WHITEPAPER:

U.S. PAYMENTS INDUSTRY OVERVIEW & OPPORTUNITIES

PHOENIX MERCHANT PARTNERS

OCTOBER 2023

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Abstract

This paper aims to provide a current overview of the U.S. payments industry, outlining market structure and the developments across the ecosystem. Specifically, the report covers:

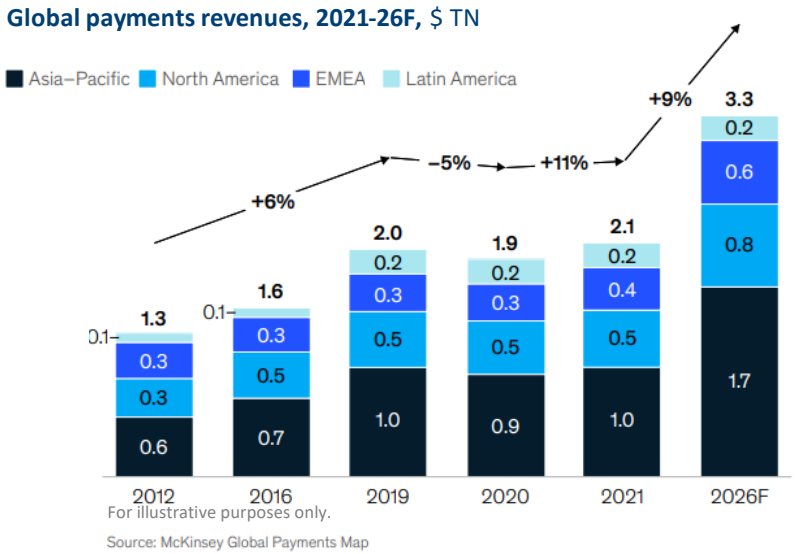
- A breakdown of U.S. market share for payment methods and associated revenues
- An overview of payment processing/services ecosystem and participants (incl. economics)
- A description of the key payment platforms (buy-now-pay-later, B2B pmts., cross-border pmts.)

We conclude with a short outlook into further payment related areas (working capital solutions, cryptocurrency networks) that may become topics of future work.

Payments Industry - Overview and Trends

The global payments ecosystem demonstrated its resilience in 2021, surpassing pre-pandemic revenue levels, following a decline in 2020, which marked the first contraction since the GFC in 2008-09. Based on McKinsey projections[1], the industry's revenue outlook now exceeds pre-pandemic expectations, reaching >$3 trillion global revenue by 2026 (*Figure 1*).

Figure 1– For Illustrative Purposes Only



Payment revenues in 2021 rebounded, with an 11% expansion and strong growth across all regions. Fee based revenue comprised more than half of the total, although the rate hikes since 2022 will add importance to interest revenue. North American revenues grew by 7%. Electronic payment transactions grew at a 19% rate in 2021—in line with pre-pandemic growth.

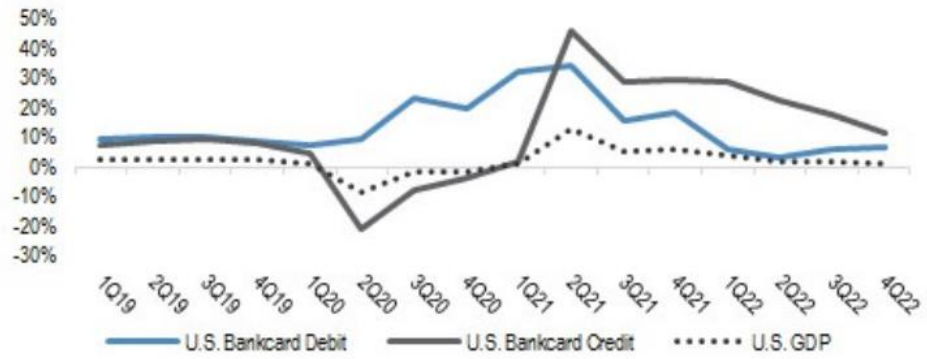
Globally, debit and credit card transactions continued to grow at ~20%, rates comparable to those before the pandemic. Spending on debit cards in the U.S. grew at a ~30 points premium to credit cards during the pandemic, explained by the popularity of debit for government support, greater use of debit online,

[1] McKinsey & Co. "The 2022 McKinsey Global Payments Report". October 2022.

and more disciplined spending. However, as pandemic recovery accelerated in 2021, spending habits normalized, with credit growth exceeding debit (*Figure 2*)

Figure 2

2019 -2022 Debit / Credit Volume Growth vs. GDP



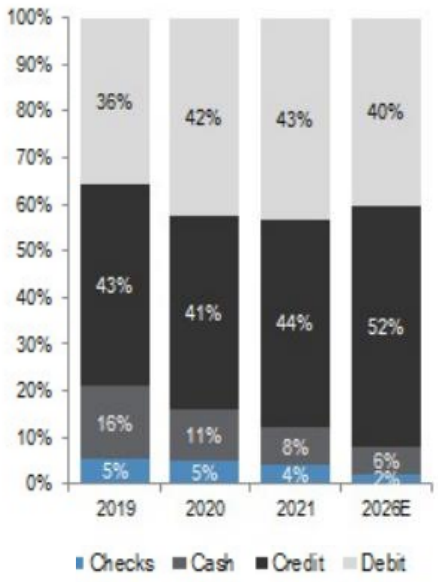
Source: Company reports, Bloomberg Finance L.P.

Account-to-account transaction revenues continued to increase their contribution in most geographies, mainly substituting cash payments and driven by the expansion of applications built on instant-payment use cases such as bill payment, point of sale (POS), and e-commerce. In the US, growth rates for instant payments surpassed 60%, albeit off a relatively small base.

The pandemic presented a further catalyst for displacing cash, with contactless methods becoming habitual. Figure 3 shows cash lost at least half its wallet share in personal consumption (PCE) during that period, at the same time the use of checks decreased.

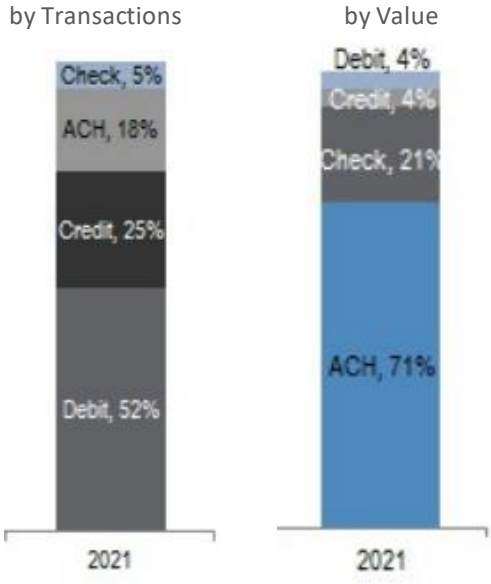
Figure 3 – For Illustrative Purposes Only

PCE payment medium wallet, %



Source: The Nilson Report and J.P. Morgan calculations.

