by ability to upcharge for complex verticals, but also is due to willingness to customize, allowing NVEI to increase rates	- NVEI completed (and integrated) a transformative acquisition of SafeCharge in 2019 - an EU based eCommerce payments processor - which now comprises ~50% of its payments volume, showing NVEI has a propensity for accretive M&A	- Over time we expect the potential to take back-end settlement and clearing in-house (and limit usage of partner TSYS) could provide leverage in the COGS contributing a ~30-40% decline in back-end processing costs (typically ~1/4 of COGS in industry)	- The expansion of the sports and online gaming market in the US could expand volumes, as we estimate < 1% of its 2020E online gaming volumes are US-based; having many premier clients in Europe puts NVEI in prime position for competitive takeaways	- For payments, the EU is often viewed as very fragmented market - with many APMs, local schemes, and complexities; thanks to the SafeCharge acquisition, NVEI already has many integrations and licenses that would have needed to be built or acquired
	- NVEI's payments engine can be fully integrated into merchant software applications through a single integration, and NVEI partners with a variety of ISVs, VARs, and PayFacs that integrate NVEI's solutions directly into their software or mobile applications	- LATAM presents a large, nascent market opportunity, and NVEI is increasing its presence in the region through the addition of popular local APMs (50%+ of transactions done through APMs) and hiring of a general manager to oversee the market	- With an already strong foothold in European large enterprises, NVEI is leveraging its partnerships and indirect sales channels to gain greater access to SMBs in Europe and replicate the partner model in North America that has successfully addressed SMBs	- With Cashier, merchants can embed a two-way payments page that is fully customizable and localized to provide payment acceptance and withdrawal functionality, particularly useful for the online gaming and FX verticals	- NVEI offers tailored and modular solutions that are sold to customers as customized packages that address merchant-specific needs with sales engineers focused on providing the "right" solution rather than a one-size-fits-all end-to-end product	- To maximize sales conversion, NVEI offers partial approval, enabling approval of partial transaction amounts, and decline recovery, encouraging users to try a different payment method, amount, or speak with customer support rather than cancel the transaction	- NVEI's volume mix is ~30% / 70% SMB/large enterprise, respectively, with SMBs having a higher take rate; As NVEI ramps up its direct sales channel and increases focus on large enterprises, this will create downward pressure on the total take rate	- With an active M&A pipeline of four deals that could add a combined ~$41mm to EBITDA, NVEI is focused on deals that are accretive to earnings with "meaningful" synergies that would expand the company's service offerings and global footprint	- Shifting sales channel emphasis to direct sales should result in reduced commissions expense as a percentage of total volumes, adding an estimated ~150bps to EBITDA margin from 2021-2023E	- Geographic expansion is on the near-term road map for NVEI, as it seeks to expand with its merchants (i.e., into Latam, APAC), an important step in rather fragmented acquiring industries, tackled by a combination of local bank-owned acquirers and regional players	- eCommerce is widely considered one of the more complicated verticals to do payments processing for, given the multitude of fraud, sercurity, etc. controls required by merchants, and the complexity associated with the front-end (i.e., gateway)
	- A portion of NVEI's "eCommerce" exposure is more appropriately classified as Card-Not-Present, given it is not traditional retail or spending-based relationships; examples include regulated financial services and online gambling, which make up ~30-35% of volumes	- Less focus is currently placed on APAC, though the company views it as a nascent opportunity; NVEI has offices in China and Singapore with direct acquiring capabilities in Hong Kong and Singapore and local acquiring partners in select markets	- NVEI has established strategic platform partnerships (software partners, marketplaces, etc.) to help facilitate partners' growth and address complex payments needs by offering highly customized solutions, with partners acting as lead generators / referral sources	- Cognizant of stricter security and risk management needs, NVEI developed Smart 3DS, an acquirer-agnostic solution to help merchant compliance with PSD2 and 3D Secure 2, while reducing fraud but maintaining high authorization rates	- NVEI's single integration, full stack product suite with global reach allows the company to provide comprehensive solutions to customers that would normally require 5-7 contracts and integrations	- With NVEI's PayLink solution, merchants can accept payments by generating a QR code for the payments page, enabling payments to be made on smart devices without an online store of a physical POS terminal	- NVEI has an extensive suite of Value-Added Services (i.e., dynamic FX conversion, Cashier & Checkout, Tokenization, KYC & AML, etc.) which it monetizes on an a la carte basis; upside to take rates exists via upselling existing customers to these services	- Targeting leverage of 2-3x as the "sweet spot" vs. ~0x leverage post-IPO indicates ample balance sheet capacity for M&A which has historically been the main capital allocation priority for the business	- Employee compensation comprises ~35% of operating expenses (excluding D&A) and has operating leverage relating to administrative, finance, and other non-sales personnel, which we expect to add ~70bps to EBITDA margin from 2021-2023E	- NVEI has stated that a portion of its growth algorithm would be attributable to product innovation, including additional Value-Added Services, which in the past included Global Pay-out, decline recovery, localized payments, and Smart 3DS	- Payments is a highly competitive industry benefitting scale, facilitating ability to offer better and reinvestment to fund more innovation, while NVEI has moderate scale, its ability to provide customized solutions and complex vertical expertise, gives it an advantage

