

Payments Systems in the U.S.

A Guide for the Payments Professional

Chapter 5 - Core Systems: Cards

This is an excerpt from the book,
"Payments Systems in the U.S."
This is meant for registered attendees of
Glenbrook's Payments Boot Camps.

All attendees will receive a paperback copy
of the book at the Boot Camp.

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THIRD EDITION

The answers you need about payments systems:

What are they?

Where did they come from?

How do they work?

Who uses them?

Who provides them?

Who profits from them?

How are they changing?

GLENBROOK PAYMENTS EDUCATION

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5

Core Systems: Cards

Type	“Pull payments” payments with authorization
Ownership	Private network ownership – public companies
Regulation	Network rules; U.S. law and Federal Reserve Bank regulation
Network Economics	Interchange (acquirers to issuers), assessments (issuers and acquirers to network), currency conversion on cross-currency
Processing	Electronic
Risk Management	Defined by card networks and augmented by processors and end parties

Table 5-1: Cards Overview

The card payments systems fascinate many people, within financial services and in many other industries, because they are at the heart of consumer commerce—facilitating trillions of dollars of consumer and business spending each year. The card systems are especially significant because of their sheer size, the extent of their global reach, their staggering degree of standardization and interoperability (enabling a cardholder from Topeka, Kansas to walk into a bar in Singapore and buy a drink, no questions asked), and, perhaps most significantly, the fabulous profits that have flowed, in particular, to credit card issuers over the years—but also to other participants in the payments cards value chain.

History and Background

The payments cards industry has its roots in the private department store and oil company “credit cards” issued during the first half of the 20th century. Later, the charge cards issued by Diners Club and American Express in the 1950s, primarily intended for business travel and entertainment (T&E) purposes, established the early “closed loop” card systems.

The card industry as we know it today, however, began in 1966, when Bank of America formed a company, BankAmerica Service Corporation, to franchise

its BankAmericard product to other banks. Bank of America had launched BankAmericard in the late 1950s, planning to roll it out across California; in the mid-1960s it began licensing BankAmericard to other banks located outside of California and in a handful of other countries. By 1970, the franchisees began pressing for a new organizational structure for the product, leading to the formation of National BankAmericard Inc. (NBI) to manage the U.S. card program. In the mid-1970s, a similar organization was formed to manage the international card program. Shortly thereafter, the two organizations came together under a new company named Visa—with the international organization (IBANCO) becoming Visa International and NBI becoming Visa USA, a group member of Visa International.

Separately, and in competition with Bank of America’s card program, another group of California banks formed a competing organization called the Interbank Card Association (ICA). The ICA created Master Charge: The Interbank Card and, in 1979, renamed itself and its products to Mastercard.

The early work done by these new companies, structured as associations of member financial institutions, was nothing short of remarkable. They established the principles of open financial institution membership—the open-loop exchange of transactions, interchange fees, and brand control through association bylaws and operating rules that would, over time, grow to define the card payments systems.

Significantly, these rules set the groundwork for interoperability that quickly grew global, as card systems were developed in other countries and linked into the Visa and Mastercard systems to extend their scope of coverage. Interoperability was primarily technical, of course, establishing protocols and timelines for all aspects of issuance, acceptance, and transaction management, but the card associations also defined the system economics, brand management, and requirements for transaction interchange.

Over time, the card associations played important roles in managing card fraud—requiring that confirmed fraud be reported by issuers to the associations and using that confirmed fraud “outcome data” to build increasingly sophisticated data analytics systems to help fight it.

The associations also established arbitration processes for the resolution of disputes between members—ensuring that any such disputes would be resolved “within the family,” with association staff acting as court, judge, and jury.

Membership

Membership in the open-loop associations was strictly limited to banks and other regulated depository financial institutions. Global and regional

associations defined their own criteria for admission, related to capital adequacy—a member bank must be able to meet its daily funding liabilities to the network, and hence to other members. In many countries, the associations relied on existing bank regulatory and supervision infrastructures to effectively handle this task. In the association bylaws, each board of directors set membership voting rights, seeking to balance the needs of small and large participants and giving some “early owner” benefits to founding members.

In joining the card associations, member banks surrendered considerable individual control over how these products worked—but gained the significant benefits of common product definitions and a global acceptance framework that no one bank could develop on its own. Ultimately, some large banks found it frustrating to see the card association brands become stronger and more visible to consumers than the banks’ own brands.