Share of U.S. non-cash payments

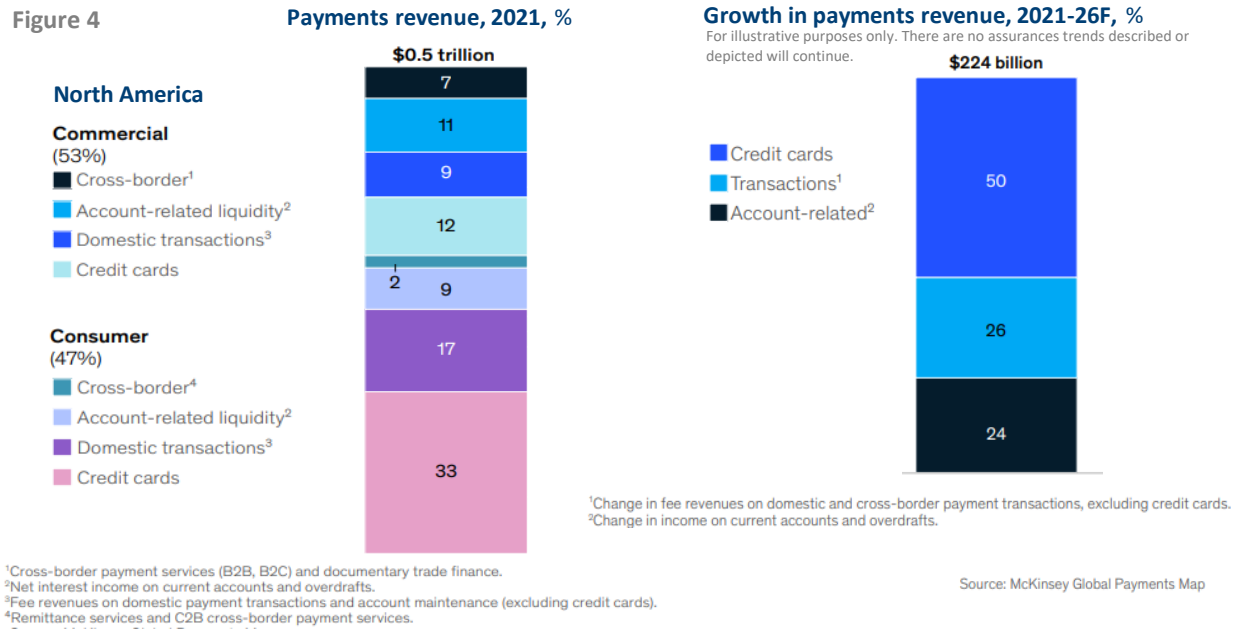


Source: The Federal Reserve

In terms of overall non-cash payments, incl. B2B (*Figure 3*)[2], card-based transactions represent the largest share (debit 52%, credit 25%) by number, followed by ACH payments. Although card payments represent most of non-cash transactions, automated clearinghouse (ACH) payments dominate by volume, with a 71% share of the $129 trillion (2021) U.S. non-cash payments[3]. As digital payments become more commonplace in the supply chain B2B flow (a $25 trillion market in U.S.), ACH is anticipated to continue taking share from checks. While virtual cards may make gains, these could be limited by the higher cost of card acceptance (interchange fees) for the supplier.

The five-year payments revenue outlook[4] for North America projects an average ~8% annual growth over the period 2021-2026 (*Figure 4*). A significant portion of the incremental gains will be driven non-transaction related income, such as deposit interest, a by-product of inflationary pressures and the rate environment.

Figure 4



Overall payment revenue in North America is experiencing steady growth, owing to several trends including (i) the sustained growth of e-commerce and card-not-present transactions, (ii) the recovery of card volume following the pandemic and (iii) the secular shift to electronic and real time payments.

The outlook for the industry remains promising, driven by the accelerating integration of financial services - payments, lending, insurance - into day-to-day software platforms. This form of partnership between banks, technology providers, and distributors of financial products via nonfinancial platforms underpins what is known as the "embedded finance" model. Payments - at the intersection of commerce, banking, and business services - is one of its fundamental use cases and source of future revenue.

[2] J.P. Morgan, "Payment Processing: Market Share Report 2023 Edition", May 2023

[3] The Federal Reserve Payment Study: 2022 Triennial Initial Data Release

[4] McKinsey & Co. "The 2022 McKinsey Global Payments Report". October 2022.

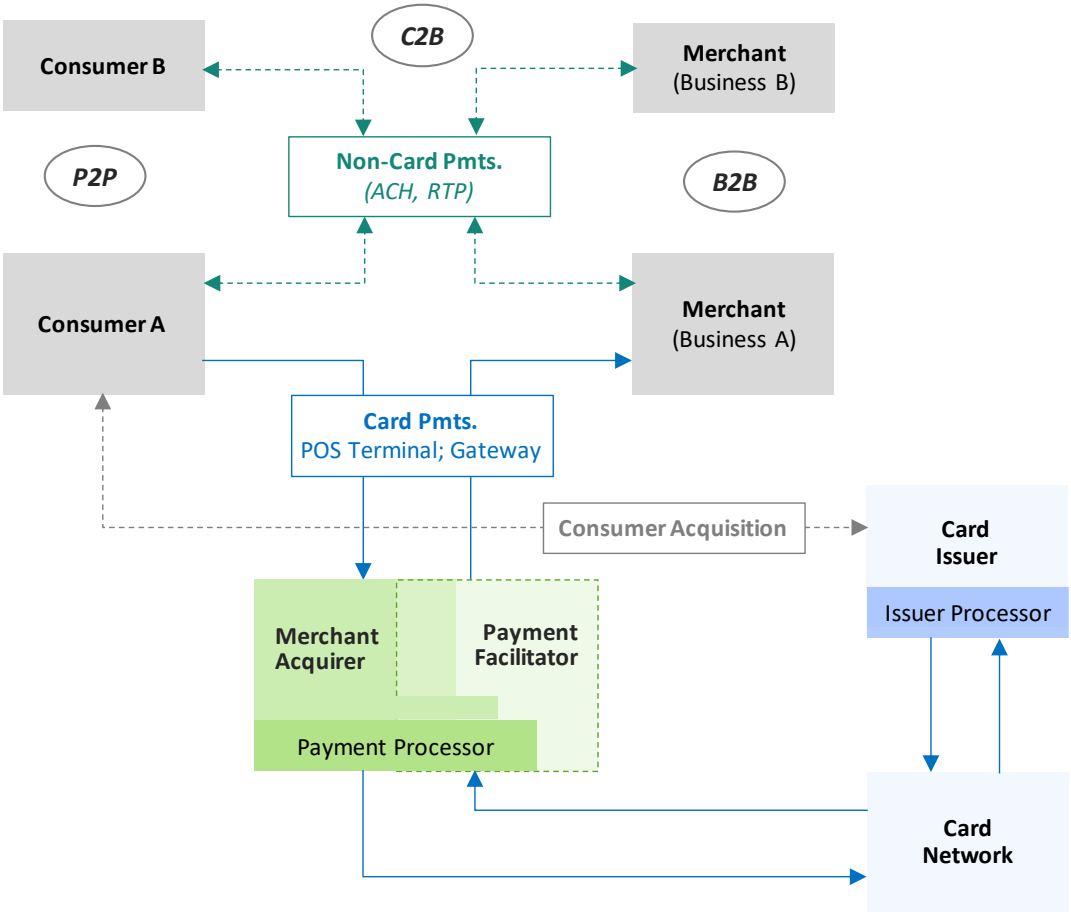
The Payments Ecosystem

The payment processing industry provides the infrastructure and services that enable electronic payments via (a) card based and (b) non-card based payment rails (*Figure 5*). Key industry participants include Point-of-Sale (POS) Terminal Providers and Gateways Merchant Acquirers and Processors, Payment Networks and Card Issuer and Processors as well as Account-to-Account Payment Network Operators.

The digitization of payments has created further hybrid companies/services (e.g. Payment Facilitators) in each of the aforementioned areas, however, the core plumbing, which relies heavily on distribution and scale, remains largely intact. The industry is characterized by recurring revenues, high operating leverage and free cash flow generation.

Transaction Flows and Participants

Figure 5



	Account 2 Account Payments
Background	Since the launch of The Clearing House's (TCH) Real-Time Payments (RTP) network in 2017, cards and cash are no longer the only option for instant settlement. At the same time, the Automated Clearing House (ACH) payment rail has seen rapid growth through the expansion of use cases, despite the fact that ACH payments do not settle instantly. Fraud risks concern both ACH and RTP payments. While ACH payments are reversible in the event the consumer claims that a transaction was unauthorized, RTP is instant and irrevocable.