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FOUR	◕	◑	◕	◕	◕	◕	◑	◑	◕	◑	◕
	- ~100% of Shft4's payments business is exposed to the attractive software-led payments channel, with its gateway and E2E processing capabilities integrated into both via owned and partnered software platforms	- Vast majority of revenues are US-sourced, although the potential to expand internationally (with the UK and Europe as potential next steps) exists medium-term (in part by leveraging the existing merchant base footprint)	- Partner-centric distribution approach consisting of both independent software vendors (350+ ISVs) and value added resellers (~7k VARs)	- SkyTab order- and pay-at-the-table offering, which includes both marketing (email collection) and reputation management (customer satisfaction surveys that provide instant alerts to manager, allowing to address in-person)	- Both an owned (Harbortouch, Future POS, Restaurant Manager, POSitouch) and partnered (350+ integrations to leading software platforms) allows Shift4 to be a part of day-to-day operations (leading to reduced churn)	- Lighthouse Business Management System for business intelligence, including a customizable dashboard, reporting, employee scheduling, social media management, online reputation tools, etc.)	- Mix-shift based take rate declines as base shifts to larger merchants (i.e., conversion of MerchantLink & Shift4 gateway customers to E2E); larger merchants ($2mm+ annual volumes) yield ~40bps net vs. ~90bps for SMB (~$300k annual volumes)	- We forecast FCF as a percentage of net revenue improving to ~low-mid 30s% in 2022-2023E, as EBITDA margins expand, with potential upside from any refinancing of high interest rate debt as leverage is reduced (from ~6x pre-IPO to less than ~3x ~12-15 post)	- A partner-centric business model (where sales, and front line support is driven by VARs) supports a high incremental margin business, with lower costs (vs. competition) for sales and support staff - this feeds expected margin expansion of ~700bps by 2021, from 2019	- Potentially conservative targets related to conversion of MerchantLink & Shift4 gateway volumes (~$200b base of gateway volume, serving as a "rolodex" for the E2E payments business); guided to ~6%, ~11%, and ~13% penetration 2019-2021E	- Competitive industry with numerous scaled platforms willing to compete on price, although Shift4 typically faces a more limited set of competitors with comparable offerings (Elavon and FreedomPay most often cited)
	- Harbortouch was an internally developed restaurant POS software, and other owned software (Future POS, POSitouch, Restaurant Manager) together boast over 100k merchants in the restauarant vertical	- Shift4 Model merchants include multinational hospitality brands (that use tokenization and POS outside the US), but there is also an opportunity to expand further with customers into new geographies	- Many resellers can attribute their recent success to Shift4, and the ability to offer the Shift4 platform has become a winning proposition for VARs and ISVs, with many of them now selling / integrating 80-90% Shift4 processing (vs. Paymentech, Elavon, FreedomPay, First Data, etc.)	- When Shift4 was acquired by Lighthouse Network it was the largest independent gateway in North America, but was also the inventor and leader of payment tokenization, an important feature given PCI and other requirements for secuirty	- Though Shift4 products / services are distributed through resellers, often times a Shift4 employee is on a first name basis with the merchants, with frequent touchpoints (every few weeks - at least a couple of times per year) to discuss new ideas or updates	- Marketplaces allows POS software to download to various 3rd party applications (i.e. MailChimp, DoorDash, UberEats, Quickbooks), providing easy integration into payments and front-of-the house operations	- Shift4 has a number of legacy software integrations which are difficult / not worthwhile to integrate to; often times Shift4 is the only gateway provider or payments processor with the ability to do this across a property / business, giving it pricing security	- In the last 3 years Shift4 has done 5 acquisitions, most recently acquiring MerchantLink (gateway and tokenization provider) for ~$60mm in 2019, Shift4 Corp. in 2017 (gateway), and 3 software POS platforms in 2017 catering to the restaurant vertical	- Margin expansion drivers: 1) MerchantLink synergies (which were pulled forward into April 2020); 2) Operating leverage/scale; 3) Taking processing in-house; and 4) Distribution costs	- International expansion of End-to-End is a large opportunity, and is mostly untapped, but the company has existing business with multinational brands, some of which are gateway only customers (includes Int'l) or payments processing customers in the US only	- Shift4 pays partner residuals near industry highs, which along with a well-like and easy to connect to product, and ability to offer subsidized or free hardware / software to merchants, typically moves Shift4 to the top for partners when going to market
	- Limited exposure to eCommerce, except for hospitality clients requiring omnichannel capabilities online bookings; although during stay-at-home, card-not-present transactions became ~40% of total (vs. 5%, mostly restaurant merchants)	- Though initially focused on restaurant sector and SMBs, Shift4's next evolution will be moving into higher volume payments processing for larger enterprise hospitality clients	- Onboarding time is dependent on reseller installation (for a new relationship / location), but Shift4 can board an existing client from gateway to full processing in as little as 24 hours (easy APIs), for more complex integrations still speedy but weeks-months	- Simple API connectivity, making integration incredibly smooth; connecting to the API is as simple as entering a port number; ISVs rave of the ease to write customized programs to Shift4's APIs, improving relative positioning of their products	- Within the hospitality vertical, Shift4 can be the sole payments processor for all profit centers and their software integrations at the property (Spa, Front Desk POS, Retail, Golf Course, Restaurant) - a rarity, as often times many are needed	- Despite being the 2nd line of the defense (behind partners), Shift4 has a dedicated 24/7/365 support team, capable in multiple difference languages; Shift4 also provides support in onboarding merchants - doing live trainings and sending "How To" videos	- Shift4 has a number of complimentary products / services it provides free of charge (i.e. POS hardware and software), but typically locks merchants into multi-year contracts, at times including monthly hardware / software charges	- Part of the growth plan for Shift4 includes inorganic growth, with an M&A team constantly evaluating deals, and a vast majority of sourcing being inbound (ISVs looking to be acquired), with plans to allocate capital to attractive acquisitions	- In-house processing scheduled for 2022, and will be a one-time step up in margins (estimated to boost EBITDA margins by ~330bps)	- Industry talks suggest a large opportunity exists in the modernization of current POS solutions and migration to the cloud, which can save merchants money on customer data storage; Shift4 has been heavily investing in these efforts	- Lighthouse Network - was the subject of a 2018 antitrust lawsuit regarding the acquisition of Shift4, alleging the company had monopolized payments in restaurants, as it could route transactions in self-serving manner; Lawsuit was dropped in 2018