Why did banks agree to participate in these associations? The answer is almost entirely economic. The open-loop networks, in their early credit card days, enabled a very profitable consumer lending business for card-issuing banks. Originally intended as a means for allowing banks to efficiently, and profitably, lend to their own existing customers, the credit card quickly opened up, for imaginative banks, a new way to extend lending to consumers outside of a bank’s existing geographic footprint. New and profitable customer relationships could be established—on the basis not of a consumer opening a checking account but, rather, applying for a credit card from the bank.

These economics also explain the relative power of card issuing banks (serving consumers) vs. acquiring banks (serving merchants) within the card networks. Although originally most banks were both issuers and acquirers, card acquiring was not nearly as profitable as card issuing. The different economic models of these two sides of the card business led many banks to separate management of card issuing and acquiring, with many banks dropping out of the card acquiring business in the 1980s, after the acceptance environment evolved from paper-based (requiring local capture of paper sales drafts using a process similar to checks) to electronic POS terminals. On the critical operating committees and boards of the card associations, the voice of card issuers frequently dominated discussions. This continues today even within the new ownership structure of the open-loop networks as they continue to focus primarily on the needs of their card issuer clients. More recently, both Visa and Mastercard have increased their efforts to try to work more closely with merchants even in the face of protracted court battles over issues relating to operating rules and interchange fees.

Dee Hock: An Appreciation

Dee Hock was the CEO of Visa during its formative years. Dee’s driving vision of an open electronic financial network is arguably what shaped the global payments card industry. He foresaw that “it was necessary to re-conceive, in the most fundamental sense, the nature of bank, money, and credit cards.... Money had become nothing but alphanumeric data... guaranteed dots... which would move around the world at the speed of light.”

Fundamentally, the card lifecycle for a card network begins with issuance and, thus, a network's primary focus is on gaining issuance of cards by their issuing bank partners that use the network's brand. In the U.S., "duality" has been the practice of issuing banks for many years—issuing both Visa and Mastercard cards. Both card networks have pursued stronger partnership relationships with issuers—especially the larger issuers—as they seek to gain increased commitment to issuance of their brand over competitors. As part of those relationships, the networks may provide various incentives to their partner issuers to help secure their commitment to their network.

ATM and Debit Network Formation

In the late 1960s—and in parallel with the growth of credit cards—banks began to introduce automated teller machines (ATMs) as a new channel for serving checking account customers. Banks issued ATM cards to their customers so they could access the ATMs for cash withdrawals. Usage of these cards required individual personal identification numbers (PINs) to authenticate the cardholder at the ATM—as it was an unattended card acceptance location with no clerk on hand to compare physical signatures on the back of card and the signed receipt.

Double Innovation?

It is interesting to note that at about the time the ATM networks were being formed, the same departments within the same banks had people working on the fledgling ACH system. At the time, the new networks were responding to very different needs: cash dispensing vs. check replacement, respectively. Now, however, the two "grown-up" networks compete for many types of transactions.

Eventually, retail bank organizations within major banks began forming shared networks to interconnect ATMs and banks within cities and geographic regions. Although similar in some respects to the credit card open-loop associations, the shared ATM networks had entirely different economic frameworks—their members were much more motivated by cost reduction (e.g., saving on branch teller expense) than by profit. After all, ATMs weren't consumer lending tools—

they simply provided a more convenient channel for customers to access the cash in their checking account and helped eliminate some of the labor associated with accepting deposits and making cash available in bank branches.

In the late 1980s and 1990s, the shared ATM networks went through a series of mergers, with a handful of large national networks emerging; Interlink, STAR, and NYCE were among the largest. A number of smaller regional networks continue to exist, most operating on an association, non-profit basis.

VISA Debit Strategy

Following the migration from paper-based acceptance to electronic acceptance, Visa believed that debit cards were going to become increasingly important for merchant acceptance. Unsure of how the debit card market might evolve, Visa hedged its bets—by providing processing services and ultimately acquiring Interlink, by becoming an ACH operator (briefly), and by enhancing its credit card network to better meet the needs of consumers and banks for debit card products.

By and large, the U.S. credit card associations were not involved in these early ATM networks. However, Visa, in particular, was watching their development—particularly when the ATM networks began extending acceptance of their

bank-issued ATM cards to new merchant locations (especially supermarkets and fuel retailers). Once again, banks were interested in the potential cost savings from having their ATM cards accepted at the point of sale with these kinds of merchants instead of checks.

Similarly, merchants appreciated the elimination of checks and their associated insufficient funds “bounce” risk, while enjoying the benefits of receiving a guaranteed payment when an ATM card was used instead. The shared ATM/PIN debit networks priced merchant acceptance attractively as an incentive—creating a win-win for merchants, consumers, and banks. But merchants did need to deploy new acceptance equipment at the point of sale—not just to read the card’s magnetic stripe, but also to securely accept the cardholder’s PIN.