	Such lack of chargebacks and other protections can make RTP more vulnerable to fraud and other types of financial crime. The infrastructure of ACH is operated by the Federal Reserve and TCH, while RTP is offered by TCH, a banking association and payments company that is owned by large commercial banks and dates back to 1853
Automated Clearing House (ACH)	The Automated Clearing House (ACH) is an electronic payment processing system that facilitates the transfer of funds between bank accounts – essentially electronic checks. It is overseen by Nacha an independent organization owned by a large group of banks, credit unions and payment processing companies. ACH payments typically take 1-3 days to settle, with same-day ACH (not instant) offered for an extra fee. ACH payments are often used for (i) recurring payments, such as direct deposit payroll; benefits, tax, and bill payments as well as (ii) fund transfers for e-commerce purchases and large business-to-business vendor/supplier payments. ACH dominates the electronic payments landscape, with over $77 trillion transferred in 2022, led B2B use and the growth of same-day ACH, which allows for faster settlement[5]
Instant Payments	An instant payments clears and settles in real time (i.e. in seconds, not hours/days) around the clock. The payments are irrevocable, with funds immediately available to the payee. Both the sender and the receiver must be participants of the respective instant payment's rail. • *Real-Time Payments*: TCH's RTP network was the first set of domestic instant payments rails (2017) and currently reaches 65% of deposit accounts in the United States, across 300+ participating financial institutions. The RTP network processed $80 billion volume in 2022, representing a >3 times increase over 2020 • *FedNow*: The Federal Reserve's instant payments rails has launched in July-2023. Access is being provided through the Federal Reserve's FedLine network which currently serves 10,000 financial institutions. Instant Payments are often used for payouts in B2C transactions in the gig/creator economy (e.g. delivery app drivers getting paid), the transfer of account balance from P2P payment apps or insurance/government disbursements. It is also sometimes used by businesses to send warranty payments or process instant payroll.
P2P Payment Apps	P2P payment apps utilize existing payment infrastructure, relying money movement rails such as credit/debit card-funded transactions and bank-to-bank transfers – with their respective fee structures. For example, • *Venmo* absorbs these fees for P2P payments via RTP and ACH rails as well major debit cards. However, it will charge (i) the interchange fee (~3%) on credit card or small bank debit card payments, and (ii) a fee for fast balance transfers using a linked debit card (push to card) • *Zelle*, owned by eight large commercial banks facilitates P2P payments using RTP and ACH rails. It does not charge fees and is integrated into several mobile banking platforms as well as the Zelle app. FedNow with its wide target reach of 10,000 financial institutions has the potential to enable banks to provide a P2P service with settlement occurring directly between the customers bank accounts in real time. This may present an opportunity for banks to regain the initiative in the P2P payments space.

[5] NACHA Press release Feb-22-2023

	Card Payments
Background	Traditionally, industry players have focused on their respective functions, serving either merchant, issuer or consumer. More recently, technological developments have started to blur the lines between the classic roles, leading to more competition and cross consolidation. • Payments are increasingly being distributed and consumed via technology. While banks and traditional acquirers are incumbents with track records and scale of distribution, software solutions are driving merchant's choice of payments partner. Legacy acquirers are adding capabilities and acquiring technology assets. At the same time, software providers are bringing payment elements in-house (becoming "Payment Facilitators") for a cut of processing revenues. • Consumers are increasingly shopping on mobile devices (29% of e-commerce spend in 2022), maintaining the card network as primary funding mechanism[6]. Smartphone wallets, which offer stronger authentication to cards are driving usage, while legacy POS technology may become obsolete. M-commerce is creating a second wave of opportunities for PayFac integrators, as well as potentially for non-card bank wallets.
POS Terminal Providers	Point of sale (POS) terminal providers design and manufacture card reader devices and systems. Historically the POS market was dominated by two global providers (Verifone and Ingenico), but it has fragmented since 2009. The POS revenue model has evolved from "one-time" hardware pricing towards SaaS and maintenance plans (e.g., gateway provision, data encryption, etc.), generating recurring revenues. Hardware providers are opening their platforms, inviting developers to implement specific solutions for small businesses. At the same time, merchants are adopting tablet-based and mobile POS solutions that integrate business software and payment processing, threatening to displace legacy (proprietary) POS systems. A 2022 survey[7] revealed that upgrading POS software is a priority for 60% of retailers.
Gateway Providers	Payment gateways are software applications that enable merchants to accept electronic payments at physical locations and/or online - with card information input from the 'shopping cart' of their website - and transmit data for processing. They are the equivalent to a virtual cash register in an electronic transaction. Key aspects of a gateway are the security standard that keeps cardholder data secure during the transmission process. Upon a card payment, the gateway encrypts the payment information and transfers the data between the merchant's website, the acquirer and the issuer. Different types of gateways include retail gateways, which connect e-commerce transactions to merchant acquirers, and wholesale gateways, that interface between merchants of record (i.e. small merchant aggregators) and the acquirer/processor
Merchant Acquirers	A merchant acquirer is a bank or financial institution that enables a merchant to accept credit card payments from a customer's card-issuing bank. Acquirers register merchants to card networks, making them the first point of contact for merchants and passing transaction information on to the card network, and issuers, to complete the payment.

[6] Comscore, "State of Digital Commerce Report", January 2023.

[7] Retail Consulting Partners, "Retailers are Re-Investing in Store Technology", October 31, 2022.

	An acquirer assumes the risk of the transaction balance, i.e. credit exposure to the merchant arises where chargebacks occur (e.g. up to 120 days from acquiring the transaction) and the merchant becomes bankrupt or committed fraud. As an institution that facilitated the merchant's acceptance of payments, the acquirer remains ultimately responsible for the chargebacks. Acquirers receive a gross "discount rate," at ~2% of the sale amount, most of which is passed on to the *card network* and eventually the *card issuer* as interchange income, while the acquirer earns a ~40bp spread (spreads are inversely proportional to the size of the merchant). The acquisition of merchants has traditionally been driven by bank branch networks with small business banking relationships and/or Independent Sales Organizations. Over the past 10 years the origination model has become increasingly technology driven, with merchants expecting integrated systems, including industry specific business management software and multiple payment options (e.g. contactless, or QR-code). Accordingly legacy acquirers have sought tech partners to embed their payment solutions into.
Merchant Processors	Merchant Processors are the gateway to the payment networks, working in the background of the payment processing cycle and providing technology and processing services to merchants. Processors act as intermediaries, handling authorization, data transmission, data security, settlement functions, and certain anti-fraud measures. The processing business relies on economies of scale, with a few providers dominating the market. Consequently, many merchant acquirers outsource these services, treating merchant processing as a cost of goods sold. Processors typically generate revenue through a fixed fee per processed transaction. While *acquirer* and *processor* are often used interchangeably, they represent distinct functions.
Payment Facilitators	Sometimes referred to as "Payment Service Providers" (PSP), PayFac's are similar to merchant acquirers, enabling merchants to accept payments. However, PayFac's offer merchant customers several benefits, incl. fast and seamless account onboarding, simple flat rates, and advanced technology. Depending on business model, PayFac's focus on different aspects of the pmt. value chain:  • *Software Providers*: After initially partnering with gateways for a cut of revenues, business software providers are increasingly leveraging their preferential access to merchants and embedding payment within their software to gain control over the customer journey and retain a larger portion of the economics. • *Merchant of Record*: To simplify the payment integration for ISVs and other merchant-facing businesses, solution providers are offering PayFac-as-a-Service (PFaaS) models that allow businesses to capture the benefits of revenue sharing, improved user experiences while outsourcing functions such as compliance and risk monitoring. • *Full-Stack Offering:* While the bulk of payment volume is processed by a few large, legacy entities, newer entrants have started becoming licensed processors with direct integrations into the card networks. This approach, while laborious, creates a single, unified technology stack that allows easier implementation of new products and solutions.