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	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
RPAY	●	◔	◕	◕	◑	◑	◑	●	◕	◕	◑
	- Focus on digital and/or ease of interaction (e.g., mobile, online, text message, voice) to simplify and shorten the process of making loan payments for consumers, using proprietary technology	- REPAY is a US focused business (close to ~100% of revenue pre 2019 in the US), with direct sales and ISV relationships with SMB's in certain niche verticals	-Roughly 50% of REPAY's business comes from ISV partnerships, where the ISV (software providers) integrates REPAY payments solutions into their software offerings	- Bringing debit card acceptance to markets that are dominated by checks & ACH, with debit cards making up just 12%, 40%, and 41% of payment volumes within the personal loans, auto loans, & receivables management verticals, respectively	- Consumer-friendly payment channels provided by REPAY allow for an accelerated payment cycle (and thus, the merchant has increased ability to lend more/faster)	- Back-end processing capabilities acquired through TriSource (formerly a partner, now insourced), which will serve to decrease processing costs (i.e., removal of margin paid to TriSource, largely fixed cost base of platform); also maintains non REPAY client base	- REPAY typically pays away ~11% of net revenue to ISV partners (ISV commission), which is meaningfully lower than other integrated payments verticals, where ISV commissions can be in the ~20-70%+ of net revenue range	- Plans to grow both organically and via acquisition, either on additional capabilities (e.g., back-end processing acquired via TriSource), penetration into existing markets, or expansion into new verticals; TriSource improves margin profile by bringing costs in-house	- Automotive loan take rates are ~10-15bps lower vs. other REPAY verticals, mostly due to higher principal (i.e., car payments tend to be higher vs. personal loans or receivables payments), but volumes are growing faster (~+400 bps vs. other REPAY verticals)	- New vertical expansion focus around healthcare (where REPAY has already gained some traction, but not reported separately), specifically Revenue Cycle Management (RCM) which manages billing for healthcare providers and practitioners; TAM is ~$100bn in volumes	- Risk that ISV partners (that make up ~50% of the business) push for a larger revenue share (i.e., paid as a percentage of net revenue, typically defined as MDR less interchange, network fees, & possibly other costs) as competitors approach ISV partners over time
	- REPAY's gateway is its own proprietary technology built on the cloud, and provides added functionality for merchants (e.g., tokenization/ security boost, recurring billing, account billing, reporting, web hooks, PCI DSS compliance, card vault, etc.)	- Entered Canada market in 2019, given existing overlap between certain receivables merchants that were already clients in the US; partnered with Visa to accelerate debit acceptance in Canada, along with use of Visa Direct (for instant funding)	- Another roughly 50% of the business is sourced via REPAY's direct sales channel. Merchants approached by the direct sales team tend to be larger ($1-$5mm+ monthly volume) and could operate their own in-house software (vs. working with an ISV)	- Provides tokenization of payments, transferring data protection risk (a liability) away from the merchant by providing_Payment Card Industry Security Standards Council (PCI DSS) compliance for the merchants	- REPAY fully underwrites each of its merchants, operating as an Independent Sales Organization (ISO); prefer to risk manage in-house, given their indirect liability to the merchant bank through facilitating CNP transactions	- Sales support team staffed to aid in the merchant onboarding process, helping to simplify and guide through the merchant application and initial set-up processes	- REPAY, over time, could see increasing pressure on ISV commission levels (although not experienced to date), as merchants in their verticals are approached with more attractive revenue share agreements from competitors	- Made four significant acquisitions since 2016 (e.g., Sigma ~$6mm in auto loans, Paymaxx ~$34mm in auto loans, PaidSuite ~$5mm in consumer receivables, and TriSource ~$65mm in back-end processing)	- Gross margin expansion ahead as front-end processing & bank sponsor fees are likely renegotiated lower, along with TriSource related leverage on back-end processing	- Credit Union (CU) vertical (recently announced integration with Jack Henry's Symitar platform), with a focus on credit union auto lending, solving a need, particularly in non-member lending where payment collection is more difficult	- Longer term risk that some ISVs (mostly larger ISVs) consider the PayFac model (PayFacs own more responsibilities, and keep a greater share of economics); lower risk in REPAY verticals given merchant onboarding complexity in lending
	- Proprietary underwriting software for onboarding merchants (although final onboarding decision made by acquiring bank partner, given REPAY operates as an ISO, not a PayFac), along with monitoring for early indications of financial difficulties	- REPAY operates in niche verticals in two countries (US, Canada) and is currently integrated into five verticals (receivables, personal loans, and auto loans, and more recently Healthcare and B2B) vs. Global Payments operating in ~70 verticals and ~100+ countries	- Recently signed partnership with Jack Henry's Symitar offering (allows the JKHY customers using Symitar to access/use RPAY in a more seamless, integrated way), targeting expansion to the Credit Union vertical	- Differentiated payments technology, with a gateway that can be leveraged cross-vertical, and software additions specifically tailored by vertical to meet industry specific needs for merchants and ISV partners	- The payments solution integrates into merchants' ERP system (either home grown via an ISV), reducing complexity for merchants (integrated into loan/deal management systems, reduced manual check-cashing, etc.)	- REPAY has the ability to move further into parallel verticals, offering the same type of enhanced payment services (with potential additions targeted in healthcare, credit union auto loans, and B2B payments)	- Any mix shift toward ACH (vs. debit) could optically pressure pricing (as a percentage of volumes) given only di minimis "cents per transaction" fees earned when customers pay via ACH (currently ~1-2% of revenue)	- Tri-Source has bolstered M&A synergy possibilities given its back-end processing capabilities (that REPAY did not have previously); ~$50mm in cash and ~$200mm in debt capacity to pursue smaller acquisition targets in the near term	- Operating leverage inherent in core platform (as is typical in the merchant acquiring industry, i.e., high incremental margins), which forms a base that can be modified to fit clients specific needs	- B2B payments is a new vertical of focus for REPAY, in which REPAY is focused on accounting software partnerships (e.g., platforms like Sage Intacct) and on A/R (payments acceptance); with first steps to expansion kick-started by the recent acquisition of APS for $60mm)	- Any increased competition from larger payments platforms (e.g., ACI (including Speedpay, acquired via WU), Billing Tree, Global Payments, and others) - which has been historically lower given larger players typically do not process payments for lending merchants

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
VRRM	◔	◑	◕	◕	◕	◑	◕	◕	◑	◑	◑
	- While rental cars are commonly booked online (53% in the US, 44% in Europe), the add-on purchase of the tolling product is largely done in-person at the rental car location (not a discrete add-on option on most rental car websites)	- Business is predominantly US, outside the of the recently acquired EPC and Pagatelia businesses in Europe (we expect European business to grow over time as tolling business begins to monetize)	- Unlikely that other competitors (none are yet to exist on a nationwide basis - with a fully outsourced management program for RAC) would be able to do the one-by-one legwork required	- Core tolling product in and of itself is an innovation past the traditional processes, and required (requires) detailed, one-by-one, working with and integrating to various tolling authorities (meaningful barrier to entry)	- Deeply integrated into the operations of tolling authorities and core RAC customers (in terms of infrastructure, program management, employee training, customer service, billing & reconciliation, etc.)	- Title and registration services provided to existing RAC and FMC customers (through acquisition of Sunshine) which allows bulk processing of registration on a fully outsourced basis	- Only nationwide provider for the core tolling product (i.e., meaningful barriers to entry given decade long efforts to integrate with various state-based tolling authorities), but customer acquisition is provided by RACs (car rentals), so pricing upside is capped to an extent	- M&A has been (Sunshine for title & registration) and will be used to provide added services to existing customers, in part due to an "ask" from these customers, along with other deals that add optionality (smart tech related to connected cars, autonomous driving, etc.)	- Lower margin (~35-40%, relative to Commercial at 60%+) Government business has a higher fixed cost structure (e.g., people costs related to analyzing camera data, incidence reports, etc.); currently working against VRRM given Texas business loss	- Tolling in Europe, with the EPC and Pagatelia acquisitions overall (tolling & violations in Europe) representing a $350mm revenue TAM opportunity (vs. $440mm of 2019 revenue for VRMM as a whole)	- Downward pressure/sentiment around red light cameras (e.g., Texas, Miami recent revenue headwinds); 21 states have photo enforcement vs. upside around school zone speed (e.g., Georgia, NYC) and work zone speeding (e.g., Pennsylvania)
	- To the extent the Peasy system gains traction, this is a mobile-first platform that can be used both in mobile phones or in other mobile OS (e.g., OEM in-dash OS)	- Within Europe, France, Spain, and Portugal make up the bulk of the opportunity, and are all operated by a single tolling authority located in France (France is the single largest tolling country in Europe)	- Long term contacts with the three large RAC companies in the US (Avis Budget Group, Enterprise, Hertz), although this brings meaningful customer concentration (~80%+ of Commercial revenues)	- Peasy example by innovating off the core tolling platform (leveraging the assets built for the RAC and FMC customer base, and repurposing the technology and connectivity to tolling authorities in the form of a consumer product)	- Acts as a partner in helping government and law enforcement clients promote public safety (e.g., in school zones, at bus stops, in work zones), with potential for additional surveillance camera usage (e.g., for detectives)	- Government Solutions segment includes the installation of cameras for any camera-programs (either traditional where VRRM owns the camera, or in New York where VRRM actually sells - product revenue - the camera, but still handles the installation)	- Revenue generator for partners in both businesses, i.e., RAC earn a revenue share from deploying VRMM tolling products and government/law enforcement citations	- Leverage at ~2.9x (vs. no formal target), but a combination of EBITDA growth and debt pay down should bring debt down below covenant at 3.2x (i.e., must pay 25% of Adj. FCF if above 3.2x, 50% if leverage is above 3.7x)	- Higher mix of variable costs (lower fixed costs) in the high margin (60%+ EBITDA margin) Commercial business, although could be somewhat pressured (or at least margin expansion limited) due to investment required to build a business in Europe	- Peasy consumer tolling, mobile app-based coverage across most toll roads in the US (opportunity to add white labeled additional services to the app, and also to white label the core Peasy service into 3rd party apps - e.g. OEMs infotainment systems)	- Redflex competitor in red light business (Government segment) plans to transition efforts/assets from red light cameras to traffic congestion (provides a near-term share gain opportunity in red light business, although a negative market signal)
	- After acquiring their title & registration business in 2016 (streamlining vehicle registration and tracking for customers - including RACs), software integrations into the DMVs themselves were required for matching cars to registrations	- Additional European upside would come from a second leg of tolling & violations penetration (i.e., into the Nordic countries)	- Agreed to a partnership with Arrive (branded and white-label tool for parking, i.e., identifying, booking, paying for parking spots)	- Adapting focus, with more of an emphasis on "purpose-built speed enforcement" with specific use cases such as school zone speeding, bus stop arm cameras, and work zone speed enforcement	- Aligned with government clients' safety goal, with a combination of fixed (dollars per month per camera, regardless of activity) and variable (revenue share per citation or dollar amount per citation) contracts; uses data to model the variable contracts to maturity	- Additional business such as ATS Live (real-time visual intelligence and post incidence analysis for law enforcement) and ATS Street Safe (handheld speeding cameras equipped with mobile citation issuance)	- Recent strength has been a combination of volume (i.e., number of billable days, number of tolling activities) vs. price / mix shift (e.g. shift to leisure, over corporate travel driving increases) with wholesale pricing done on a longer term contractual basis	- Recently hired Mike McMillin as VP of Corporate Development and Strategy to build out a larger and more formal acquisition funnel and screening process	- Leveraging a decade of "heavy lifting" for the core US business, now beginning to add focus on bolt-on M&A (hiring of VP of Corporate Development and Strategy), new markets (Europe), and other new areas/call options (Peasy, ATS Live, ATS Street Safe, etc.)	- Congestion pricing (more common in Europe), and likely becoming a service that VRRM will be able to support (more of a ~5-10 year opportunity); US opportunities in Philadelphia, NYC, Washington DC, and others	- Highway tolling is regulated on a state level, and certain states will never approve expansion of tolling (negative sentiment, not enough volume to generate $). Expansion of toll roads or building new toll roads can take years and is subject to govt bureaucracy

