Payments, Processors, & FinTech
If Software Is Eating the World…
Payments Is Taking a Bite

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# Payments, Processors, & FinTech

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Payments, Processors, & FinTech coverage overview
Networks, merchant acquirers, bank tech, B2B-related, and money transfer

- The initial payments coverage universe consists of networks (V and MA, co-covered with Moshe Orenbuch), merchant acquirers & bank technology providers (GPN, FISV, FIS, PYPL, SQ, RPAY, and FOUR), B2B-related businesses (FLT, WEX, and VRRM), and money transfer platforms (WU and IMXI).
Credit Suisse Payments Innovation Event Series
Recent 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
- Neobank monetization, unit economics, and potential product roadmaps (Cash App, Chime, etc.) with Atomic CEO
- Bank CEO & COO Panel on Core Banking Technology (FIS, FISV, JKHY, Finastra, etc.)
- Introduction to Dave (Neobank)
- 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
- 3rd Annual FinTech Conference Recap: Neobank Panel (Dave, Varo, Revolut, & Atomic)
Payments, Processors, & FinTech recent reports

Links to our recent company-specific reports

- PYPL: Pay With Venmo deep dive
- PYPL: True TAM update and eCommerce acceleration
- SQ: Cash App deep dive
- GPN, FIS, FISV detailed progression build, intra-quarter V/MA commentary
- V/MA FTC Inquiry into debit routing – what we know so far
- PYPL: COVID scenario analysis by business
- Credit Suisse Bank Technology survey
- RPAY: Updated segment build & MBFS US quantified
- Cash App vs. Venmo monetization and strategy deep dive
- Update to our initial COVID “Scenarios” analysis for GPN, FIS, & FISV, from April
- PYPL: Quantifying Pay With Venmo, Paymentus, eBay, and Uber opportunities
- May remittances update, sharing Latam central bank data, WU, IMXI exit rate builds
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
- **Fidelity National Information Services (FIS):** Accelerating at scale
- **Fiserv (FISV):** Scale begets scale
- **Global Payments (GPN):** In all the right swim lanes
- **Square (SQ):** Square stands apart; ecosystem scaling
- **FleetCor Technologies (FLT):** King of the Cross-Sell
- **Western Union (WU):** The traditional money remittance power
- **WEX (WEX):** Operating in attractive FinTech swim lanes
- **Verra Mobility (VRRM):** Market leader in tolling payments processing and traffic safety solutions
- **Repay (RPAY):** Integrated payments platform serving niche (but expanding) verticals
- **International Money Express (IMXI):** Focused competitor gaining share in important remittance corridors
- **Shift4 Payments (FOUR):** Integrated payments player with idiosyncratic drivers over the medium term

Source: Credit Suisse estimates

20 August 2020
Payments, Processors, & FinTech coverage & ratings
9 Outperform, 3 Neutral, 1 Underperform (1 Restricted)

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<tr>
<th>Ticker</th>
<th>Company Name</th>
<th>Market Cap ($b)</th>
<th>CS Rating</th>
<th>Market Price</th>
<th>CS Target</th>
<th>Brief take on stock</th>
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<tr>
<td>V</td>
<td>Visa, Inc.</td>
<td>$445</td>
<td>Outperform</td>
<td>$301</td>
<td>$320</td>
<td>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 + Earnpoints, efforts in both cross-border and B2B, pending acquisition of Plaid)</td>
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<tr>
<td>MA</td>
<td>Mastercard, Inc.</td>
<td>$336</td>
<td>Outperform</td>
<td>$322</td>
<td>$325</td>
<td>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</td>
</tr>
<tr>
<td>PHPL</td>
<td>PayPal Holdings, Inc.</td>
<td>$230</td>
<td>Outperform</td>
<td>$192</td>
<td>$205</td>
<td>Share gainer &amp; 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 [WEI, Uber], bill-pay, China, [Zettle, Honey])</td>
</tr>
<tr>
<td>FIS</td>
<td>Fidelity National Information Services, Inc.</td>
<td>$89</td>
<td>Outperform</td>
<td>$143</td>
<td>$160</td>
<td>Expectation for accelerating topline in medium term, rare; ~45% of merchant acquiring in global eComm &amp; 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</td>
</tr>
<tr>
<td>SQ</td>
<td>Square, Inc.</td>
<td>$78</td>
<td>Outperform</td>
<td>$160</td>
<td>$170</td>
<td>Interconnection 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 omnichannel offerings accelerated, setting up GPV recovery</td>
</tr>
<tr>
<td>RISV</td>
<td>Fiserv, Inc.</td>
<td>$69</td>
<td>Neutral</td>
<td>$100</td>
<td>$115</td>
<td>FDC undervalued thesis now validated by market (valuation); Exposure to attractive swim lanes (ISV, eCommerce International) albeit at lower levels of total revenue vs. Outperform-rated acquirers; CSB tougher companies in 2019 (following impressive acceleration in 2018)</td>
</tr>
<tr>
<td>GPN</td>
<td>Global Payments, Inc.</td>
<td>$51</td>
<td>Outperform</td>
<td>$169</td>
<td>$210</td>
<td>Highest relative exposure to the fastest growing channels (owned &amp; partnered software, global eCommerce/Omni channel with local support in 33 markets); Leading credit issuer processor via TSYS; Potential for more bank/JV partnerships</td>
</tr>
<tr>
<td>FLT</td>
<td>FleetCor Technologies, Inc.</td>
<td>$21</td>
<td>Neutral</td>
<td>$249</td>
<td>$250</td>
<td>Fuel, Corporate Payments, Lodging, &amp; Tolls all recurring revenue, high margin, network effects, similar distribution; Best at cross-sell &amp; accretive M&amp;A (Beyond Fuel latest example); Historically a LDD organic ex-FX topline grower</td>
</tr>
<tr>
<td>WU</td>
<td>The Western Union Co.</td>
<td>$10</td>
<td>Up</td>
<td>$24</td>
<td>$22</td>
<td>Valuation at a meaningful premium to historical averages, dividend yield (~3%) at low end of range, yet supportive of stock; Competition from traditional &amp; FinTechs, many of which is being driven by Visa Direct; Platform/value &amp; online white labeling supportive of value</td>
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<tr>
<td>WEX</td>
<td>WEX, Inc.</td>
<td>$7.2</td>
<td>R</td>
<td>$168</td>
<td>-</td>
<td>Bullish on the underlying businesses (including potential for accretive M&amp;A ahead), but valuation and expectations for organic deceleration beginning Q2 2020 (tapping of Chevron and Shell); More defensive revenue streams in Healthcare and Corporate (ex-Travel) segments</td>
</tr>
<tr>
<td>F0UR</td>
<td>Shift4 Payments, Inc.</td>
<td>$4.1</td>
<td>Outperform</td>
<td>$50</td>
<td>$50</td>
<td>An integrated payments pure play with a two-pronged growth algorithm driven by ~$18Bb (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)</td>
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<tr>
<td>VRRM</td>
<td>Verra Mobility Corp.</td>
<td>$1.8</td>
<td>Outperform</td>
<td>$11</td>
<td>$13.5</td>
<td>Positive on the moats and sustained mid-single digits+ growth (guidance Government +2-4%, Commercial +6-8%, + boost via M&amp;A, Europe, and new initiatives): Awaiting full rollout of Western Europe Commercial opportunity (where plot programs began in Spring 2020)</td>
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<tr>
<td>RPAY</td>
<td>Repay Holdings Corp.</td>
<td>$1.8</td>
<td>Outperform</td>
<td>$26</td>
<td>$28</td>
<td>Integrated payments in niche lending verticals; Increasing debt penetration in core verticals, adding verticals, new merchants &amp; ISV partners as drivers (organic +mid-teens + M&amp;A, e.g., B2B and Healthcare)</td>
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<tr>
<td>IMXI</td>
<td>International Money Express, Inc.</td>
<td>$0.7</td>
<td>Neutral</td>
<td>$18</td>
<td>$14</td>
<td>Operates within a large TAM, share gainer, and numerous nascent initiatives (Africa, Canada, white labeling with Latin American banks, GFR cards); Mexico &amp; Guatemala concentration (volatile data/end-market), two of strongest corridors globally (US-MEX largest corridor globally)</td>
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Source: Company reports, FactSet, Credit Suisse estimates

20 August 2020
### Payments, Processors, & FinTech coverage overview

**Top Pick: Global Payments (GPN), stable large-cap growth**

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<th>Top Pick</th>
<th>Rationale</th>
<th>Catalyst Path</th>
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| **Global Payments** (Outperform, $210 TP) | - Highest relative exposure to the fastest growing channels (2019E): 1) ~37% owned & partnered software growing ~10-14% organic ex-COVID; 2) ~17% global eCommerce & omnichannel growing ~15-20%; 3) ~20% International growing ~10%+ ex-COVID; and 4) an emphasis on SMB and multi-nationals.  
- Leading credit issuer processor with dominant share in the US, UK, Ireland, Canada, and China (~MSD+% growth vs. industry +3%); improved ability to win bank partnerships and joint ventures; TAM expansion via AWS partnership. | - Potential vertical software M&A (late 2020/early 2021 return)  
- New and/or expanded partners and client wins  
- AWS partnership issuer processing wins |

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<tr>
<th>Added Outperform Highlights</th>
<th>Rationale</th>
<th>Catalyst Path</th>
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| **Square** (Outperform, $170 TP) | - 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 ~$230mm in annual revenue in 2019E by our estimates).  
- COVID as an accelerant of Cash App adoption – with stimulus direct deposited to accounts – further reinforcing usage of entire ecosystem (Cash Card, Boost, investing, Bitcoin, etc.).  
- Seller ecosystem transitioning further upmarket (sales personnel investment planned) and to eComm & omnichannel offerings (attracting larger than expected 2020 new cohort). | - Further adoption of eComm & omnichannel within Seller  
- New product launches (i.e., Cash App features)  
- Boost potential to flip from cost center to profit center  
- SMB digital banking |

| **PayPal** (Outperform, $205 TP) | - Near pure-play on eCommerce, with a ~$5tr “True TAM” inclusive of global eCommerce, eTravel, eFood delivery, eTicketing, ride-sharing, streaming, gambling, etc. – supports persistence of growth and annual compounding.  
- Increased eCommerce activity potentially proving to be more of a consumer behavior change vs. simply a pull-forward due to COVID pandemic, driving record Net New Actives on platform.  
- Potential areas of upside: QR Code, Business Profiles, Pay With Venmo, Bill-pay (Paymentus), Braintree (local acquiring, APM/LPM, omni), iZettle (offline), new marketplaces, emerging markets investments (Uber, MercardoLibre, GoPay), engagement (Pay with Rewards), Honey, and M&A. | - Venmo-related (Pay with Venmo, Honey integration, International expansion, updated user #, etc.)  
- In-Store QR Code partnerships  
- Braintree becomes more global |

| **FIS** (Outperform, $160 TP) | - Prospects for +7-9% organic topline, 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, growing ~MSD with upside potential in large client wins (e.g. Banking to accelerate to ~7% ahead, supported by top 100 bank wins, a TAM less addressable to Fiserv and others).  
- Worldpay business with high exposure to eCommerce and integrated payments (~half of acquiring business). | - Continued Banking client wins in the top 100 bank opportunity  
- Progress in more nascent omnichannel merchant opportunity (ex-core markets, such as Brazil, India, etc.) |

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Source: Company reports, FactSet, Credit Suisse estimates  

20 August 2020
2019 & 2020 YTD recap...
“Mega-mergers”, COVID-19, & FinTech advancement

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<th>Consolidation</th>
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<td>- Three mega-mergers (GPN-TSS, FISV-FDC, FIS-WP)</td>
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<td>- GPN, MA, WU best performing stocks of 2019, while SQ was a laggard, PYPL and SQ best YTD, WEX, VRRM lagging</td>
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<th>Premier private FinTechs scale</th>
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<td>- Financing rounds and increasing valuations (e.g., Stripe ~$36b, Paytm ~$16b, Nubank ~$10b, Marqeta ~$4.3b, Plaid ~$2.65b [acquired by Visa for $5.3b in Q1 2020], SoFi-Galileo acquisition for $1.2b, Mastercard-Finicity acquisition for ~$1b, Affirm ~$3b (Preliminary IPO talks), Chime ~$5.8b, Bill.com IPO, Shift4’s IPO for $345mm, nCino IPO for ~$250mm, Ant Financial preliminary IPO announcement (HK-CN listing)</td>
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<th>BigTech &amp; FinTech moves</th>
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<td>- Apple Card/Apple Pay critical mass</td>
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<td>- Google Checking + hired Bill Ready (PayPal)</td>
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<td>- Facebook Pay across properties (FB, Instagram)</td>
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<td>- Affirm announced “Anywhere”</td>
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<td>- Alipay continued expansion outside China (US, Europe)</td>
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<td>- Paytm in India expanding to 7mm+ merchants, launching banking product</td>
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<td>- Challenger banks global expansion takes hold (Revolut, Monzo, N26 launch in US), and Nubank’s expansion in Latin America</td>
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<td>- Uber Money launched</td>
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Source: Company reports, FactSet, Credit Suisse research, WSJ, Reuters, TechCrunch
...and expectations for 2020 into 2021
“Big three” mergers of 2019 give way to progress on nascent initiatives

Some of our expectations for 2020 – 2021 are for more M&A (bolt-on acquisitions with an emphasis on merchant acquiring), card networks progress on more nascent initiatives, and increasing efforts by BigTech in FinTech

| Bolt-on M&A returns (2H 2020 into 1H 2021) | ・Digest recent mergers (integration) 1H 2020
・Potential return to acquisitions 2H 2020 – 1H 2021 with an emphasis on merchant acquiring (fastest growing sub-segment within FISV, FIS, and GPN) and FinTech platforms (leveraging distribution reach) |
| COVID accelerating cash -> card and contactless adoption, followed by new payment flows, and FinTech partnerships | ・COVID accelerating adoption of card usage due to health concerns and increased remote eCommerce; further emphasizing the need for Omnichannel payments as brick & mortar merchants move to an online presence for survival
・Contactless cards could reach ~40% of US cardholders by year-end 2020
・Visa Direct/Mastercard Send, bill-pay efforts, G2C disbursement opportunities and more B2B automation
・Continue to help FinTechs scale, ensuring their positions in the ecosystem (e.g. Visa – Plaid, Mastercard - Finicity) |
| Increasing focus from and partnerships with BigTech | ・Continued efforts from BigTech to drive adoption of their payments offerings to reduce checkout friction and increase commerce on their platforms: Instagram shopping, Google Commerce, and more launches from Apple (growth priority)
・We note 17% of European bankers view BigTech as the single biggest threat to their business (#2 overall behind regulation), ahead of FinTech at 15% given their established customer relationships, large user bases, brand recognition, and technical talent (Tink) |

Source: Company reports, A.T. Kearney, 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 ~5-14% CAGRs (2019-2023E), with APAC, LatAm, and Eastern Europe as faster-growth geographies

Source: Mastercard, Euromonitor forecast as of Sept 2019 (bottom right chart), Credit Suisse estimates
(1) Includes $12T of non-purchase consumption; (2) Includes $13T of non-PCE card purchases in China

20 August 2020
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.
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)

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 year¹ 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

~$100m+ net yield = $1b+ revenue
~10-40bps net yield = $7.5b+ revenue
~40-100bps net yield = $6b+ revenue
~80-120bps net yield = $4.5b+ revenue
Less than $250k annual revenue
~1mm - $100m
~$250k - $1mm
~3mm SMB
~20mm Micro merchants
~10-40bps net yield = $6b+ revenue
~40-100bps net yield = $850b card volumes
~$850b card volumes
~20k mega merchants
~1mm mid-market larger merchants
~$1mm - $100m
~$3.2tr card volumes
~$3tr card volumes
~$3.2tr in US card volumes

¹Small 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

*…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)
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 growing ~2-3x the overall market (~5x traditional channels) and eCommerce ex-Amazon growing ~3-4x traditional.

- 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 ~40% 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% software-led and ~24% eCommerce-related (across Amazon and other non-Amazon online channels)

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.

Software-led payments (~2-3x+ industry growth rates, or ~5x+ traditional channels) is the most attractive vertical in the US market, along with eCommerce ex-Amazon – 2019-2023E CAGRs below
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 ~6%, going from ~16% to 22% share) and the remainder going to eCommerce payments channels (gaining ~7%, going from ~23% to ~30%).

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.

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 ~30% of Square’s total company revenue will come from additional seller services (e.g., Capital, payroll, Instant Deposit, Business debit, additional paid software, online store, etc.) by 2023E

 “…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)
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).

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 (~17% CAGR 2019-2023E), with the cross-border component growing ~25%+ (with an even faster-growth sub-component, cross-border on Marketplaces, is growing ~27%)

“…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)

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)
## Merchant Acquiring: Channel and business mix matter

Estimated revenue exposure within merchant acquiring business segments

<table>
<thead>
<tr>
<th>Provider</th>
<th>Software-led (owned and/or partnered, iPOS)</th>
<th>eCommerce</th>
<th>SMB</th>
<th>International</th>
<th>Comment/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Payments</td>
<td>~37%</td>
<td>~17%</td>
<td>~80%</td>
<td>~20%</td>
<td>Owned (e.g., AdvancedMD) and partnered (OpenEdge integrated payments) approach to software, along with a leading global eCommerce &amp; Omnichannel business processing in-store domestic, with local support in 33 markets.</td>
</tr>
<tr>
<td>FIS (Worldpay)</td>
<td>~20%</td>
<td>~25%</td>
<td>~60-65%</td>
<td>~15%+</td>
<td>Includes a leading global eCommerce acquiring businesses, along with a leading integrated payments offering (Mercury); Revenue recognition based on home country of merchant, understating International.</td>
</tr>
<tr>
<td>Fiserv (First Data)</td>
<td>~12%</td>
<td>~14%</td>
<td>&gt;50%</td>
<td>~24%</td>
<td>Software-led includes both Clover iPOS offering and ISV/integrated payments business (CardConnect &amp; 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.</td>
</tr>
<tr>
<td>PayPal</td>
<td>~1-2%</td>
<td>~98-99%</td>
<td>~65-70%</td>
<td>~47%</td>
<td>Pure-play eCommerce, although iZettle represents offline expansion, software-led payments (owned software-led iPOS); As of 2015, large merchant mix was ~46% of volume (we assume an increase, and factor in P2P volume, pricing, and OVAs revenue).</td>
</tr>
<tr>
<td>Repay</td>
<td>~100%</td>
<td>~0%*</td>
<td>&gt;60%</td>
<td>~1%</td>
<td>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.</td>
</tr>
<tr>
<td>Square</td>
<td>~95%</td>
<td>~1-3%</td>
<td>~90%</td>
<td>~5%</td>
<td>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.).</td>
</tr>
</tbody>
</table>

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.

20 August 2020
### Merchant Acquiring: If these platforms gain share, who will lose it? Hundreds of sub-scale, country/regional, and local bank-owned acquirers

<table>
<thead>
<tr>
<th>Rank</th>
<th>Acquirer</th>
<th>Country</th>
<th>Transactions (mil.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Antelipay Group</td>
<td></td>
<td>35,235</td>
</tr>
<tr>
<td>2</td>
<td>PNC</td>
<td></td>
<td>25,610</td>
</tr>
<tr>
<td>3</td>
<td>BAMS</td>
<td></td>
<td>17,701</td>
</tr>
<tr>
<td>4</td>
<td>First Data Group</td>
<td></td>
<td>17,063</td>
</tr>
<tr>
<td>5</td>
<td>Berbennik</td>
<td>Russia</td>
<td>14,372</td>
</tr>
<tr>
<td>6</td>
<td>Global Payments Group</td>
<td></td>
<td>13,187</td>
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<tr>
<td>7</td>
<td>Nabrays</td>
<td></td>
<td>9,080</td>
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<tr>
<td>8</td>
<td>China UMS Group</td>
<td>China</td>
<td>7,770</td>
</tr>
<tr>
<td>9</td>
<td>Citi-Merchant</td>
<td>US</td>
<td>7,564</td>
</tr>
<tr>
<td>10</td>
<td>Wells Fargo Group</td>
<td>US</td>
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<td>11</td>
<td>Data Group</td>
<td></td>
<td>7,022</td>
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<td>12</td>
<td>Elion Group</td>
<td></td>
<td>6,147</td>
</tr>
<tr>
<td>13</td>
<td>BC Card Group</td>
<td>South Korea</td>
<td>5,192</td>
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<td>14</td>
<td>Redi</td>
<td>Brazil</td>
<td>4,437</td>
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<tr>
<td>15</td>
<td>Alipay.com Multai</td>
<td>Iran</td>
<td>4,309</td>
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<tr>
<td>16</td>
<td>Algoritmos Solutions</td>
<td>Canada</td>
<td>3,964</td>
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<tr>
<td>17</td>
<td>Crédit Agricole</td>
<td>France</td>
<td>3,613</td>
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<tr>
<td>18</td>
<td>Crédit Mutuel</td>
<td>France</td>
<td>3,611</td>
</tr>
<tr>
<td>19</td>
<td>Banca a Pi</td>
<td>Italy</td>
<td>3,503</td>
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<td>20</td>
<td>Niki</td>
<td></td>
<td>3,579</td>
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<tr>
<td>21</td>
<td>Akbank</td>
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<td>22</td>
<td>Ivan Parsahefian</td>
<td>Iran</td>
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<td>AB Kookien</td>
<td>South Korea</td>
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<td>24</td>
<td>Bogbank Group</td>
<td>Sweden</td>
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<td>25</td>
<td>CB Group</td>
<td>Japan</td>
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<td>26</td>
<td>EVO Group</td>
<td></td>
<td>3,030</td>
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<tr>
<td>27</td>
<td>Panion E-Commerce</td>
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<tr>
<td>28</td>
<td>Alfatis Group</td>
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<td>29</td>
<td>BNP Group</td>
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<td>30</td>
<td>ANZ Group</td>
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<td>31</td>
<td>Westpac Group</td>
<td>Australia</td>
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<td>32</td>
<td>BPC Group</td>
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<td>33</td>
<td>Iran Koh Credit Card</td>
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<td>34</td>
<td>Commonwealth</td>
<td>Australia</td>
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<td>35</td>
<td>BNP Paribas</td>
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<td>36</td>
<td>BBVA Group</td>
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<td>37</td>
<td>Societé Générale</td>
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<td>38</td>
<td>ING Sarpcco</td>
<td>Italy</td>
<td>1,636</td>
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<td>39</td>
<td>Samsung Card</td>
<td>South Korea</td>
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<td>40</td>
<td>Ind-Payments</td>
<td>Italy</td>
<td>1,598</td>
</tr>
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<td>41</td>
<td>Mitsubishi UFJ Nikko</td>
<td>Japan</td>
<td>1,541</td>
</tr>
<tr>
<td>42</td>
<td>Hyundai Card</td>
<td>South Korea</td>
<td>1,535</td>
</tr>
<tr>
<td>43</td>
<td>Transbank</td>
<td>Chile</td>
<td>1,530</td>
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<tr>
<td>44</td>
<td>TD Merchant Solutions</td>
<td>Group</td>
<td>1,462</td>
</tr>
<tr>
<td>45</td>
<td>National Australia Bank</td>
<td>Australia</td>
<td>1,384</td>
</tr>
<tr>
<td>46</td>
<td>Prima Med. De Plazo</td>
<td>Argentina</td>
<td>1,373</td>
</tr>
<tr>
<td>47</td>
<td>VTB Bank</td>
<td>Russia</td>
<td>1,362</td>
</tr>
<tr>
<td>48</td>
<td>Salier Informatics</td>
<td>Iran</td>
<td>1,263</td>
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<tr>
<td>49</td>
<td>Paymeyes</td>
<td>Brazil</td>
<td>1,235</td>
</tr>
<tr>
<td>50</td>
<td>Garanti Bank</td>
<td>Turkey</td>
<td>1,228</td>
</tr>
</tbody>
</table>

### Merchant acquirers (and MSP, PSP, etc.) outside The Nilson Group’s global top 25 handle ~30% of transactions 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

20 August 2020
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 ~2-3% - 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 2018, 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.

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

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

2018 Merchant acquiring share (by transactions), top five with ~43% share
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

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

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 ~300bps of its ~9% 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

Source: Company reports, Credit Suisse estimates
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 (Visa alone expects cards to move 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 Visa and Mastercard will pay away the majority of this premium opportunity in the near term (~2-3 years) to incent 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 2019-2023 E CAGR, but a lesser revenue impact given lower net yields vs. debit (as use cases become more commercial, pricing could improve).
**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)
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 less than 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.

<table>
<thead>
<tr>
<th>Corporate Payments segment</th>
<th>Virtual card</th>
<th>Cross-border</th>
<th>AP automation</th>
<th>Other</th>
<th>Comment/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FleetCor</td>
<td>Comdata</td>
<td>Cambridge</td>
<td>Nvoicepay</td>
<td>Fintwist for Payroll</td>
<td>Emphasis on mid-market; partnerships with AvidXchange and Bill.com (more SMB focused platforms)</td>
</tr>
<tr>
<td>WEX</td>
<td>WEX Virtual Payments</td>
<td>n/a</td>
<td>Noventis, EFS</td>
<td>3Delta Systems, AOC Solutions</td>
<td>Inspyrus partnership in AP automation; utilizes bank channel partners (American Express, PNC Bank, etc.); to address larger multi-national merchants' cross-border needs</td>
</tr>
</tbody>
</table>

Source: Company reports, Credit Suisse research estimates
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) 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).
- Bank wires (~65% of global volumes) 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 per 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). Although markets with high underbanked (cash-based) remittances (e.g., US into Mexico – largest corridor) remain attractive for traditional players (WU, IMXI).
- 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.