Card Networks	Payment networks are the backbone of the electronic payments system, connecting transactions between acquiring banks and issuing banks. These networks oversee payment processing activity, monitor settlement of transactions and the process of clearing sales, and manage their network's compliance policies to adhere to regulation. Network providers determine interchange rates for their respective issuers and acquirers, set rules and compete on merchant acceptance, reliability and price. Some credit card network companies (e.g. American Express), issue their own credit cards, which allows them to consolidate the functions normally provided by the merchant acquirer, card issuer and card network
Card Issuer Processors	Issuer processors provide outsourced authorization, settlement, customer service, call centers, loyalty program administration and statement processing to card issuers, earning a nominal service fee (per active account) from the issuer, and typically a transaction fee. There are an estimated ~200 issuer processors[8] worldwide, 30% less than on the merchant processing side. Modern card processors are gaining scale by providing instant issuance of physical and virtual cards popular with fintechs (e.g. tokenization, corporate cards)
Consumer Acquisition	The top two lead generation sources, encouraging consumers to apply for credit cards remain bank/issuer websites at 27% and direct mail offers at 26%, while the response channel is overwhelmingly digital[9]. Third Party Comparison Website ("TPCs") are gaining market share (at 18% of leads) by allowing consumers to comparison shop for credit cards. Their ability to steer consumers to a preferred card issuer, and perceived independence – despite paid promotion disclosures- make them a strong source of leads. Accordingly, Issuers partner with TPC as marketing affiliates, e.g. paying for top positions in search results. Besides traditional card marketing channels, several new offerings are emerging that acquire consumers through value-add services. These include: • *Card Aggregation*: Providing an app solution that links existing credit/debit cards under one card (e.g. Curve), allowing to switch between payment methods even after a transaction has been completed. • *Travel Cards*: Various offerings, including e.g. a travel debit card that links to the consumer's domestic debit card (e.g. Currensea) and converts currency at the interbank exchange rate with low/transparent fees. • *Loyalty Card Integration*: Providing an app solution (e.g. Bink) that eliminates the need for loyalty cards, by directly linking debit/credit card payments to consumer's loyalty point accounts at participating merchants.

[8] J.P. Morgan, "Payment Processing: Market Share Report 2023 Edition", May 2023

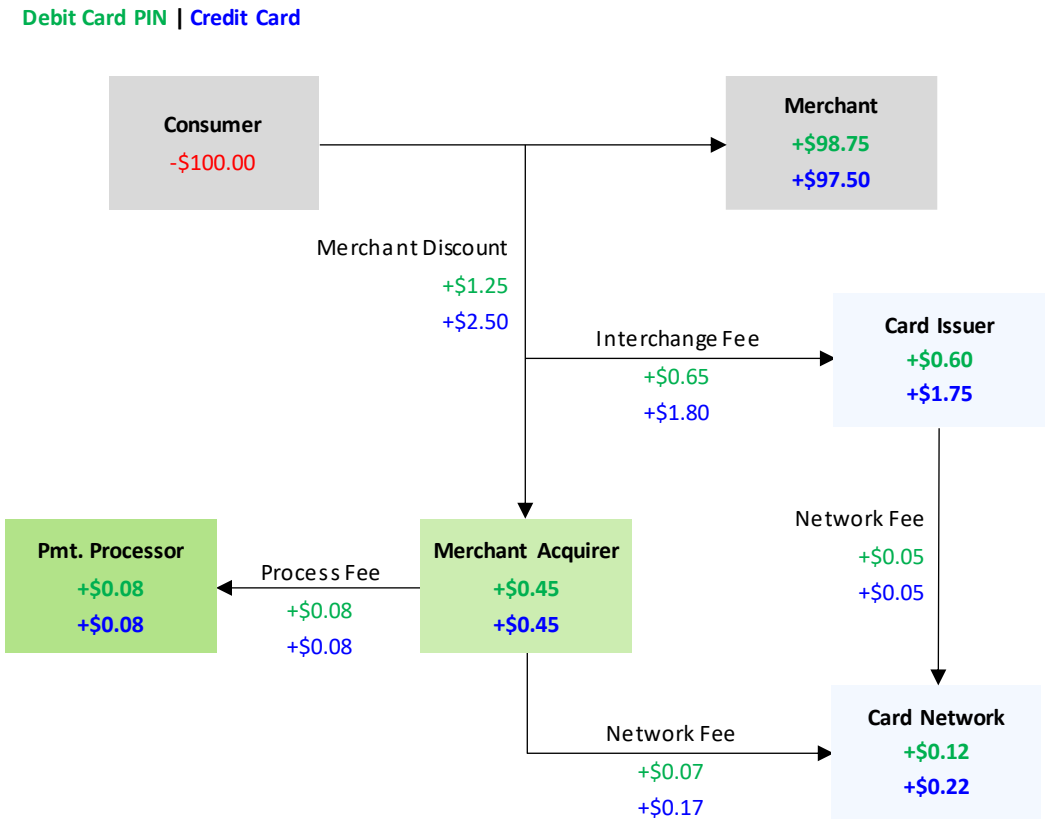
[9] American Banker "Card-account acquisition: A consumer view" October 2019

Payment Processing Economics

The merchant pays its merchant acquirer a discount (MDR) on all card-based transactions, which varies depending on several factors (e.g., merchant size, card present/not present, when services are delivered relative to payment). The merchant discount rate covers interchange (which goes to the issuer), network fees, and the merchant acquirer spread.

Interchange has historically been the largest component of the merchant discount, followed by the merchant acquirer spread and network fees.

Figure 6
For Illustrative Purposes Only



The MDR for debit card payments is significantly lower than for credit cards, given that the debit network only approves payments covered by the consumer's account balance. Accordingly, the issuer does not extend a credit line or charge for consumer credit exposure. In addition, the Durbin Amendment, introduced in 2010 as part of the Dodd-Frank Wall Street Reform and Consumer Protection Act, limits transaction fees charged by debit card issuers (except for institutions with <$10 billion assets), capping debit interchange fees at 0.05% + 21cent per transaction.

Where Gateway and/or PayFac services are used to enable e-commerce or POS electronic payments, additional fees are charged, depending strongly on the payment channels and range of business services included. For example, a basic e-commerce payment integration of the main credit card networks will result in ~3.0%[10] MDR equivalent, adding ~0.5% to the payment processing economics outlined above.

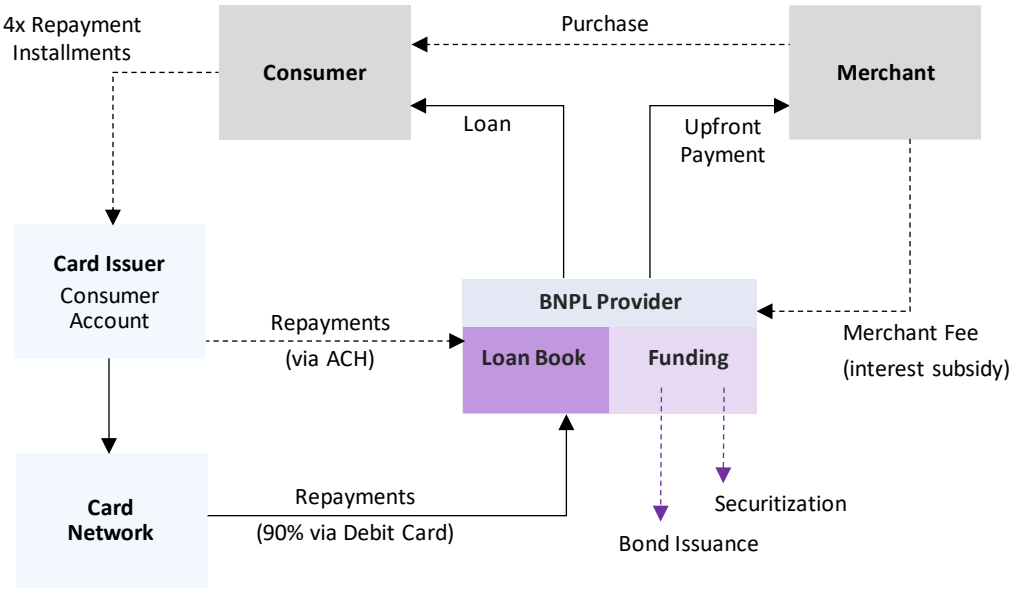
[10] Source: Stripe pricing tables Sep-2023, covering MA/V, Amex, Maestro, Discover, ApplePay, GooglePay, JCB, UnionPay

Payment Linked Platforms

Buy Now Pay Later ("BNPL")

Credit cards have long been the primary method of unsecured borrowing for US consumers, with balances reaching $1.03 trillion in Q2-2023[11]. Issuers profits rely mainly on revolvers, or customers that carry a balance on their credit-card account. Revolvers make up around 60% of credit-card accounts, but generate ~90% of issuers' revenues, net of rewards. Profit per account stands at around $240 for revolvers vs. $25 for customers that pay off their balance every month.