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
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WU	◐	◕	◕	◔	◐	◐	◐	◔	◐	◐	◐
	- Online platform (westernunion.com) comprises ~13% of C2C revenues. Economics (currently) similar to retail at the gross profit level, but lower overall due to marketing, technology infrastructure (although there should be tech cost leverage over time)	- 200 plus countries/territories, 71 of which have outbound capabilities, serving 20k distinct corridors overall, a near ubiquitous operation	- Amazon partnership in certain EM countries will allow customers that normally would not have access to Amazon due to the currency they transact in, or the country they live in, to pay local currency via WU retail locations	- Ability to expand further into offering platform capabilities (leveraging scale, compliance, licenses, local knowledge, etc.), serving as a cross-border arm for many 3rd party platforms	- ~70%+ exclusive agent locations (e.g., US, Eastern Europe, but not regions like Middle East and Russia), with agent locations in 200+ countries	- White-labeling of the platform (leverage of fixed cost, compliance, licenses, knowledge, etc.). Western Union does not intend to pursue becoming a bank itself, but partnering with banks (albeit with reduced/shared economics) can provides access to an expanded TAM	- Pricing pressures vary by corridor - and given WU's breadth, there will always be corridors with pricing power (i.e., where WU is one of just a few providers) and others that are more competitive (where consumers are migrating to online - e.g., AsiaPac)	- Leverage ~2.4x (debt/EBITDA), with sufficient cash to do a tuck-in acquisition or potentially take on additional debt for a larger deal	- Scaled platform with EBITDA margins ~25% vs mid-high teens for Ria & Intermex, although with a relatively high fixed cost structure (~40% fixed in nature), WU would see ~100-150bps margin expansion on ~MSD revenue growth (vs. flat to LSD in recent past)	- We believe Western Union has ample opportunity for additional integrations/ partnerships with FinTechs, further leveraging its platform (fixed costs) and its ubiquity on a global basis (e.g. Sberbank, STC)	- Competitive industry, particularly with smaller players tending to be more willing to discount, select incumbents gaining share on a regional basis (i.e., Intermex in Mexico, ~7% in 2014 to ~18%, now second to WU), and FinTechs offering disruptive tech & pricing
	- High quality mobile applications extend the TAM to banked customers, allowing for transfers using bank accounts (account-based), debit card, credit card, and other local-payment methods (although more competitive online vs. FinTechs)	- Majority of volume is sent via North America and the EU & CIS regions (~70% in Q3 2019). US is the largest outbound remittance market by more than 2x ($71b), with Saudi Arabia ($33b) as the second largest	- White labeling with universities, banks, NGO's, non-profits, & others to facilitate cross-border transactions - can take numerous forms, e.g., C2B payment (tuition), C2C payment (banking transactions), B2B payment (NGO's), etc.	- WU Connect initiative - integrate WU cross-border technology into digital platforms allowing for P2P transfer via card or bank account, and allows connection into social media and consumer messaging platforms	- Agent locations are often large retailers (e.g., 7-11, Walgreens, Albertsons, Dollar General) providing frequent touchpoints in high traffic retailers	- Still has some ability to increase send-market penetration (i.e., 71 countries outbound vs. 200 total); Management has communicated it intends to push for growth into additional send markets (although limited volume opportunity)	- Recently (Q2 2019) took meaningful (~10-15%) price increases on US domestic P2P (and following revenue going from ~10% of C2C in 2014 to 7% in 2018), helping to offset (short term) reduced volumes due to low cost (or free) offerings (e.g., Venmo, Cash App, PayPal)	- Attractive set of local asset (licenses, knowledge, infrastructure) for a potential large cap technology platform interested in expanding further into financial services (e.g., Ant Financial attempted to purchase MGI at ~11x EBITDA in 2017)	- WU Way initiative (completed in 2018) resulted in ~$70mm in cost savings (although largely re-invested in compliance, online, etc.); more recent savings initiative is targeting $150mm run-rate savings (including ~10% reduced headcount)	- WU partners and integrates with numerous businesses operating in different verticals (NGO, Bank, universities, etc.), and has the ability to increase penetration in these verticals, and the possibility to expand into additional verticals	- Threat of past and ongoing litigation impacting operations, have a past joint case settled in 2017 for $586mm (that has also spurred multiple class action lawsuits due to admission of guilt) and ongoing cases, pose significant legal threats to business operations
	- Mobile application install base 15mm+ and downloads have grown at a ~90% CAGR 2015-2018	- State and country-based licenses, knowledge of local rules & regulations, and even banking licenses in certain European countries (e.g., Ireland). Money transmitter licenses can be time consuming and in certain countries challenging to obtain	- Greater number of agent locations than the competition (550k vs. 370k for MGI, <6k for IMXI); 10% of WU's send agents (~55k) are located in the US; Top 40 agents have been with WU for an average of 20 years	- Implementation of dynamic pricing methods (from previous static, wholesale), able to utilize customer transaction data to adjust prices based on city, location density, day of the week, time of day, and customer service preference	- Multiple avenues for end-consumer interactions including agent locations, white-labelled products, mobile application, C2B payments, and bill-pay services	- Bill-pay services for consumers, allowing for handling of bill payments (e.g., utility, car, mortgage, electricity, etc.) either online, in person, or by phone	- Pricing pressure exists in certain corridors due to increased availability (and more scaled) offerings from FinTech platforms (e.g., Transferwise, Remitly), but has maintained industry leading take rates (gross and net of ~5.1% and 2.8% respectively), albeit in part due to mix	- WU has not been active in M&A recently (last two acquisitions were $25mm or less, in 2017 and 2014), other than the divestiture of two businesses in 2019 (Speedpay and Paymap)	- Compliance spend has increased at a ~12% CAGR since 2012 (and doubled from $100mm to $200mm); these costs are largely fixed in nature, and thus could contribute to margin upside in combination with MSD revenue growth	- Through WU Way and other cost cutting initiatives (announced at Investor Day) the company has committed to cutting overhead to bolster industry leading EBITDA margins (~$150mm annual savings going forward)	- Regulations around money-transfer: 1) Bank Secrecy Act regulated by FINCEN (KYC/AML); 2) Dodd-Frank regulated CFPB (disclosures); 3) additional requirements related ID (transactions over $3k), fraud prevention/ detection, etc.