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).
Healthy bank IT spend (+4.5% through 2021) 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.

“...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 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)
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 (~63% of assets) have annual technology budgets of ~$40b, equivalent to the entirety of global FinTech funding in 2018.
- 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

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

Neobanks in the US have ~62mm global users in aggregate; longer-term potential to pressure account growth and transactions

In addition to Apple Card, Uber Money and Google checking accounts to come...

2018E technology spend budgets show the big banks in a league of their own (annual spend of ~$40b) vs. FISV & FIS ~$10b combined

Source: Company data, CB Insights, Credit Suisse estimates; Note 1: 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; Note 2: FinTech user numbers presented are global for non-US platforms that recently entered the US; Note 2: Cash App user numbers are CSE
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.)**

- Monitoring for any changes related to (1) longer-term potential for small- to mid-sized US banks to cede account & transaction share among digitally native generations and (2) any increased desire for and investment in third-party bank technology competitors.

Components of growth for US core bank tech providers

Source: Company reports, Credit Suisse research estimates; Note: Growth contribution portions illustrative
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).

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

Source: Company reports, Aite Group, Credit Suisse estimates
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

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

NTM P/E – Current vs. 3-year Median

NTM EV/EBITDA – Current vs. 3-year Median

Source: Company reports, OnDeck, Credit Suisse research estimates

(1) Exclusions – SQ (results are NM), RPAY, and FOUR do not have sufficient data to provide this breakout.
Median PEG ratio of ~1.1x
High valuation multiples, but more reasonable vs. growth, market

- Payments stocks appear expensive at first glance given mid-30s or higher P/E multiples, but on a growth adjusted basis valuations appear more reasonable (company dependent).
- For context, we show Nasdaq 100 tracking the QQQ (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)

<table>
<thead>
<tr>
<th>Company</th>
<th>PEG Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>WU</td>
<td>0.5x</td>
</tr>
<tr>
<td>FLT</td>
<td>0.8x</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>1.0x</td>
</tr>
<tr>
<td>FISV</td>
<td>1.3x</td>
</tr>
<tr>
<td>V</td>
<td>1.5x</td>
</tr>
<tr>
<td>WEX</td>
<td>1.8x</td>
</tr>
<tr>
<td>MA</td>
<td>2.0x</td>
</tr>
<tr>
<td>QQQ</td>
<td>2.3x</td>
</tr>
</tbody>
</table>

Source: Company reports, FactSet, Credit Suisse estimates, Excluding SQ, VRRM, and FOUR (not within bounds); RPAY, IMXI 2022 EPS CSe (due to lack of consensus)
Payments, Processors, & FinTech sector valuation
Trades at a premium to S&P, currently about inline with average

Source: Company reports, FactSet, Credit Suisse estimates; Sector includes CS payments coverage universe (excluding RPAY, SQ, FOUR - NM)
HOLT® “What’s Priced In” Analysis via Credit Suisse HOLT team
Implied 10-year revenue CAGR based on HOLT proprietary methodology

Methodology

- This analysis is based on the HOLT DCF framework and uses CS Research forecasts as a starting point for 2020-2021
- EBITDA margins: 2020-2021 based on CS Research estimates, then assumed constant
- Sales growth: 2020-2021 based on CS Research estimates, 2022-2029 solved for the sales CAGR required to get to today’s price
- After the 10-year explicit forecast, the HOLT methodology calculates the terminal value by fading returns on capital and growth towards cost of capital and GDP growth respectively

Source: Company reports, Credit Suisse estimates
## Payments macro dashboard
### A view of some of the macro and sector-related items we track

<table>
<thead>
<tr>
<th>Metric</th>
<th>Comments</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>US retail sales</td>
<td>July headline number indicates recovery slowing (~40bps improvement), off of a ~1000 bps acceleration in June (YoY) flipping positive and nearing pre-pandemic levels; July read (MoM) exceeded expectations ex-Autos; Vertical specific: Food &amp; Drink recovery continued, down only ~17% in July, accelerating ~500bps (vs. down ~53% April low); Grocery store grew LDD in July, still meaningfully above historical averages, and nonstore retail continued strength growing ~25% in July; Pauses in reopening and voluntary social distancing behavior create downside risks to further recovery; Note: we track non-adjusted retail sales, more relevant (vs. adjusted) when extrapolating to the financials of our coverage</td>
<td>−</td>
</tr>
<tr>
<td>Global retail sales</td>
<td>Q1 2020 down ~2% vs. Q1 2019 (CS economics team global consumption index) to ~0.39%; Index is showing signs of recovery with May accelerating ~1500 bps (M/M) to -1.5% YoY. Trend is below longer term average of a ~2.2% YoY monthly growth (10-year average)</td>
<td></td>
</tr>
<tr>
<td>US eCommerce</td>
<td>Q1 2020 was a strong eComm quarter up 14.5% YoY vs. Q1 2019 as eCommerce absorbed offline sales with US consumers shifting shopping habits during the pandemic; Adobe reports suggest online sales growth is beginning to plateau in June following the recent surge; Mastercard SpendingPulse noted that more money was spent online in the U.S in April and May than the last 12 Cyber Mondays combined, with US e-commerce spending growing by 93% YoY for the month of May</td>
<td>🟢</td>
</tr>
<tr>
<td>USD strength (DXY)</td>
<td>~+150bps YoY in Q2 2020 vs. ~+200bps in Q1 2020 (DXY quarterly, daily average); Overall, strong dollar trends have fallen in the past month (below 200 day and 50 day moving averages), weaker against EUR, GBP and AUD, –flat vs. CAD, and stronger vs. BRL in June/July; Stronger dollar can have a “triple whammy” negative impact for payments (translation/re-measurement, demand destruction, and take rates)</td>
<td>−</td>
</tr>
<tr>
<td>FX Vol (CVIX)</td>
<td>Q2 2020 volatility accelerated ~1600 bps to ~36%; Overall, the CVIX is elevated vs. 2019 levels, but Q2 came in below its longer term average of ~9, at ~8.3, having decreased from levels seen at the end of Q1 and early Q2 2020 (hitting a max of 16 in late March); 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</td>
<td>🟢</td>
</tr>
<tr>
<td>US retail gasoline prices</td>
<td>Quarterly average retail gas price per gallon decreased ~2000 bps Q2 2020 vs. Q1 2020 and ~3000 bps YoY; Monthly prices are down ~2300 bps YoY, but up sequentially (~1200 bps MoM), coming off a 4y low in April; V/MA – MSD % of US volumes at gas stations; Summary is gas prices are still down YoY, but off recent lows</td>
<td>◼️</td>
</tr>
<tr>
<td>IATA</td>
<td>Industry wide RPK’s down 91% YoY in May; Declines acutely impacting International, which is down 98% YoY in May, with Domestic holding up relatively better posting a decline of 79% YoY in May; Note: IATA airline data provides tourism reads, with tourism representing ~50-60% or more of cross-border card volumes</td>
<td>−</td>
</tr>
<tr>
<td>Visa &amp; Barclaycard UK</td>
<td>Visa UK spending index decelerated ~1400 bps for Q2 2020 vs. Q1 2020 down ~4.4%, with April presenting the largest YoY decline of ~27.8%, index is showing signs of recovery with June accelerating ~1300bps (M/M, declined ~6.5% YoY), eCommerce notably hit record high of ~15%; Barclaycard noted monthly retail sales also decelerated by ~2600bps in Q2 2020 vs. Q1 2020 with June accelerating ~1200 bps (M/M, declined ~14.5% YoY)</td>
<td>🟢</td>
</tr>
<tr>
<td>NFIB SMB confidence</td>
<td>After posting a significant comeback (exceeding 100 in June, off of a seven year low in the index April 2020 at ~91), confidence fell back to ~98 in July, down ~2% MoM; Q2 2020 flattish sequentially (monthly average) vs. Q1 2020 to an average of ~94; Note: SMB payments volumes are the highest yielding for merchant acquirers (vs. larger merchants)</td>
<td>−</td>
</tr>
<tr>
<td>First Data SpendTrend</td>
<td>Lower Q2 2020 vs. Q1 2020 for All Industries data decelerating ~2500 bps, with signs of improvement (June improving sequentially, but still negative), with Total E-Commerce Retail down relatively less showing a ~1200 bps deceleration (better than Total Brick &amp; Mortar Retail down ~2900 bps); Note: SpendTrend is a macro-economic indicator based on aggregate SSS activity in the First Data POS network</td>
<td>−</td>
</tr>
<tr>
<td>US card issuer volumes</td>
<td>Q2 2020 credit card volume decel ~2600 bps from Q1 2020; Q2 2020 debit card volume decel ~400 bps vs. Q1 2020; total carded volume decel ~2000 bps in Q2 2020 vs. Q1 2020; Long-term trends for issuer volume expected to rebound, though overall lower growth rates vs. 2019; Note: US issuer volume includes AXP, BOA, COF, C, DFS, JPM, USB, WFC credit card volumes, and BOA, JPM, USB, WFC debit card volumes</td>
<td>◼️</td>
</tr>
</tbody>
</table>
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 has moderated over the past 10 years but still averages nearly triple total retail sales. As a % of total retail sales, eCommerce has grown to 10% in 2019 from 1% in 2001

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

DXY index is at 2-year highs, at stronger levels than previously (negative for cross-border card purchase volumes)

The NFIB small business confidence index fell off its 20 year high in August 2018 to a 7 year low of 90.9 in April 2020

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

<table>
<thead>
<tr>
<th>Ticker</th>
<th>Target Price</th>
<th>Price Rating</th>
<th>Price ($)</th>
<th>Market Cap ($mm)</th>
<th>EV ($mm)</th>
<th>Net Debt / EBITDA (1)</th>
<th>2020E</th>
<th>2021E</th>
<th>Sales 20-22E CAGR</th>
<th>Sales 20-22E</th>
<th>Sales EBITDA</th>
<th>Adj. EBITDA 2020E</th>
<th>Adj. EBITDA 2021E</th>
<th>EV / EBITDA</th>
<th>EBITDA margin %</th>
<th>Multiple-to-growth</th>
<th>P/E</th>
<th>Multiple-to-growth</th>
<th>3-Year Average PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>220</td>
<td>OP</td>
<td>201</td>
<td>445,335</td>
<td>448,300</td>
<td>0.2x</td>
<td>21,768</td>
<td>24,179</td>
<td>12%</td>
<td>18.5%</td>
<td>1.5x</td>
<td>14,824</td>
<td>16,733</td>
<td>15%</td>
<td>26.6%</td>
<td>68%</td>
<td>1.8x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA</td>
<td>325</td>
<td>OP</td>
<td>332</td>
<td>336,157</td>
<td>336,589</td>
<td>0x</td>
<td>15,667</td>
<td>18,755</td>
<td>17%</td>
<td>17.9%</td>
<td>1.0x</td>
<td>8,981</td>
<td>11,416</td>
<td>22%</td>
<td>29.5%</td>
<td>57%</td>
<td>1.3x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PYPL</td>
<td>205</td>
<td>OP</td>
<td>192</td>
<td>230,297</td>
<td>226,892</td>
<td>(0.7x)</td>
<td>21,362</td>
<td>25,470</td>
<td>18%</td>
<td>8.9%</td>
<td>0.5x</td>
<td>6,186</td>
<td>7,262</td>
<td>18%</td>
<td>31.2%</td>
<td>29%</td>
<td>1.7x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIS</td>
<td>160</td>
<td>OP</td>
<td>143</td>
<td>88,828</td>
<td>107,703</td>
<td>3.7x</td>
<td>12,614</td>
<td>13,687</td>
<td>7%</td>
<td>9.1%</td>
<td>0.7x</td>
<td>5,301</td>
<td>6,194</td>
<td>14%</td>
<td>17.4%</td>
<td>42%</td>
<td>1.2x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FISV</td>
<td>115</td>
<td>NEUTRAL</td>
<td>100</td>
<td>68,789</td>
<td>91,497</td>
<td>4.0x</td>
<td>14,073</td>
<td>15,049</td>
<td>7%</td>
<td>6.1%</td>
<td>0.9x</td>
<td>5,472</td>
<td>6,423</td>
<td>13%</td>
<td>14.2%</td>
<td>39%</td>
<td>1.1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPN</td>
<td>210</td>
<td>OP</td>
<td>169</td>
<td>59,208</td>
<td>59,208</td>
<td>2.9x</td>
<td>6,779</td>
<td>7,618</td>
<td>11%</td>
<td>7.8%</td>
<td>0.7x</td>
<td>3,048</td>
<td>3,610</td>
<td>15%</td>
<td>16.4%</td>
<td>45%</td>
<td>1.1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQ</td>
<td>170</td>
<td>OP</td>
<td>150</td>
<td>77,605</td>
<td>77,106</td>
<td>1.4x</td>
<td>2,890</td>
<td>3,915</td>
<td>32%</td>
<td>19.7%</td>
<td>0.6x</td>
<td>311</td>
<td>687</td>
<td>81%</td>
<td>112.2%</td>
<td>11%</td>
<td>1.4x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(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

Source: Company reports, FactSet, Credit Suisse estimates

20 August 2020

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Visa (V)

Visa Europe and Contactless in the US ahead

- Mid- to high-teens EPS compounder featuring higher relative exposure to the US, UK, and debit (vs. MA higher international and credit).
- ~50% of contracts renewed in FY 2019 and 1H 2020, boosting incentives in FY 2020 ( laps in FY 2021).
- Expect share stabilization and pricing in Europe over the coming quarters (with platform migration completed late 2018, value-added services, processing share, etc.).
- 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

V is currently trading at a 16% discount to MA on a PE basis, and has consistently traded at a discount since 2017

Source: Company reports, FactSet, Credit Suisse estimates
Mastercard (MA)
Attractive Regional Mix, high teens compounding

- High-teens EPS compounding featuring higher relative exposure to faster-growth international markets (relative to V, although trading at a ~4x-turn premium on NTM EPS).

- 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).

- Maestro card conversions supportive of volume and revenue growth (~still 443mm remain vs. ~2.2b Mastercard branded).

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

<table>
<thead>
<tr>
<th>Year</th>
<th>US</th>
<th>Latin America</th>
<th>Europe</th>
<th>Canada</th>
<th>APMEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>10%</td>
<td>4%</td>
<td>15%</td>
<td>4%</td>
<td>16%</td>
</tr>
<tr>
<td>2018</td>
<td>4%</td>
<td>6%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>2019</td>
<td>13%</td>
<td>5%</td>
<td>1%</td>
<td>4%</td>
<td>16%</td>
</tr>
<tr>
<td>2020E</td>
<td>4%</td>
<td>6%</td>
<td>1%</td>
<td>1%</td>
<td>6%</td>
</tr>
<tr>
<td>2021E</td>
<td>4%</td>
<td>6%</td>
<td>1%</td>
<td>1%</td>
<td>6%</td>
</tr>
</tbody>
</table>

Source: Company reports, FactSet, Credit Suisse estimates

5-Year NTM P/E; MA has consistently traded at a premium vs. V, dating back to 2016

MA is currently trading at a 19% premium to V on a PE basis, and has consistently traded at a premium since 2016
PayPal (PYPL)

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

- eCommerce pure play and share gainer, informed by our true TAM analysis (global eCommerce, online travel, eFood delivery, eTicketing, online charitable donations, ride-sharing, crowdfunding, mobile gaming, and streaming subscriptions).
- Long list of emerging areas of upside (i.e., Braintree becoming more global, Venmo flipping from an EPS drag to boost, tech partnerships [MELI, Uber, Facebook], bill-pay, China, iZettle, Honey).
- eBay headwind manageable and likely accompanied by previously restricted marketplace partnerships.

### TPV Build – We model eBay contributing a slight drag to volumes, but rolling off over time instead of a distinct point in time

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>YoY ex eBay OA expiry</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(1%)</td>
<td>(1%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>eBay OA expiry impact</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>YoY</td>
<td>27%</td>
<td>25%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
<td>28%</td>
<td>20%</td>
<td>23%</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>2-year</td>
<td>56%</td>
<td>50%</td>
<td>56%</td>
<td>58%</td>
<td>56%</td>
<td>56%</td>
<td>48%</td>
<td>43%</td>
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<td>International TPV</td>
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<td>266,748</td>
<td>73,511</td>
<td>89,058</td>
<td>90,315</td>
<td>101,730</td>
<td>354,614</td>
<td>425,645</td>
<td>515,080</td>
<td>617,778</td>
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<tr>
<td>YoY F/XN</td>
<td>14%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
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</tr>
<tr>
<td>2-year F/XN</td>
<td>-</td>
<td>-</td>
<td>36%</td>
<td>54%</td>
<td>55%</td>
<td>49%</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
<td>Total TPV</td>
<td>578,419</td>
<td>711,926</td>
<td>190,567</td>
<td>221,731</td>
<td>229,203</td>
<td>255,996</td>
<td>897,497</td>
<td>1,076,043</td>
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<tr>
<td>YoY Organic F/XN</td>
<td>25%</td>
<td>23%</td>
<td>19%</td>
<td>30%</td>
<td>30%</td>
<td>30%</td>
<td>28%</td>
<td>20%</td>
<td>22%</td>
<td>21%</td>
</tr>
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</table>

Source: Company reports, FactSet, Credit Suisse estimates

PayPal’s P/E has inflected since mid-2016’s “Choice” decision
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 and partnered software; longer-term in-store expansion in new countries (i.e., 6 today vs. GPN at 33).
- Bank technology segments (Banking & Capital Markets) are positioned to sustain their current topline trajectory, fueled by a healthy bank IT spend environment (+4.5% through 2021) and an increasing need for banks to modernize their infrastructure by leaning on technology providers.

FIS set to accelerate top-line growth in 2020, 2021, and possibly 2022, benefiting from two deals’ worth of revenue synergies

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<tr>
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<td>3,078</td>
<td>2,962</td>
<td>3,216</td>
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<td>2%</td>
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<td>2%</td>
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<td>(1%)</td>
<td>9%</td>
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<tr>
<td>YoY PXN</td>
<td>-</td>
<td>2%</td>
<td>(8%)</td>
<td>3%</td>
<td>1%</td>
<td>0%</td>
<td>8%</td>
</tr>
<tr>
<td>Inorganic contribution to growth (%)</td>
<td>-</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Revenue synergies run-rate ($)</td>
<td>-</td>
<td>100</td>
<td>115</td>
<td>150</td>
<td>200</td>
<td>200</td>
<td>395</td>
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<tr>
<td>Revenue synergies contribution to growth (%)</td>
<td>-</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>YoY organic PXN (w/ synergies)</td>
<td>-</td>
<td>2%</td>
<td>(7%)</td>
<td>2%</td>
<td>1%</td>
<td>(3%)</td>
<td>9%</td>
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<tr>
<td>2-year</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6%</td>
<td>6%</td>
<td>(4%)</td>
<td>4%</td>
</tr>
<tr>
<td>YoY organic PXN ex-synergies</td>
<td>-</td>
<td>1%</td>
<td>(8%)</td>
<td>1%</td>
<td>0%</td>
<td>(4%)</td>
<td>7%</td>
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<tr>
<td>2-year</td>
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<td>0%</td>
<td>0%</td>
<td>6%</td>
<td>6%</td>
<td>(4%)</td>
<td>4%</td>
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</table>

Source: Company reports, FactSet, Credit Suisse estimates

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

FIS has seen multiple expansion since announcing the Worldpay acquisition (gaining a leading eCommerce payments business)

Credit Suisse
Square (SQ)
Recycling monetization (sellers & Cash App)

- Intersection of software + payments, with a 3x "recycling" (seller ecosystem, Cash App/Card, and Business Debit/ID).
- 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 rates and subsequent spending (spending 2-3x all other card actives).
- Upside in Cash App, Omni channel (Weebly), scaling of recently introduced products, B2B (Square Card) and potential new products (credit card, expense management, AP/AR partnership, etc.).

### Square sources ~54% of its revenue via the core seller transaction-based business, with another ~42% in S&S revenue (mostly Cash App)

![Square sources revenue breakdown]

### Seller GPV characterized by shift up-market to higher volume enterprise merchants, with a net spread north of 100bps

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<tbody>
<tr>
<td>Gross Payment Volume (GPV)</td>
<td>84,655</td>
<td>106,239</td>
<td>25,743</td>
<td>22,801</td>
<td>29,907</td>
<td>31,783</td>
<td>110,234</td>
<td>145,848</td>
<td>179,393</td>
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<tr>
<td>YoY</td>
<td>55%</td>
<td>44%</td>
<td>24%</td>
<td>(18%)</td>
<td>14%</td>
<td>9%</td>
<td>37%</td>
<td>27%</td>
<td></td>
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<tr>
<td>2-year</td>
<td>122%</td>
<td>99%</td>
<td>70%</td>
<td>30%</td>
<td>55%</td>
<td>61%</td>
<td>53%</td>
<td>46%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Source: Company reports, FactSet, Credit Suisse estimates
Fiserv (FISV) - Scale begets scale

- Remain Neutral given our merchant acquiring “swim lanes” analysis (i.e., lower relative exposure to faster growth channels in merchant acquiring, particularly in software-led payments), lower relative confidence in Acceptance margin expansion medium-term (i.e., down ~40bps in 2019 despite strong topline growth), and lower potential within the top 100 bank IT outsourcing opportunity (vs. FIS, which has won the vast majority of top 100 bank outsourced deals thus far).
- Fiserv is attempting to increase exposure to attractive swim lanes (ISV, eCommerce, international) and has several “crown jewel” assets (Clover, CardConnect, Latin American merchant acquiring), yet still not a material growth driver; Acceptance tougher compares ahead off of strong 2019

FISV will benefit from revenue synergies driving medium-term reported revenue growth higher

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<tr>
<td>YoY reported</td>
<td>4%</td>
<td>0%</td>
<td>(12%)</td>
<td>0%</td>
<td>3%</td>
<td>(2%)</td>
<td>9%</td>
<td>7%</td>
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<tr>
<td>YoY Organic</td>
<td>(1%)</td>
<td>3%</td>
<td>(8%)</td>
<td>2%</td>
<td>(1%)</td>
<td>(1%)</td>
<td>8%</td>
<td>7%</td>
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<tr>
<td>YoY FXN Organic (w/ Synergies)</td>
<td>1%</td>
<td>4%</td>
<td>(7%)</td>
<td>3%</td>
<td>0%</td>
<td>0%</td>
<td>8%</td>
<td>7%</td>
</tr>
<tr>
<td>Run-rate Synergies ($)</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>19</td>
<td>24</td>
<td>59</td>
<td>194</td>
<td>360</td>
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<tr>
<td>Incremental Synergies (%)</td>
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<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
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<tr>
<td>YoY FXN Organic ex-Synergies</td>
<td>1%</td>
<td>4%</td>
<td>(7%)</td>
<td>2%</td>
<td>(0%)</td>
<td>(0%)</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>2-year FXN Organic ex-Synergies</td>
<td>-</td>
<td>4%</td>
<td>(8%)</td>
<td>3%</td>
<td>4%</td>
<td>1%</td>
<td>7%</td>
<td>13%</td>
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<tr>
<td>Inorganic % to growth</td>
<td>1%</td>
<td>(1%)</td>
<td>(0%)</td>
<td>4%</td>
<td>5%</td>
<td>2%</td>
<td>3%</td>
<td>0%</td>
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Source: Company reports, FactSet, Credit Suisse estimates

Similar to FIS, FISV has seen multiple expansion following the announcement of its merger (with FDC) in early 2019
Global Payments (GPN)
In all the right swim lanes

- Highest relative exposure to the fastest growing channels: 1) ~37% owned & partnered software growing ~10-14%; 2) ~17% global eCommerce & omnichannel growing ~15-18%; 3) ~20% International growing ~10%+; and 4) an emphasis on SMB and multi-nationals.

- 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 among the three mega-mergers given it provides with the fastest revenue growth as a payments pure play with the lowest leverage and the least dependence on revenue synergies.

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

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<td>1,729</td>
<td>1,521</td>
<td>1,768</td>
<td>1,817</td>
<td>6,836</td>
<td>7,574</td>
<td>8,277</td>
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<td></td>
<td>0%</td>
<td>(14%)</td>
<td>(3%)</td>
<td>1%</td>
<td>(4%)</td>
<td>11%</td>
<td>9%</td>
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<tr>
<td>YoY Organic</td>
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<td>(0%)</td>
<td>(15%)</td>
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<td>YoY FXN Organic (ex-Synergies)</td>
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<td>(0%)</td>
<td>(4%)</td>
<td>10%</td>
<td>9%</td>
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<tr>
<td>Run-rate Synergies ($)</td>
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<td>5</td>
<td>5</td>
<td>15</td>
<td>30</td>
<td>30</td>
<td>109</td>
<td>159</td>
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<tr>
<td>Incremental Synergies (%)</td>
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<td>YoY FXN Organic (w/Synergies)</td>
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<td>1%</td>
<td>(14%)</td>
<td>(4%)</td>
<td>(0%)</td>
<td>(4%)</td>
<td>11%</td>
<td>9%</td>
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<tr>
<td>Inorganic contribution to growth (%)</td>
<td></td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
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GPN has historically traded at a low-20x multiple, with estimates typically low due to continued M&A (verticalized software emphasis)

+1 Std. Dev: 24.8x
-1 Std. Dev: 19.9x

4/26/19: GPN - TSYS merger announcement

Source: Company reports, FactSet, Credit Suisse estimates
FleetCor Technologies (FLT)
King of the cross-sell

- Approaching 60% of revenues ex-fuel (and just ~13% of revenue exposed to fuel prices vs. ~21% for WEX).
- Four main verticals (Fuel, Corporate Payments, Lodging, Tolls), share similar appealing characteristics (recurring revenue, high margins, network effects, similar distribution, scale) & overlapping customer bases.
- "Beyond Fuel", faster-growth platforms in corporate payments & Brazil, and the prospect for more of what FleetCor does best (cross-sell & accretive M&A).