Figure 7

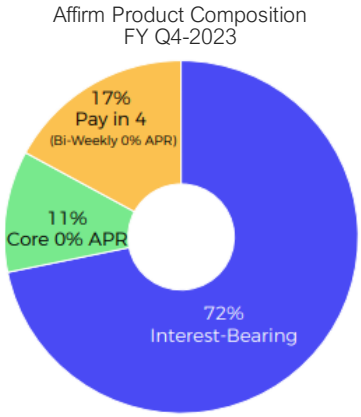


Technology enabled BNPL providers represent a challenge to further profitable growth of credit card borrowing. With an estimated ~$50bn GMV in 2023 and rapid growth forecast at ~30% p.a. BNPL is increasingly taking market share both in POS and e-commerce[12]. Figure 7 outlines the BNPL transaction framework.

	Buy Now, Pay Later
Loan Offering	The BNPL entry product typically consists of a "pay-in-four" 0% APR installment loan (e.g. 25% down payment and three biweekly installments), where the respective merchant subsidizes the credit, in order to acquire new consumers and drive incremental sales. In addition, BNPL providers offer a range of longer term consumer loans (up to 36 month) at market APRs. BNPL providers typically use soft credit checks to assess applicant's creditworthiness. Loans are individually priced based on credit scoring models, including those using AI methods to predict behavioral patterns and the likelihood of repayment. Unlike credit card borrowing, BNPL loans are largely unregulated with high interest rates and fees becoming due in case payments are missed.

[11] Federal Reserve Bank of New York: Household Debt and Credit Report – Q2 2023

[12] Research and Markets: United States Buy Now Pay Later Business and Investment Opportunities Databook – Aug-2023

Profitability	Generally, the pay-in-four product is not profitable by itself, given that the ~3-5% merchant fee barely covers credit costs, funding costs and network/processing fees associated with the product – a reason why providers promote repayments from bank accounts via ACH.[13]  • Affirm's profitability is largely driven by the interest bearing loan book, i.e. equivalent to the revolvers in credit card borrowing • As a result of increased funding cost, the RLTC of Affirms book has decreased from 5.9% in FY-2021 to 3.3% in FY 2023 • Pricing initiatives include rising APR cap to 36%, increasing MDR, expanding use of downpayments, tightening underwriting parameters As BNPL providers further drive engagement and access in prepurchase journeys, they are increasingly offering affiliate marketing services. Given the importance of customer acquisition, merchants are willing to pay 4-10% of the transacted amount for clients sourced through a provider's portal/channel. At scale providers are seeing the contribution of earnings from affiliate marketing grow versus financing revenue
Super-Apps	Contrary to the assumption that shopping apps offering BNPL solutions are pure financing products, the leading providers are developing integrated e-commerce hubs that engage consumers through consolidation of shopping, payments, delivery/returns and product support. Large players are steadily building out their product ecosystem with the aim to become a "super app," following the example of Asian providers such as WeChat and Alipay, that offer shopping, payments, financing, and banking products in a single platform. These providers already monetize consumer engagement through a range of offerings other than financing incl. affiliate marketing, cross-selling of credit cards, and banking products (e.g. payments and savings). Such platforms are particularly effective in engaging younger consumers, with 74% of 18-25 year olds using or considering to switch to money transfer apps for direct deposits.[14]
New Entrants	As BNPL becomes more prevalent, card networks, such as Visa and Mastercard, have introduced short-term installment payment capabilities. These enable banks, lenders and fintechs to offer BNPL solutions without the cost of building acceptance relationships with merchants. Network installment offerings bypass MDR negotiations, making it easy to implement for merchants, but are less profitable for the BNPL provider, since only a transaction interchange 3.0% is charged.[15] *Apple Pay Later*:

[13] Affirm: FY 2021 Earnings Supplement; Shareholder Letter Q2-2023; FY 2023 Earnings Supplement

[14] JP Morgan: Online Checkout Survey May-2023

[15] Bloomberg: "Mastercard faces retailer backlash over installment payments" 12-Aug-2022

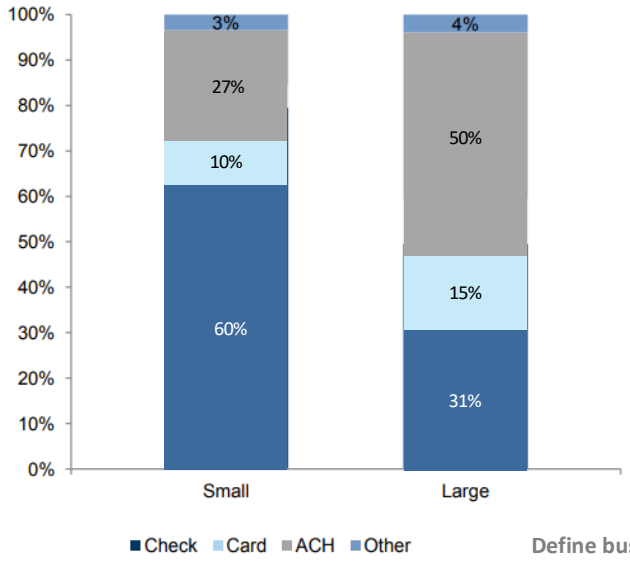
	In March-2023 Apple released a pilot program for its Apple Pay Later service. Powered by Mastercard Installments, this functionality is incorporated within Apple Wallet, that includes Apple Pay (linking debit/credit cards for in stores or online payments), Apple Card (a Mastercard credit card issued by Goldman Sachs), and Apple Cash (a P2P payment service). *Apple Pay Later is offered by Apple Financing LLC, a subsidiary of Apple Inc., which takes on credit decisioning and lending risk on balance sheet (no bank involved).* *Purchases using Apple Pay Later are authenticated using Face ID, Touch ID, or passcode. Credit decisioning appears to take place on the device itself, leveraging "device use patterns" to identify fraud (and potentially assess the consumer's credit risk?).* *With its BNPL offering and a new high-yield savings account (with Goldman Sachs) Apple is driving its push into finance, however it does not yet offer the shopping platform integration required of a super app.*

Business-to-Business ("B2B") Payments

The B2B payment market is undoubtedly large ($25 trillion Total Addressable Market (TAM) in U.S.) but more difficult to digitalize than consumer payments due to legacy systems where data, cost and payment cycle terms are often inconsistent between the payer and receiver.

Businesses accepting corporate payments are price sensitive. Card payments are seen as expensive, and penetration remains low. It is estimated that ~40% of U.S. B2B volume is still paid via paper check, which remain the dominant form of payment for small/medium size businesses (~60% of volume).