Source: Company reports, Credit Suisse research

	Growth & Share Gains			Differentiation				Financial		Additional Factors	
	eCommerce & Software exposure	Geographic Mix & Scale	Partnerships & Distribution	Product & Innovation	Proximity to Customer	Additional Services	Pricing Power	Benfitting from M&A/Cash	Operating Leverage	Emerging Areas of Upside	Threats (Competitive, Regulatory)
IMXI	◔	◑	◕	◑	◕	◑	◑	◑	◑	◕	◑
	- Predominantly an offline, in-store business, particularly given the focus on Mexico and Guatemalan markets (higher portion of under-banked consumers)	- Focused on the largest (~$33b in 2018 volumes vs. industry of ~$690b) and most profitable (~$5 gross profit per order) corridor in the industry, which is US into Mexico. Taking market share from incumbents in this corridor (~40% of incremental growth)	- Approximately ~6k sending agent locations in the US, selected based on location (high concentration of foreign born consumers) and ability to provide customer service	- On-site the remittance network accessed through an installed, Windows-based application (vs. a web-based interface); means less data loads per transaction (given the interface is local), resulting in faster speeds (~10-20 seconds vs. competitors > 1+ minutes)	- Source of revenue generation for sending agents both on a direct (commission levels competitive, i.e., ~64% of transaction fees vs. WU ~44% of total revenues) and indirect basis (driver of traffic into retail location)	- Launched a GPR / payroll card in 2019, with distribution through the company's 32 owned store locations (ability to offer lower fees vs. Green Dot, Netspend, etc. due to indirect monetization via additional Intermex wires)	- Intermex mix shift optically reduces overall profitability (any mix shift away from US -> Mexico is likely to be margin dilutive), though like-for-like pricing trends have been relatively stable (comments from both IMXI and WU management)	- Roughly neutral net debt position with ~$94mm in cash on balance sheet and ~$96mm in debt, providing flexibility to increase leverage to acquire and/or invest	- EBITDA margins guided to ~flattish over the near-medium term as mix shift to lower gross margin business (Africa, Canada, El Salvador, Honduras, CA/TX as send states) to be offset by non-transaction expense leverage (despite investment in new markets, GPR card, etc.)	- Growth states, where Intermex has ~10% share (vs. ~25-30% in more established, stronghold states), with growth rates that have been ~1.5x that of the core stronghold states (which also continue to growth above market rates)	- Generally a competitive industry, particularly around smaller competitors tending to be more willing to discount to attempt share gains (making maintaining a premium service integral to maintaining share)
	- Offers online & mobile transfers, although this makes up a di minimis portion of the business (if and when the demographic group served begins to desire an online product, Intermex will have available, albeit comes with added CAC)	- Receive capabilities in 17 Latin American countries and 4 African. Volume drivers are Mexico and Guatemala, but generally focused on highest volume corridors in any region (Nigeria is 90% of Sub-Saharan Africa volume)	- Does not attempt to gain ubiquity in terms of agent locations; focused approach provides for quality customer experience (interview agents, credit worthiness, provide with faster technology, etc.), with agents 4x as productive as industry average	- Emphasis on "time to live" in customer service, i.e., getting a live customer service representative fast, helping to decrease cancellation rates (currently stand at less than 1%, well below industry averages of ~mid-single digits %)	- Agent locations based in convenient, densely populated (foreign born) areas within targeted neighborhoods, with new agent locations driving ~half of growth (vs. ~half SSS)	- Began partnering with employers in Q3 2019 (working to bring workers to the US from Mexico and sponsor their visas); beneficial to the employer (reduce paper check cost) and the employee (saves check-cashing fees)	- Industry wide pricing compression more concentrated in online transactions, which typically appeal to banked customer sets and corridors (e.g., US -> India, where online would be a higher portion of the mix for highly skilled workers in the US)	- Prior to 2012, acquired Servimex, Americana, and Maniflo to extend their footprint to additional states (but has not made any acquisitions since)	- Focused approach allows for reduced overhead (vs. being in ~200 countries with a larger fixed cost base to maintain licenses, compliance, etc. in those markets); allows for additional focus and expertise on the customer, compliance, regulations of core markets	- Africa inbound (~$9-10b volume TAM, similar to Guatemala) and Canada outbound (~roughly the size of Texas) - both launched during 2019, with Canada enabling additional inbound markets due to its diversity (many equally split send geographies internationally)	- Any real or perceived threat related to taxation of remittances (i.e., into Mexico and Guatemala) at a national level, along with any efforts by states to introduce taxation (e.g., Oklahoma currently has a tax, Tennessee and Georgia have laws being proposed)
	- Mobile application only launched in July 2019 with ~4k downloads 1st four months (vs. WU had 1mm+ over the same period), partially explained by underbanked mix, but a trend to watch as underbanked get increasing access to financial services	- Targeted approach to send locations in the US through highly dense Latin-born population states / neighborhoods. In a similar light, key "growth" states have been identified (CA, TX, UT, AZ, etc.) for targeted expansion into highly dense foreign populated areas in those states	- Bank partner white labeling expands reach into banked customers (more typically users of online, where CAC is high - but not a concern in a white-label deal); typically ~$2-$3 net per wire (not too dissimilar from ex-Mexico/Guatemala wires)	- Sizable amount of capex investment ("millions of dollars on capex for our technology") in and also maintenance of highly operational call centers (1 in Mexico, 1 in Guatemala); supports ~8-second answer time (live service) operating extended hours (until midnight)	- GPR / payroll card increases stickiness of customer relationship (i.e., increased engagement, more daily usage when used as primary card/account), in addition to the Interpuntos loyalty program (drives ~1/3rd of volumes)	- Interpuntos loyalty program (began 2014) allows customers to earn points for transacting with Intermex. Points can be redeemed for discounted fees. Program members transact 3x non-members, with 85% of cards actively transacting	- Continued share gains (e.g., historically ~40-50%+ of volume growth in Mexico and Guatemala, and impressive but lower ~30-40% YTD 2019) supportive of the brand and potential leverage with customers and/or agents (i.e., traffic driver for retail locations)	- Public company with equity as a currency for M&A increases choice in deal funding relative its previous private status	- Agent startup cost synergies from expansion / increased focus into geographies that have agent overlap (both send & receive side). On the send side, agent start-up costs are ~$2.5k per location, and take 2-3 years to ramp (which can be avoided using existing agents)	- White labelling of the platform, leveraging additional capacity and expanding reach (i.e., into a more banked consumer base, via bank partnerships); large bank partner established with ~3.5mm Guatemalan customers in the US	- Regulations around money-transfer: 1) Bank Secrecy Act regulated by FINCEN (KYC/AML); 2) Dodd-Frank regulated CFPB (disclosures); 3) additional requirements related ID (transactions over $3k), fraud prevention/ detection, etc.