In parallel with this evolution of the ATM networks and their cards, credit card acceptance began transitioning from paper-based to a fully authorized electronic environment beginning in the mid-1980s—and these two different systems for merchant acceptance began increasingly colliding. This led to Visa and Mastercard developing debit products for retail banks that would ride over their credit card network “rails” rather than over the shared ATM/PIN debit networks.

Along the way, Visa began providing processing services to the west coast-based Interlink network, and did so for many years before ultimately acquiring that network from its member banks. In the process, Visa acquired a large ATM/PIN debit network to complement its existing credit card network.

In the early 1990s, after initial efforts by Visa and Mastercard to collaborate on debit cards were blocked by the U.S. Department of Justice, both Visa and Mastercard introduced their own debit card products—these became known as “signature debit cards”—as alternatives to the PIN debit cards for handling debit transactions to a consumer’s checking account. The differences between these two types of cards will be discussed in more detail later in this chapter.

Card Lessons—Debit is Different!

When Visa and Mastercard executives went to their member banks to discuss the new debit card products, they quickly learned that they were talking to the wrong people! In most large banks, the powerful managers of the credit card issuing businesses had little to do with the people who ran the branch banking network—the retail bank—and who controlled the ATM and PIN debit networks. Full of plans to roll out PIN debit cards, these retail bank executives were not pleased to hear that their plans for the expansion of merchant acceptance were being hijacked by the much more profitable credit card issuing business unit—their rival within the bank. It took a number of years for banks to sort this out, and to focus on the higher profitability of the Visa and Mastercard products relative to the PIN debit products.

Going Public

Today, the two major U.S. open-loop card networks are no longer owned by banks, but are rather publicly traded companies—a fact that would have astonished a 1980s card banker used to working collaboratively within the association structures of that era.

The first networks to transition to non-bank ownership were the large, shared ATM/PIN debit networks bought by payment processors. In 2004, First Data Corporation bought STAR (through First Data's acquisition of Concord EFS) and Metavante bought NYCE (ironically from First Data, which was required by regulators to sell NYCE after First Data's acquisition of Concord EFS). Banks' willingness to give up control of these networks was largely a matter of cost. The payment processors saw opportunities to participate in increased transaction volumes as debit acceptance continued to expand. As mentioned earlier, the other major, shared ATM/PIN debit network, Interlink, had already been acquired by Visa.

Perhaps the most dramatic change occurred in May 2006 with Mastercard's initial public offering. Later that year, Visa (excepting Visa Europe which opted to remain a separate, bank-owned entity) announced that it would also go public—and followed in March 2008 with what was, up until that point, the largest initial public offering (IPO) in U.S. history. In late 2015, Visa Inc. announced the acquisition of Visa Europe—bringing together the two separate companies into a single global organization.

Member bank agreement to support the two major card associations going public was based upon different reasons than with the earlier sales of shared ATM/PIN debit networks to processors. The Mastercard and Visa IPOs certainly allowed banks to recognize the value of their investments in the two associations, which had previously been carried entirely off banks' balance sheets. But much more significantly, the association restructurings into public companies provided the banks with a new way to deal with potential liabilities related to an increasingly challenging legal and antitrust environment.

With their IPOs now solidly behind them, the card companies are in a position to acquire, and potentially expand their roles into, a number of new lines of business.

An overview of the history of the U.S. payment card industry is provided in the table below.

U.S. Card Industry Evolution				
Formation	Expansion	Segmentation	Diversity	Digitize
1960s–1970s	1980s	1990s	2000s	2010–>
<ul style="list-style-type: none"> • Associations • Regional governance • Revolving credit • Role of issuer & acquirer • Systems infrastructure • Interchange economics • “Honor all cards” • Global interoperability 	<ul style="list-style-type: none"> • Consumer adoption of cards • POS Terminals • New acceptance markets • Third-party processors • Systematic fraud mgmt. • Brand competition; affinity cards • Early litigation 	<ul style="list-style-type: none"> • Co-branding • Debit begins • Rewards cards • Product, rate proliferation • Commercial and purchasing cards • eCommerce begins • EMV chip specification • Receivables securitization • Association litigation losses 	<ul style="list-style-type: none"> • Debit Decade • V/MC IPOs • PayPal, eCommerce • Prepaid cards • Decoupled debit • New form factors • Security: PCI-DSS • Payments as a Service • Merchant power strengthens • Durbin debit, network routing 	<ul style="list-style-type: none"> • EMV to U.S. in 2015 • New regs • No signature • Wallets • Acquisitions • NFC payments • Mobile POS • Tablet registers • Tokenization • P2P; Bitcoin • Visa/Chase • Apple Pay • Chase Pay • Walmart Pay