Figure 8 **Estimate B2B payments mix by firm size,** North America 2022



Define business by revenue: Small <$25m, Large $500m+

Estimate cost for manual, paper based payment processing

	Small	Large
Avg. Invoice ($)	$1,000	$10,000
No. Invoices (mm)	6,500	1,404
Processing Cost		
Avg. Cost/Invoice	$1.47	$1.16
Headcount Cost		
Avg. Cost/Invoice	$20.79	$8.23
Direct Cost/Invoice	2.2%	0.1%

Source: Goldman Sachs Investment Research, PMP Calculation

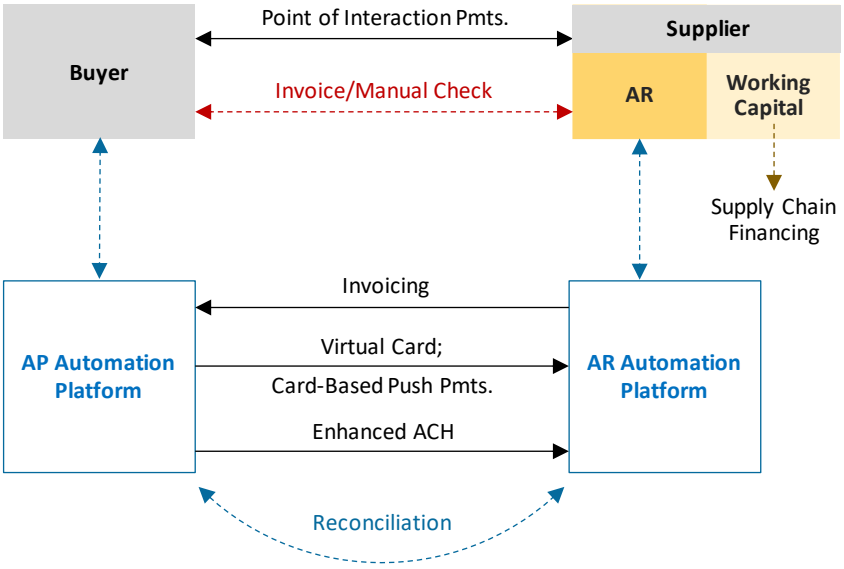
Manual processes are inefficient, with interventions needed to issue/receive and approve invoices, as well as to make the payments and reconcile accounts (Figure 8). These are particularly costly for small

businesses, where the cost of a manually processes check payment is estimated at ~2% of the invoice amount[16]

Payment platforms focus on automating and/or outsourcing the collection of payment information, invoicing, settlement and reconciliation. Such solutions can help SMBs and Mid-Market businesses expand, without needing to correspondingly scale their back-office/fixed cost base.

At the simplest level, B2B payments can is divided into three main markets: (1) point of interaction, including commercial cards and business transactions, (2) accounts payable/receivable and related processes and workflows, and (3) cross-border payments. Figure 9 outlines the main elements of the B2B payments framework.

Figure 9



	Point of Interaction
Procurement Cards	P-cards are used to pay suppliers quickly in return for a discount. The card issuer makes the payment on behalf of the buyer, allowing the buyer to make only one monthly aggregate payment to the bank. Since card acceptance cost for the supplier are high (2.5-3.0%), the issuer can offer the buyer rebates (e.g. subsidized by interchange fees). Accordingly, p-cards are typically only accepted for small ticket items.

	Accounts Payable/Receivable
Background	AR/AP digitalization is complex, due to the challenge of bridging the gap between suppliers and buyers using different back office systems to exchange invoices, with different payment preferences (e.g. ACH, check, virtual card). Data is key, as information needs to travel with the payment to enable error-free execution. However, incentives to invest in AR/AP automation are not the same for buyers and suppliers (see merchants in consumer cards) and penetration significantly lags B2C.

[16] Goldman Sachs: "B2B How the next payments frontier will unleash small business" 16-September 2018

AP Platform	Buyers prefer to defer payment and pay using a method available on their platform (e.g. virtual card, ACH). They may choose to take advantage of early payment discounts and see the benefit of card spend rebates. Automation platforms offer buyers an opportunity to generate additional revenue
AR Platform	Suppliers prefer to be paid as quickly as possible and aim to accept multiple forms of payment at minimal cost. They may choose to offer early payment discounts or charge fees for late payment. For suppliers, automation platforms offer efficiency, despite potentially higher cost of payment acceptance. A major reason that B2B has been slower to modernize than B2S is the cost factor on the supplier side, where the ROI is less obvious
Biller Directories	In order to seamlessly connect buyer sponsors (i.e. banks, AP platforms) and billers via a single link, service providers are establishing Biller Directory Networks that allow members to route, post, and settle transactions electronically. While some AP providers have developed similar network structures, AR driven networks are believed to scale better, since AR providers already have a base of plugged-in suppliers, significantly reducing the supplier recruitment workload.

	B2B Payment Methods
Virtual Cards	Single-use accounts (SUA) are assigned a random credit card number that can only be used once. After an invoice is issued, the buyer pays using the virtual card, which is transmitted from its AP platform. Once the supplier "charges" the VC, the SUA purchase is "stapled" to the invoice and the card number expires. Advantages include greater security without the need to expose card numbers and easier reconciliation.
Card-Based Push Pmts.	Enable users to push funds from one debit card to another utilizing card credentials (instead of bank-routing and account numbers). Businesses can receive funds in real-time without exposing bank account information. Cross-border payments can also be made possible as more cards are enabled.
Enhanced ACH	Suppliers benefit from enhanced remittance data, allowing better reconciliation of payment to underlying invoice. AP companies can reap greater economics than for a "basic" ACH payment, though the fee is still lower than for virtual cards.

Cross-Border Payments

Cross-border payment dynamics remained robust in 2022 with flows[17] reaching ~$150 trillion, a 13% increase in a single year. This growth generated a 17% YoY increase in cross-border revenues, which reached $240 billion, largely driven by B2B activity (~70% of revenue), travel and e-commerce spending.

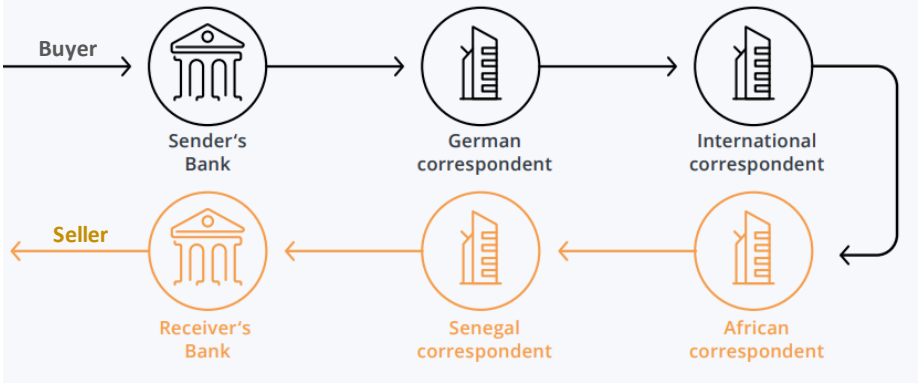
In today's world of payments, funds cannot be directly transferred between banks in different countries. Instead, money is routed through correspondent banks, which have relationships with both the sending and receiving banks. This process is slow, transactions can take 3-5 days to clear, complex and costly, with transaction and FX fees estimated at 4.0% - 4.5% of volume[18].

[17] McKinsey: 2023 Global Payments Report; September 2023

[18] Goldman Sachs: "B2B How the next payments frontier will unleash small business" 16-September 2018

Over 90% of cross-border traffic goes through SWIFT with 11,000 members in 200 countries connecting with each other 42m times a day[19]. For more distant and illiquid currency pairs, multiple correspondent banks may be needed to complete the transaction (Figure 10).

Figure 10 **Correspondent banking payment flow** (Example Germany → Senegal)



Source: valantic: "Payments without borders" June 2023

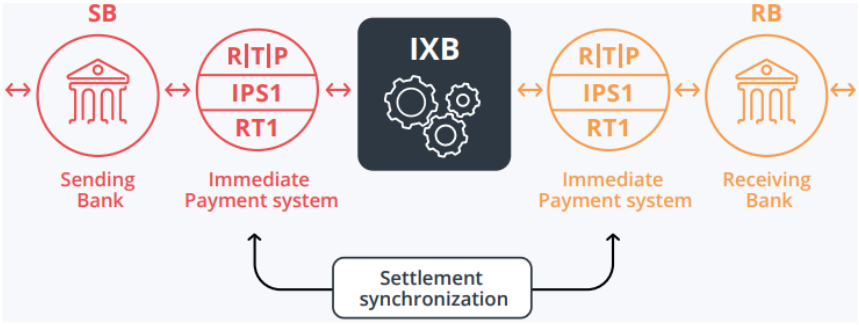
In 2020, the G20 economies endorsed a "Roadmap for Enhancing Cross-Border Payments", developed by the Financial Stability Board (FSB) and the Committee on Payments and Market Infrastructures (CPMI). The first pillar of this strategy prioritizes the interlinking of instant payment schemes.