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

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<tbody>
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<td>Total net revenue</td>
<td>2,433</td>
<td>2,649</td>
<td>661</td>
<td>525</td>
<td>587</td>
<td>629</td>
<td>2,402</td>
<td>2,736</td>
<td>3,017</td>
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<tr>
<td>YoY</td>
<td>13%</td>
<td>9%</td>
<td>6%</td>
<td>(18%)</td>
<td>(14%)</td>
<td>(10%)</td>
<td>(9%)</td>
<td>14%</td>
<td>10%</td>
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<tr>
<td>YoY organic</td>
<td>-</td>
<td>9%</td>
<td>5%</td>
<td>(20%)</td>
<td>(15%)</td>
<td>(9%)</td>
<td>(10%)</td>
<td>14%</td>
<td>10%</td>
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<tr>
<td>YoY macro neutral</td>
<td>-</td>
<td>11%</td>
<td>7%</td>
<td>(15%)</td>
<td>(10%)</td>
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<td>(17%)</td>
<td>(12%)</td>
<td>(7%)</td>
<td>(7%)</td>
<td>14%</td>
<td>10%</td>
</tr>
<tr>
<td>2-year macro neutral organic</td>
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<td>22%</td>
<td>15%</td>
<td>(5%)</td>
<td>(1%)</td>
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<td>4%</td>
<td>7%</td>
<td>24%</td>
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<td>Inorganic %</td>
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<td>4%</td>
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<td>&quot;Like for like&quot; adjustments</td>
<td>66</td>
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Source: Company reports, FactSet, Credit Suisse estimates
Western Union (WU)

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

- Continued competitive pressures from both incumbents and FinTechs and a declining US transfer business (~6% of revenue).
- Strong digital transaction growth, showing resilience during COVID, albeit partially fueled by lower RTP white-label partnerships (beginning to comp over initial ramp in 2H 2020)
- 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

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

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<tbody>
<tr>
<td>Total revenue</td>
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<td>5,292</td>
<td>1,190</td>
<td>1,115</td>
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<td>1,286</td>
<td>4,844</td>
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<tr>
<td>YoY</td>
<td>1%</td>
<td>(5%)</td>
<td>(11%)</td>
<td>(17%)</td>
<td>(4%)</td>
<td>(2%)</td>
<td>(8%)</td>
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<td>1%</td>
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<td>YoY FX Neutral</td>
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<td>(13%)</td>
<td>(2%)</td>
<td>(0%)</td>
<td>(6%)</td>
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<td>YoY organic</td>
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<td>YoY organic ex-FX</td>
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<td>2-year organic ex-FX</td>
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<td>3%</td>
<td>(0%)</td>
<td>1%</td>
<td>6%</td>
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<tr>
<td>Argentina inflation benefit</td>
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<td>2%</td>
<td>1%</td>
<td>0%</td>
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<tr>
<td>YoY organic FX Neutral ex-Argentina benefit</td>
<td>2%</td>
<td>1%</td>
<td>(2%)</td>
<td>(11%)</td>
<td>(2%)</td>
<td>(0%)</td>
<td>(4%)</td>
<td>5%</td>
<td>1%</td>
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Source: Company reports, FactSet, Credit Suisse estimates

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

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

- +1 Std. Dev 12.9x
- -1 Std. Dev 9.9x
WEX (WEX)
Exposed to attractive FinTech end markets

- Positive on the underlying businesses and the longer term.
- Expectations for organic deceleration (Pre-COVID) in the Fleet segment beginning Q2 2020 (initial lapping of Chevron and Shell, alongside a noted recent weakness in SSS at -2.5% in Q3 2019), suggesting slower growth existing 2020.
- Higher relative fuel exposure vs. FleetCor (~21% of revenue vs. ~13%).
- Corporate Payments revenue approaching ~10% of total (vs. ~20% for FleetCor).

For WEX, similar to FLT, we look at the 2-year organic, macro-neutral, growth; 2H 2020 Fleet segment lapping 2 large portfolio conversions

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<tbody>
<tr>
<td>Total net revenue</td>
<td>1,489</td>
<td>1,724</td>
<td>432</td>
<td>330</td>
<td>360</td>
<td>394</td>
<td>1,515</td>
<td>1,749</td>
<td>1,906</td>
</tr>
<tr>
<td>YoY</td>
<td>19%</td>
<td>16%</td>
<td>14%</td>
<td>14%</td>
<td>(24%)</td>
<td>(21%)</td>
<td>(13%)</td>
<td>(12%)</td>
<td>15%</td>
</tr>
<tr>
<td>Organic FXN (ex-FX, ex-Fuel, ex-M&amp;A)</td>
<td>13%</td>
<td>10%</td>
<td>6%</td>
<td>(17%)</td>
<td>(12%)</td>
<td>(5%)</td>
<td>(8%)</td>
<td>17%</td>
<td>9%</td>
</tr>
<tr>
<td>2-year Organic FXN</td>
<td>21%</td>
<td>23%</td>
<td>12%</td>
<td>6%</td>
<td>0%</td>
<td>8%</td>
<td>3%</td>
<td>9%</td>
<td>26%</td>
</tr>
<tr>
<td>FX impact %</td>
<td>(0%)</td>
<td>(1%)</td>
<td>(1%)</td>
<td>(2%)</td>
<td>(2%)</td>
<td>(1%)</td>
<td>(1%)</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Fuel impact %</td>
<td>5%</td>
<td>(1%)</td>
<td>1%</td>
<td>(6%)</td>
<td>(7%)</td>
<td>(7%)</td>
<td>(5%)</td>
<td>(2%)</td>
<td>(0%)</td>
</tr>
<tr>
<td>Inorganic %</td>
<td>2%</td>
<td>9%</td>
<td>8%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Fleet solutions segment revenue</td>
<td>975</td>
<td>1,038</td>
<td>950</td>
<td>194</td>
<td>202</td>
<td>216</td>
<td>862</td>
<td>908</td>
<td>957</td>
</tr>
<tr>
<td>YoY</td>
<td>18%</td>
<td>6%</td>
<td>9%</td>
<td>(26%)</td>
<td>(26%)</td>
<td>(21%)</td>
<td>(17%)</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Organic FXN (ex-FX, ex-Fuel, ex-M&amp;A)</td>
<td>12%</td>
<td>8%</td>
<td>6%</td>
<td>(15%)</td>
<td>(12%)</td>
<td>(9%)</td>
<td>(8%)</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>2-year Organic ex-FX</td>
<td>17%</td>
<td>20%</td>
<td>10%</td>
<td>(3%)</td>
<td>1%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Source: Company reports, FactSet, Credit Suisse estimates

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

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

WEX exposed to attractive FinTech end markets

WEX has swapped premiums over the past few years (WEX more of a premium in 2018 vs. FLT in 2019)

FLT traded at a premium to WEX from April 2019 until recently on a P/E basis, while WEX historically (from late 2016) traded at a premium until April 2019

Table: FLT and WEX have swapped premiums over the past few years (WEX more of a premium in 2018 vs. FLT in 2019)

<table>
<thead>
<tr>
<th></th>
<th>FLT NTM PE</th>
<th>FLT Average</th>
<th>WEX NTM PE</th>
<th>WEX Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.5x</td>
<td>20.3x</td>
<td>19.9x</td>
<td>21.4x</td>
<td>20.8x</td>
</tr>
</tbody>
</table>

Source: Company reports, FactSet, Credit Suisse estimates
Shift4 Payments (FOUR)
Integrated payments pure play with idiosyncratic drivers

- 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.

- The company has historically displayed its ability to do strategic M&A unlocking value (i.e., Merchant Link, Shift4 Corporation, Future POS, and more), and we believe they could return to M&A as early as 2021; Additionally we see the possibility for international expansion given existing relationships with multinational merchants.

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

<table>
<thead>
<tr>
<th>Gateway conversion volume - incremental</th>
<th>2019A</th>
<th>2Q20A</th>
<th>2Q20E</th>
<th>3Q20E</th>
<th>4Q20E</th>
<th>2020E</th>
<th>2021E</th>
</tr>
</thead>
<tbody>
<tr>
<td>YoY</td>
<td>37%</td>
<td>32%</td>
<td>23%</td>
<td>11%</td>
<td>6%</td>
<td>860</td>
<td>721</td>
</tr>
<tr>
<td>Inorganic Gateway Conversion Volume growth YoY</td>
<td>37%</td>
<td>13%</td>
<td>(36%)</td>
<td>(13%)</td>
<td>(13%)</td>
<td>24%</td>
<td>21%</td>
</tr>
<tr>
<td>2-year organic volume</td>
<td>3%</td>
<td>3%</td>
<td>21%</td>
<td>24%</td>
<td>24%</td>
<td>11%</td>
<td>42%</td>
</tr>
<tr>
<td>Gateway conversion volume - cumulative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gateway conversion volume - penetration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Opportunity</td>
<td>0%</td>
<td>2%</td>
<td>3%</td>
<td>5%</td>
<td>5%</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>Net E2E Payments Revenue</td>
<td>113</td>
<td>44</td>
<td>48</td>
<td>53</td>
<td>183</td>
<td>265</td>
<td>261</td>
</tr>
<tr>
<td>YoY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take Rate</td>
<td>0.76%</td>
<td>0.72%</td>
<td>0.91%</td>
<td>0.74%</td>
<td>0.74%</td>
<td>0.76%</td>
<td>0.65%</td>
</tr>
<tr>
<td>YoY bps</td>
<td>(70 bps)</td>
<td>7 bps</td>
<td>8 bps</td>
<td>(3 bps)</td>
<td>(1 bps)</td>
<td>(2 bps)</td>
<td>(7 bps)</td>
</tr>
</tbody>
</table>

Source: Company reports, FactSet, Credit Suisse estimates

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

Valuation history on EV/EBITDA since IPO in June 2020 (albeit limited in nature)
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).
- Future opportunities ahead with NYC school-bus cameras and congestion pricing in other markets (currently taking a “wait-and-see” approach on congestion).
- 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.

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

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Red light</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported YoY</td>
<td>76%</td>
<td>68</td>
<td>61</td>
<td>60</td>
<td>58</td>
</tr>
<tr>
<td>Discrete contract impacts (bps)</td>
<td>-271 bps</td>
<td>-768 bps</td>
<td>-890 bps</td>
<td>0 bps</td>
<td>0 bps</td>
</tr>
<tr>
<td>Speed (school, city)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported YoY</td>
<td>4%</td>
<td>15%</td>
<td>71%</td>
<td>36%</td>
<td>2%</td>
</tr>
<tr>
<td>Discrete contract impacts - NYC (bps)</td>
<td>-1360 bps</td>
<td>7627 bps</td>
<td>3018 bps</td>
<td>311 bps</td>
<td></td>
</tr>
<tr>
<td>YoY ex-discrete impacts</td>
<td>4%</td>
<td>1%</td>
<td>(5%)</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>Other (school stop, bus lane)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported YoY</td>
<td>9%</td>
<td>10%</td>
<td>(50%)</td>
<td>58%</td>
<td>9%</td>
</tr>
<tr>
<td>Total segment revenue (ex-product)</td>
<td>142</td>
<td>140</td>
<td>148</td>
<td>182</td>
<td>187</td>
</tr>
<tr>
<td>Reported YoY</td>
<td>4%</td>
<td>(2%)</td>
<td>6%</td>
<td>23%</td>
<td>3%</td>
</tr>
<tr>
<td>Implied underlying organic YoY</td>
<td>5%</td>
<td>(3%)</td>
<td>(20%)</td>
<td>15%</td>
<td>4%</td>
</tr>
<tr>
<td>Total discrete contract impacts (bps)</td>
<td>-146 bps</td>
<td>-22 bps</td>
<td>1673 bps</td>
<td>1638 bps</td>
<td>202 bps</td>
</tr>
</tbody>
</table>

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

Source: Company reports, FactSet, Credit Suisse estimates
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 organic 2-year card payment volume build – we model organic growth in the high teens, plus ~3,100bps of inorganic contributions

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Card payment volume ($)</td>
<td>7,452</td>
<td>10,697</td>
<td>3,849</td>
<td>3,513</td>
<td>3,923</td>
<td>4,048</td>
<td>15,433</td>
<td>18,651</td>
</tr>
<tr>
<td>YoY</td>
<td>42%</td>
<td>44%</td>
<td>58%</td>
<td>63%</td>
<td>50%</td>
<td>18%</td>
<td>44%</td>
<td>21%</td>
</tr>
<tr>
<td>2-year</td>
<td>21%</td>
<td>23%</td>
<td>16%</td>
<td>23%</td>
<td>15%</td>
<td>12%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>Organic Volume growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organic Volume growth</td>
<td>21%</td>
<td>20%</td>
<td>42%</td>
<td>40%</td>
<td>35%</td>
<td>6%</td>
<td>28%</td>
<td>3%</td>
</tr>
<tr>
<td>Inorganic Volume</td>
<td>1,124</td>
<td>1,499</td>
<td>1,019</td>
<td>886</td>
<td>912</td>
<td>215</td>
<td>3,033</td>
<td>391</td>
</tr>
<tr>
<td>Inorganic Volume growth</td>
<td>21%</td>
<td>20%</td>
<td>42%</td>
<td>40%</td>
<td>35%</td>
<td>6%</td>
<td>28%</td>
<td>3%</td>
</tr>
</tbody>
</table>

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

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

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

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US -&gt; Mexico Inbound Volume ($b)</strong></td>
<td>$29</td>
<td>$32</td>
<td>$35</td>
<td>$36</td>
<td>$38</td>
</tr>
<tr>
<td>Growth</td>
<td>11%</td>
<td>8%</td>
<td>4%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>IMXI share</td>
<td>15%</td>
<td>17%</td>
<td>18%</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td><strong>IMXI Mexico Volume</strong></td>
<td>4,321</td>
<td>5,617</td>
<td>6,270</td>
<td>6,716</td>
<td>7,169</td>
</tr>
<tr>
<td>Growth</td>
<td>-</td>
<td>30%</td>
<td>12%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Incremental share</td>
<td>38%</td>
<td>41%</td>
<td>26%</td>
<td>32%</td>
<td>25%</td>
</tr>
<tr>
<td>% of IMXI volume</td>
<td>63%</td>
<td>63%</td>
<td>60%</td>
<td>62%</td>
<td>61%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>US -&gt; Guatemala Inbound Volume</strong></td>
<td>7.4</td>
<td>8.4</td>
<td>9.5</td>
<td>9.9</td>
<td>11.1</td>
</tr>
<tr>
<td>Growth</td>
<td>13%</td>
<td>13%</td>
<td>4%</td>
<td>12%</td>
<td></td>
</tr>
<tr>
<td>IMXI share</td>
<td>22%</td>
<td>24%</td>
<td>26%</td>
<td>26%</td>
<td></td>
</tr>
<tr>
<td><strong>IMXI Guatemala Volume</strong></td>
<td>1,601</td>
<td>2,016</td>
<td>2,414</td>
<td>2,547</td>
<td>2,927</td>
</tr>
<tr>
<td>Growth</td>
<td>0%</td>
<td>26%</td>
<td>20%</td>
<td>6%</td>
<td>15%</td>
</tr>
<tr>
<td>Incremental share</td>
<td>41%</td>
<td>42%</td>
<td>36%</td>
<td>35%</td>
<td>32%</td>
</tr>
<tr>
<td>% of IMXI volume</td>
<td>23%</td>
<td>23%</td>
<td>23%</td>
<td>23%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Source: Company reports, FactSet, Credit Suisse estimates

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)

<table>
<thead>
<tr>
<th></th>
<th>+1 Std. Dev</th>
<th>-1 Std. Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intermex sources ~2/3rd of its volume (2019E) via the US-into-Mexico corridor (maintains #2 share in largest remittance corridor in the world)</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Credit Suisse NEUTRAL
CS Target Price $14.0

20 August 2020

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$34b in global FinTech investment in 2019 and $16b YTD in 2020 through Q2; $120b in the last 5 years.

### Merchant Acquiring/Service Providers

<table>
<thead>
<tr>
<th>PayFac enablement</th>
<th>ISO/ Acquirers/ PSPs/ Gateways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaryllis</td>
<td>Appetize</td>
</tr>
<tr>
<td>Finix Payments</td>
<td>Citixys</td>
</tr>
<tr>
<td>Payrix</td>
<td>Revel</td>
</tr>
<tr>
<td>AuthVia</td>
<td>ShopKeep</td>
</tr>
<tr>
<td>Emergent</td>
<td>SumUp</td>
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<tr>
<td>Episode 6</td>
<td>Toast</td>
</tr>
<tr>
<td>Flow</td>
<td>TouchBistro</td>
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<tr>
<td>Flutterwave</td>
<td>Vend</td>
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<tr>
<td>Rapyd</td>
<td>North American Bancard</td>
</tr>
<tr>
<td>Text2Pay</td>
<td>Nubank Tech.</td>
</tr>
<tr>
<td>ReCharge Payments</td>
<td></td>
</tr>
</tbody>
</table>

### Core Processors

- Alkami
- 11:FS Foundry
- Allied Payment Network
- Hydrogen Platform
- Amaryllis
- Appetize
- Billing Tree
- Paragon Payments
- BlueSnap
- Checkpoint.com
- PayNearMe
- PaySafe
- ClearSnap
- Pineapple Payments
- Priority Payment
- Gravity Payments
- Stripe
- Fattmerchant
- Tidal Commerce
- Neocova
- NYMBUS
- Fidor Bank
- Solaris Bank
- Starling Bank
- Trezor

### Bank IT

- Avox
- Bankable
- Bankbase
- Bond
- Thought Machine
- Treasury Prime
- ClearBank
- Fisco
- Deposit Solutions
- ClearSale
- Vesta
- mandi Fin. Technologies
- Early Warning (Zelle)
- Faster Payments (UK)
- RTP (The Clearing House)
- PaySafe (India)
- Smartlink
- UnionPay (China)

### CryptoCurrency (Wallets, Payments)

- Binance
- BillPay
- Blockchain
- Circle
- Coinbase
- Dash
- Coinbase
- Bitmex
- Moven
- Petal
- Robo

### Remittances

- NIUM (formerly InstaRem)
- Remitly
- RTGS global
- TransferWise
- World Remit

### Personal Finances

- Acorns
- Amber
- Betterment
- DriveWealth
- Ibbota
- Moven
- Petal
- Robinhood
- Wealthfront Inc.
- Wealthsimple (CAN)
- Wealthfront
- YieldStreet

### Digital Lending

- BlueVine
- FundBox
- FundingOptions
- Greensill
- Joust
- Judo Bank
- Kabbage
- Loan Builder
- Neptune Financial
- OakNorth
- Payability

### Alternative Consumer Lending

- Europay
- Habito
- Klarra
- Kreditech
- LoanDepot
- Row
- Credit Culture (SG)
- Creditas (Brazil)
- Creditas (Brazil)
- Creditas (BRAZIL)
- Simpl (India)
- Other

### C2B & P2P

- Dwolla
- NETELLER
- PayWick
- Skrill
- Trustly
- Toss (Korea)
- Verse (Europe)
- Wirex
- TransferWise
- Zoopla
- Yodee

### Connectivity / Payments APIs

- Button
- Finlync
- Mobeewave
- Plaid
- Tink
- Token
- TrueLayer
- Yapily

### Merchant Acquiring/Service Providers

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- 11:FS Foundry
- Allied Payment Network
- Hydrogen Platform
- Amaryllis
- Appetize
- Billing Tree
- Paragon Payments
- BlueSnap
- Checkpoint.com
- PayNearMe
- PaySafe
- ClearSnap
- Pineapple Payments
- Priority Payment
- Gravity Payments
- Stripe
- Fattmerchant
- Tidal Commerce
- Neocova
- NYMBUS
- Fidor Bank
- Solaris Bank
- Starling Bank
- Trezor

### Bank IT

- Avox
- Bankable
- Bankbase
- Bond
- Thought Machine
- Treasury Prime
- ClearBank
- Fisco
- Deposit Solutions
- ClearSale
- Vesta
- mandi Fin. Technologies
- Early Warning (Zelle)
- Faster Payments (UK)
- RTP (The Clearing House)
- PaySafe (India)
- Smartlink
- UnionPay (China)

### CryptoCurrency (Wallets, Payments)

- Binance
- BillPay
- Blockchain
- Circle
- Coinbase
- Dash
- Coinbase
- Bitmex
- Moven
- Petal
- Robinhood
- Wealthfront Inc.
- Wealthsimple (CAN)
- Wealthfront
- YieldStreet

### Remittances

- NIUM (formerly InstaRem)
- Remitly
- RTGS global
- TransferWise
- World Remit

### Personal Finances

- Acorns
- Amber
- Betterment
- DriveWealth
- Ibbota
- Moven
- Petal
- Robinhood
- Wealthfront Inc.
- Wealthsimple (CAN)
- Wealthfront
- YieldStreet

### Digital Lending

- BlueVine
- FundBox
- FundingOptions
- Greensill
- Joust
- Judo Bank
- Kabbage
- Loan Builder
- Neptune Financial
- OakNorth
- Payability

### Alternative Consumer Lending

- Europay
- Habito
- Klarra
- Kreditech
- LoanDepot
- Row
- Credit Culture (SG)
- Creditas (Brazil)
- Creditas (Brazil)
- Creditas (BRAZIL)
- Simpl (India)
- Other

### C2B & P2P

- Dwolla
- NETELLER
- PayWick
- Skrill
- Trustly
- Toss (Korea)
- Verse (Europe)
- Wirex
- TransferWise
- Zoopla
- Yodee

### Connectivity / Payments APIs

- Button
- Finlync
- Mobeewave
- Plaid
- Tink
- Token
- TrueLayer
- Yapily

### Merchant Acquiring/Service Providers

- Amaryllis
- Appetize
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### Core Processors

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- BlueSnap
- Checkpoint.com
- PayNearMe
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- Mobeewave
- Plaid
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- TrueLayer
- Yapily

Source: Visa, CB Insights, Credit Suisse research.
# 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. | 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. | PayFacas and the rise of the “aggregator” model |
| 8. | Rationale for software-enabled payments |

## NextGen FinTech Ecosystems

| 9. | Continued consolidation and scaling of platforms |
| 10. | Open Banking (APIs) and Account Connectivity |
| 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 (consumer offerings) |
| 16. | FinTech-driven credit for merchants (micro & SMB lending) |
| 17. | Digitally native expectations |

## 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 |

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Global eCommerce & Software-led Payments
1. Global eCommerce as a key source of growth

E-commerce 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 ~$4.3tr 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 (~low-20% 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 ~$4.3tr global market, with Marketplaces-based eCommerce sales expected to be a key driver of total market growth (~23% CAGR 2018-2022 vs. direct merchant eCommerce growing more at a high-single-digit pace)
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 land 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).

Source: Company reports, eMarketer, Credit Suisse estimates, Top right chart 2019E
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 cross-border card volumes for the networks vs. ~70% 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 ~2/3 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% vs. ~mid-teens for eCommerce overall), per Zion Market Research

Source: Zion Market Research, Forrester, Worldpay, Credit Suisse research
1. Global eCommerce as a key source of growth

US market focus – eComm still growing 3-4x faster vs. in-store

- US eCommerce market is approaching ~$710b and has been growing roughly mid-teens (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 2019 was roughly $209b, which implies Amazon makes up ~35% of the US eCommerce market (but will make up ~55% of total growth).

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 sits at ~$600b as of 2019 but is projected to reach ~$1tr by 2023 (growing at a ~mid-teens CAGR)

Source: eMarketer, Worldpay Global Payments Report, Credit Suisse research
1. Global eCommerce as a key source of growth

“True TAM” for Global Online Acquirer’s

- 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 (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
## 1. Global eCommerce as a key source of growth

### True TAM assumptions and rationale

<table>
<thead>
<tr>
<th>Global Category</th>
<th>TAM Assumptions &amp; Rationale</th>
<th>2019-2023E CAGR</th>
<th>2019E Size ($b)</th>
<th>% of TAM (2019E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global retail eCommerce, ex-BABA &amp; JD</td>
<td>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.</td>
<td>22%</td>
<td>$2,400</td>
<td>56%</td>
</tr>
<tr>
<td>Online Travel</td>
<td>Global online travel forecasts informed by CS Global OTA Industry Model (Stephen Ju), and is inclusive of assumptions around vacation rentals and sharing economy rentals. We assume the online travel market doesn’t recover to 2019 pre-COVID levels until 2022.</td>
<td>3%</td>
<td>$800</td>
<td>18%</td>
</tr>
<tr>
<td>Ride-Sharing</td>
<td>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 &amp; Lyft ride-sharing consensus estimates.</td>
<td>12%</td>
<td>$130</td>
<td>3%</td>
</tr>
<tr>
<td>Food Delivery</td>
<td>Informed by Euromonitor estimates for Global Food Delivery market size (i.e., GrubHub, UberEats, DoorDash, Postmates, Delivery Hero, Takeaway.com, Deliveroo, Just Eat, restaurant websites, etc.).</td>
<td>33%</td>
<td>$200</td>
<td>4%</td>
</tr>
<tr>
<td>Online Event Ticketing</td>
<td>Assumes ~$47b market size in 2017, with a ~7% CAGR through the forecast period (ex COVID impacted 2020E and assumed recovery in 2021E). Market sizing base sourced via ResearchAndMarkets.com.</td>
<td>3%</td>
<td>$50</td>
<td>1%</td>
</tr>
<tr>
<td>Online Charitable Donations</td>
<td>Forecasts assume US Charitable donation market has 40% global market share and grows ~5% annually overall (in line with historical trends) and card penetration increases 1% per year. US market historical figures reflect donations from individuals. Sources include givingusa.org and Funraise.</td>
<td>8%</td>
<td>$350</td>
<td>8%</td>
</tr>
<tr>
<td>Streaming Media Subscriptions</td>
<td>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.</td>
<td>28%</td>
<td>$50</td>
<td>1%</td>
</tr>
<tr>
<td>Video gaming</td>
<td>Includes in-game purchase 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).</td>
<td>17%</td>
<td>$100</td>
<td>2%</td>
</tr>
<tr>
<td>Crowdfunding (ex-China)</td>
<td>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).</td>
<td>15%</td>
<td>$30</td>
<td>1%</td>
</tr>
<tr>
<td>Online On-demand Home Services</td>
<td>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.</td>
<td>13%</td>
<td>$180</td>
<td>4%</td>
</tr>
<tr>
<td>Online Gambling</td>
<td>Our TAM for online gambling represents Gross Gambling Revenue (potentially conservative in comparison to total volume flowing over the platform). Online gambling includes sportbook wagering, casino, state lotteries, poker, and other. Source: Grand View Research</td>
<td>12%</td>
<td>$50</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>17%</td>
<td>$4,300</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Company data, eMarketer, Phocuswright, Euromonitor, ResearchAndMarkets.com, givingusa.org, Funraise, Statista, IAC, Grand View Research, Credit Suisse estimates
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 ~40 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 at ~2.5k, and valuation most recently $35b – 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 (e.g., Stripe Issuing, Stripe Corporate Cards, chargeback protection, Stripe Capital, Stripe Terminal for omnichannel, etc.). Leading marketplaces offering in Stripe Connect.