Table 5-2: A Short History of Cards

When we look back at this history, with its many changes in a relatively short period of time, a couple of major events stand out as particularly important:

- The move, in the mid-1980s, away from paper to electronic POS acceptance and authorization of every transaction was a pivotal development for the industry. Before that point, a merchant accepting a card payment created a paper “sales draft” and deposited it, very much like a paper check, at the local bank branch. Authorization was done by voice over the telephone, and floor limits (below which transactions were simply not authorized) were common. The card associations significantly accelerated the shift from paper to electronic acceptance by creating a new, lower “incentive” interchange rate that merchants could benefit from if they installed the new electronic draft capture POS terminals. This approach also marked the beginning of the use of specialized interchange rates (separating paper-based acceptance from electronic POS-based acceptance), which later came to be used by the card associations to tackle the specialized needs of many other vertical acceptance markets.
- Card associations have historically been the subject of litigation and regulatory scrutiny. Their unusual structure—and their practice of setting interchange rates as well as a variety of membership requirements—raised many questions concerning possible violations of antitrust or other commercial law. A detailed review of the many legal cases in the card industry is outside of the scope of this book, but it is interesting to note that in the early decades of the card industry, the card associations won essentially all of the important cases. Beginning

in the late 1990s, the card associations began losing several significant cases.

What's Next for the Now-Public Networks?

It is still early to understand the full implications of this ownership change for the U.S. payments industry. But it is logical to assume the following:

The new card companies have very different economic motivations than did their predecessor associations. Before the IPOs, they operated, practically speaking, on a not-for-profit basis—enabling their members and owners, the banks, to generate profits. Today, they are primarily technology-based processing companies, earning revenue from their bank clients (no longer owners) for transaction handling, brand management, and associated services. A debit transaction may be just as profitable for a card network as a credit transaction—which is certainly not true for a bank issuer. Also, although the card companies set interchange fees, they do not receive those fees—in theory, the card companies could be fine if interchange disappeared entirely.

The power of banks to influence operating rules has also changed with this transition—though banks continue to participate in user groups and remain the primary customers of the card companies, they no longer set policy on interchange, brand, or membership. One possibility? Card companies could eventually open up membership to non-banks and, in fact, this has begun to happen in some markets outside the U.S.

Card Types and Brands

Types

Payment cards may be categorized by type, primarily based on timing of funding—before, during, or after the transaction.

- **Charge cards** are non-revolving credit cards: the cardholder pays in full, at the end of the billing period, for all charges incurred during that month.
- **Credit cards** provide the cardholder easy access to a revolving, unsecured line of credit. The cardholder has the option of paying the balance off in full at the end of the billing period, or “revolving” and paying the balance over a period of time based upon terms set by the card issuer.
- **Signature debit cards** (so called because cardholder authentication is based upon signature comparison at the acceptance location) access funds on deposit in the cardholder’s checking account at the issuing bank. The debit to the cardholder account occurs on the day of the transaction. In the U.S., signature debit card transactions are carried over either the Visa or the Mastercard network depending upon the bank issuer’s choice of card brand. Visa established an early market share lead with bank issuers of signature debit cards through its use

of an integrated debit strategy that optionally provided issuers with debit card processing services. More recently, the Durbin Amendment resulting in Federal Reserve Regulation II required debit card issuers to choose two unaffiliated debit card networks for their cards—and allowed merchants to decide which network would be used for each debit transaction.

- **PIN debit cards** (authenticated at the acceptance location by the consumer entering a PIN) also access funds on deposit in the cardholder’s checking account at the issuing bank. The debit to the cardholder account occurs either on the day of, or the day after, the transaction. In the U.S., PIN debit card transactions are carried over national, regional, or local PIN debit or ATM networks—with routing based on the bank issuer’s choice of network participation and the accepting merchant’s choice of network routing. PIN debit cards, drawing on their ATM network origins, also can be used to provide cash back to the consumer at the point of sale.
- **Prepaid cards** access funds from an account, most typically held by the card issuer or—for single merchant cards—by the merchant, that has been pre-funded by the cardholder (or someone acting on behalf of the cardholder, such as the purchaser of a gift card). Closed loop prepaid cards are usable only at the merchant that issued the card. Open-loop, network-branded prepaid cards are typically signature-based and operate over the Visa or Mastercard networks.