One advanced initiative is the immediate cross-border payment (IXB) model being developed by EBA Clearing, The Clearing House (TCH) and SWIFT, in collaboration with 25 financial institutions. It utilizes existing instant payment networks – namely TCH's RTP and EBA Clearing's RT1 – to provide instant cross-border payments along the Euro and US dollar currency corridor (Figure 11). The service is expected to be rolled out sometime in 2024.

IXB is not a payment system, but enables the interlinking single currency real time payment systems by ensuring both systems proceed with synchronized settlement of their respective transactions. The model can be replicated across other currency corridors and payment systems.

Figure 11
For Illustrative Purposes Only

Transaction Flow on IXB



Source: valantic: "Payments without borders" June 2023

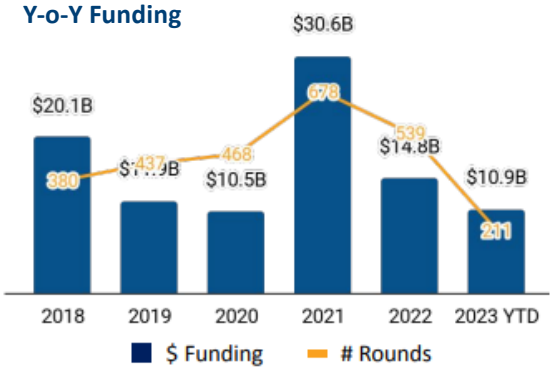
[19] The Economist: "The race to redefine cross-border finance"; October 2021

Payment Linked Business Models

Based on a 2020 review of ~9,500 companies participating in traditional web based and offline payment cycles, a taxonomy has been proposed[20] (*see Appendix A*) that classifies a broad range of payments related business models.

Figure 12 - For Illustrative Purposes Only

Y-o-Y Funding



Payments Business Taxonomy

Consumer (Payor) **Model**	**Business** (Payee) **Model**	**Enabler Model**
Provide products that allow consumers and businesses to make payments	Provide solutions that allow businesses to receive payments	Provide technology solutions for payment processes

Source: Tracxn: "Payments Feed Report" Sep-2023

While the rate of funding for payment businesses has declined over the last two years, the total number of companies in the sector has doubled to ~18,500 since 2020[21], having raised a total of ~$140 billion over the past five years.

The following tables highlight selected payment business sectors that Phoenix believes show significant growth prospects.

	Healthcare Payments
Theme	**Digital Healthcare Payment Solutions**
Category	Consumer Payments > Industry Specific > Healthcare Payments
Background	Per capita health spending in the U.S. has reached ~$13,000 in 2021, representing ~18% of GDP[22]. Over 2022-31 the National Health Expenditures growth (5.4%) is projected to continue outpacing GDP growth (4.6%) resulting in a 19.6% share of GDP in 2031[23]. Share of NHE by source of funds (2021)  Source: Peterson-KFF; "Health System Tracker" Dec-2022

[20] "Tracxn Feed Report - Payments"; Tracxn; September 2020

[21] "Tracxn Feed Report - Payments"; Tracxn; September 2023

[22] "The state of the U.S. healthcare system in 2022 …"; Peterson-KFF Health System Tracker; December 2022

[23] "NHE Projections 2022-203"; Centers for Medicaid and Medicare Services"; December 2021

	In 2021, private insurance represented 28.5% of total health spending, public insurance (incl. Medicare, Medicaid, Veterans Administration and DoD), represented 42.5%, and out-of-pocket costs covered ~10% of health expenditures. Given the complexity of healthcare payments, providers are modernizing their systems, seeking to reduce administrative costs for all parties. Consumers, having to manage different sources of healthcare funding, expect an efficient "check-out" experience and will consider switching providers if they are not satisfied with how they pay and discover the costs connected to their care.[24]
Market	A large part (~30%) of health care payments consists of insurance premiums and out-of-pocket costs. An analysis of 2020[25] estimates that employers covered ~$520 billion toward premiums, while workers paid ~$365 billion and a further ~$390 billion was spent on out-of-pocket costs. The remaining ~70% of health care spending is covered by Medicare, Medicaid, other programs, and subsidies. The market for Digital Healthcare Payment Solutions is estimated at $6.3 billion in the year 2022 and predicted to grow substantially by >24% CAGR, reaching more than $35 billion by 2030[26]
Notable Private Companies	• **Cedar,** founded 2016, offers a cloud-based platform, integrated with healthcare providers and insurance companies, that provides a single place to view and pay medical bills. • **Rialtic,** founded 2020, operates healthcare enterprise platform that provides tools for automated claims processing, real time claims adjudication and payment integrity. • **HealthPay24,** founded 2001, provides a patient engagement platform that offers mobile bill payments, financial assistance (i.e. comparison service) and communication tools. • **InstaMed,** founded 2004, is a healthcare payment network that provides secure and efficient payment processing solutions for healthcare providers, payers, and patients. • **Zelis,** founded 2016, operates a technology platform that connects all stakeholders (payers, providers and patients) to streamline the payment process and reduce errors. • **SmartHealth PayCard,** founded 2019, is a credit card (Mastercard) that offers a credit line to pay for urgent/emergency care and other health needs not covered by insurance.

	Transportation Payments
Theme	**Digital Fleet Payment Solutions**
Category	Business Payments > Industry Specific > Logistics Payments
Background	Digital payment solutions have historically been underprioritized by commercial fleet operators, even though the sector comprises ~10% of domestic B2B card spend. However, dedicated solutions offering integrated payments (e.g. fuel, tolling, expenses and maintenance), fleet management (e.g. routing, scheduling), and monitoring (e.g. driver behavior, telematics) are driving increased adoption. Many freight factoring companies combine their offering with payment solutions (e.g. fuel cards) as value-add service.

[24] "63% of Patients Will Switch Healthcare Providers if Their Payment Experience Doesn't Cut It"; PYMTS; October 2021

[25] "Health care spending continues decades long rise"; Medical Economics; August 2022

[26] "Digital Payment in Healthcare Market Expected To Reach USD 35.64 Billion By 2030"; MRFR; March 2023

	Modern card issuers are evolving the traditional fleet/fuel card, offering customizable controls, virtual/re-assignable cards and advanced security features. New developments include the integration of EV fleet charging and maintenance as well as and vehicle-initiated payments (e.g. tolls, parking) that don't require cards.
Market	The TAM for digital fleet payments covers various sub-applications, including: • The fuel card market in North America, estimated at $215 billion in 2022 and expected to grow by >4.5% CAGR, reaching ~ $330 billion by 2032[27] • The market for fleet management solutions, estimated at $8 billion in 2022, and predicted to grow significantly by ~15% CAGR to >$30 billion by 2032[28]
Notable Private Companies	• **Coast,** founded 2020, offers a fleet management platform that provides a smart Visa fleet and fuel card, as well as sophisticated expense management tools. • **Highnote,** founded 2020, provides a platform to issue fleet management and fuel cards with features such as customizable limits, real-time reporting and fraud monitoring. • **Apex,** founded 1995, is a freight factoring company that offers a range of additional services to the trucking industry including fuel cards, credit checks and load tracking tools. • **Car IQ,** founded 2016, provides a payment solution for fleets, that allows a vehicle to transact autonomously using an assigned unique identity to authenticate payments • **Driivz,** founded 2012, provides EV charging management solutions for network operators and fleet managers, including smart charging, billing/payments and driver apps. • **Electronic Funds Source,** founded 1998, provides customized payment solutions to fleet customers, including private label cards, fleet cards, payroll solutions and money transfers.