<table>
<thead>
<tr>
<th>Provider</th>
<th>2019E eCommerce volumes</th>
<th>2019E eCommerce volumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braintree</td>
<td>~$280b</td>
<td>+25-30% YoY (inclusive of gateway and PayPal button transactions)</td>
</tr>
<tr>
<td>Stripe</td>
<td>~$210b</td>
<td><em>Hundreds of billions</em> (disclosed by management, we estimate that volumes are slightly below those of Adyen &amp; Braintree when including PayPal transactions)</td>
</tr>
<tr>
<td>Adyen</td>
<td>~$400b</td>
<td>(Adjusts volume down ~10% [assumption] to remove offline/in-store volumes)</td>
</tr>
<tr>
<td>Worldpay</td>
<td>~$160b</td>
<td>(CS est. based on legacy WP disclosures, $279b in 2017, assumed 20% YoY growth in 2018 and 2019)</td>
</tr>
<tr>
<td>Global Payments</td>
<td>~$375b</td>
<td>(based on $900mm eComm &amp; Omni revenue, adjusted to ~$720mm ex-network fees, grossed up assuming ~50bps net acquiring spread)</td>
</tr>
</tbody>
</table>

Source: Company reports, Credit Suisse estimates
## 2. Global eCommerce (and omnichannel) acquiring platforms

### Large eCommerce payments providers (detail)

<table>
<thead>
<tr>
<th>Metric</th>
<th>Braintree</th>
<th>adyen</th>
<th>globalpayments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valuation</strong></td>
<td>$29-$54b (CS est.), depending on extent to which PayPal button transactions occur on Braintree merchant sites which include PayPal</td>
<td>$4-92b (CS est.)</td>
<td>$150b (CS est.) on an assumed base of $320b in revenue ($75b in revenue in 2018 growing mid-teens)</td>
</tr>
<tr>
<td><strong>E-commerce volume</strong></td>
<td>~$230trn estimated, ~380k+ merchants</td>
<td>~$190trn estimated, ~450k+ merchants</td>
<td>~$150trn estimated, 350k merchants</td>
</tr>
<tr>
<td></td>
<td>(dictated by management in September 2019, we estimate that e-commerce volumes are slightly below Adyen &amp; Braintree when including e-commerce platforms)</td>
<td></td>
<td>(CS estimate based on legacy WP disclosures, $75bn in 2017, increased 25% YoY growth in 2018 and 2019)</td>
</tr>
<tr>
<td><strong>Geographic</strong></td>
<td>~130 countries, 45+ currencies</td>
<td>~130 countries, 45+ currencies</td>
<td>~90 countries, 100+ currencies</td>
</tr>
<tr>
<td></td>
<td>~30 countries as of May 2020 (with local doingacquiring)</td>
<td>~150 countries, 85% of all revenue, with ~25 new countries added over the last year</td>
<td>~80 countries, 95% of all revenue, with ~10 new countries added over the last year</td>
</tr>
<tr>
<td><strong>Acceptance methods</strong></td>
<td>25 unique forms of payment (globally), based on size of merchant (large is US-focused)</td>
<td>25 unique forms of payment (globally), based on size of merchant (large is US-focused)</td>
<td>~30 methods including card issuance (at TSS) and mobile payments (at SCA)</td>
</tr>
<tr>
<td><strong>Processing partners &amp; licensing</strong></td>
<td>- Regional banking relationships for processing banks with acquiring licensed, e.g., Wells Fargo and China Merchants in the US, MB, and Adyen Services in Europe, MB, Asia, Australia, etc.</td>
<td>- PayPal does not serve as an acquirer in any market (acts as either as a PayPal or US, depending on merchant site)</td>
<td>~600 payment methods</td>
</tr>
<tr>
<td></td>
<td>-Stride serves as a merchant acquirer (direct links via the card network) in virtually all markets (including all of Europe)</td>
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<td>~600 payment methods (potentially depending upon regional agreements with ACI Worldwide)</td>
</tr>
<tr>
<td><strong>Number of merchants</strong></td>
<td>~8.2k as of end 2018</td>
<td>~850k+ merchants (with P&amp;L transparency)</td>
<td>~5.5m merchant connections globally</td>
</tr>
<tr>
<td></td>
<td>~2.5mm merchant locations via Global Payments; 820k via TSYS</td>
<td></td>
<td>~5.5m merchant locations via Global Payments (Braintree only)</td>
</tr>
</tbody>
</table>

### Pricing

- **2.5% + $0.30 for full-install in the US** - Lower in Europe (1% + $0.25 per transaction) - $1.00 per pan, $0.40 per month for gateway

### Additional services

- **Stripe Extend (vertical commerce on another platform)**
- **In-store payments (US, UK, Australia, albeit at risk to expand to China) (Gate acquisition)**
- **Global APIs (foundational for platform expansion)**

### Go-to-market

- **Braintree Marketplace (offering, building a network of Hyperventilation for improving the platform’s value)**
- **Go-to-market (discover and onboard merchants)**
- **Employee**

### Other

- **Single contract and integration for PayPal and merchants appealing to smaller merchants (single contract)**
- **Customer experience (CX) and delivery (Omni-channel)**
- **Retailers and online marketplaces (marketplace platforms)**
- **Other merchants (SMB)**

Source: Company reports, Credit Suisse estimates

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20 August 2020

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Forrester’s assessment of global omnichannel payment providers suggests Adyen and Worldpay are leading the pack.

Adyen’s strengths were identified as global capabilities, single platform, and omnichannel solutions (homegrown terminal software and hardware).

Worldpay scored well on global platform and infrastructure, along with added services (e.g., AuthMax cited).

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, Q4 2018); Forrester excludes Braintree and Stripe due to their historical CNP focus (vs. omnichannel); also excludes large bank acquirers that use third-party processing technology (e.g., Wells, Citi, Bank of America Merchant Services)
## 2. Global eCommerce (and omnichannel) acquiring platforms

**Stripe additional service offerings “beyond payments”**

<table>
<thead>
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<th>Stripe additional service</th>
<th>Description</th>
<th>Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billing</td>
<td>Offering for subscription and/or recurring billing businesses, including ability to customize pricing (e.g., usage-based, tiered, billing frequency, one-time charges, etc.).</td>
<td>0.40%</td>
</tr>
<tr>
<td>Connect and Connect Payouts</td>
<td>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.</td>
<td>0.25% or $2 per account + $0.25 per ACH payout; Instant Payout 1.5%</td>
</tr>
<tr>
<td>Radar</td>
<td>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.</td>
<td>$0.04 per transaction; included for those paying standard pricing; 0.40% for Chargeback protection</td>
</tr>
<tr>
<td>Sigma</td>
<td>Reporting and data analytics (standard and custom SQL queries) for business operations/intelligence, accounting, finance, and product management teams.</td>
<td>$0.014 - $0.02 per charge + $10-$100 monthly infrastructure fee</td>
</tr>
<tr>
<td>Atlas</td>
<td>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.</td>
<td>$500 one-time fee, along with ongoing costs for Delaware filings, tax prep, etc.</td>
</tr>
<tr>
<td>Issuing</td>
<td>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.</td>
<td>Stripe will earn a revenue share on interchange earned on card usage, along with potential program management fees</td>
</tr>
<tr>
<td>Premium Support</td>
<td>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).</td>
<td>Starts at $1,000 per month</td>
</tr>
<tr>
<td>Terminal</td>
<td>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).</td>
<td>2.7% + 0.05 for in-store payments; Hardware options $59 and $299</td>
</tr>
<tr>
<td>Works with Stripe</td>
<td>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).</td>
<td>By third-party app</td>
</tr>
<tr>
<td>Corporate Card</td>
<td>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.</td>
<td>No fees (annual, foreign, late), no interest (must pay balance in full monthly)</td>
</tr>
<tr>
<td>Capital</td>
<td>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 %.</td>
<td>One-time flat fee, no interest, paid as a % of daily sales</td>
</tr>
</tbody>
</table>

**Source:** Company reports
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 ~350mm active users (and ~26mm accepting merchants) and network effects
- Rollout schedule: Began with a few merchants in October 2019, more slated for Q1 2020 following the holiday season

Visa Checkout & Masterpass failed to gain meaningful traction, although we suspect SRC will be an “easier sell”

Source: Worldpay, PYMNTS.com, Credit Suisse estimates

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

Source: Worldpay, PYMNTS.com, Credit Suisse estimates
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
### 4. Checkout buttons & digital wallets

Overview of the major US wallets and business models

<table>
<thead>
<tr>
<th>Product</th>
<th>PayPal</th>
<th>Amazon Pay</th>
<th>Google Pay</th>
<th>Apple Pay</th>
<th>EMV SRC “Click-to-pay”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pricing</strong></td>
<td>2.9% + $0.30 for online (US)</td>
<td>2.9% + $0.30 for online (US)</td>
<td>No fees charged by Google (online payments are considered card-not-present transaction, and card-present when done in-store)</td>
<td>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</td>
<td>No fees to merchants (merchants pay their standard card acceptance fees through their acquirer or PSP)</td>
</tr>
<tr>
<td><strong>eCommerce acceptance (US)</strong></td>
<td>71.0%</td>
<td>15.8%</td>
<td>5.5%</td>
<td>4.1%</td>
<td>10,000+ Merchants rolled out as of Q2 2020, per Mastercard</td>
</tr>
<tr>
<td><strong>Contracting required?</strong></td>
<td>Must be contracted with PayPal, offering “rack rate” pricing and negotiated deals for larger merchants</td>
<td>Must be contracted with Amazon, offering “rack rate” pricing and negotiated deals for larger merchants</td>
<td>Pass-through mechanism only, no contract (integration and development work only), i.e., paying with a Google-stored card credential</td>
<td>Pass-through mechanism only, no contract (integration and development work only); Replaces (and consolidates) Visa Checkout, Masterpass, and Amex Express Checkout</td>
<td></td>
</tr>
<tr>
<td><strong>User and/or transaction statistics</strong></td>
<td>~350mm active users</td>
<td>~33mm last reported February 2017, but ~100mm Prime subscribers &amp; ~350mm customers, this user number is understated</td>
<td>Hundreds of millions of card credentials compiled by Google (although that does not equate to usage of the Google Pay button)</td>
<td>~275-325mm users ~12b transactions in 2019, growing ~100%+ YoY (although these statistics are largely offline in-store)</td>
<td>Live October 2019 at select merchants, with further expansion planned for 2020</td>
</tr>
<tr>
<td><strong>Additional comments</strong></td>
<td>• Venmo ~60mm active users, monetizes same as PayPal</td>
<td>• Amazon customers become Amazon Pay users simply by using their Amazon credentials on a third-party site (i.e., no separate registration process)</td>
<td>• All payments products consolidated and re-branded as “Google Pay” in early 2018 (prior offerings included Google Wallet, Google Checkout, Android Pay, etc.)</td>
<td>• Online transactions limited to Safari browser, iPhone, iPad, or Mac devic4.9k card issuers supporting</td>
<td>• 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)</td>
</tr>
<tr>
<td></td>
<td>• MercadoPago agreement expands utility (~230mm LatAm users enabled to transact at PayPal merchants)</td>
<td></td>
<td>• PayPal is a partner and funding option on Google Pay</td>
<td></td>
<td>• SRC users will still need to go through their issuers for chargebacks &amp; disputes (similar to most other wallets)</td>
</tr>
</tbody>
</table>

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

In-store Online

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
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.

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**5. Increasing complexity in global eComm/Omnichannel**

**Complexity associated with 400+ LPMs globally**

<table>
<thead>
<tr>
<th>Platform</th>
<th>Methods</th>
<th>Countries</th>
<th>Currencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worldpay</td>
<td>300+</td>
<td>146</td>
<td>126</td>
</tr>
<tr>
<td>Adyen</td>
<td>250+</td>
<td>200+</td>
<td>150+</td>
</tr>
<tr>
<td>PayPal (Braintree)</td>
<td>25</td>
<td>(we expect more via PPRO)</td>
<td>45+</td>
</tr>
<tr>
<td>Stripe</td>
<td>25 by end 2019, 50+ planned</td>
<td>95+</td>
<td>135+</td>
</tr>
<tr>
<td>Global Payments</td>
<td>140+</td>
<td>33 in-store domestic (60 inc. eComm)</td>
<td>135+</td>
</tr>
</tbody>
</table>
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)

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.
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

<table>
<thead>
<tr>
<th>Payment Methods</th>
<th>Acceptable Payment Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>The only payments platform that gives you access to PayPal, Venmo (in the US), credit and debit cards, plus the most relevant wallets and local payment methods in a single integration.</td>
<td>Visa, Mastercard, American Express, Discover, Apple Pay, Google Pay, Samsung Pay, Venmo, PayPal, and more...</td>
</tr>
</tbody>
</table>
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)

"…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)

Source: Company reports, AlphaSense, Credit Suisse research
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 every $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.).

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

20 August 2020
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

Source: Federal Reserve Bank of Atlanta, Credit Suisse research
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. PayFacs and the rise of the “aggregator” model
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 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)

Source: Mastercard, Double Diamond Group, Infinicept, Stripe, Credit Suisse research, AZ Payments
7. PayFacs and the rise of the “aggregator” model
Advantages exist for ISVs & platforms that become PayFacs…

The advantages of becoming a PayFac 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 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

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)
7. PayFacs and the rise of the “aggregator” model
…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 meaningful 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; Illustratively, if net revenue on payments volume was 75-100bps to the PayFac, it is not unreasonable to think that close to $50-75mm in volume would be required to cover ~$500k–1mm in ongoing costs
- 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, etc., although revenue generation can be reduced
- Traditional payments partnership – traditional integrated payments providers (e.g., OpenEdge, Worldpay, CardConnect); come with lower revenue shares (wide range of ~10-80%) 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)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiring team to manage capability</td>
<td>Requires team of full-time employees to manage business, legal, and engineering processes, along with building a customer service function, etc.</td>
</tr>
<tr>
<td>Payments systems set-up (13-27 months, ~$650k – ~$1.1mm)</td>
<td>Acquiring processor (bank) sponsorship, potential gateway integrations, Level 1 PCI DSS certification, building initial merchant dashboard and payout systems; could require consultants/advisors</td>
</tr>
<tr>
<td>Merchant onboarding &amp; compliance (11-38 months, ~$1.8mm)</td>
<td>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 &amp; privacy, etc.</td>
</tr>
<tr>
<td>Ongoing management of capability (~$200k – $ millions per year)</td>
<td>Per account costs for onboarding &amp; monitoring, risk monitoring, fraud prevention, chargeback process handling (i.e., responding with evidence submissions, reporting [1099s], annual compliance validation, etc.)</td>
</tr>
<tr>
<td>Additional costs to consider longer term</td>
<td>• International expansion (some of the above, but for a new market) • Technical &amp; procedural changes due to changing regulations (e.g., PSD2)</td>
</tr>
</tbody>
</table>

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 PayFac.
7. PayFacs and the rise of the “aggregator” model
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
- Allows the Stripe client to stay outside the flow of funds but still offer the onboarding speed and elements of control/experience of full-fledge PayFacs
- 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 processor relationships (i.e., Wells Fargo in the US for Stripe), 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 aspect of their business, in addition to the advantages outlined above
  - Revenue = fees charged to sub-merchants
  - Cost of revenue = fees from Stripe

Stripe Connect partners that have opted to use this alternative (examples by sub-segment)

| On-demand marketplaces       | • Lyft       |
|                             | • Instacart  |
|                             | • Postmates  |
|                             | • Thumbtack  |
| eCommerce platforms         | • Shopify    |
|                             | • Squarespace|
|                             | • Wufoo      |
|                             | • WooCommerce|
| Crowdfunding                | • Kickstarter |
|                             | • Indiegogo  |
|                             | • Zola       |
|                             | • GoFundMe   |
| Travel & Events             | • Wetravel   |
|                             | • Bookeo     |
|                             | • Tripleseat |
|                             | • FareHarbor |
| Software platforms          | • OpenTable  |
|                             | • DocuSign   |
|                             | • ChowNow    |
|                             | • Salesforce |

Source: Stripe, Credit Suisse research
7. PayFacs and the rise of the “aggregator” model

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.

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

Source: PaymentFacilitator.com, Stripe, Credit Suisse research
# 7. PayFacs and the rise of the “aggregator” model

**ISV or PayFac? It’s not that simple...**

<table>
<thead>
<tr>
<th>ISV partners with integrated payments provider</th>
<th>Emerging “Hybrid Approach”</th>
<th>“Managed Payment Facilitator”</th>
<th>Full-fledged PayFac</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Revenue</strong></td>
<td>Typically ~20-80% of net revenue (ex-interchange, network fees, and other) but varies meaningfully by vertical and volumes</td>
<td>Revenue share can be lower in exchange for the instant onboarding, but negotiable (volumes matter)</td>
<td>Keeps full amount of net revenue but pays a portion (e.g., bps + cents per transaction) to partner and has a degree of ongoing costs</td>
</tr>
<tr>
<td><strong>Onboarding &amp; Experience</strong></td>
<td>Standard onboard with a separate MID for each merchant; acquirer handles KYC, AML, etc.; less control over experience</td>
<td>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)</td>
<td>Instant onboarding and near-complete control over experience</td>
</tr>
<tr>
<td><strong>Ongoing support</strong></td>
<td>Payments co. handles; i.e., sub-merchant has two touchpoints (although GPN serves as 1st point of contact)</td>
<td>Stays with payments partner (acquirer); i.e., sub-merchant has two touchpoints</td>
<td>Software company takes on</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>Stays with payments partner (acquirer), generally, but varies</td>
<td>Stays with payments partner (acquirer), generally, but varies</td>
<td>Software company takes on (as the “equity” tranche), but could revert to the payments partner ultimately</td>
</tr>
<tr>
<td><strong>Portability (merchants, tokens)</strong></td>
<td>No</td>
<td>Generally no (but can be negotiated)</td>
<td>May have contractual portability, but not practical portability</td>
</tr>
<tr>
<td><strong>One-liner (ISV’s perspective)</strong></td>
<td>Can be profitable (i.e., no payments-related costs or responsibilities) if revenue share negotiated well</td>
<td>Close to full benefits of being a PayFac (although generally lacks portability), with minimal effort/costs</td>
<td>Must share revenue with the partner, but still takes on risk &amp; support, and lacks practical customer/token portability</td>
</tr>
<tr>
<td><strong>Selection of sample partners</strong></td>
<td>Global Payments (OpenEdge), Worldpay (Mercury), First Data (CardConnect, BluePay), Stripe Connect, Braintree, BlueSnap, Paysafe, Chase, and others</td>
<td>Clearnet, First Data (CardConnect, BluePay), Stripe Connect, Adyen for Platforms, Braintree Marketplace, Chase, and others</td>
<td>WePay (owned by Chase), ProPay, Pivotal Payments, Paysafe, Payment Data Systems, Stripe Connect (custom), Payrix, and others</td>
</tr>
</tbody>
</table>

**Less control & merchant contract portability**

**More control & merchant contract portability**

Source: Finix Payments, Infinicept, Credit Suisse research
8. 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)

### Example Platform

<table>
<thead>
<tr>
<th>Example Platform</th>
<th>SaaS &amp; other revenue ~%</th>
<th>Payments revenue ~%</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopify</td>
<td>43%</td>
<td>57%</td>
<td>Vast majority of Merchant Solutions revenue (~67% of total) is Payments</td>
</tr>
<tr>
<td>Intuit</td>
<td>85%</td>
<td>15%</td>
<td>2017A result (last payments disclosure), as a % of Small Business &amp; Self-employed revenue</td>
</tr>
<tr>
<td>MindBody</td>
<td>61%</td>
<td>39%</td>
<td>2017A result, prior to being acquired by Vista Equity Partners</td>
</tr>
<tr>
<td>RealPage</td>
<td>79%</td>
<td>22%</td>
<td>Payments resides in the &quot;Resident Services&quot; category, which was ~43% of revenue in 1H 2019 (we assume ~1/2 payments for illustrative purposes)</td>
</tr>
</tbody>
</table>

Source: Company reports, Infinicept, Credit Suisse estimates
## 8. Rationale for software-enabled payments

Software is one of the fastest growing swim lanes in payments

<table>
<thead>
<tr>
<th>Channel/Type of Entity</th>
<th>Description</th>
<th>Increasing or decreasing in importance?</th>
<th>Growth</th>
<th>Sample payments providers employing model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct self-serve</strong></td>
<td>In-house sales force, generally focused on larger, high-value merchants within their employer/merchant acquirer’s target market</td>
<td>↑</td>
<td>-20%+</td>
<td>Global Payments, FIS (Worldpay), Repay, FISV (First Data)</td>
</tr>
<tr>
<td><strong>Direct sales force</strong></td>
<td>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</td>
<td>↑</td>
<td>-Mid-high singles</td>
<td>Square, Fiserv (First Data/Clover), Adyen</td>
</tr>
<tr>
<td><strong>Bank branch</strong></td>
<td>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.</td>
<td>↓</td>
<td>-Mid-singles</td>
<td>First Data (via JVs with Bank of America, Wells Fargo, Citi, and PNC), FIS (Worldpay), Global Payments (mostly outside the US)</td>
</tr>
<tr>
<td><strong>Independent Software Vendor (ISVs)</strong></td>
<td>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 &quot;in-house&quot;).</td>
<td>↑</td>
<td>~Mid-teens</td>
<td>Global Payments, FIS (Worldpay), Fiserv (First Data), Repay, Shift4, Paya, BlueSnap</td>
</tr>
<tr>
<td><strong>Value Added Reseller (VAR)</strong></td>
<td>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).</td>
<td>↑</td>
<td>~Mid-teens</td>
<td>For payments: Shift4, FIS (Worldpay), Fiserv (First Data); For ISVs: Oracle, Microsoft, SAP (ERP/acctg), Shift4 (POS), Agrilysis (real estate mgmt) + many more</td>
</tr>
<tr>
<td><strong>Modern Independent Sales Organization (ISO) - wholesale</strong></td>
<td>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 &amp; Mastercard; modern platforms add layers of technology and services to their product and distribution; Category includes many of the payments platforms that are &quot;an authorized ISO of&quot; an underlying acquiring bank.</td>
<td>↓</td>
<td>~Slightly above market rates</td>
<td>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</td>
</tr>
<tr>
<td><strong>Traditional wholesale ISO</strong></td>
<td>Traditional “feet on street” salesforce extensions; Wholesale ISOs take on the risk of merchant failure, and thus, are more well compensated than retail ISOs.</td>
<td>↓</td>
<td>~Low-mid-singles</td>
<td>Numerous smaller organizations</td>
</tr>
<tr>
<td><strong>Independent Sales Organization (ISO) - retail</strong></td>
<td>Retail ISOs do not take on the risk of merchant failure, and thus, are less well compensated than wholesale ISOs.</td>
<td>↓</td>
<td>~Low-mid-singles</td>
<td>Numerous smaller organizations</td>
</tr>
</tbody>
</table>

**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. 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 Android 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)
# 8. Rationale for software-enabled payments