Double Duty

The same physical card, and the same card number, is typically used for both PIN and signature debit. The card issuer determines whether both authentication methods are supported. When merchants accept debit cards, they can look up the issuer’s routing options and determine whether to prompt for PIN or not. For regulated debit cards in the U.S. today, there’s no economic advantage for doing so. But, prior to the Durbin Amendment, large merchants often wanted to prompt for PIN where possible so that they could route the transaction over a lower cost PIN debit network. Today, some large merchants continue to prompt for PIN in an attempt to steer the non-regulated debit cards over a PIN debit network.

Types of Acceptance Environments

Signature-based cards, both credit and debit, work within two primary acceptance environments:

- **Card-present (CP) transactions** occur when a cardholder is physically using his or her card to effect a transaction at some type of terminal—and the terminal is able to electronically capture the card data. Card-present transactions may be at either attended or unattended venues (for example, a kiosk or vending machine). Card network rules usually protect the merchant from fraud risk in a card-present environment—with fraud losses borne by card issuers. Beginning in late 2015, card network rules changed to incent the adoption of EMV chip card technology—with fraud liability shifting from the issuer to the merchant if the merchant has failed to adopt EMV-capable acceptance devices.

- **Card-not-present (CNP) transactions** occur when the cardholder is making a remote purchase—online, by phone, or even by mail order. Card network rules generally do not protect the card-not-present merchant from fraud risk in a card-not-present environment and these merchants bear the risk of losses on fraudulent transactions. The card networks have developed and deployed additional technology—based on a protocol known as 3D Secure—which allows merchants to request the issuer to authenticate the cardholder. When 3D Secure buyer authentication is utilized, any fraud liability shifts from the merchant to the card issuer.
- **PIN debit transactions** have historically been allowed only in card-present environments: PIN debit network rules have required the entry of a PIN into a secure device. This is now changing, as some PIN networks are allowing card-not-present transactions for bill payment (known as “PIN-less debit”) and certain types of low fraud risk eCom-merce transactions.

Brands

As the table below shows, most major card brands in the United States support most types of cards. American Express, currently with no debit card offering, is an exception. The major PIN debit networks, now owned by payments processors, have also not expanded into credit or charge card offerings.

	Visa	Mastercard	American Express	Discover	STAR, NYCE, Accel
Charge Cards	✓ P-Cards	✓ P-Cards	✓	✓	
Credit Cards	✓	✓	✓	✓	
Signature Debit	✓	✓		✓	
PIN Debit	✓ Interlink	✓ Maestro		✓ Pulse	✓
ATM	✓ Plus	✓ Cirrus	(ATM Sharing Agreements)	✓ Pulse	✓
Prepaid	✓	✓	✓	✓	✓

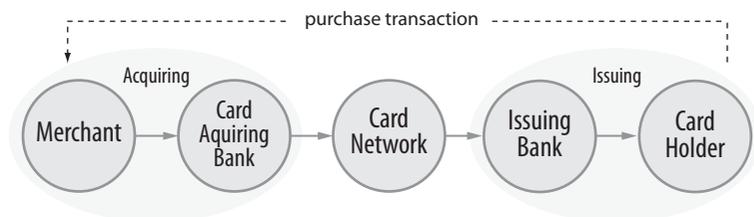
Table 5-3:
Card Brands

Roles and the Value Chain

The card payments value chain, shown below, has two main components: issuing and acquiring. In an open-loop network, an issuing bank serves the cardholder, and an acquiring bank serves the merchant. The card network sits in the middle and manages the electronic exchange of the items, the

setting and ongoing management of rules, and some forms of risk management. The card networks also manage the resolution of any disputes between members—providing an arbitration function whose decisions are final and binding on participants.

Open loop card networks connect two separate value chains—the **issuing process** and the **acquiring process**—at the point of sale.

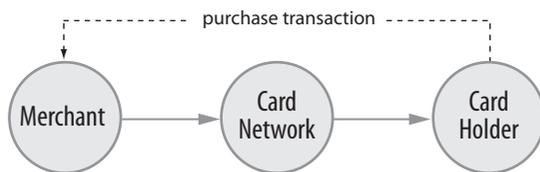


Card processing has a dual message flow: first an authorization message and then a clearing message flow along the same “rails.”

Figure 5-1: The Card Payments Value Chain

In a closed loop card model, shown below, the same functions occur, but a single card company performs the issuing, acquiring, and network functions. Hybrid models, in which a closed loop network opens up one side of its network to permit other entities to issue and/or acquire on its behalf, are also evolving as both Discover and American Express have begun pursuing hybrid models.

Closed loop card networks perform the same functions as open loop networks—but the issuing and acquiring functions are done by the network itself (or by a processor on its behalf).



Closed loop networks are more efficient to operate, but may scale more slowly than open loop networks.

Figure 5-2: The Closed Loop Value Chain

Private label cards are a special category of closed loop cards: rather than using a network, these cards are issued by the merchant (or a processor acting on behalf of the merchant), and are accepted only at that merchant’s outlets.