What do we like in a payments stock?

Large TAM + share gains/mix + unit economics + "call options"

We prefer companies that show

- Aforementioned sector-specific factors such as meaningful exposure and/or best-in-class capabilities in Software-led payments, eCommerce payments, and/or SMB exposure
- Large total addressable markets (of which almost all payments companies have, by definition)
- Unit or volume share gains, either currently or expected over the near to medium term (either due to lack of competition or a more attractive/sticky offering relative to competitors)
- Unit economics, either via stable pricing (and high incremental margins) or mildly reduced pricing (i.e., tiered volume discounts) successfully driving growth
- "Call options" or areas of upside not properly valued or understood by the market (e.g., new business, new product launch, partnership potential)
- Management teams with strong track records of meeting and/or exceeding guidance and expectations
- Valuation that is reasonable on a growth-persistence-adjusted basis (typically expressed by a ~2- to 3-year forward CAGRs)

We do not prefer companies with

- Lesser exposure or upside related to software and/or eCommerce-based growth
- Decreasing unit or volume share metrics, either currently or expected over the medium term (either due to increasing competition, elevated customer attrition, or a less relevant offering vs. alternatives)
- Deteriorating unit economics, either due to pricing pressure or an elevated need to invest in customer acquisition, particularly when competitors with willfully lower margins are willing to drive up CAC in key channels
- Lack of new business and/or product launch cadence (i.e., lower levels of innovation)
- Less consistency in meeting targets and expectations
- Valuation that appears stretched relative to expectations for growth persistence

Credit Suisse Payments Innovation Event Series
Additional reports

- Neocova, a next-gen core banking platform
- Card networks, software-led payments, and acquirers discussion
- Core banking technology in a recessionary environment discussion (FIS, FISV, etc.)
- PayPal (PYPL) Real-Time Data & Introduction to Edison Trends
- SMB Payments trends & longer-term outlook with CardFlight
- Finxact & SaaS Core Banking Technology
- Bank CEO & COO Panel on Core Banking Technology (FIS, FISV, JKHY, Finastra, etc.)
- Introduction to YipitData; Analysis of PayPal & Square (including Venmo & Cash App)
- "Demystifying Faster Payments" with Glenbrook Partners
- An Introduction to OakNorth
- 3rd Annual FinTech Conference Recap: Fireside chat with Plaid
- 3rd Annual FinTech Conference Recap: Introduction to PPRO

Valuation, Methodology and Risks

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Adyen (ADYEN.AS)

Method: Adyen is a global payments company with a leading position in fast-growth areas of the market like eCommerce. Our market share analysis shows that Adyen's share in global eCommerce has risen annually, reaching c6-11% in FY19, depending on market size estimate. Meanwhile, our in-depth total addressable market (TAM) analysis implies this trend is set to continue, with Adyen reaching FY23E shares of c11-15%. Looking ahead, levers of future growth - such as a focus on the mid-market, expansion of Unified Commerce, and geographical expansion - should position the company well in the long term. In order to reflect Adyen's unique growth trajectory in our forecasts - and to account for the near-term COVID disruption, we continue to target a slightly wider valuation window than normal in our valuation of Adyen, looking to FY23 in our valuation. Ideally, we would use CY23 EV/ EBITDA from consensus to drive our analysis, but with many analysts yet to publish CY23 forecasts in payments, the quality of data is mixed. Consequently, we use a correlation of CY22 EV/EBITDA multiple and growth, to derive our multiple for Adyen. On average, CY22 EV/ EBITDA valuations are 18% cheaper than CY21. Consequently, in order to simulate CY23, we assume that CY23 valuations are 18% cheaper than CY22. Applying this sector-derived discount to our peer-regression-implied CY22 multiple of 81x drives a CY23 EV/EBITDA multiple of 66x. Applying this 66x multiple to our FY23 EBITDA estimates gets us to our implied EV. We then forecast add net cash (excluding merchant funds) for FY23 so as to arrive at our target share price of EUR 2283, and hence we rate the shares Outperform.

Risk: The primary risk to our TP of EUR 2283 and Outperform rating is that COVID disruption in seasonally important 4Q20 and also 1H21 is worse than we currently forecast and this pushes Adyen's recovery further to the right; our FY21 estimates are for example based upon a gradual recovery in both airline and non-airline volumes. Meanwhile from an operational point of view, digital payments is a round-the-clock mission-critical operation on which businesses of all sizes are increasingly reliant upon - any technical issues that may lead to payments network downtime presents a serious risk to Adyen's course of business and reputation as a leading global payments provider.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Fidelity National Information Services Inc (FIS.N)

Method: Our $160 target price and Outperform rating is based on 21x our 2022E EPS, a 2-turn discount to the average since the closing of the Worldpay deal (mid-2019) and a premium to the legacy FIS 3-year average of ~19x. We feel the premium to historical is warranted given resilience of revenues in Banking and Capital Markets segments during economic downturn, and the high quality acquiring assets with less exposure to business closure risk, feed our expectations for a return to mid-teens plus EPS growth post COVID.

Risk: Key risks to our $160 target price and Outperform rating include any sustained economic turndown, competition in both the bank technology and merchant acquiring segments, increasing pressure from a sub-segment of banks wishing easier access to integrate third-party ancillary services, any acceleration in bank consolidation, integration risks associated with the Worldpay merger, and FX.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Fiserv (FISV.OQ)

Method: Our $135 target price and Outperform rating are based on 21x our 2022E EPS, a 2-turn discount to the 3-year historical FISV multiple of 23x and double the historical First Data (FDC) multiple of ~11x. The premium related to First Data is warranted due to the removal of excessive leverage (~5x net debt/EBITDA as of end 2018) and associated constraints on investment for growth/innovation.

Risk: Risks to our $135 target price and Outperform rating are mainly competitive (in merchant acquiring and bank technology), along with complexity (i.e., 78 deal-related work streams), synergy execution, and FX.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for FleetCor Technologies, Inc. (FLT.N)

Method: We maintain a Neutral at a target price of $240, Our target price is based on ~19x our 2021E EPS, representing a 1x discount to its three-year average of 20x given limited fuel card visibility and weakening market conditions.

Risk: Key risks to our Neutral rating and $240 target price are largely macro (fuel price), acquisition (integration and/or dilution risk, particularly if FleetCor were to consider larger acquisitions), and SMB related. Approximately 13% of FleetCor's revenue is exposed to fuel prices. Additional risks include increases in credit losses, any required changes in practices or monetary impacts in connection with the lawsuit announced by the US Federal Trade Commission (with additional context provided in the risk section of this note), and foreign exchange within the International business (contributes ~40% of revenue).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Global Payments (GPN.N)

Method: Our $215 target price, which helps drive our Outperform rating, is based on 23x our 2022E EPS.