## Square as an example of additional software services for merchants

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
<th>Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square POS</td>
<td>General purpose POS software, pre-installed on Square Register. Automatically tracks sales, inventories, customer data, digital receipts, and more</td>
<td>Free</td>
</tr>
<tr>
<td>Square for Retail</td>
<td>Designed for retail industry. Includes barcode scanning and advanced inventory management</td>
<td>From $60/month</td>
</tr>
<tr>
<td>Square for Restaurants</td>
<td>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</td>
<td>From $60/month</td>
</tr>
<tr>
<td>Order Manager</td>
<td>Integrates &gt;20 delivery platforms with Square for Restaurants, allowing sellers to manage all orders from the POS. Top partners include DoorDash, Postmates, and Chowly.</td>
<td>~1% take rate</td>
</tr>
<tr>
<td>Payroll</td>
<td>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</td>
<td>$29 monthly subscription + $5/month per employee</td>
</tr>
<tr>
<td>Appointments</td>
<td>Provides sellers with an integrated appointment scheduling solution. Focused on the services industry</td>
<td>From $0/month</td>
</tr>
<tr>
<td>Employee Management</td>
<td>Enables services including manage employee timecards, view employee sales analytics, and secure employee permissions</td>
<td>$5/month per employee</td>
</tr>
<tr>
<td>Customer Relationship Management</td>
<td>Provides sellers with an integrated customer loyalty program and targeted marketing campaigns by linking customer data with transaction data. The company enables sellers to easily assess the ROI of their marketing spend</td>
<td>From $15/month</td>
</tr>
<tr>
<td>Gift Cards</td>
<td>Enables sellers to offer custom gift cards</td>
<td>From $0.80/card</td>
</tr>
<tr>
<td>Invoices</td>
<td>Enables sellers to create and send custom digital invoices to customers (recorded in transaction revenue)</td>
<td>2.9% + $0.30</td>
</tr>
<tr>
<td>Developer Platform</td>
<td>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</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Source: Company reports, Credit Suisse estimates
8. 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 we are 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)
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
9. Continued consolidation and scaling of platforms

Recent acquisitions of greater than $500mm

<table>
<thead>
<tr>
<th>Target Company</th>
<th>Date</th>
<th>Description</th>
<th>Rationale</th>
<th>Purchase Price</th>
<th>LTM EV/EBITDA</th>
<th>Acquiring Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total System Services</td>
<td>Sep-19</td>
<td>Merchant acquiring and issuer processing</td>
<td>Enhanced scale and product capabilities in merchant acquiring businesses, and diversification benefits by adding consumer and issuer processing business lines</td>
<td>$26b</td>
<td>20x</td>
<td>Global Payments</td>
</tr>
<tr>
<td>First Data</td>
<td>Jul-19</td>
<td>World’s largest merchant acquirer and issuer processor</td>
<td>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</td>
<td>~$39b</td>
<td>13x</td>
<td>Fiserv</td>
</tr>
<tr>
<td>Worldpay</td>
<td>Jul-19</td>
<td>Merchant acquiring and issuer processing</td>
<td>FIS’s banking customer base provides a meaningful cross-sell opportunity for Worldpay’s merchant acquiring business in high-growth international markets</td>
<td>$35b</td>
<td>23x</td>
<td>FIS</td>
</tr>
<tr>
<td>Elan Financial Services (Debit Processing Unit)</td>
<td>Oct-18</td>
<td>Electronic payments network (bills and invoices)</td>
<td>Sits within the Payments segment and expands reach/capabilities in debit card processing and ATM managed services.</td>
<td>~$690mm</td>
<td>NA</td>
<td>Fiserv</td>
</tr>
<tr>
<td>AdvancedMD</td>
<td>Sep-18</td>
<td>Software-led</td>
<td>Added software and payments for SMB ambulatory physician practices</td>
<td>~$700mm</td>
<td>NA</td>
<td>Global Payments</td>
</tr>
<tr>
<td>Worldpay</td>
<td>Jul-18</td>
<td>UK-based global merchant acquirer</td>
<td>Expanded presence both internationally (Vantiv was a 100% North American-based business) and in eCommerce</td>
<td>~$12b</td>
<td>19x</td>
<td>Worldpay (legacy Vantiv)</td>
</tr>
<tr>
<td>Cayan Holdings</td>
<td>Jan-18</td>
<td>Merchant acquiring</td>
<td>Accelerated technology-led payments business and added ~70k merchants and more than 100 integrated partners in the US; strengths in omnichannel</td>
<td>~$1.05b</td>
<td>23x</td>
<td>Total System Services</td>
</tr>
<tr>
<td>BluePay</td>
<td>Dec-17</td>
<td>Integrated payments ISO</td>
<td>Strengthened the company’s position in the card-not-present integrated software vendor (ISV) channel</td>
<td>~$760mm</td>
<td>NA</td>
<td>First Data</td>
</tr>
</tbody>
</table>

Source: Company filings, Credit Suisse research
# 9. Continued consolidation and scaling of platforms

Recent acquisitions of greater than $500mm (cont.)

<table>
<thead>
<tr>
<th>Target Company</th>
<th>Date</th>
<th>Description</th>
<th>Rationale</th>
<th>Purchase Price</th>
<th>LTM EV/EBITDA</th>
<th>Acquiring Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVE Network</td>
<td>Sep-17</td>
<td>Software-led</td>
<td>Added event organization software and booking technology platform, focused on the health and fitness market</td>
<td>~$1.2b</td>
<td>12x</td>
<td>Global Payments</td>
</tr>
<tr>
<td>CardConnect</td>
<td>Jul-17</td>
<td>Integrated payments ISO</td>
<td>Strengthened the company’s position in the card-present ISV channel</td>
<td>~$750mm</td>
<td>20x</td>
<td>First Data</td>
</tr>
<tr>
<td>Heartland Payments</td>
<td>Aug-16</td>
<td>Merchant acquiring</td>
<td>Added software and payments business, with an SMB emphasis</td>
<td>~$4.3b</td>
<td>20x</td>
<td>Global Payments</td>
</tr>
<tr>
<td>TransFirst</td>
<td>Apr-16</td>
<td>Merchant acquiring</td>
<td>Added ~1.3k integrated technology and referral partners in important areas such as ISVs, healthcare, not-for-profit, referral banks, and eCommerce</td>
<td>~$2.4b</td>
<td>16x</td>
<td>Total System Services</td>
</tr>
<tr>
<td>SunGard</td>
<td>Nov-15</td>
<td>Financial software &amp; technology</td>
<td>Allowed FIS to expand its capabilities and client roster, gaining scale and technologies</td>
<td>~$5.1b</td>
<td>NA</td>
<td>FIS</td>
</tr>
<tr>
<td>Mercury Payments Systems</td>
<td>Jun-14</td>
<td>Merchant acquiring</td>
<td>Integrated payments leader and part of the foundation of the integrated business today</td>
<td>~$1.65b</td>
<td>18x</td>
<td>Worldpay (legacy Vantiv)</td>
</tr>
<tr>
<td>NetSpend</td>
<td>Jul-13</td>
<td>Prepaid cards</td>
<td>Expanded business capability to include prepaid debit card issuance</td>
<td>~$1.4b</td>
<td>14x</td>
<td>Total System Services</td>
</tr>
</tbody>
</table>

Source: Company filings, Credit Suisse research
10. Open Banking (APIs) and Account Connectivity

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

- Started in Europe with PSD2 – 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 requiring banks to make consumer financial data available to licensed third parties (FinTechs/Techs) via APIs

- Bringing about the “platform-ification” of banking as distribution of financial services becomes increasingly digital and decouples financial products from banks, allowing consumers and Neo banks to cherry pick the best services

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: Earnst & Young, Credit Suisse research
10. Open Banking (APIs) and Account Connectivity
Driving force of innovation by enabling FinTech

- Build the infrastructure to power Fintech apps by connecting them to banks via an API
- 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.)

Source: Open Banking UK, Earnst & Young, Credit Suisse research
10. Open Banking (APIs) and Account Connectivity

- Tink (founded in 2013), TrueLayer (founded in 2016), Token (founded in 2015), and Yapily (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 both believe that no single company will do everything 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, but no API requirements
  - 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

Source: Open Banking UK, N26, Credit Suisse research
10. Open Banking (APIs) and Account Connectivity

US enablers: Plaid 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
  - Sample FinTechs working with Plaid: Venmo, Robinhood, Cash App, Acorns, Expensify, Marcus, Betterment, and more
  - Visa announced it signed an agreement to acquired Plaid for $5.3b on January 13th, 2020 (expected to close in 3-6 months)
  - Plaid was previously valued at $2.65b valuation (Series C) – Visa, Mastercard, Goldman Sachs, and Andreessen Horowitz
  - 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 banking well:

“Transform financial services by lowering the barriers to entry for developers, spurring technical interest in the sector and democratizing access to critical services.”
10. Open Banking (APIs) and Account Connectivity
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

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**Source:** Company reports, Credit Suisse research

**Plaid**

- >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)

- Powers >4k applications
  - 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
  - Venmo & PayPal, Square (Cash app), Marcus by Goldman Sachs, Robinhood, Coinbase, Betterment, Affirm, Gusto, Transferwise, Acorns, Intuit, Microsoft, Zillow, LendingClub, Quicken Loans, Blend
10. Open Banking (APIs) and Account Connectivity
Plaid and the proposed acquisition by Visa, mutually beneficial

- Plaid accelerates Visa’s network of networks money movement strategy and represents a significant opportunity for Visa to partner with FinTechs and >2.6k FinTech developers.

- Demonstrates Visa’s deep competitive moats, solidifying Visa’s position in next-gen FinTech ecosystem by owning a top open-banking enabler, curbing disruption concerns of the incumbent financial ecosystem.

- Visa’s global brand name will give Plaid more credence with traditional financial institutions across the world, as well as help Plaid expand internationally where there are ~15x more FinTech users vs. the US.
11. BigTech in FinTech, highlighting Apple’s FinTech efforts

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

<table>
<thead>
<tr>
<th>BigTech</th>
<th>Actions taken in FinTech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon (detailed on slides 214-218)</td>
<td></td>
</tr>
</tbody>
</table>
- 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 on slides 103-105) |  
- Launched Apple Card with Goldman Sachs (Aug 2019), which GS believes to be “the most successful credit card launch ever”  
- Apple Pay (launched September 2014), at 12b annual transaction run-rate at a 155% CAGR since Q1 2017, in 49 markets  
- Apple Cash and Apple Cash Card (launched December 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 at 60% with ~67mm MAUs, although Facebook could be a strong contender with plans to rollout payments to its~400mm WhatsApp users in India  
- 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: 2.4b MAUs and 140mm registered businesses on Facebook, 500mm DAUs on Instagram and 75% of US businesses expected to use IG by 2020, and WhatsApp with 1b DAUs across 180 countries  
- 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  
- Libra, cryptocurrency wallet effort but not essential for FB’s other FinTech efforts to be successful, in our view; we see this as a longer-term call option and an ambitious project while 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
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.

<table>
<thead>
<tr>
<th>BigTech</th>
<th>Actions taken in FinTech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alibaba</td>
<td>▪ The scaled Ant Financial ecosystem includes MYBANK, asset management, insurance&lt;br&gt;▪ Flagship Alipay wallet with 53% share of China’s mobile payments market&lt;br&gt;▪ Expanding acceptance into key international tourism locations (including US and Europe)&lt;br&gt;▪ Owns 40% share in Paytm, $16b valuation and #3 market share of UPI payments in India</td>
</tr>
<tr>
<td>Samsung</td>
<td>▪ Samsung Pay&lt;br&gt;▪ Expected to pilot SoftPOS in Q4 2019, which powers contactless payments on Samsung phones with via an app download</td>
</tr>
<tr>
<td>Tencent</td>
<td>▪ WeChat FinTech ecosystem (Tenpay, WeBank, asset management, insurance)&lt;br&gt;▪ Leading lifestyle super app with &gt;1.15b MAUs&lt;br&gt;▪ WeChat’s mobile payment wallet has 43% share of China’s mobile payments market</td>
</tr>
<tr>
<td>Uber</td>
<td>▪ Uber Money bank-like services (for drivers), following Instant Transfer capabilities&lt;br&gt;▪ Uber credit card (for consumers)</td>
</tr>
</tbody>
</table>

Source: Company reports, iResearch, statista, Credit Suisse research
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)
    - 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 iPhone share is meaningful in developed markets, and skews to a higher-income demographic

Apple’s iPhone install base is ~925mm globally, which compares favorably to PayPal active users and Amazon customers

Source: Company reports, IDC, Credit Suisse research

~30-35% Apple Pay penetration within the iPhone user base would suggest ~275-325mm Apple Pay users

Credit Suisse
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.
  - There are 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).
  - 70% of US retailers “accept” Apple Pay; available in 40 markets globally

- **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 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 recently in June 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., Marcus 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

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
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

<table>
<thead>
<tr>
<th>Company</th>
<th>Global/China Leader</th>
<th>US Leader</th>
<th>User Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>PayPal</td>
<td>Market leader globally ex China</td>
<td>- Started in 1998 as a P2P company</td>
<td></td>
</tr>
<tr>
<td>WeChat Pay</td>
<td>Market leader in China</td>
<td>- Started in 2014 via P2P (tradition of giving money in red envelopes)</td>
<td></td>
</tr>
<tr>
<td>venmo</td>
<td>Largest FinTech app in the US</td>
<td>- Started in 2009 as a P2P app</td>
<td></td>
</tr>
<tr>
<td>Cash App</td>
<td>2nd largest FinTech app in the US behind Venmo (owned by Square)</td>
<td>- Started in 2013 as a P2P app</td>
<td></td>
</tr>
</tbody>
</table>

~350mm users (including Venmo) ~900mm users >60mm users (as of Q2 2020) ~24mm users (as of Q4 2019)

Source: Company reports, Credit Suisse research
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 ~2/3 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.
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
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 incumbent players (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.
- 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)

Source: World Bank, Western Union, Credit Suisse research
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 as 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

Source: World Bank, Credit Suisse research
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.

- 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).

Source: World Bank, Credit Suisse research, US Census Bureau
## 14. Global remittance market innovation

Start-ups see elevated remittance prices as an opportunity

<table>
<thead>
<tr>
<th>Metric</th>
<th>Transferwise</th>
<th>Remitly</th>
<th>WorldRemit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recent valuation</strong></td>
<td>$5b (July 2020)</td>
<td>~$1.5b (July 2020)</td>
<td>~$900mm (June 2019)</td>
</tr>
<tr>
<td><strong>Geographic reach</strong></td>
<td>59 countries</td>
<td>50 send and 150 receive countries</td>
<td>50 send and 150 receive countries</td>
</tr>
</tbody>
</table>
| **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) |  
| **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 |
15. FinTech-driven credit (consumer 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, SoFi, Avant, and Marlette)
  - Dedicated POS financing – Financing options that are offered when consumers are checking out, either online or in-store (e.g., Affirm, 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).

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

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 $7.7b in funding in 2019, most recently highlighted by a $500mm Series G by SoFi to expand its financial services offerings (which most recently is cryptocurrency trading)
15. FinTech-driven credit (consumer 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).

Source: Company reports, TransUnion consumer credit database (TransUnion does not break out POS personal loans separately, per The Financial Brand), Credit Suisse research
Examples of large marketplace (P2P) lenders are Lending Club (LC), Prosper, SoFi, 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 use cases).
15. FinTech-driven credit (consumer offerings)
Dedicated POS financing (purchase-specific credit offerings)

- Examples of large, FinTech-dedicated POS financing platforms are Affirm, 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

- Key questions: (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)

Affirm data suggest meaningfully higher basket size, conversion, and revenue per visitor

- Higher basket size vs. non-Affirm users: 75%
- Increase in online conversion: 20%
- Increase in revenue per site visitor: 10%

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

- Prefer fixed monthly plans with clear payment terms: 62%
- Feel that they have enough credit cards and prefer not to open more just to make a big purchase: 65%
- More likely to make a retail purchase if a payment plan backed by a simple and seamless point of sale experience is offered: 76%

Source: Company reports, PYMNTS.com, Citizens Financial Group, Inc., Credit Suisse research
15. FinTech-driven credit (consumer offerings)
Selection of Personal lending FinTech platforms

<table>
<thead>
<tr>
<th>Marketplace lenders</th>
<th>Comment</th>
</tr>
</thead>
</table>
| SoFi                | • $4.8b valuation  
                      • $45b in funded loans across 1m+ members  
                      • Offerings in student loan refi, private student loans, personal loans, home loans, SoFi Invest, and SoFi Money  
                      • Expanding into cryptocurrency trading (partnering with Coinbase)  
                      • Anthony Noto became CEO in early 2018 (former COO of Twitter, CFO of NFL, Goldman Sachs analyst & banker)  
                      • Had applied for a US banking license but withdrew application in October 2017  
                      • 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) |
| Avante              | • $4b+ borrowed across 600k+ consumers;  
                      • Loan amounts of $2k to $35k, with APR range of ~10-36%, terms of 24-60 months  
                      • Also charges an administrative fee of 4.75%; Primarily a lower FICO score lender (and lending-as-a-service) |
| Prosper             | • $17b+ borrowed across 1mm+ consumers; loan amounts up to $40k, with terms of ~3-5 years |
| Marlette (Best Egg) | • $8b+ borrowed across 600k+ loans; loan amounts of $2k to $35k, with APR range of ~6% to 30% |
| Upstart             | • Loans from $1k to $50k; 3- and 5-year terms |
| Upgrade             | • Loans from $1k to $50k; 36- to 60-month payback periods |

<table>
<thead>
<tr>
<th>Other personal lending FinTechs</th>
<th>Comment</th>
</tr>
</thead>
</table>
| Earnest                       | • Range of student loan refi, private student loans, and personal loans (up to $75k)  
                      • Acquired in July 2018 by Navient Corp., for $155mm |
| Marcus (Goldman Sachs)        | • Loans up to $40k, with APR starting at 5.99% (range ~6-29%), 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; $7.4b in volume, 2.5mm customers (July 2019) |

Source: Company reports, Credit Suisse research
## 15. FinTech-driven credit (consumer offerings)
### Selection of dedicated financing platforms innovating at the POS

<table>
<thead>
<tr>
<th>POS financing platform</th>
<th>Valuation</th>
<th>Comment</th>
</tr>
</thead>
</table>
| **Affirm** | ~$2.9b ($300mm financing, April 2019) | • Checkout button credit offering; simple interest range 0% to 30% (avg.~17%); no late fees  
• Partially merchant funded at ~2-3%  
• Average order ~$800 paid back over ~10-11 months  
• ~4k+ merchants offering (Walmart, Peloton, Wayfair)  
• October 2019 launch of Anywhere (Visa virtual card) expanding network to all Visa accepting merchants vs. ~3k Affirm acceptance points (i.e., even non-Affirm merchants) |
| **AfterPay (AfterPay Touch Group)** | ~$13.5b (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)  
• ~$11bn (A$) volume run rate (based on Q2 2020)  
• ~55k+ merchants (Urban Outfitters, Forever 21, GOAT)  
• Merchant funded at ~4-6% plus $0.30 (free to consumers)  
• ~18k merchants (Home Depot, Renewal by Andersen) |
| **GreenSky** | ~$1b (publicly traded in the US, GSKY) | • Emphasis on home improvement & elective healthcare  
• Partners with banks (Regions, Fifth Third, Synovous)  
• ~$23b+ cumulative volume (as of Q1 2020)  
• ~18k merchants (Home Depot, Renewal by Andersen) |
| **Klarna (Visa strategic investor)** | ~$5.5b ($460mm financing, August 2019) | • 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  
• 130k+ merchants  
• Merchant funded (3-4% fee) |
| **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  
• ~$1.4b in consumer receivables (largely international) as of Q1 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
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)

- TAM expansion via FinTech innovation
- Existing TAM of business loans < $250k, per FDIC

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

Examples of Payments & eCommerce platforms offering merchant credit

<table>
<thead>
<tr>
<th>Merchant credit offerings</th>
<th>Comment</th>
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</table>
| 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      | • 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) |
| Corporate Credit Line & Amazon.com Corporate Pay-In-Full Credit Line | |
| Global Payments           | • 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) |
| (Evolocity Financial partnership) | |
| 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
## 16. FinTech-driven credit for merchants (micro & SMB lending)

Additional FinTech platforms innovating in merchant credit

<table>
<thead>
<tr>
<th>FinTech Platform</th>
<th>Comment</th>
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</table>
| 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,    | • Business loans between $5k and $500k                                                                                               |
| acquired by PayPal)              | • $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. Digitally native expectations

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).

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, RTR 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)

- More likely to work with a business that offers fast disbursements
- Consider a debit card number to be more convenient than a bank account + routing number
- 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)
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 ~75%, and these volumes now make up ~3% 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

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

Network fees

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

**Visa Direct & Mastercard Send vs. ACH-based alternatives**

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Visa Direct &amp; Mastercard Send</th>
<th>ACH-based (including faster payments, ACH-like alternatives)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic vs. Global</td>
<td>Cross-border: Global by definition, with cross-border capabilities and access to ~3.5b cards and ~25k banks connected to Visa and Mastercard</td>
<td>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)</td>
</tr>
<tr>
<td>Account-access</td>
<td>Traditional bank accounts &amp; prepaid cards: Broader access to the underbanked via prepaid cards; Can also access credit cards</td>
<td>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).</td>
</tr>
<tr>
<td>Costs to sender</td>
<td>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)</td>
<td>Lower: Appropriate for many uses cases, but without the full scope of services provided by card network-enabled push payments</td>
</tr>
<tr>
<td>Costs to receiver (bank)</td>
<td>Banks earn money: Banks are compensated for receiving funds, earning &quot;reverse interchange-like&quot; revenue; Receiving banks earn $0.10 each time they accept Visa Direct</td>
<td>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)</td>
</tr>
<tr>
<td>Risks</td>
<td>Chargebacks &amp; dispute process: Card network rails come with processes around chargebacks &amp; disputes; Originating bank bears the risk when accounts are taken over; These processes generally add costs to the ecosystem</td>
<td>No chargebacks &amp; 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)</td>
</tr>
<tr>
<td>Speed &amp; availability</td>
<td>24/7 real-time (card rails are always on); Visa requires fast-funds enabled issuers to make funds within 30 minutes</td>
<td>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)</td>
</tr>
<tr>
<td>Other</td>
<td>Long-standing real-time capabilities, consolidated into two known brands (Visa, Mastercard)</td>
<td>Numerous, more recent developed options</td>
</tr>
</tbody>
</table>

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).

~35% of US workers are participating in the “Gig” economy

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

Source: Hyperwallet/PYMNTS.com Gig Economy Index, 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.

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

<table>
<thead>
<tr>
<th>Paycheck to paycheck</th>
<th>Paycheck to paycheck with savings</th>
<th>Paycheck to paycheck, no savings, struggling to pay bills</th>
</tr>
</thead>
<tbody>
<tr>
<td>29%</td>
<td>42%</td>
<td>13%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Freelancers using platforms that do not offer pay advances &amp; would consider switching to one that does</th>
<th>Freelancers that would work more if they could be paid faster</th>
</tr>
</thead>
<tbody>
<tr>
<td>52%</td>
<td>85%</td>
</tr>
</tbody>
</table>

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

Source: Company reports, Credit Suisse estimates
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

<table>
<thead>
<tr>
<th>Enterprise and B2B Solutions</th>
<th>Consumer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INGO Push</strong></td>
<td></td>
</tr>
<tr>
<td>Enables mobile and branch / ATM check cashing for businesses</td>
<td></td>
</tr>
<tr>
<td><strong>INGO Check</strong></td>
<td></td>
</tr>
<tr>
<td><strong>INGO Cash</strong></td>
<td></td>
</tr>
<tr>
<td>Turns cash received at register into push payments via APIs or web POS platform</td>
<td></td>
</tr>
<tr>
<td>An app store mobile application which allows consumers to cash checks remotely into various payout options, or across various methods</td>
<td></td>
</tr>
</tbody>
</table>

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)

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
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

<table>
<thead>
<tr>
<th></th>
<th>Australia</th>
<th>Singapore</th>
<th>Canada</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>52%</td>
<td>22%</td>
<td>14%</td>
<td>4%</td>
</tr>
<tr>
<td>2017</td>
<td>84%</td>
<td>52%</td>
<td>42%</td>
<td>44%</td>
</tr>
</tbody>
</table>

*“... 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)
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
## 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.

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of contactless cards deployment</th>
<th>% point-of-sale transactions conducted using cards</th>
<th>% cards in force that are contactless</th>
<th>% total point-of-sale transactions that are contactless</th>
<th>% card point-of-sale transactions that are contactless</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>2009, 2012</td>
<td>45.00%</td>
<td>67.45%</td>
<td>12.44%</td>
<td>27.64%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2007, 2015</td>
<td>54.00%</td>
<td>63.87%</td>
<td>12.56%</td>
<td>23.27%</td>
</tr>
<tr>
<td>Canada</td>
<td>2007, 2013</td>
<td>61.00%</td>
<td>66.40%</td>
<td>13.93%</td>
<td>22.84%</td>
</tr>
<tr>
<td>South Korea</td>
<td>2004, 2012</td>
<td>58.00%</td>
<td>95.91%</td>
<td>12.07%</td>
<td>20.82%</td>
</tr>
<tr>
<td>Spain</td>
<td>2012, N/A</td>
<td>13.00%</td>
<td>53.09%</td>
<td>2.48%</td>
<td>19.11%</td>
</tr>
<tr>
<td>China</td>
<td>2006, N/A</td>
<td>6.00%</td>
<td>53.25%</td>
<td>0.96%</td>
<td>15.94%</td>
</tr>
<tr>
<td>France</td>
<td>2007, N/A</td>
<td>37.00%</td>
<td>42.85%</td>
<td>2.47%</td>
<td>6.67%</td>
</tr>
<tr>
<td>Italy</td>
<td>2010, N/A</td>
<td>14.00%</td>
<td>38.24%</td>
<td>0.89%</td>
<td>6.39%</td>
</tr>
<tr>
<td>Russia</td>
<td>2013, N/A</td>
<td>18.64%</td>
<td>21.88%</td>
<td>1.13%</td>
<td>6.06%</td>
</tr>
<tr>
<td>Germany</td>
<td>2012, N/A</td>
<td>16.60%</td>
<td>58.73%</td>
<td>0.88%</td>
<td>5.33%</td>
</tr>
<tr>
<td>India</td>
<td>2015, N/A</td>
<td>7.00%</td>
<td>3.14%</td>
<td>0.04%</td>
<td>0.52%</td>
</tr>
<tr>
<td>United States</td>
<td>2003, N/A</td>
<td>50.00%</td>
<td>3.47%</td>
<td>0.18%</td>
<td>0.32%</td>
</tr>
<tr>
<td>Mexico</td>
<td>2012, N/A</td>
<td>15.64%</td>
<td>0.37%</td>
<td>0.01%</td>
<td>0.07%</td>
</tr>
<tr>
<td>Brazil</td>
<td>2013, N/A</td>
<td>40.00%</td>
<td>0.69%</td>
<td>0.03%</td>
<td>0.06%</td>
</tr>
<tr>
<td>Japan</td>
<td>2001, N/A</td>
<td>16.20%</td>
<td>0.03%</td>
<td>0.00%</td>
<td>0.02%</td>
</tr>
</tbody>
</table>

Source: A.T. Kearney, Credit Suisse research
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
20. Loyalty and rewards becoming easier to spend
FIS Loyalty-as-a-Currency set to expand with WP merchants

- Premium Payback program enables ~23mm consumers to redeem rewards on the POS, originally launched in 2016
- 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 expects the first joint (FIS-WP) loyalty-as-a-currency customer will go live 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

- 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
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

Source: PayPal, Credit Suisse research
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

Source: Square, Credit Suisse research
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)
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., ~6-8% 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).