Credit card issuance is a term that is easy to understand. The card issuer solicits new consumers, receives and underwrites applications to acquire new customers, furnishes each customer with a card, authorizes and clears card transactions, and provides ongoing statements to cardholders, collections, and customer service.

Card acquiring, on the other hand, is one of the least understood parts of the payments industry. Acquiring is best understood as a set of functions provided to card-accepting merchants, often by different companies, with varying degrees of functional “bundling.” In the broadest sense, acquiring refers to functions supporting all of a merchant’s needs in card payments acceptance, including POS terminals, software, card processing, dispute management, and merchant customer service. Acquirers want to provide their merchants with support for the card tender types the merchants want to accept. In the narrow and most formal sense, it refers to the requirement, in an open-loop network, that the merchant submit and receive transactions to the network through a contract with a bank that is a member of that network and bound by its operating rules. In practice, the term “acquiring” can include all or only some of these functions.

The functional value chain for debit cards is essentially the same as the value chain for credit or charge cards. Cards are issued, authorized, and cleared over one of the debit networks. The difference between signature debit and PIN debit cards relates primarily to which networks the transactions are processed on, the merchant acceptance environment (PIN-capable or not), and the rules applied by those networks (including interchange).

As the figure below shows, processors are very important in the card payments systems. Processors handle “on behalf of” functions for both issuers and acquirers. The processing industry is much more concentrated than the banking industry as the industry has evolved around a few large processors. Processors generally are more visible on the acquiring side of the business—where they may be the entity a merchant contracts with—than on the issuing side of the business, where they tend to act behind the scenes serving card issuers.

A processor may perform some or most of the functions of an acquiring or issuing bank. Frequently, physical message switching is conducted entirely among banks, processors, and card networks. On the acquiring side, the processor may be the one entity visible to the merchant, and may be considered to be the “acquirer” by the marketplace. There is always an acquiring bank, however, and this bank bears responsibility to the card network for the transaction.

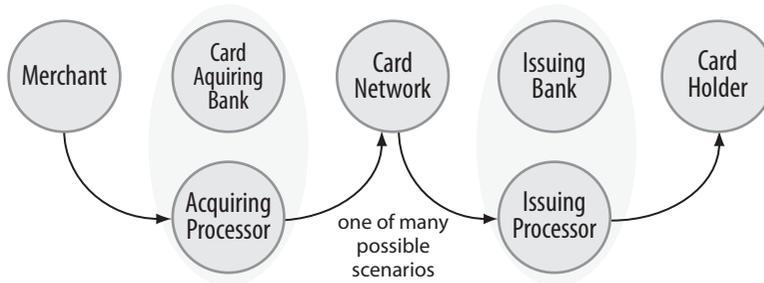


Figure 5-3: Card Processing

Enabling Technology and Standards

Card networks work because the networks and their member banks have agreed on global standards for physical formatting of cards and definition of key data fields.

The Physical Card

American Express first introduced the plastic credit card in 1959—and since that time the dimensions and other physical characteristics of the card has been standardized through industry collaboration as ISO/IEC 7810.

The card has defined data fields and locations, both printed or embossed on the physical card and encoded in the magnetic stripe on its back. Although there are variations by card network, region, and country, enough of the data fields are standardized—or commonly recognized—to enable global interoperability of the system.

The key card data element is the PAN, or Primary Account Number. The first six digits of the PAN are the IIN, or Issuer Identification Number, which identifies both the card network and the issuing bank. Earlier these digits were called the BIN, or Bank Identification Number. The American Bankers Association acts as the registration authority for IINs and manages

Sponsorship Required

With open-loop networks, the bank itself—either the issuing or the acquiring bank—is always the entity responsible for the transaction to the network. The processor is always sponsored by a member bank in the network. Sometimes, the bank is large and the processor is simply its “hired hand.” At other times, the processor is large and visible in the market, and has, in essence, hired the bank to be the sponsor. In either case, however, the ultimate technical and financial responsibility for compliance with card network rules and other regulations remains with the bank.

Terminology Standardization

While card technology is standardized across brands, terminology is not always consistent. All four of the major card networks in the U.S. use different terminology for the security codes they use to mitigate fraud. Visa refers to its security code as the CVV (Card Verification Value); Mastercard calls its code the CVC (Card Verification Code); American Express refers to its code as the CIN (Card Identification Number). We refer to these codes generically as the CVN (Card Verification Number).