	Payment Security
Theme	**Payment Fraud Detection Solutions**
Category	Enablers > Payment Security > Payment Fraud Detection
Background	The cost of eCommerce fraud in North America is estimated to exceed $20 billion in 2023[29], and predicted to continue growing, driven by the use of alternative payment methods (e.g. BNPL, where fraudsters infiltrate accounts and make unauthorized purchases). Organizations that process, transmit, or store cardholder data must comply with Payment Card Industry Data Security Standards, which shape how payment security is implemented and reflect new fraud prevention techniques. Current measures include: • Tokenization: Allow businesses to provision customer accounts without handling sensitive cardholder information each time • Address Verification Service: Verify that the address provided at checkout matches known address via a response code sent by the credit card company. • SSL Protocol: Encryption of all communications on a website, important for securing web pages that process customer payment information.

[27] "Fuel Card market research report Information – Market Forecast to 2032"; Market Research Future; November 2022

[28] "Fleet Management market size & forecast 2023-232"; Global Market Insights; April 2023

[29] "Online Payment Fraud: Market Forecasts, Emerging Threats & Segment Analysis 2022-2027" Juniper Research; October 2022

	• Fraud Screening Tools: Modern fraud screening uses ML and AI-based methods of anomaly detection. Such algos learn from historical fraud patterns and recognize them more effectively and faster than humans.
Market	The market for Payment Security in North America is estimated at $3.7 billion in the year 2022 and predicted to grow at a ~14% CAGR, reaching more than $10 billion by 2030. The fraud detection & prevention segment currently represents ~40% of the payment security market, while tokenization and encryption measures cover ~30% each[30].
Notable Private Companies	• **Bolt,** founded 2013, offers payment fraud reduction tools including fraud activity pattern recognition, user behavioral analysis and device fingerprinting. • **SafeNet,** founded 1983, provides data protection and encryption solutions, safeguarding data from unauthorized access, use, disclosure, disruption, modification, or destruction. • **Sift Science,** founded 2011, offers a machine-learning platform to analyze big datasets of transactions / events and identify patterns of suspicious activity. • **TeleSign,** founded 2005, offers solutions for digital identity verification, access security (two-factor authentication) and programmable communications. • **Jumio,** founded 2010, provides multi-channel ID authentication and KYC services, using artificial intelligence and machine learning to verify identities in real time. • **Termtegrity,** founded 2013, provides solutions to protect customer information by ensuring integrity of merchant's POS environment (PCI DSS compliance requirement)

Beyond Payments

Cryptocurrency Networks

The technology theoretically exists today for crypto-based cross-border payments, however, crypto itself faces unique commercial challenges, such as 1) lack of merchant acceptance, 2) currency price volatility, and 3) lack of consumer protections, as well as technical limitations in terms of transaction throughput.

While technological solutions based on established payment rails are more advanced and scalable (see IXB), the distributed ledger technology behind crypto nevertheless makes it possible to circumvent the global settlement network and is one of the few credible threats to the networks' moat around cross-border payments.

Developments of the crypto-payments ecosystem, such as "Bitcoin Lightning Network", allowing for global micropayments between crypto wallets, are being closely watched[31].

Working Capital and Cash-Flow Management Solutions

Automating invoice and payment processes (domestic + cross-border) enable businesses to pay and get paid faster. For buyers, avoiding late fees and capturing pre-payment discounts and rebates. For suppliers, this means better working capital and potentially less reliance on supply chain finance.

[30] "Payment Security Market Size, Share & Trends Analysis, and forecasts 2023-2030" Grand View Research; May 2022

[31] https://lightning.network/lightning-network-summary.pdf

For example, advanced AP/AR solutions allow the implementation of dynamic discounting, where a buyer can set an APR and the supplier can decide how early it wants to be paid based on that APR, instead of standard “2% 10 net 30” prepayment discounts.

Working capital solutions are only beginning to emerge, but the offering is expected to grow significantly, leveraging direct interfaces between the supplier and buyer.

Conclusion

With >$500 billion annual revenue and a wide range of industry participants, payment rails and connections represent a key component of U.S. infrastructure. The sector touches on largely all paid economic activity, from real time P2P micropayments to B2B cross-border transfers. Technology and data are integral to the payment industry and as such it benefits significantly from the secular digitalization trend across commerce and supply chains.

We believe the payments sector offers multiple opportunities for lenders with the capacity to devise and deliver flexible hybrid capital solutions to support businesses growth, as well as financing capacity for asset origination platforms.

Appendix A

Taxonomy of Payment Business Models[32]

Consumer Payments

- *Wallets*
  - NFC
  - Card Linked
    - NFC
    - Bluetooth
- *Vertical Payments*
  - Conversational Payment
  - Parking Payments
  - Toll Payments
    - FASTag
  - Tips
  - Fuel Payments
  - Education Payments
  - Cannabis Dispensaries Pmts
  - Bill Payments
    - Horizontal
    - Utility Bills
    - Credit Cards
    - Rental
  - Hospitality
    - Dining Payments
  - Laundry Payments
- *Payment Cards*
  - Credit Cards
    - General Purpose
    - Corporate Cards
    - Credit Builder
    - For Relocation Profs.
    - Healthcare
    - For Subscriptions Mgmt
  - Prepaid Cards
    - General Purpose
    - Travel Cards
    - Fuel
    - Public Transport
    - Corporate Cards
    - Gift
    - Children
    - Special Needs
    - Healthcare Payments
    - Tax Refunds
    - Laundry Services
    - Payment Vouchers
    - Credit Builder
  - Multi Account Card
    - NFC
- *Credit Card Comparison Platf.*
- *Wearables*
- *Card Scanning Apps*
- *Direct Debits*
- *Prepaid Card Redemp. for Cash*
- *Payment Card Fraud Detection*
- *Spare Change Wallet*

Business Payments

- *Diversified*
- *Online Payments*
  - International
- *POS Payments*
  - POS Payment Terminal
    - Hardware
  - POS Mobile App
- *Agent Based Payments*
- *QR Code Payments*
  - Hardware
- *Payment Links*
- *Gift Card Based Payments*
- *E-Checks*
- *Direct Debits*
- *Telephonic Payments*
- *Reward Points Payments*
- *Carrier Billing*
- *Payment Splitting*
- *Bill Payments*
  - Government
- *Industry Specific*
  - Digital Publishing
  - Gaming
  - Insurance
  - Schools
  - Healthcare
  - Vending Machines
  - Lending
  - Events
  - Logistics
  - Travel
  - Cannabis Industry
  - Nonprofits
  - Law Firms
  - Financial Planners
  - Rent Collection
  - Car Dealers
  - Tanning Studios
  - Freelancers
  - Firearms Businesses
- *Escrow Payments*
- *Virtual Cards*
- *Mass Payouts*
  - Diversified
  - Invoice Payments
    - Accounts Payables
    - Accounts Receivables
  - Payroll Payments

Enablers

- *Card Networks*
  - Debit Networks
- *Issuer Processor*
- *Open Banking APIs*
- *White Label Solutions*
  - Merchant Acquirers
    - Banks
  - Payment Cards
    - Prepaid Cards
    - Credit Cards
  - Wallets
    - Banks
  - Payment Facilitators
- *Payment Routing*
- *Payment Gateway Comparison*
- *Contactless Payments*
  - NFC
    - Wearables
  - Sound
  - Bluetooth
- *Payment Security*
  - Payment Card Security
    - Tokenisation
    - Biometric Authentication
    - Hardware
    - PCI Compliance Solution
  - Payment Fraud Detection
    - Financial Crime
    - Chargeback
  - User Authentication
    - Finger Print
    - Facial Recognition
    - Multi-Factor Authentication
- *Payment Systems Testing*
- *Online Payments Notifications*
- *Settlement File Converter*

[32] "Tracxn Feed Report - Payments"; Tracxn; September 2020

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