Globally, Mastercard estimates there is still ~$7tr of cash & check within the Personal Consumption Expenditures (PCE), and ~$68tr in total globally.
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, #6 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

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)

$6.1T Cash Opportunity Underpins Growth

Source: GSMA, Visa, Euromonitor, Credit Suisse research
21. Long runway for card penetration in both EM & DM markets

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

- India (#7 GDP globally, 2nd by population) along with Japan (#4 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 Financial 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

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

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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

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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 (#28 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
21. Long runway for card penetration in both EM & DM markets

Summary data for the US, Europe, AsiaPac, and 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 comprise ~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).

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

1. **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

2. **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

3. **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

- 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 strengthens 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)

PayPal's cross-border volumes make up ~17% 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)

Source: Company filings, Credit Suisse research
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).

- 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, although a greater portion of that being intra-Europe vs. Visa.

- 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

<table>
<thead>
<tr>
<th>Network</th>
<th>Reporting of revenue associated with cross-border transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visa</td>
<td>Cross-border related revenue contained in &quot;Service Fees&quot; and &quot;Data Processing&quot; (including a processing premium), along with the bulk of the premium residing in the &quot;International transaction fees&quot; line item.</td>
</tr>
<tr>
<td>Mastercard</td>
<td>Cross-border related revenue contained in &quot;Transaction Processing Fees&quot; (at a premium), and also within &quot;Cross Border Volume Fees&quot;; Mastercard’s &quot;Domestic Assessments&quot; revenue line item does not contain brand fees associated with cross-border transactions.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Company</th>
<th>Overview of cross-border platform and how it supports SMB merchants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airwallex</td>
<td>• Hong Kong-based platform with strength in APAC</td>
</tr>
<tr>
<td></td>
<td>• Customers include: JD.com, Tencent, and Shopify; investors include: Tencent, Sequoia, DST, and Mastercard</td>
</tr>
<tr>
<td></td>
<td>• 130+ countries and 50+ currencies</td>
</tr>
<tr>
<td>EBANX</td>
<td>• Brazilian-based platform that offers payments for the entire eCommerce transaction</td>
</tr>
<tr>
<td></td>
<td>• Allows global merchants to more easily reach Brazilian consumers</td>
</tr>
<tr>
<td>Payoneer</td>
<td>• International money transfer for marketplace sellers and freelancers, along with working capital offerings, payout capabilities, and fraud combatting solutions for marketplace partners</td>
</tr>
<tr>
<td></td>
<td>• “Millions” of customers and “billions” of volumes annually, across 200 countries and 150 currencies</td>
</tr>
<tr>
<td></td>
<td>• KYC, AML investment (automating as much as possible – i.e., in the US, 86% of accounts automatically onboard and get approved)</td>
</tr>
<tr>
<td></td>
<td>• Provides solutions for marketplaces to combat fraud (~4% of revenues, with ~60-70% of fraud via by repeat users/opening new stores)</td>
</tr>
<tr>
<td>PingPong</td>
<td>• Hangzhou, Zhejiang, China-based platform with $10b+ in payments volume</td>
</tr>
<tr>
<td></td>
<td>• Amazon-focused for sellers in China (also works with sellers on NewEgg, Wish, and others) aiming to reduce cross-border fees for 3P sellers</td>
</tr>
<tr>
<td>Transferwise &amp; Revolut</td>
<td>• Offer borderless accounts that compete with other companies on this page (although core business is in P2P money transfer)</td>
</tr>
</tbody>
</table>
23. COVID-19 as a forcing factor
Industry leaders’ recent commentary on COVID-19

A common theme among 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)

“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)

“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)

“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)
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 pandemic is accelerating cashless penetration
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)

Source: Square company website, Company Reports, WHO, CDC
23. COVID-19 pandemic is accelerating cashless penetration
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)
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, pick up in-store grew 195% in May 2020.

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.
23. COVID-19 pandemic is accelerating cashless penetration
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 279% YoY in Q2 2020 (although we note off of a small base)
- Western Union online transactions increasing 34% and 96% for Q1 and Q2 2020, respectively
  - Digital transactions have grown from 15% of the C2C transactions in Q2 2019 to 31% in Q2 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 are up ~62% YoY as of Q2 2020, with Remitly and WU leading the growth

Source: Sensor Tower, Company reports, Credit Suisse estimates
B2B/Corporate Payments
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.)

- 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
# 24. B2B payments coming of age

**Companies under coverage with B2B exposure (V, MA, FLT, WEX)**

<table>
<thead>
<tr>
<th>Company</th>
<th>Overview of B2B assets</th>
</tr>
</thead>
</table>
| **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 entities 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**  | • >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**       | • >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
## 24. B2B payments coming of age
### Additional B2B assets at various public companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Overview of B2B assets</th>
</tr>
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</table>
| 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  
• 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
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
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).

<table>
<thead>
<tr>
<th>Key benefits of virtual card usage</th>
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<tbody>
<tr>
<td>Improve speed and simplification of AR &amp; AP reconciliation processes</td>
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<tr>
<td>Reduce operating costs – scale from process efficiency, reduces errors, helps to avoid FX markups (up to 3%)</td>
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<tr>
<td>Increase control of corporate spend – limit a purchase to the amount, date, merchant, and MCC code</td>
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<tr>
<td>Revenue opportunity from financial incentives (rebates) on transactions</td>
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<tr>
<td>Reduce fraud – single-use virtual card numbers can only be used once with the controls above</td>
</tr>
<tr>
<td>Better reporting with enhanced data from card transactions</td>
</tr>
</tbody>
</table>

Source: WEX, eNett, Mastercard, Credit Suisse
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.

Source: WEX, Credit Suisse research
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 alternative 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

1. Travel company makes reservation for consumer and receives payment
2. Travel company requests Virtual Card Number, WEX provides credit
3. Supplier charges Virtual Card Number
4. Transaction reconciles automatically
5. Travel company settles with WEX
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

Source: Company Data, Deloitte, Credit Suisse research
26. Next leg of B2B payments puts SMB services in focus

Numerous fast-growing private companies developing solutions

<table>
<thead>
<tr>
<th>Overview of a selection (not exhaustive) of private B2B payments companies serving the SMB and middle-market segment</th>
</tr>
</thead>
</table>
| **Bill.com**  
IPO in Q4 2019 | • 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 |
| **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
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
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.

Source: Mastercard, FIS, Credit Suisse research

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
- 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.
27. “Faster payments” & “RTP” become more real
54 schemes live vs. 14 in 2014 and 40 in 2018
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
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)

<table>
<thead>
<tr>
<th>Company</th>
<th>Vocalink</th>
<th>Nets</th>
<th>Mastercard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure</td>
<td>• Larger markets&lt;br&gt;  • Sophisticated &amp; customized</td>
<td>• Smaller markets&lt;br&gt;  • Fast deployment&lt;br&gt;  • Region-specific capabilities</td>
<td>• Extended global coverage&lt;br&gt;  • Industry-leading solutions</td>
</tr>
<tr>
<td>Applications</td>
<td>• US Bill Pay (C2B)&lt;br&gt;  • Transactis&lt;br&gt;  • Pay by Account (P2M)</td>
<td>• Europe Bill Pay&lt;br&gt;  • E-invoicing &amp; new billing platform</td>
<td>• Proven applications (e.g., Pay by Account)&lt;br&gt;  • New flow penetration (e.g., bill-pay)&lt;br&gt;  • Extensive roadmap</td>
</tr>
<tr>
<td>Services</td>
<td>• Suite of services &amp; analytics&lt;br&gt;  • Can be provided across technologies</td>
<td>• Additional market access</td>
<td>• Broad opportunity to sell suite of services &amp; analytics</td>
</tr>
</tbody>
</table>

Source: Mastercard, Credit Suisse research
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?
  - 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

**FPRI 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:**

**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).

Source: FIS, The Clearing House, Levvel, Credit Suisse research
27. “Faster payments” & “RTP” become more real
A focus on progress being made in the US

<table>
<thead>
<tr>
<th>System</th>
<th>Owners</th>
<th>Overview &amp; Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Clearing House (TCH) Real-Time</td>
<td>25 large US commercial bank owners</td>
<td>- Launched in December 2017, now reaches +50% of US bank accounts&lt;br&gt;- First new core US payments infrastructure to be built in over four decades, licensing Mastercard’s technology (Vocalink)&lt;br&gt;- Pricing structure consists of flat fees and no volume discounts, and only the originating bank pays for a transaction&lt;br&gt;- 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</td>
</tr>
<tr>
<td>Payments (RTP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zelle (Early Warning Services)</td>
<td>7 large US commercial banks</td>
<td>- Initially launched by JPM, Wells Fargo, and Bank of America in 2011 as clearXchange, rebranded to Zelle in 2017&lt;br&gt;- US banks view Zelle as their antidote to compete with Venmo and Cash App&lt;br&gt;- Participating banks represent 80% of bank accounts in the US&lt;br&gt;- 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)&lt;br&gt;- Current use cases are for P2P and disbursements (government, corporate-like insurance payouts)&lt;br&gt;- Potential to be used for consumer purchases, per comments from Fiserv&lt;br&gt;- Real Time? For end users, transactions occur in real time via banks “fronting” the funds, but the actual funds settle overnight via ACH rails</td>
</tr>
<tr>
<td>FedNow (live in 2023-2024)</td>
<td>US Federal Reserve</td>
<td>- Similar to TCH’s RTP network, but operated and owned by the Federal Reserve&lt;br&gt;- Expected to launch in 2023-2024 and will increase competition in RTP, a net positive for the ecosystem&lt;br&gt;- “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</td>
</tr>
</tbody>
</table>
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
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.

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)

Source: Celent, PWC, Company data, Credit Suisse estimates
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)

Customer Demands
- 24/7 responsiveness
- Rising expectations set by mainstream apps
- Convenience

Competitive Dynamics
- Big banks gaining share
- Challenger banks
- BigTech

Regulatory Burden
- High compliance costs (Dodd-Frank)
- Ring-fencing, KYC
- PSD2 (Europe)

Industry Backdrop
- Profitability pressures from low interest rates
- Channel shifts to online
- Consolidation

Source: CUNA, Credit Suisse research
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).

FinTechs in the US now have ~62mm users in aggregate; longer-term potential to pressure account growth and 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, Affirm, etc. | ~10-11k US financial institutions | JP Morgan Chase, Bank of America, Wells Fargo, Citi, US Bank, PNC, TD Bank, Truist, Capital One

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
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).
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

- Legacy cores are expensive to maintain
- Faster time to market for new products
- Need for more open platforms that remove friction from partnering with FinTechs
- Need for a centralized view of customer data across product silos, full access to customer data, and real-time transaction posting
- Legacy programming languages (Cobol) are not relevant for top tech talent and are inefficient

### Factors Against Core System Replacement

- Viewed as the hardest project a bank can undertake; it can be risky and take ~6 months to 2 years to complete
- Expensive, with potential de-conversion and integration fees that often equal -->90% of the remaining contract value
- Long contracts (3-7 years), comfort with existing provider, and desire for a single vendor limit other options
- Limited IT budgets and digital investment priorities
- Different talent requirements: modern core platforms written in modern language

Source: Company reports, Aite Group, Credit Suisse research
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

<table>
<thead>
<tr>
<th>Banks by asset size</th>
<th>FIS</th>
<th>Fiserv</th>
<th>Jack Henry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market share (# of banks)</td>
<td>12%</td>
<td>38%</td>
<td>16%</td>
</tr>
<tr>
<td>Large banks (&gt;30b)</td>
<td>41</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Mid-size banks (10-$30b)</td>
<td>37</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>Small banks (5-10b)</td>
<td>37</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>Community banks (&lt;5b)</td>
<td>909</td>
<td>2,164</td>
<td>1,020</td>
</tr>
<tr>
<td>Credit Unions</td>
<td>239</td>
<td>1,886</td>
<td>695</td>
</tr>
<tr>
<td>Total</td>
<td>1,263</td>
<td>4,100</td>
<td>1,736</td>
</tr>
</tbody>
</table>

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)

Source: Credit Suisse estimates; Number of ratings per app: Chase (1.72mm), Bank of America (1.27mm), Cash App (218k), Revolut (7,870)
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 outsourced, 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)

<table>
<thead>
<tr>
<th>Aspect</th>
<th>SaaS</th>
<th>Licensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upfront fees</td>
<td>• Little to none</td>
<td>• Upfront perpetual license (with revenue recognition also upfront, which can create a degree of lumpiness)</td>
</tr>
<tr>
<td>Recurring fees</td>
<td>• Monthly or quarterly fees (and revenue recognized similarly)</td>
<td>• Annual maintenance fees (~20% of total cost)</td>
</tr>
<tr>
<td>Data storage and processing</td>
<td>• Runs on a private cloud (not AWS, Azure) managed by the core provider (e.g., Fiserv, FIS)</td>
<td>• Typically runs on-premise, but banks can pay their core provider for a private cloud</td>
</tr>
<tr>
<td>Customization</td>
<td>• More likely to be out-of-the-box and less customizable, and tends to attract smaller banks</td>
<td>• Customizable and tends to attract larger banks that make these modifications</td>
</tr>
<tr>
<td></td>
<td>• 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)</td>
<td>• FIS has a greater degree of this vs. Fiserv and Jack Henry, due to larger bank skew</td>
</tr>
</tbody>
</table>

Source: Company data, Credit Suisse research
Market shifts toward SaaS core deployments have been ongoing for the past decade with room for improvement.

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.

### SaaS (hosted) vs. Licensed (on-premise)

- In 2018, ~95% of new core system contracts signed by banks were hosted vs. ~70% for Credit Unions.

#### Source: Aite Group, Credit Suisse

<table>
<thead>
<tr>
<th>Year</th>
<th>Hosted (SaaS)</th>
<th>Licensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>52%</td>
<td>48%</td>
</tr>
<tr>
<td>2015</td>
<td>35%</td>
<td>65%</td>
</tr>
<tr>
<td>2018</td>
<td>30%</td>
<td>70%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Hosted (SaaS)</th>
<th>Licensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>71%</td>
<td>29%</td>
</tr>
<tr>
<td>2015</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>2018</td>
<td>47%</td>
<td>53%</td>
</tr>
</tbody>
</table>
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.
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 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)

October 2019
ABA Core Platforms Committee 
publishes “Principles for Strong Bank-Core Provider Relationships”

January 2019
Finxact raises $30mm from 
strategic investors (American Bankers Association, Accenture, and SunTrust)

September 2019
Chime surpasses 5mm FDIC-insured accounts in < 5 years

October 2019
Chime looking to raise new funding at a $5b valuation (to be led by existing investor DST)

July 2019
Monzo, a UK challenger bank (~2-3mm accounts) 
launches in the US

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)

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

May 2017
Finxact raises initial seed round of $12mm via Live Oak Ventures, First Data, Woodforest National Bank, and TNI

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

July 2019
N26, a leading European challenger bank (~3.5mm accounts) 
launches in the US with a 100k user waitlist

September 2019
Revolut announces expanding global partnership with Visa, including the US, with plans to expand headcount from 1.5k to 5k during 2020

Source: American Bankers Association (ABA), WSJ, the BLOOMBERG PROFESSIONAL™ service, Credit Suisse research
## 29. Bank Tech key drivers and outlook

### A selection of emerging bank IT vendors

<table>
<thead>
<tr>
<th>Company</th>
<th>Year Founded</th>
<th>Description</th>
<th>Expertise</th>
<th>Customers</th>
<th>Investors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkami</td>
<td>2009</td>
<td>Provider of online and mobile banking for retail and business customers</td>
<td>Ancillary services</td>
<td>Nicolet National Bank ($3b), Oregon Community CU ($1.7b)</td>
<td>General Atlantic, S3 Investors, Argonaut</td>
</tr>
<tr>
<td>Apiture</td>
<td>2017</td>
<td>Vision to &quot;redefine the digital experience across the financial industry...&quot; 500+ customers, API-first mindset (i.e., build everything as an API vs. wrapping old technology in an API layer)</td>
<td>Ancillary services</td>
<td>SunTrust, Live Oak Bank</td>
<td>Canapi Ventures, First Data</td>
</tr>
<tr>
<td>nCino</td>
<td>2012</td>
<td>Modern cloud-based core banking system provider built on Salesforce with a particular strength in lending solutions</td>
<td>Ancillary services</td>
<td>TD Bank, KeyBank, Navy Federal Credit Union</td>
<td>T. Rowe Price, Salesforce Ventures, Bessemer Venture Partners, etc.</td>
</tr>
<tr>
<td>Synapse</td>
<td>2014</td>
<td>Modern provider of ancillary banking services including card issuance, brokerage accounts, and loan origination and servicing products</td>
<td>Ancillary services</td>
<td>Not disclosed</td>
<td>Andreessen Horowitz, Core Innovation Capital</td>
</tr>
<tr>
<td>Backbase</td>
<td>2003</td>
<td>Core overlay service, also offering omnichannel banking and digital solutions</td>
<td>Core overlay</td>
<td>ABN AMRO, Barclays, ING, KeyBank, Lloyds Banking Group</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>Treasury Prime</td>
<td>2017</td>
<td>Core overlay service, also offering instant digital onboarding for account opening</td>
<td>Core overlay</td>
<td>Not disclosed</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>Corelation</td>
<td>2009</td>
<td>Core provider focused on serving credit unions</td>
<td>Core platform</td>
<td>60+ Credit Unions</td>
<td>N/A</td>
</tr>
<tr>
<td>Finxact</td>
<td>2016</td>
<td>Core-as-a-Service banking system provider built on AWS with a curated ecosystem of third-party partners</td>
<td>Core platform</td>
<td>Live Oak Bank</td>
<td>First Data (now Fiserv), SunTrust Banks, American Bankers Association, etc.</td>
</tr>
<tr>
<td>Mambu</td>
<td>2011</td>
<td>Modern cloud-based core banking system focused on Europe with headquarters in Berlin, Germany</td>
<td>Core platform</td>
<td>ABN AMRO, Santander, N26 OakNorth, TBC Bank, new10</td>
<td>Bessemer Venture Partners, Acton Capital, CommerzVentures</td>
</tr>
<tr>
<td>Neocova</td>
<td>2019</td>
<td>Modern cloud-based core banking system provider focused on community banks and credit unions</td>
<td>Core platform</td>
<td>Not disclosed</td>
<td>Not disclosed</td>
</tr>
<tr>
<td>Q2</td>
<td>2004</td>
<td>Provider of digital and mobile banking, lending and leasing services, and cloud-based core banking systems</td>
<td>Core platform and ancillary services</td>
<td>Core customers: Sallie Mae, Capital, H&amp;R Block</td>
<td>Public company (QTWO)</td>
</tr>
<tr>
<td>Temenos (limited US presence)</td>
<td>1993</td>
<td>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</td>
<td>Core platform and ancillary services</td>
<td>HSBC, PayPal Credit, EQ Bank, UBS</td>
<td>Public company (TEMN)</td>
</tr>
<tr>
<td>Nymbus</td>
<td>2015</td>
<td>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</td>
<td>Payments: NYMBUS SmartPayments real-time payments suite</td>
<td>~46 Credit Unions</td>
<td>Insight Partners, Home Credit Group, Venture Enterprises</td>
</tr>
</tbody>
</table>

### 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
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).

~80% of participants would be willing to consider a new entrant for core banking needs

Survey data suggest satisfaction with core provider was limited to 21%, while most participants agree providers are slow to innovate or upgrade technologies

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
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.

Most CEOs of banks with > $10b in assets are not sure when their bank tech contracts end.

In totality - the majority of CEOs either aren’t sure when their contracts end or are locked in past 2024.

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%
30. Modern Card Issuance Platforms
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 platforms like Marqeta 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 (which would be meaningful business and a positive for Marqeta and/or i2c, but likely *di minimis* for the likes of TSYS, FIS, and FISV.)

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

Source: Company reports, CB Insights, Credit Suisse research
30. Modern Card Issuance Platforms
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 (e.g., Marqeta handles both).
- Additional players are the networks (Visa, Mastercard) and, at times, a distribution partner (e.g., Blackhawk).

<table>
<thead>
<tr>
<th>Non-bank issuer</th>
<th>Issuing Bank</th>
<th>Issuer Processor</th>
<th>Program Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owns the cardholder relationship (e.g., employee, contractor, consumer)</td>
<td>Holds an actual bank license</td>
<td>Routing of card transactions for approval (including advanced rules for case-specific approvals)</td>
<td>Oversees P&amp;L of program, along with fraud and compliance</td>
</tr>
<tr>
<td>Marketing and/or distribution of the cards (sometimes through a distribution partner)</td>
<td>Final approval on account creation (i.e., risk tolerance on NSF, fraud)</td>
<td>Account number &amp; card generation</td>
<td>Maintains relationship with issuing bank and card networks (V/MA)</td>
</tr>
<tr>
<td></td>
<td>Typically a more minimal role, but cobrand issuers (e.g., SYF, ADS) can be more active in marketing</td>
<td>Offer APIs to developers</td>
<td>Earns the largest portion of interchange on smaller programs</td>
</tr>
</tbody>
</table>

Examples:
- DoorDash
- PayPal & Venmo
- Uber
- Square
- Green Dot
- Walmart
- Hyundai
- Apple
- Green Dot Bank
- Axos Bank
- Sutton Bank
- Cross River Bank
- Lincoln Savings Bank
- MetaBank
- Evolve Bank & Trust
- The Bancorp Bank
- 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
30. Modern Card Issuance Platforms

“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 Marqeta 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).
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)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Pre-paid debit issuer</th>
<th>2018 purchase volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Bancorp Bank</td>
<td>$41.9b</td>
</tr>
<tr>
<td>2</td>
<td>MetaBank</td>
<td>$37.7b</td>
</tr>
<tr>
<td>3</td>
<td>Green Dot Bank</td>
<td>$26.0b</td>
</tr>
<tr>
<td>4</td>
<td>Comerica Bank</td>
<td>$19.6b</td>
</tr>
<tr>
<td>5</td>
<td>JPMorgan Chase</td>
<td>$18.7b</td>
</tr>
<tr>
<td>6</td>
<td>Axos Bank</td>
<td>$9.7b</td>
</tr>
<tr>
<td>7</td>
<td>Bank of America</td>
<td>$8.5b</td>
</tr>
<tr>
<td>8</td>
<td>MB Financial</td>
<td>$5.5b</td>
</tr>
<tr>
<td>9</td>
<td>US Bank</td>
<td>$5.4b</td>
</tr>
<tr>
<td>10</td>
<td>UMB Bank</td>
<td>$5.0b</td>
</tr>
<tr>
<td>11</td>
<td>Sunrise Banks</td>
<td>$4.6b</td>
</tr>
<tr>
<td>12</td>
<td>Sutton Bank</td>
<td>$3.2b</td>
</tr>
<tr>
<td>13</td>
<td>Webster Bank (incl. HAS)</td>
<td>$2.4b</td>
</tr>
<tr>
<td>14</td>
<td>Comdata</td>
<td>$1.7b</td>
</tr>
<tr>
<td>15</td>
<td>PNC Bank</td>
<td>$1.4b</td>
</tr>
<tr>
<td>16</td>
<td>KeyBank</td>
<td>$1.3b</td>
</tr>
<tr>
<td>17</td>
<td>Wells Fargo</td>
<td>$1.0b</td>
</tr>
<tr>
<td>18</td>
<td>Metro. Comm'l Bank</td>
<td>$0.7b</td>
</tr>
<tr>
<td>19</td>
<td>BB&amp;T</td>
<td>$0.6b</td>
</tr>
<tr>
<td>20</td>
<td>Fifth Third Bank</td>
<td>$0.5b</td>
</tr>
</tbody>
</table>

Illustrative transaction size: $39
+ Cents per transaction: $0.21
x Bps of volume: 0.05%
= Total interchange ($) = $0.23
Total interchange (%): 0.59%
30. Modern card issuance platforms
Marqeta 2019 update and highlights

- 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)
30. Modern card issuance platforms

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).

Source: Company reports, Credit Suisse research
30. Modern card issuance platforms
“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.