Brand Placement

Card networks, of course, care a great deal about their brands, and particularly about the physical display of the brand on cards. Many operating rules have been written, debated, and challenged about the size and placement of card network brand icons on cards. Many banks have mixed feelings about the strength of the card network brands: they understand the benefits that result from a globally accepted mark, but also hope that their bank brand will be their cardholder's primary association with the card. A great deal of attention has been paid, as well, to the "secondary" brands displayed on the back of the card. Originally, these marks were key identifiers to let consumers know which ATM networks could be used by the card. Today, with widespread interconnectivity of payment networks, most consumers assume that ATM cards will "just work" at any ATM.

the allocation of IINs to issuers. The PAN is both embossed on the card itself and encoded onto two "tracks" of the magnetic stripe.

A data element, referred to as CVN (Card Verification Number), is also encoded on the magnetic stripe, but not physically embossed or printed on the card. The CVN was added to magnetic stripe cards in the 1990s to reduce counterfeit card fraud resulting from fraudsters using data from paper transaction receipts to create cloned cards. In that era, it was possible to recreate a valid magnetic stripe using just the information embossed on the physical card (or on a printed receipt or a carbon paper copy). The addition of the

CVN data element to the magnetic stripe changed this—requiring that the card would have to be read in a magnetic stripe reader to capture all of the data from the magnetic stripe that would be needed to create a counterfeit card. Later, both card network rules and federal legislation required merchants to truncate the card number details from the receipts they provide to their customers—further reducing the potential inadvertent exposure of payment card credentials to fraudsters.

Another fraud control data element, referred to as CVN2, is the three- or four-digit number printed on the signature panel on the back (or, for American Express, on the front) of the card, and used as the "Card Security Code" for card-not-present transactions conducted online. If a merchant captures the CVN2 from the cardholder and forwards it in the authorization message to the issuer, the issuer will respond by indicating its validity—or lack thereof. This helps prevent fraud where a card number is known but where the fraudster hasn't had access to the physical card.

There are a number of other features on the physical cards—some broadly used and some specific to a card brand or card issuer—that have been added over time to help reduce fraud.

Chip Cards

In most countries, cards are migrating from magnetic stripe to chip card (smart card) technology. These cards have both magnetic stripes and chips. In markets where the acceptance infrastructure has been upgraded to support chip reading, counterfeit card fraud should be much more challenging for fraudsters. However, with most cards still usable internationally, including in markets that haven't deployed chip card readers, card fraud

often migrates out of the domestic “chip-protected” environment to other countries where only magnetic stripe acceptance still exists. Until a universal chip reading infrastructure exists globally, it’s not yet possible for issuers to eliminate reliance on magnetic stripes. Slowly but surely, this migration has gotten underway—but we are likely still several years away from removing the mag stripe from payment cards and relying exclusively on chip technologies. The best that can be done right now is to include an indicator in the magnetic track (in the Service Code field) that tells the terminal it should force a chip read transaction.

Two principal chip standards are used. The first, known as EMV, use an industry standard for a “smart” chip which can perform significant computation within the chip. EMV cards can be recognized by the physical contacts that are present on the face of the card when an EMV chip is present. When inserted into an EMV-capable POS device, contact is made with the card and the chip is powered up to perform processing. EMV cards are most typically implemented in conjunction with PINs, which is referred to as Chip-and-PIN, although in some markets chip cards function in “chip and signature” mode as well. EMV-compliant POS terminals read the EMV cards, validate them, prompt the cardholder to provide a PIN if required, etc.

EMV cards are being introduced on a country-by-country basis as bank issuers and card networks evaluate the costs and benefits associated with their deployment. Many countries, particularly in Europe, made early decisions to migrate to EMV primarily based on concerns about the potential growth in counterfeit card fraud. However, in the U.S. the common assumption was that there wasn’t a positive business case to justify a migration to EMV based on the level of counterfeit card fraud on magnetic stripe cards versus the costs associated with upgrading both POS devices and the cards themselves. This changed in August 2011 when Visa introduced rule changes designed to incent merchants to migrate to new POS acceptance devices capable of supporting chip cards by late 2015 (2017 in the case of fuel retailers). Merchants who fail to migrate to new devices become subject to a shift in fraud liability from the issuer—the avoidance of which provides the merchant with the economic incentive to make the upgrade. Unlike in all of the other countries that had migrated to EMV, there was no mandate on U.S. card issuers to issue EMV cards—only the liability shift designed to incent merchant adoption of EMV-capable POS devices.