Risk: Key risks to our $215 target price and Outperform rating relate to integration of the TSYS acquisition (albeit muted given both companies have exceptional integration track records) given the size of the deal (~$4b revenue business merging with ~$4.5b one). Within the issuer processing business, any consolidation in the banking and financial services industry could affect client relationships and/or increase the bargaining power of TSYS customers. Additional risks relate to competition (from a handful of global merchant acquirers such as Stripe, Worldpay, Adyen, First Data, and Chase), along with FX.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for International Money Express (IMXI.OQ)

Method: Our $18 target price and Neutral rating are based on 7x our 2022E EBITDA, approximately in line with its peer group (WU, MGI, EEFT), which we view as appropriate, given less certainty around outcomes relating to the pandemic (i.e., 2nd wave), although somewhat offset by resilient performance during the COVID pandemic.

Risk: Key risks to our Neutral rating and $18 TP are concentration (i.e., Mexico 60% of volumes) and the potential for adverse events (currency, migration, macroeconomic), political and regulatory risks (heavily regulated industry [Bank Secrecy Act/Anti-Money Laundering regulation for money remittance providers], fraught with political headlines), and competition from existing players and more recent entrants (FinTech providers with lower fees for online consumers, albeit a less core customer for Intermex, meaningful reducing this risk in the medium-term).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Jack Henry & Associates (JKHY.OQ)

Method: Our $175 target price and Neutral rating are based on 38.5x our CY2022E EPS, in-line with JKHY's three-year average multiple. Our target multiple for JKHY is among the highest in our coverage, nearly ~2x the target multiples we assign to FIS & FISV of 21x, JKHY's most comparable competitors and a modest 0.5x discount to our target multiples for V & MA of 39x.

Risk: Key risks to our $175 target price and Neutral rating include any sustained economic turndown, increased competition in the bank technology market, increasing pressure from a sub-segment of banks wishing easier access to integrate third-party ancillary services, and any acceleration in bank consolidation.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Lightspeed POS (LSPD.N)

Method: Our 12-month forward target price of $70 is based on an 18x EV/sales multiple on CY2023E net revenue discounted back one year at 11%. Our target multiple implies a multiple-to-growth of ~0.6x (CY2020-2022E net revenue CAGR of ~30%). We rate LSPD Outperform as we believe the company will perform better than its peers.

Risk: Risks to our $70 target price and Outperform rating are mainly competitive (other modern, cloud-based POS providers), failure to execute (Payments penetration, M&A integrations, etc.), and macro (potential reduction in number of SMBs due to COVID-related restrictions and economic impacts).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for MasterCard Inc. (MA.N)

Method: Our $380 target price for MasterCard represents ~37x our C'22 EPS estimate. We believe this valuation is justified given that MasterCard has demonstrated the ability to grow through the slowing of spending volumes. Since 2012 MasterCard has traded of 17x-27x forward PE. We believe that MasterCard deserves a significant premium over the market multiple due to the network's strong organic growth and sustainable business model. Given the upside potential indicated by our target price, we rate the stock Outperform.

Risk: The primary risks for our Outperform rating and $380 target price on MasterCard are reduced spending or increased price competition stemming from the effects of the Fed's recent Durbin Amendment ruling. Another potential risk to our rating would entail significant market share competition in the U.S. and Europe.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Nuvei Corp (NVElu.TO)

Method: Our Outperform rating and a one-year target price of $45 based on ~25x EV/EBITDA on our 2023E adjusted EBITDA discounted back one year at a 9% discount rate. Our target multiple implies a multiple-to-growth of ~1.3x (2021-2023 EBITDA CAGR of ~19%), at a slight premium to its group of the most comparable peers (Global Payments, Adyen, PayPal, REPAY, Shift4 and EVO Payments). We believe the limited public market of SMID cap payments companies provides added potential for an elevated valuation.

Risk: Risks to our $45 price target and Outperform rating are largely related to Nuvei's success in acquiring new customers and continuing to upsell to existing customers to grow wallet share. Further risks relate to competition, with the potential for larger eCommerce acquirers, such as Adyen and Worldpay, to take share away from Nuvei, along with difficulties expanding globally. Longer term risks exist for competitive pricing pressure given Nuvei's high take rates.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for PayPal (PYPL.OQ)

Method: Our $215 target price, which helps drive our Outperform rating, is based on 38x 2022E EPS (vs. +/- 1 std. dev. range [3-year avg.] 30x - 36x), given prospects for an acceleration in eCommerce mix shift, presenting potential upside to estimates both near-term (should recent positive data points continue) and medium-term (increased digital commerce tailwinds).

Risk: Risks to our $215 target price and Outperform rating for PYPL are mainly competitive in nature (e.g., Secure Remote Commerce "single payments button" from the networks, W3C's Payment Request API in-browser, and any further payments efforts by large cap technology companies). Given the inertia in consumer payments, we are hesitant to put too much weight on these competitive offerings (but acknowledge related headlines will create volatility). We note that a long list of large technology players have made payments announcements over the years, only to see PayPal to continue to grow through these perceived threats.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Repay Holdings (RPAY.OQ)

Method: Our $28 target price and Outperform rating are based on a target EV/EBITDA multiple of 26x of 2022E adjusted EBITDA. Historically has traded around ~1.0x on a multiple-to-EBITDA-growth (i.e. 2020-2022E) basis, and is roughly aligned with a group of the most comparable peers.

Risk: Key risks to our Outperform rating and $28 target price are largely competitive in nature, with the potential for commission pressures should large-scale integrated payments players (e.g., OpenEdge, Mercury, CardConnect, etc.) increase focus on REPAY verticals. The possibility remains that a subset of its largest ISV partners could consider taking payments in-house (i.e. become a PayFac).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Rocket Companies (RKT.N)

Method: We maintain our Neutral rating, and a target price of $27. Our target is based on 15x our 2022 Adjusted EPS estimate. While we believe RKT has no perfect public comparable in the market, we believe its business resembles a combination of best in class financials, technology/platforms, and mortgage companies, coupled with industry-leading technology that would allow the company to sustain multi-year share gain in an enormous market going forward. As such, we believe RKT's multiple should be more closely aligned with financials with relatively high ROE and scaled technology platforms, rather than pure-play mortgage businesses that are trading at significant discount to the market.

Risk: Risks to our $27 price target and Neutral rating are largely related to the lack of visibility into medium-term volumes and the underlying volatility of the US mortgage market (sensitivity interest rate movements). Further risks relate to competition, should bank-based channels potentially advance their technology overtime to better approximate the Rock Mortgage user experience, either via internal development or partnership with third party FinTech platforms.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Shift4 Payments (FOUR.N)

Method: We arrive at a one year target price of $66 based on ~26x our 2022E adjusted EBITDA, +2x turn given improved prospects for M&A (~$1b in cash on B/S proforma) and/or CAC investments to attract merchants to E2E (accelerating gateway conversion and/or share gains). Our target multiple implies a multiple-to-growth (vs. 2021-2023 EBITDA CAGR), roughly aligned with its group of the most comparable peers (Global Payments, Square, REPAY, and EVO Payments). Further, given the potential for better-than-forecast gateway conversion, we consider our initial estimates to be conservative. Additionally, we believe the scarcity of high quality SMID cap payments names lends itself to the potential for an elevated multiple. We rate FOUR Outperform as we expect the stock' s total return to outperform peers over the next 12 months.