Source: Company reports, Credit Suisse research
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%

<table>
<thead>
<tr>
<th>Pre-SCA</th>
<th>Post-SCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>19%</td>
<td>57%</td>
</tr>
</tbody>
</table>

3x increase

- SCA requirements: 2 of 3 factors below
  - Something they **K N O W** (e.g., password or security question)
  - Something they **O W N** (e.g., phone or hardware token)
  - Something they **A R E** (e.g., fingerprint or face ID)

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
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)

<table>
<thead>
<tr>
<th>Key differences between 3DS 1.0 and 3DS 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3-D Secure 1.0</strong></td>
</tr>
<tr>
<td>Static passwords</td>
</tr>
<tr>
<td>Browser dependent</td>
</tr>
<tr>
<td>Limited dataset (supports 15 data elements)</td>
</tr>
<tr>
<td>Enrollment required</td>
</tr>
<tr>
<td>Merchant bound by issuer decision</td>
</tr>
</tbody>
</table>

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
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

<table>
<thead>
<tr>
<th>North America</th>
<th>Europe</th>
<th>Asia-Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>USA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ongoing US Merchant Interchange Fee Antitrust Litigation</td>
<td>2017 Interchange caps on credit and debit</td>
</tr>
<tr>
<td></td>
<td>Anti-steering case with American Express deemed legal by US supreme Court (2018)</td>
<td>Open Banking mandated in July 2019</td>
</tr>
<tr>
<td></td>
<td>EMV Liability shift (2015)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interchange caps on debit transactions (Durbin, 2011)</td>
<td></td>
</tr>
<tr>
<td><strong>Canada</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Launched publication consultation on Open Banking merits (2019)</td>
<td>Open Banking support but not mandated</td>
</tr>
<tr>
<td><strong>Mexico</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>FinTech law effective (2018)</td>
<td>Published API playbook for financial industry in 2016</td>
</tr>
</tbody>
</table>

Australia
- 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

Singapore
- 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
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

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**PSD2 Timeline – Key Dates**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 2015</td>
<td>Final approval of PSD2 by European Council</td>
</tr>
<tr>
<td>January 2018</td>
<td>PSD2 becomes national law</td>
</tr>
<tr>
<td>February 2018</td>
<td>Regulatory technical standards (RTS) on open banking APIs and SCA published, giving European banks and merchants 18 months to implement</td>
</tr>
<tr>
<td>September 2019</td>
<td>RTS mandated to start (for open banking API requirements, not SCA). In June 2019, the EBA allowed for time extensions on an exceptional basis</td>
</tr>
<tr>
<td>December 2020</td>
<td>RTS enforced for SCA</td>
</tr>
</tbody>
</table>

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**Open Banking brings the platform model into financial services**
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.

Source: Credit Suisse research, Tink Report “Inside the minds of European Bankers”
### 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)

#### IFR Articles

<table>
<thead>
<tr>
<th>Articles</th>
<th>Description</th>
<th>Objective &amp; Potential Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interchange Caps (articles 3 &amp; 4)</td>
<td>- Cap domestic interchange rates to 0.30% and 0.20% for credit and debit card transactions, respectively; also applies to intra-Europe cross-border</td>
<td>- Lower acceptance cost of card payments and stimulate merchant acceptance of card payments</td>
</tr>
<tr>
<td>Separation of Processing &amp; Scheme (article 7)</td>
<td>- Card networks must separate their processing and scheme operations (accounting, organization and decision-making) - Bans price bundling for processing and scheme fees</td>
<td>- 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</td>
</tr>
<tr>
<td>Co-badging (article 8)</td>
<td>- Restricts card networks from charging scheme fees for transactions made on co-badged cards that were not processed on the scheme’s network</td>
<td>- Improves competition in cross-border payments among card schemes</td>
</tr>
<tr>
<td>Honor all cards relaxation &amp; Anti-steering (articles 10 &amp; 11)</td>
<td>- 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</td>
<td>- Allows merchants to decide if they want to accept various card types (consumer prepaid, debit, and credit)</td>
</tr>
<tr>
<td>Unblending (article 9)</td>
<td>- Acquirers required to separately list interchange fees, scheme fees, and the acquirer mark-up</td>
<td>- Improves transparency on card transaction fees paid by merchants</td>
</tr>
</tbody>
</table>

---

**Source:** ECB, Credit Suisse research
### 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**

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
<th>Example of Cards/Transactions in Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 2015</td>
<td>• 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</td>
<td>• Applies to all domestic and cross-border transactions for cards issued and used in Europe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For example, a French consumer making card purchases in France</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• And a French consumer making card purchases in Germany</td>
</tr>
<tr>
<td>~October 2019</td>
<td>• Regulates/reduces interchange on cards used in Europe but issued elsewhere (tourists visiting Europe), by 40% on average</td>
<td>• For example, a US tourist making an in-store card purchase in Belgium</td>
</tr>
<tr>
<td>(within 6 months of April 2019)</td>
<td>• For in-store transactions (card present), caps interchange rates to 0.30% and 0.20% for credit and debit cards, respectively</td>
<td>• And a US consumer making a card purchase at an eCommerce merchant in Belgium while in the US</td>
</tr>
<tr>
<td></td>
<td>• For online transactions (card not present), caps interchange rates to 1.50% and 1.15% for credit and debit cards, respectively</td>
<td></td>
</tr>
<tr>
<td>December 2019</td>
<td>• 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)</td>
<td>• For example, a Polish consumer making card purchases in France</td>
</tr>
<tr>
<td></td>
<td>• These transactions account for ~80% of all cross-border payments from non-Euro area member states</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** European Commission, Credit Suisse research
### 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

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### 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 31 countries 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

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### Banking Market Dynamics

**US banking market is more consolidated at the top and fragmented at the bottom**

- Top 4 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

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*“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
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**

- **Top 4 US Banks**:
  - 2015: $32b
  - 2016: $34b
  - 2017: $36b
  - 2018: $38b
- **Global Fintech VC Funding**:
  - 2015: $17b
  - 2016: $20b
  - 2017: $19b
  - 2018: $41b

---

**Share of Total Assets by 5 largest Banks**

- **Germany**: 30% (1,632)
- **UK**: 37% (370)
- **France**: 47% (422)
- **US**: 70% (11,025)

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Source: Credit Suisse research. CB Insights, CSBS, the BLOOMBERG PROFESSIONAL™ service
34. US vs. International FinTech regulations & market dynamics

Fragmented US Banking Market

Banks by Asset Category as of July 2020

- JPMorgan Chase Bank, National Association
- Wells Fargo Bank, National Association
- Citibank, National Association
- Bank of America, National Association
- U.S. Bank National Association
- PNC Bank, National Association
- TD Bank, National Association
- HSBC Bank
- Fifth Third
- Ally
- Truist Bank
- The Bank of New York
- Capital One, National
- State Street Bank and Trust

Source: CSBS (only shows US banks, excludes credit unions), Credit Suisse research
### 34. US vs. International FinTech regulations & market dynamics

#### Overview of US Payments Regulations

<table>
<thead>
<tr>
<th>Regulation</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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

<table>
<thead>
<tr>
<th>Timeline</th>
<th>MDL 1720: Payment Card Merchant Discount and Interchange Fee Antitrust Litigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>Merchants brought suit against Visa, Mastercard, and their card-issuing banks for:</td>
</tr>
<tr>
<td></td>
<td>• Default interchange fees on every transaction</td>
</tr>
<tr>
<td></td>
<td>• Honor all cards, requiring merchants to accept all cards regardless of the differences in interchange fees</td>
</tr>
<tr>
<td></td>
<td>• Rules banning surcharging</td>
</tr>
<tr>
<td>2012</td>
<td>$7.25B settlement approved</td>
</tr>
<tr>
<td></td>
<td>• Visa, Mastercard, and the banks agreed to pay a $7.25Bn settlement and allowed merchants to surcharge</td>
</tr>
<tr>
<td></td>
<td>• In return, merchants (current and all future merchants) forfeit right to sue banks and card networks on these topics</td>
</tr>
<tr>
<td>2016-Present</td>
<td>case re-opened, settlement overturned</td>
</tr>
<tr>
<td></td>
<td>• 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)</td>
</tr>
<tr>
<td></td>
<td>• 2 classes of plaintiffs: comprising all the merchants in the US that accept Visa and/or Mastercard</td>
</tr>
<tr>
<td></td>
<td>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</td>
</tr>
<tr>
<td></td>
<td>2. Rules relief (injunctive relief class) negotiations are ongoing</td>
</tr>
<tr>
<td>Recent Developments &amp; Next Steps</td>
<td>• January 2019: Preliminary approval of $6.24bn settlement for the current merchant class</td>
</tr>
<tr>
<td></td>
<td>• December 17, 2019: Court granted final approval of a $5.5 settlement</td>
</tr>
<tr>
<td></td>
<td>• 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</td>
</tr>
</tbody>
</table>
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)

<table>
<thead>
<tr>
<th>Item</th>
<th>Industrial Banks</th>
<th>Commercial Banks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make loans?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>FDIC-insured deposits?</td>
<td>Yes, but not demand deposits if assets are &gt; $100mm</td>
<td>Yes, including demand deposits</td>
</tr>
<tr>
<td>Interest on deposits?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Regulation of parent company?</td>
<td>No, not a bank (as defined by the BHCA)</td>
<td>Yes, defined as a bank by BHCA</td>
</tr>
<tr>
<td></td>
<td>The bank itself is subject to federal (FDIC) &amp; state banking regulators (e.g., Utah Department of Financial Institutions), but the parent company is not</td>
<td>Parent company limited to banking and/or financial services</td>
</tr>
<tr>
<td></td>
<td>License in one state allows for credit extension nationwide</td>
<td>Cannot mix commerce and banking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regulated by Federal Reserve and State regulators</td>
</tr>
<tr>
<td></td>
<td></td>
<td>National banks regulated by the OCC, while US State banks (non-member banks) are regulated by the FDIC</td>
</tr>
<tr>
<td>Additional</td>
<td>Low-cost source of funds (discount window &amp; deposits)</td>
<td>~4.7k commercial banks in the US (vs. 12k in 1990)</td>
</tr>
<tr>
<td></td>
<td>Can become a member of Visa &amp; Mastercard</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Two separate applications (Utah and FDIC), but state will generally accept the FDIC application</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Utah DFI and FDIC generally review in close coordination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 current ILC in the US</td>
<td></td>
</tr>
</tbody>
</table>

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
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)

---

Source: Company reports, Credit Suisse research  *Amazon is covered by CS analyst Stephen Ju.

---
### Amazon Consumer Payments & FinTech offerings

<table>
<thead>
<tr>
<th>Description</th>
<th>Partner</th>
<th>Pricing and/or Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amazon Pay</strong></td>
<td>None (although Worldpay is an acquiring partner for merchant distribution)</td>
<td>2.9% + $0.30 web &amp; mobile; 4% on transactions done via Alexa; Cross-border an additional 1% fee</td>
</tr>
<tr>
<td><strong>Amazon Prime Rewards Signature Visa Card</strong></td>
<td>Chase Bank (J.P. Morgan Chase)</td>
<td>No annual fees, no foreign transaction fees; $50 Amazon Gift card sign-up bonus; ~16-24% APR</td>
</tr>
<tr>
<td><strong>Amazon.com Store Card</strong></td>
<td>Synchrony Bank</td>
<td>No annual fees; Minimum deposit of $100 (max of $1,000); $10 Amazon Gift card sign-up bonus; Non-prime version has no rewards</td>
</tr>
<tr>
<td><strong>Amazon.com Store Card Credit Builder</strong></td>
<td>Synchrony Bank</td>
<td>No annual fee; Minimum deposit of $100 (max of $1,000); $10 Amazon Gift card sign-up bonus; Non-prime version has no rewards</td>
</tr>
<tr>
<td><strong>Amazon Reload and Amazon Prime Reload</strong></td>
<td>None (although the balance technically sits in a gift card, provided by ACI Gift Cards)</td>
<td>2% bonus for using these lower cost funding methods (debit, checking account) and reloading in bulk</td>
</tr>
<tr>
<td><strong>Amazon Cash</strong></td>
<td>Numerous retail partnerships (7-Eleven, CVS, Rite Aid, etc.)</td>
<td>No fees</td>
</tr>
<tr>
<td><strong>Amazon Allowance</strong></td>
<td>ACI Gift Cards issues the gift cards</td>
<td>No fees</td>
</tr>
<tr>
<td><strong>Amazon Protect and other insurance offerings</strong></td>
<td>London General Insurance Company Limited for UK; Asurion for US</td>
<td>By product and purchase price</td>
</tr>
</tbody>
</table>

**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.

**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).

**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.

**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.

**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.

Amazon sometimes routes the reloads through checking accounts instead of debit cards. Reloads occur when the balance drops below a set amount.

**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.
36. Amazon’s building blocks in Payments & FinTech
…and beginning to bolster the Business side as well

<table>
<thead>
<tr>
<th>Amazon Business Payments &amp; FinTech offerings</th>
<th>Description</th>
<th>Partner</th>
<th>Pricing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amazon Business American Express Card</strong> and Amazon Prime Business American Express Card</td>
<td>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.</td>
<td>American Express</td>
<td>No annual fee; $100-$125 Amazon Gift card sign-up bonus for; ~16-24% APR</td>
</tr>
</tbody>
</table>

**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 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.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
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).

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.
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 Financial & 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 Financial & 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

Source: Company reports
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
Alipay & WeChat expand acceptance beyond China
Sizing the impact within the payments ecosystem

Our analysis suggests ~1% of volume, ~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.

<table>
<thead>
<tr>
<th>Sizing China Exposure relative to V/MA</th>
<th>2019E</th>
<th>Comment / Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastercard</td>
<td>$4,764</td>
<td>FY 2019A</td>
</tr>
<tr>
<td>Visa</td>
<td>$8,945</td>
<td>CY 2019A</td>
</tr>
<tr>
<td>Total</td>
<td>$13,709</td>
<td></td>
</tr>
<tr>
<td>China outbound tourism</td>
<td>$295</td>
<td>McKinsey, which implies ~$2k per trip</td>
</tr>
<tr>
<td>% of combined V/MA volume</td>
<td>2.2%</td>
<td>Represents entire opportunity (card, cash, Alipay/WeChat) as a % of V &amp; MA volume</td>
</tr>
<tr>
<td>China outbound tourism on card</td>
<td>38.0%</td>
<td>&quot;2018 trends for mobile payment in Chinese outbound tourism&quot; (Nielsen &amp; Alipay)</td>
</tr>
<tr>
<td>Implied China outbound card volumes</td>
<td>$112</td>
<td></td>
</tr>
<tr>
<td>Assumed V &amp; MA portion</td>
<td>67%</td>
<td>Assumes China Union Pay (Discover network) &amp; American Express have some share</td>
</tr>
<tr>
<td>Implied China outbound V &amp; MA card volumes (via tourism)</td>
<td>$75</td>
<td></td>
</tr>
<tr>
<td>Gross up assumption for eCommerce</td>
<td>70%</td>
<td>Assumes China cross-border eCommerce ~70% of tourism spend</td>
</tr>
<tr>
<td>Total implied China outbound V&amp;MA card volumes (tourism and eCommerce)</td>
<td>$128</td>
<td></td>
</tr>
<tr>
<td>% of V/MA combined volume</td>
<td>0.9%</td>
<td>Represents est. V &amp; MA volume exposure to China cross-border</td>
</tr>
<tr>
<td>Multiplier</td>
<td>~5-6x</td>
<td>Meaningfully higher cross-border yield, offset by non-volume based revenue mix</td>
</tr>
<tr>
<td>% of V/MA combined revenue</td>
<td>~5 - 6%</td>
<td>Implied contribution to combined V/MA revenue</td>
</tr>
</tbody>
</table>

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 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.)
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.

<table>
<thead>
<tr>
<th>C2B innovation will have a higher bar for adoption, given the status quo works well…</th>
<th>…while cross-border C2C (remittances) solves a problem for volatile EM currencies…</th>
<th>Cross-border B2B is the most meaningful, medium-term use case for crypto payments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Lightning Network</strong></td>
<td>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).</td>
<td>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</td>
</tr>
<tr>
<td><strong>BitPay</strong></td>
<td>Evaluated various blockchain technologies (including Ripple), but have yet to find a solution that enables them to improve on their current speed, costs, etc.</td>
<td>Platforms like Ripple have the potential to reduce settlement times (from days to seconds) and provide savings (low bps, but large absolute dollars)</td>
</tr>
<tr>
<td><strong>Stable Coins</strong></td>
<td>Potential example of a stable coin, backed by a basket of fiat currencies</td>
<td>Ripple, ~300 financial institutions using platform (RippleNet), which provides an option to use XRP cryptocurrency</td>
</tr>
<tr>
<td><strong>Libra</strong></td>
<td>Additional layer on top of the blockchain, using payments channels between parties; when the channel is closed, the transactions are added to the blockchain</td>
<td>JPM Coin, JP Morgan’s stable coin (USD backed) for use in B2B payments, securities transactions, and treasury applications</td>
</tr>
</tbody>
</table>

Source: Ripple, BitPay, Credit Suisse research
# Cryptocurrency impact on the Payments ecosystem

...along with crypto-related activities for our covered companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Cryptocurrency-related activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Square</strong></td>
<td>• Launched Bitcoin buy/sell capabilities within Cash app in Q4 2017&lt;br&gt;• “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.”&lt;br&gt;– Jack Dorsey, CEO in speaking about integrating the Lightning Network into the Cash app (February 2019)</td>
</tr>
<tr>
<td><strong>FIS</strong></td>
<td>• Worldpay is the acquirer for Coinbase, a leading cryptocurrency wallet (i.e., Worldpay benefits when users load fiat currency into their Coinbase account)</td>
</tr>
<tr>
<td><strong>PayPal</strong></td>
<td>• Currently does not support cryptocurrency (does not see demand for it from merchants)&lt;br&gt;• Braintree-enabled Bitcoin acceptance in 2014, but pulled it back due to lack of demand/usage&lt;br&gt;• Originally announced as part of the original Libra Association (although later removed itself)</td>
</tr>
<tr>
<td><strong>Visa</strong></td>
<td>• Partnered with Coinbase on the issuance of a Visa card&lt;br&gt;• Originally announced as part of the original Libra Association (although later removed itself)</td>
</tr>
<tr>
<td><strong>Mastercard</strong></td>
<td>• Recent hiring in areas of cryptocurrency (payments, wallets)&lt;br&gt;• Originally announced as part of the original Libra Association (although later removed itself)</td>
</tr>
<tr>
<td><strong>Western Union</strong></td>
<td>• Testing and considering use of Ripple (XRP) for cross-border (Ripple has made a $50mm investment in Western Union competitor, MoneyGram)</td>
</tr>
</tbody>
</table>

*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

<table>
<thead>
<tr>
<th>Country</th>
<th>Card Penetration (%)</th>
<th>Smart Phone Penetration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>6%</td>
<td>45%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>9%</td>
<td>73%</td>
</tr>
<tr>
<td>Philippines</td>
<td>22%</td>
<td>63%</td>
</tr>
<tr>
<td>Brazil</td>
<td>19%</td>
<td>44%</td>
</tr>
<tr>
<td>Colombia</td>
<td>20%</td>
<td>51%</td>
</tr>
<tr>
<td>Argentina</td>
<td>55%</td>
<td>75%</td>
</tr>
</tbody>
</table>

### 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%)
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

Source: CNBC, Credit Suisse research
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

<table>
<thead>
<tr>
<th>On-demand Transportation</th>
<th>Financial Services</th>
<th>Market Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largest player in the region</td>
<td>Grab Financial</td>
<td>GrabExpress</td>
</tr>
<tr>
<td>– ~3mm drivers vs. ~2m for Uber (globally)</td>
<td>– Loans and insurance services</td>
<td>– On-demand delivery for users to send items such as documents, parcels, and gifts to business partners, family, and friends</td>
</tr>
<tr>
<td>– ~6mm rides per day</td>
<td>– In-app mobile payments analogous to Alipay with online and offline capabilities through QR codes</td>
<td>– Addresses local challenges of last-mile delivery in congested cities</td>
</tr>
<tr>
<td>– Offers monthly subscription ride packages</td>
<td>– Adoption supported by 2-sided network of drivers &amp; users of ride-hailing feature</td>
<td></td>
</tr>
<tr>
<td>Offerings include:</td>
<td>– For merchants, powers online and offline storefronts, taps on Grab’s large user base, access to partner-exclusive online promotions &amp; campaigns</td>
<td></td>
</tr>
<tr>
<td>– GrabTaxi</td>
<td>– Mastercard prepaid card for cross-border spend</td>
<td></td>
</tr>
<tr>
<td>– GrabBike</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– GrabCycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– GrabShuttle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Offers car rentals</td>
<td>– GrabRewards</td>
<td>GrabFood</td>
</tr>
<tr>
<td></td>
<td>– Earn points for spend on platform to be used at any Grab merchant</td>
<td>– Food delivery platform similar to UberEats</td>
</tr>
</tbody>
</table>
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)
  - ~23mm Merchants
  - 80% of Internet Retailer 500

- Platforms & Market Places
  - ~300mm Consumers
  - 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
  - Daily use case spend categories, aids consumer engagement

- Ride-Sharing & Food Delivery
  - Plans to power Uber’s mobile wallet - direct distribution channel to underbanked driver’s globally

Source: Company websites, Credit Suisse
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
- 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

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.

<table>
<thead>
<tr>
<th>Region</th>
<th>Domestic Networks</th>
</tr>
</thead>
<tbody>
<tr>
<td>AsiaPac</td>
<td>Eftpos (Australia), Eftpos (New Zealand), BC Card (South Korea), Smartlink (Vietnam), VN BC (Vietnam), Bancnet (Philippines), Megalink (Philippines), NEFS (Nepal)</td>
</tr>
<tr>
<td>North America</td>
<td>US PIN debit networks (STAR, Accel, NYCE, Jeanie, Presto, Shazam, etc.), Interac (Canada)</td>
</tr>
<tr>
<td>Europe</td>
<td>Girocard (Germany), Carte Bancaire (France), PostFinance (Switzerland), Multibanco (Portugal), Eufiserv (Pan Europe ATM), BCC (Belgium), Nets (Nordic/Baltic), UPC (Ukraine), DIAS (Greece)</td>
</tr>
<tr>
<td>Latin America</td>
<td>Elo (Brazil), Prosa (Mexico), Redcompra (Chile)</td>
</tr>
<tr>
<td>Middle East &amp; Africa</td>
<td>GCC Net (pan-Middle East), BENEFIT (Bahrain), UAE SWITCH, OMAN NET, KNET (Kuwait), NAPS (Qatar), InterSwitch/Verve (Nigeria), Monetique (Tunisia), EthSwitch (Ethiopia)</td>
</tr>
</tbody>
</table>

V & MA process ~75-80% of their transactions (i.e., transactions where V/MA earn processing revenue)

<table>
<thead>
<tr>
<th>Year</th>
<th>Visa % processed</th>
<th>Mastercard % processed</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>2013</td>
<td>65%</td>
<td>75%</td>
</tr>
<tr>
<td>2014</td>
<td>70%</td>
<td>80%</td>
</tr>
<tr>
<td>2015</td>
<td>75%</td>
<td>85%</td>
</tr>
<tr>
<td>2016</td>
<td>80%</td>
<td>90%</td>
</tr>
<tr>
<td>2017</td>
<td>85%</td>
<td>95%</td>
</tr>
<tr>
<td>2018</td>
<td>90%</td>
<td>97%</td>
</tr>
<tr>
<td>2019E</td>
<td>95%</td>
<td>98%</td>
</tr>
</tbody>
</table>

Source: Company reports, Reuters, Infosys, Credit Suisse estimates
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)

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)

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)
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 card network volumes are dominated by China Union Pay, making up ~80% of the entire region

Source: The Nilson Report, Credit Suisse research
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

Source: Company reports, Credit Suisse research

Timeline:
2000
- 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
- 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

PayPal

GoPay

Source: Company reports, Credit Suisse research
### 40. National payment schemes, alternatives to V and MA

Examples of government and/or local preferential treatment

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Benefiting domestic network</th>
<th>Government and/or local operating preferential actions</th>
</tr>
</thead>
</table>
| 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  
• Demonetization (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: + 205bps – interchange
- 10bps – network fees
- 3bps – issuer processing
+ 3bps – rebates
= + 195bps net

Customer: 
- $100 – payment
- $100 net

Network: +15bps – merchant fee
+10bps – issuer fee
- 6bps – rebates
+19bps net

Merchant Acquirer: + 250bps – MDR
- 205bps – interchange
- 15bps – network fees
+ 3bps – rebates
= + 33bps net

Merchant: + $100 – sale
- 250bps – MDR
= + $97.50 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)

<table>
<thead>
<tr>
<th>Merchant</th>
<th>Network</th>
<th>Merchant Acquirer</th>
<th>Card Issuer</th>
<th>Issuer Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accepts payments from consumers and pays the merchant discount rate (MDR) to the merchant acquirer</td>
<td>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)</td>
<td>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</td>
<td>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; chargebacks come to the merchant via the back-end processor</td>
<td>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</td>
</tr>
</tbody>
</table>

| 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) |

<table>
<thead>
<tr>
<th>Front-end processor</th>
<th>Back-end (acquirer processor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square, PayPal, Stripe</td>
<td>Acquiring banks (BIN sponsor): Wells Fargo, BMO Harris, BBVA USA, MetaBank, etc.</td>
</tr>
</tbody>
</table>

### Sample economics on $100 eCommerce credit card transaction

<table>
<thead>
<tr>
<th>+ $100 Customer payment</th>
<th>+ $0.15 Merchant network fee</th>
<th>+ $0.10 Issuer network fee</th>
<th>+ $0.03 3bps rebates (acquirer)</th>
<th>+ $0.03 3bps rebates (issuer)</th>
<th>+ $2.50 MDR</th>
<th>+ $0.15 Merchant network fee</th>
<th>+ $0.05 Back-end processing fee</th>
<th>+ $0.25 acquiring spread</th>
<th>+ $0.05 back-end acquiring fee</th>
<th>+ $0.03 Network rebates</th>
<th>= + $0.23 net</th>
<th>+ $0.10 Issuer network fee</th>
<th>+ $0.03 flat charge (issuer processor fee)</th>
</tr>
</thead>
<tbody>
<tr>
<td>= + $97.00</td>
<td>= + $0.19 net</td>
<td>= + $0.15 Merchant network fee</td>
<td>= + $0.05 3bps rebates (issuer)</td>
<td>= + $0.25 acquiring spread</td>
<td>= + $0.05 back-end acquiring fee</td>
<td>= + $0.03 Network rebates</td>
<td>= + $1.95 net</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Issuer processors also charge fees based on the number of accounts, along with other services like statement printing, card production, customer service, etc.

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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.

Source: Company websites, Credit Suisse research
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).

Source: Company websites, Credit Suisse research
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

<table>
<thead>
<tr>
<th>Visa US interchange (US Retail category)</th>
<th>Credit Card</th>
<th>Credit card (unregulated) prepaid debit</th>
<th>Exempt (unregulated) debit</th>
<th>Regulated debit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illustrative Transaction Size</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
<td>$50</td>
</tr>
<tr>
<td>+ Cents per Transaction</td>
<td>0.10</td>
<td>0.10</td>
<td>0.15</td>
<td>0.15</td>
</tr>
<tr>
<td>x % of volume</td>
<td>1.95%</td>
<td>1.43%</td>
<td>1.15%</td>
<td>0.80%</td>
</tr>
<tr>
<td>= Total Interchange ($)</td>
<td>$1.08</td>
<td>$0.82</td>
<td>$0.73</td>
<td>$0.55</td>
</tr>
<tr>
<td>Total interchange (%)</td>
<td>2.15%</td>
<td>1.63%</td>
<td>1.45%</td>
<td>1.10%</td>
</tr>
</tbody>
</table>

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 fee (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

Source: Company websites, Credit Suisse research
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)

Source: Credit Suisse research

Typical Bundled Pricing for a Small Merchant

For a typical e-commerce credit card transaction with an online merchant, by percentage of total purchase cost

- Interchange 1.95%
- Network assessment fee 0.20%
- Acquiring spread (varies) 0.85%
- 97.00%
- 3.00%
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).

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

---

**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
- Network fees are lower for PIN debit transactions vs. signature debit transactions.

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

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Traditional debit (Visa, Mastercard, PIN debit networks)</th>
<th>ACH-based (including faster payments, ACH-like alternatives)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Interchange fees, network fees, and merchant acquiring fees; regulated interchange when card issued by bank with &gt; $10b assets (21bps + $0.05), or Durbin-exempt, unregulated interchange when issued by smaller banks</td>
<td>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)</td>
</tr>
<tr>
<td>Costs to merchant</td>
<td></td>
<td>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)</td>
</tr>
<tr>
<td>Good funds</td>
<td>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</td>
<td></td>
</tr>
<tr>
<td>Chargebacks and disputes</td>
<td>Chargebacks &amp; dispute process: Card network rails come with processes around chargebacks &amp; disputes; originating bank bears the risk when accounts are taken over; these processes generally add costs to the ecosystem</td>
<td>No chargebacks &amp; 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</td>
</tr>
<tr>
<td>Account take-over</td>
<td>Network rules protect for signature debit, Reg E protects for PIN debit and signature debit</td>
<td>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)</td>
</tr>
<tr>
<td>Domestic vs. Global</td>
<td>Cross-border: Global by definition, with cross-border capabilities and access to ~3.5b cards and ~25k banks connected to Visa and Mastercard</td>
<td>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)</td>
</tr>
<tr>
<td>Speed &amp; availability</td>
<td>24/7 real-time: Card rails are always on</td>
<td>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</td>
</tr>
<tr>
<td>Other</td>
<td>Long-standing, real-time capabilities consolidated into two known brands (Visa, Mastercard)</td>
<td>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)</td>
</tr>
</tbody>
</table>

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**

- **Push $ flow**: sender’s bank bears account takeover risk
- **Pull $ flow**: initiated by the receiver (e.g., at POS)
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)

Appendix
Framework for “at-a-glance” view of companies
Credit Suisse framework and snapshot

<table>
<thead>
<tr>
<th>Growth &amp; Share Gains</th>
<th>Differentiation</th>
<th>Financial</th>
<th>Additional Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>eCommerce &amp; Software exposure</td>
<td>Geographic Mix &amp; Scale</td>
<td>Partnerships &amp; Distribution</td>
<td>Product &amp; Innovation</td>
</tr>
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<th>PYPL</th>
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<td></td>
<td>eCommerce &amp; Software exposure</td>
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<td>Product &amp; Innovation</td>
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<td></td>
<td>• Clean pure-play on eCommerce, particularly on mobile (Braintree, core PayPal, Venmo), which makes up &gt;40% of TPV and growing ~35-40%</td>
<td>• 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 &lt; 10%</td>
<td>• Venmo’s attractive highly-engaged &gt;40mm Millennial user base and social aspect (newsfeed) provides a direct engagement platform for merchants</td>
<td>• POS software via iZettle (inventory management, invoicing, staffing tools, etc.), expanding PayPal’s in-store TAM</td>
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<td>• Approaching 20% of TPV from non-eBay, fast growing eCommerce marketplaces (e.g., Facebook, Instagram, AliExpress, Grubhub, Airbnb, etc.)</td>
<td>• MercadoLibre commercial agreement provides for added exposure to fast growth/low penetration Latin American payments and eCommerce (also itau partnership in Brazil)</td>
<td>• In addition to V/MA, partnerships with large tech platforms (e.g., Google, Facebook, Walmart, banks (e.g., Citibank, BoFA, Itau), and others (e.g., FIS, America Movil))</td>
<td>• Consumer reach extended to new geographies and contexts via partnerships. In-store (V/MA, Walmart), Facebook (contextual commerce on Instagram), MELI (340mm users in Latin America)</td>
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Source: Company reports, Credit Suisse research
- Two broad buckets 1) First-party commerce enablement (Square Online Store (powered by Weebly)) and Weebly 2) Developer Platform-related efforts with Marketplaces, e-commerce enablement platforms, and a set of APIs and SDKs

- Japan business benefiting from government incentives in digitizing payments (longer term, and ahead of the 2020 Olympics), new product rollouts, and SMB distribution partnership (bank branches)

- 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 "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)

- Weekly 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.)

- Local competition and lower awareness (relative to the US home market) in International markets

- 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)

- 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)

- 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.)

- Any capping (regulation) of interchange serves to lower funding costs (a positive for Square margins)

- Third-party developers through the developer platform (APIs, SDKs, Developer Platform)

- 80% of large sellers (~100% of micro merchants) self-onboard given high net promoter 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)

- Demostrated 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)

- Competitive, Regulator

- Additional factors in Emerging Areas of Upside

- Incremental CAC

- Benfitting from

- Differentiation

- Financial

- Geographic Mix & Scale

- Growth & Share Gains

- Partnerships & Distribution

- Product & Innovation

- Proximity to Customer

- Pricing Power

- Product & Innovation

- Emerging Areas of

- Threats
Emerging Areas of Financial Product & Innovation

Additional Factors

Differentiation

· Large eCommerce & Omnibus business, sized at ~$900mn (approaching $1bn in 2020E, but ~$800mn ex-network fees), with an emphasis on SMB and multinational merchants

- Combined business will have the majority of its revenue sourced via North America (~80-85% of total revenue), given both businesses 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

- Sizable (~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, "unrivalled" 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 verticals

- Addition of Consumer Solutions (NetSpend) provides for new/expanding opportunities in payroll (synergies of PayCard business with existing Global Payments Payroll offerings), as well as other B2B/B2C, & PPP 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 acquires (as an all stock deal) to allow for continued flexibility for investment and room for continued M&A leverage

- 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

- Future M&A possibilities are open to: 1) horizontal (along the lines of Heartland and TSYS); 2) vertical software (likely share leaders in integrated 3 vertical markets, with a payments aspect); and 3) geographical expansion

- At least $100mn 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, fragmented markets, with a payments aspect); and 3) geographical expansion

- 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

- In an effort to allow for minimal execution risk

- eCommerce competitors are also focused on expanding local presence (Adyen powering 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., IDA, 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, ~30% of issuer business in the US, ~5-3.5 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, high margins, 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’ 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

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**Growth & Share Gains**
- **eCommerce & Software exposure**
  - Source: Company reports, Credit Suisse research

**Geographic Mix & Scale**
- **Partnerships & Distribution**
  - Source: Company reports, Credit Suisse research

**Product & Innovation**
- **Proximity to Customer**
  - Additional Services
- **Pricing Power**

**Benfitting from M&A/Cash**
- **Operating Leverage**
  - **Emerging Areas of Upside**
  - **Additional Factors**
    - **Threats (Competitive, Regulatory)**

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**Proximity to Emerging Areas of Financial**
- **Additional Factors**

**v**
- 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 V) 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虔心 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
  - Contactless transactions skew lower ticket, implying higher yields (Ethoca, Brighterion, NuData Security), innovation at the POS (Vyze POS financing platform), and additional value-added services (Mastercard Payment Gateway Services, Applied Predictive Technologies)
  - Digital banking or financing platform), enabling rich data processing & 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 (~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 move (lower yield than debit on average, although varies by use case, with the majority of fees priced as cents per transaction)
  - 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)

- eCommerce transactions come with meaningfully higher carded rates and represent a channel growing ~4x that of traditional off-line commerce (in-stores) further fueling 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
  - 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 continue to see growth in corporate disbursement use (e.g., payroll, insurance claim) - partners Mastercard Send include Zelle, Google, Facebook, and others
  - Mastercard has various in-house environments, such as its Start Path and Accelerate program, which allowed for an early “first mover” advantage with FinTechs relative to Visa
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- Geographical Mix 
  - eCommerce & Software exposure
  - Partnerships & Distribution
  - Product & Innovation
  - Proximity to Customer
  - Additional Services
  - Pricing Power
  - Benfitting from M&A/Cash
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  - Emerging Areas of Upside
  - Threats (Competitive, Regulatory)

- 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 consumers 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 yield accretive longer term (and could compete with mobile tap-and-pay as the next form factor for payment)
  - Transfund acquisition will help Mastercard increase worldwide reach in the accounting 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)

- Regulated liquids lead us to believe use cases will be niche and outside core C2B over the medium term)
  - 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)
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### Operating Leverage

- Leading eCommerce acquiring platform, accepting 300+ payment methods across ~150 countries and serving 1m+ merchants
- Combined company ~70% of revenue US-based (FIS was ~75% US, WP was ~67% US), with FIS local presence in Brazil, China, 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 (boldered 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 with ~1.2k core banking customers in the US empower 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 (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 (~4-6 years) that include annual pricing escalators
- Core bank technology business drives annual wallet share gains via additional product sales
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  - Legacy FIS offerings (e.g., core account processing) generally associated with long-term contracts (~4-6 years) that include annual pricing escalators
- Legacy Worldpay Merchants 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
- 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 products/services such as digital solutions (back office revenue, fraud/risk mgmt, EFT & network services, issuer processing, bill-pay, corporate liquidity, etc.)
- Worldpay’s e-commerce 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 via the Worldpay merchant relationships)
- Due to the overreach 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 diversification of non-core business, demonstrating this discipline with the sales of various solutions (geos, e.g., SunGard Public Sector, SunGard K-12 Education, CAPCO, Kingston)
- 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)

### Challenges

- Building repositories of data (via FIS financial institution data, along with Worldpay existing data) should enable differentiated e-commerce authorization rates (aiming toward ~2-5% better than the eCom 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 Visa, 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)
- Unique loyalty redemption program (“loyalty-as-a-currency”), with roots at gas stations, and recently expanded to retail and restaurants (with further expansion via the Worldpay merchant relationships)
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### Source

Company reports, Credit Suisse estimates

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**Credit Suisse**

Source: Company reports, Credit Suisse estimates

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- 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., Cit, Wells Fargo, PNC, with BAMS terminating June 2020) along with ~1500 referral/distribution partners (e.g., TD Bank, SunTrust, KeyBank, BBVA Compass, etc.)

- Dedicated $500m innovation investment pool (funded by $900m in cost synergies), aimed at digital enablement, advanced risk management, eCommerce, next-gen merchant solutions, and data-focused solutions

- 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)

- Dovetail (payments platform for allowing banks to handle various ACH, real-time, and wire-based money movements) has the potential to increase distribution more globally via First Data financial institution relationships

- Clover POS platform combining hardware, software (including app-store populated by 3 develop), Clover Capital, etc., $700+ payment volume +45% in 2018 (vs. Square ~$85b, +30%). Expanding digital unsigned 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)

- Leverate at ~3x, with an aim toward returning to historical levels 2.5-3x ~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 top-line growth profiles, been in the L-MSB, 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 EMER market 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)

- 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 Accent (Fiserv-owned) to form a more formidable competitor for debit processing (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 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 win opportunities (e.g., NY Community Bank, $2B 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
### Additional Factors

#### Benefit from

- Product & Innovation
- Financial
- Differentiation
- Emerging Areas of
- Proximity to

#### Sources

- Company reports, Credit Suisse research

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- 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 Toll segment (and "Beyond Toll").

- FleetCor's best-in-class distribution (SMV 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.

- 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 4-6 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 creditworsiness.

- 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 automatable 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 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.)

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| Source: Company reports, Credit Suisse research | 20 August 2020 | 259 |
### Growth & Share Gains

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- **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, DriverDash, and ClearView analytics)**
- **New digital fleet products contributing to contract wins (Chevron) and gaining wide adoption from customers (Clearview Snap analytics at 6k customers, DriverDash 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**
- **~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**

### Differentiation

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- **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, DriverDash pilot with large merchant)**
- **Direct relationship with over 28nm 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)**
- **WEX Health Cloud (mobile app and desktop) provides a comprehensive consumer solution for managing healthcare related accounts and expenses**
- **WEX Health Cloud 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)**

### Financial

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- **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)**
- **Digital distribution investments in marketing tools supporting growth in Fleet business (particularly in harder to reach smaller fleets)**
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### Additional Factors

- **Suit 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)**
- **WEX Health Cloud (mobile app and desktop) provides a comprehensive consumer solution for managing healthcare related accounts and expenses**
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### Source

Company reports, Credit Suisse research
|--------------------------------|---------------------|--------------------------|-----------------------------|---------------------|---------------------|---------------------|----------------|--------------------------|----------------|----------|--------------------------|-------------------------------|
| ~100% of Shift4’s \(\text{payments business is exposed to the attractive software-led payments channel, with its gateway and E2E processing capabilities integrated in 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 (~74 VARs)
- Skytab order- and pay-at-the-table offering, which includes both marketing (email collection) and reputation management (customer satisfaction surveys that prompt instant alerts to manager, allowing to address in-person)
- Both an owned (Harbortouch, Future POS, Restaurant Manager, POSiTouch) and partnered (350+ integral to leading software platforms) allows shift4 to-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 (~$2mn + annual volumes) yield ~40bps net vs. ~90bps for SMB (~$300k annual volumes)
- We forecast FCF as a percentage of revenue to improving to ~low-mid 30% 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-IP 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 “roloids” 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, POSTouch, Restaurant Manager) together boast over 100k merchants in the restaurant 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 also the inventor and leader of payment tokenization, an important feature given PCI and other requirements for security
- 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 times per year) to discuss new ideas or updates
- Marketplaces allows POS software to download to various 3rd party applications (i.e MailChimp, DooDash, 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 ~$60mn in 2019, Shift4 Corp. in 2017 (gateway), and 3 software 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 un tapped, 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
- 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

Source: Company reports, Credit Suisse research | 20 August 2020 | 261
- 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 presence in certain EM countries will allow customers who 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

- 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 provide 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 (e.g., InterRemex, ~7% in 2014 to ~18%, now 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 in additional send markets (although limited volume opportunity)

- Recently (Q2 2019) took meaningful (~10–15%) price increases on US domestic P2P (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 reinvested in compliance, online, etc.); more recent savings initiatives are 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 (MGI, STC, etc.); more recent class action lawsuits due to admittance of guilt) and ongoing cases, pose significant legal threats to business operations

- Mobile application install base 15mm+ and downloads have grown at ~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
Additional Services

- Proximity to Pricing Power
- Product & Innovation
- Registration business platform that can be integrations into the phones or in other DMVs themselves were required for OEM in-dash OS)
- Matching cars to in the US, 44% in mobile OS (e.g., option on most discrete add-on largely done in-
- 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 VRMM given Texas business loss
- Tolling in Europe, with the EPC and Pagetalia acquisitions overall (tolling & violations in Europe) representing a $350mn revenue TAM opportunity (vs. $440mn 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)

- Geographic Mix & Share Gains
- Growth & Share Gains
- Differentiation
- Financial
- Emerging Areas of Upside
- Threats

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<th>VRMM</th>
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- 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.)
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- 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 detectors)
- Government Solutions segment includes the installation of cameras for any camera-programs (either traditional where VRMM owns the camera, or in New York where VRMM 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)
- High 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 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)

- Additional European upside would come from a second leg of tolling & violations penetration (i.e., into the Nordic countries)
- 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 VRMM will be able to support (more of a ~5-10% 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 $10 Expansions of toll roads or building new toll roads can take years and is subject to gover
Differentiation

Pricing Power

Financial

Additional Factors

| Source: Company reports, Credit Suisse research |
| 20 August 2020 | 264 |

**Financial Benefits from Operating Leverage**

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.).

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- REPAY is a leading US business focused on driving growth through TriSource (formerly a partner, now insourced), which will serve to increase 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.

- Back-end processing capabilities acquired through TriSource (formerly a partner, now insourced), which will serve to increase processing costs (i.e., removal of margin paid to TriSource, largely fixed cost base of platform); also maintains non-REPAY client base.

- REPAY fully undertakes each of its merchants, operating as an Independent Sales Organization (ISO); prefer to manage in-house, giving their indirect liability to the merchant bank through facilitating CNP transactions.

- REPAY over time, could see increasing pressure on ISV commission levels (albeit 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 ~$3mm in auto loans, Paymaxx ~$34mm in auto loans, PaidSuite ~$5mm in consumer receivables, and TriSource ~ ~$69mm in back-end processing).

- Gross margin expansion advanced as processing & bank sponsor fees are likely renegotiated lower, along with TriSource-related leverage on back-end processing.

- New vertical expansion focused 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 ~$1nbn in volumes.

- Risk that ISV partners (that make up ~20% of the business) push for a larger revenue share (i.e., paid as a percentage of net revenue, typically defined as MDM plus interchange, network fees, and possibly other costs) as compared to ISV partners over time.

- Longer term risk that some ISVs (mostly ~30%) 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.

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<tr>
<td><strong>Growth &amp; Share Gains</strong></td>
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<tr>
<td><strong>Geographic Mix &amp; Scale</strong></td>
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<tr>
<td><strong>eCommerce &amp; Software exposure</strong></td>
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<tr>
<td><strong>Additional</strong></td>
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<tr>
<td>- Focused on the largest (~$33b in 2018 volumes vs. industry of <del>$690b) and most profitable (</del>$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)</td>
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<td>- Approximately ~6k sending agent locations in the US, selected based on location (high concentration of foreign born consumers) and ability to provide customer service</td>
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<tr>
<td>- Offers online &amp; mobile transfers, although this makes up a diminishing 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 CAD)</td>
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<tr>
<td>- 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)</td>
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<tr>
<td>- Does not gain ubiquity in terms of agent locations; focused approach provides for quality customer experience (interview agents, credit worthiness, provide with fast technology, etc.), with agents 4x as productive as industry average</td>
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<tr>
<td>- 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 %)</td>
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<tr>
<td>- Agent locations based in convenient, densely populated (foreign born) areas within targeted neighborhoods, with new agent locations driving half of growth (vs. ~half SSS)</td>
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<tr>
<td>- 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)</td>
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<tr>
<td>- Industry wide pricing compression more concentrated in online transactions, which typically appeal to banked customer sets and corridors (e.g., US -&gt; India, where online would be a higher portion of the mix for highly skilled workers in the US)</td>
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<tr>
<td>- Prior to 2012, acquired Servimore, America, and Maniño to extend their footprint to additional states (but has not made any acquisitions since)</td>
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<tr>
<td>- 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</td>
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<tr>
<td>- 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)</td>
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<tr>
<td>- 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 taxing (e.g., Oklahoma has a tax, Tennessee and Georgia currently have laws being proposed)</td>
</tr>
<tr>
<td>- 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</td>
</tr>
<tr>
<td>- Targeted approach to send locations in the US through highly dense Latin-born population states &amp; 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</td>
</tr>
<tr>
<td>- Bank partner white labeling expands reach into banked customers, (more typically uses of online, where CAD is high - but not a concern in a white-label deal); typically ~$2-$3 net per wire (not too dissimilar from e.g., Mexico/Guatemala wires)</td>
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<tr>
<td>- Sizable amount of capex investment (millions of dollars on capex for our technology) 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)</td>
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<tr>
<td>- GPR/pollard 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)</td>
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<tr>
<td>- Interpuntos loyalty program (began 2014) allows customers to earn points for transactions via intermex. Points can be redeemed for discounted fees. Program members transact 3x non-members, with 85% of cards actively transacting</td>
</tr>
<tr>
<td>- 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)</td>
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<tr>
<td>- Public company with equity as a currency for M&amp;A increases choice in deal funding relative its previous private status</td>
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<tr>
<td>- Agent startup cost synergies from expanding increased focus into geographies that have agent overlap (both send &amp; 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)</td>
</tr>
<tr>
<td>- White labeling 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 ~3.5m Guatemala customers in the US</td>
</tr>
<tr>
<td>- 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.</td>
</tr>
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</table>

Source: Company reports, Credit Suisse research
## 1. Credit Suisse Equity Strategy

### US recession indicators

<table>
<thead>
<tr>
<th>Start of Recession</th>
<th>Yield Curve</th>
<th>Mfg.</th>
<th>Inflation</th>
<th>Jobs</th>
<th>Housing Activity</th>
<th>Credit Perform</th>
<th>Earnings</th>
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<tr>
<td>Nov-73</td>
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**Key:**
- **↓** Recessionary
- **↑** Expansionary
- **⇔** Neutral

Source: Company data, Credit Suisse research, CS Equity Strategy
What do we like in a payments stock?
Large TAM + share gains/mix + unit economics + “call options”

<table>
<thead>
<tr>
<th>We prefer companies that show</th>
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<tbody>
<tr>
<td>Aforementioned sector-specific factors such as meaningful exposure and/or best-in-class capabilities in Software-led payments, eCommerce payments, and/or SMB exposure</td>
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<tr>
<td>Large total addressable markets (of which almost all payments companies have, by definition)</td>
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<tr>
<td>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)</td>
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<tr>
<td>Unit economics, either via stable pricing (and high incremental margins) or mildly reduced pricing (i.e., tiered volume discounts) successfully driving growth</td>
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<tr>
<td>“Call options” or areas of upside not properly valued or understood by the market (e.g., new business, new product launch, partnership potential)</td>
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<td>Management teams with strong track records of meeting and/or exceeding guidance and expectations</td>
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<tr>
<td>Valuation that is reasonable on a growth-persistence-adjusted basis (typically expressed by a ~2- to 3-year forward CAGRs)</td>
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<tr>
<th>We do not prefer companies with</th>
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<tr>
<td>Lesser exposure or upside related to software and/or eCommerce-based growth</td>
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<tr>
<td>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)</td>
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<tr>
<td>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</td>
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<tr>
<td>Lack of new business and/or product launch cadence (i.e., lower levels of innovation)</td>
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<tr>
<td>Less consistency in meeting targets and expectations</td>
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<tr>
<td>Valuation that appears stretched relative to expectations for growth persistence</td>
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Source: Credit Suisse research
Credit Suisse Payments Innovation Event Series
Event notes and links

- 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
- Neobank monetization, unit economics, and potential product roadmaps (Cash App, Chime, etc.) with Atomic CEO
- Bank CEO & COO Panel on Core Banking Technology (FIS, FISV, JKHY, Finastra, etc.)
- Introduction to Dave (Neobank)
- Introduction to YipitData; Analysis of PayPal & Square (including Venmo & Cash App)
As of December 10, 2012 Analysts’ stock ratings are defined as follows:

Outperform (O) : The stock’s total return is expected to outperform the relevant benchmark* over the next 12 months.

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.

Restricted (R) : In certain circumstances, Credit Suisse policy and/or applicable law and regulations preclude certain types of communications, including an investment recommendation, during the course of Credit Suisse's engagement in an investment banking transaction and in certain other circumstances.

Not Rated (NR) : Credit Suisse Equity Research does not have an investment rating or view on the stock or any other securities related to the company at this time.

Not Covered (NC) : Credit Suisse Equity Research does not provide ongoing coverage of the company or offer an investment rating or investment view on the equity security of the company or related products.

Volatility Indicator [V] : A stock is defined as volatile if the stock price has moved up or down by 20% or more in a month in at least 6 of the past 24 months or the analyst expects significant volatility going forward.

An analyst’s sector weightings are distinct from analysts’ stock ratings and are based on the analyst’s expectations for the fundamentals and/or valuation of the sector* relative to the group’s historic fundamentals and/or valuation:

Overall Weight : The analyst’s expectation for the sector’s fundamentals and/or valuation is favorable over the next 12 months.

Market Weight : The analyst’s expectation for the sector’s fundamentals and/or valuation is neutral over the next 12 months.

Underweight : The analyst’s expectation for the sector’s fundamentals and/or valuation is cautious over the next 12 months.

*An analyst’s coverage scope consists of all companies covered by the analyst within the relevant sector. An analyst may cover multiple sector.