Risk: Key risks to our $66 target and Outperform rating are largely macro (SMB restaurant & travel industry-related) and competitive in nature, either via share loss or elevated commissions should large-scale integrated payments players (e.g., Global Payments, Worldpay, CardConnect) competitors increase focus on Shift4's core market. Further, the possibility remains that a subset of its largest ISV partners could consider taking payments in-house (i.e. become a payments facilitator or provide some other form of in-house managed payments offering).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Square (SQ.N)

Method: Our $210 target price, which helps drive our Outperform rating, is based on a 2023E adjusted revenue multiple of 17x.

Risk: Key risks to our $210 target price and Outperform rating are mainly macro-, SMB-related, and competitive in nature. We are cognizant that any pressures on small business creation and/or confidence would impact Square's multiple (valuation-wise) and core customer base (operationally). Diversification toward larger sellers has mitigated a portion of this risk, but also introduces increased competition and the potential for lower net take rates. As to Square Capital, we plan to monitor for any change in demand from institutions purchasing loans originated by Square and/or any slowing in originations (and note that the majority of loan balances are sold off and thus not held on Square's balance sheet). Additional risks relate to any uptick in transaction losses, and any added Cash App competition (stemming from FinTechs, incumbents, and/or Internet giants).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Verra Mobility (VRRM.OQ)

Method: Our $13.5 target price and Outperform rating is based on ~12x our 2022E EBITDA (warranted due to defensive Government ARR).

Risk: Key risks to our $13.5 target price and Outperform rating are: (1) uncertainty of government contracting, and the ability to exit contracts without penalty (should a legislative action change the law), along with associated political sentiment; and (2) customer concentration (the three large RAC customers contribute ~50% to revenue).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Visa Inc. (V.N)

Method: Our Outperform rating and $255 target price for Visa represent ~36x our C22 EPS estimate. We expect the company to recapture most of its debit market share through new pricing and keep rapidly expanding its international business. Visa has demonstrated ability to enhance margins if weaker economic activity leads to slower revenue growth. Given the upside potential indicated by our target price, we rate the stock Outperform.

Risk: The primary risk to our Outperform rating and $255 target for Visa is a reduction in spending or an increase in pricing competition as a result of the recently passed card legislation. Another risk would include challenges increasing pricing in Europe.

Target Price and Rating
Valuation Methodology and Risks: (12 months) for WEX (WEX.N)

Method: Our $205 target price is based on ~20x our 2022E EPS in line with WEX' s three-year historical average.

Risk: Risks are largely macro (fuel prices), acquisition (integration), and SMB related (credit).

Target Price and Rating
Valuation Methodology and Risks: (12 months) for Western Union (WU.N)

Method: Our target price is $22 with an Underperform rating (which suggests no upside over the next 12 months [least attractive relative to our coverage], absent a 4~5% dividend that is at / above the high-end of its historical 3-4% range) is based on 10x our 2021E EPS.

Risk: Key risks to our $22 price target and Underperform rating are competition (from incumbents and fintechs alike) driving down pricing and decreasing stickiness of the Western Union service, regulatory risks resulting from adherence to the Bank Secrecy Act, Dodd-Frank Act and other regulatory requirements (which previously resulted in ~$570mm in fines for Western Union, not including legal costs), and migration risk (that migration trends slow, impacting the growth of the money remittance market as a whole). Risks to the upside include faster than anticipated adoption of digital, and downward pricing trends abating in the near-medium term.

Companies Mentioned *(Price as of 27-Jan-2021)*

ACI Worldwide Inc (ACIW.OQ, $38.01)
Adyen (ADYEN.AS, €1775.0)
Alibaba Group Holding Limited (BABA.N, $260.25)
Alibaba Group Holding Limited (9988.HK, HK$260.0)
Alphabet (GOOGL.OQ, $1818.94)
Amazon com Inc. (AMZN.OQ, $3232.58)
Apple Inc (AAPL.OQ, $142.06)
Bank of America Corp. (BAC.N, $29.83)
Bill.Com Hldg (BILL.N, $113.49)
Bottomline Tech (EPAY.OQ, $47.52)
Citigroup Inc. (C.N, $59.4)
EVO Payments (EVOP.OQ, $23.06)
Euronet Worldwid (EEFT.OQ, $123.3)
Facebook Inc. (FB.OQ, $272.14)
Fidelity National Information Services Inc (FIS.N, $122.53)
Fiserv (FISV.OQ, $103.22)
FleetCor Technologies, Inc. (FLT.N, $245.29)
Global Payments (GPN.N, $177.58)
Green Dot Corporation (GDOT.N, $51.77)
Intercontinental Exchange (ICE.N, $109.35)
International Money Express (IMXI.OQ, $14.4)
Jack Henry & Associates (JKHY.OQ, $149.65)
Lightspeed POS (LSPD.N, $65.34)
MGIC Investment Corporation (MTG.N, $11.86)
Macy's Inc. (M.N, $17.73)
MasterCard Inc. (MA.N, $315.49)
Nexi (NEXII.MI, €14.435)
Nuvei Corp (NVEIu.TO, $50.0)
PayPal (PYPL.OQ, $229.94)
Q2 Holdings (QTWO.N, $136.2)
Repay Holdings (RPAY.OQ, $22.75)
Rocket Companies (RKT.N, $23.0)
Samsung Electronics (005930.KS, W85,600)
Shift4 Payments (FOUR.N, $64.2)
Square (SQ.N, $202.46)
Tencent Holdings (0700.HK, HK$701.5)
U.S. Bancorp (USB.N, $42.81)
Uber (UBER.N, $48.11)
Verra Mobility (VRRM.OQ, $13.49)
Visa Inc. (V.N, $194.97)
WEX (WEX.N, $187.22)
Walmart Inc. (WMT.N, $143.84)
Wells Fargo & Company (WFC.N, $30.17)
Western Union (WU.N, $23.15)
Worldline (WLN.PA, €70.2)

Disclosure Appendix

Analyst Certification

Timothy Chiodo, CFA, Nik Cremo and Moshe Orenbuch each certify, with respect to the companies or securities that the individual analyzes, that (1) the views expressed in this report accurately reflect his or her personal views about all of the subject companies and securities and (2) no part of his or her compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this report.

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Neutral (N) : The stock's total return is expected to be in line with the relevant benchmark* over the next 12 months.

Underperform (U) : The stock's total return is expected to underperform the relevant benchmark* over the next 12 months.

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Global Ratings Distribution

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Restricted	2%	

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See the Companies Mentioned section for full company names

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Credit Suisse is acting as exclusive advisor to Nets A/S (NETSc.NXT) on the announced pending sale of their account payment business to MasterCard Inc (MA.N)

For date and time of production, dissemination and history of recommendation for the subject company(ies) featured in this report, disseminated within the past 12 months, please refer to the link: https://rave.credit-suisse.com/disclosures/view/report?i=585384&v=vx7mfkmtpe7mb29xw12skej8 .

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