The second kind of chip standard supports contactless cards. These cards use a simpler, lower-cost chip, based on RFID (radio frequency identification) technology, to pass data between the card and an RFID reader at a POS terminal. Contactless cards were initially implemented primarily as a customer convenience (for speed of checkout), rather than for fraud

management—although they do contain technology analogous to the CVN on the magnetic stripe that helps reduce counterfeit fraud at contactless acceptance locations. Contactless acceptance devices are also important to the deployment of certain kinds of mobile payments—particularly those based on the use of near field communication (NFC) technology such as Apple Pay and Android Pay.

Issuers can choose to issue cards containing both EMV and contactless chips. This hybrid approach works well where relatively low value transactions can be performed quickly in contactless mode without requiring a PIN or signature while higher value (presumably more risky) transactions can continue to require full EMV authentication and cardholder verification with PIN or signature at the issuer's option.

POS Acceptance

In the United States, a wide range of point of sale terminal types can read cards and pass the required transaction data on to the acquirer (either to the acquiring bank itself or the bank's processor). These exist both as freestanding devices and as software functionality that is integrated into ECRs (electronic cash registers), mobile tablets or other devices. The acquirer must route the transaction to the correct payment card network; the network then routes the transaction on to the appropriate issuing bank. The figure below shows the extensive interconnection of key nodes in the U.S. market's "payments acceptance grid."

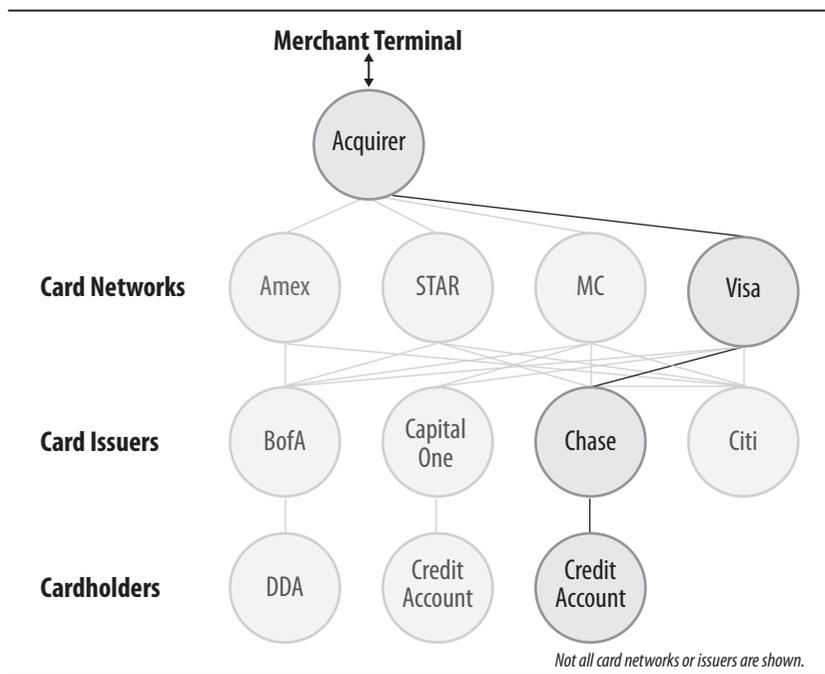


Figure 5-4: The Acceptance Grid

Card Network Processing

Credit card and signature debit transactions (without PINs) are routed through the acceptance grid twice—once in real time for authorization of the transaction and again (typically at the end of the day) for clearing and settlement.

The card network processing hubs sit in the middle, receiving transactions from acquiring member banks (or, more often, from their processors), sorting and switching them to issuing banks and processors. The major card network systems are among the largest online real-time financial systems in the world and, with extensive redundancy and resiliency built in over the years, hold impressive records for ultra-high availability. The architecture of these systems help ensure that high levels of cardholder service can be provided even in the face of various problems with issuer systems, network outages, etc. Stand-in processing can be performed on behalf of issuers at the card network level, for example, to allow transactions to still be processed even when an issuer's systems may be unavailable.

The processing environment is quite different, however, for the two message types:

- The authorization transaction is in real time, with sub-second response times.
- The clearing and settlement transaction occurs in batch, most typically at the end of the day.

PIN debit transactions use a “single message” approach that evolved from their original ATM network heritage. ATM transactions never have subsequent adjustments (such as the addition of a tip to a fine dining purchase), so the single message approach worked well. For PIN debit, the equivalent of an authorization message is sent in real time to the acquirer without a subsequent clearing message. This single message essentially creates its own secondary clearing and settlement message, which is automatically processed—although later and still in batch.

Card Use, Volumes, and Trends

Payment cards are used for many different types of payments. To some extent, these categories define the card products offered by card issuers.

- General-purpose consumer credit, debit, and prepaid cards are used for purchases at merchants and other point of sale locations, for online purchases of goods and services, and to make bill payments.
- Consumer cards are also used for obtaining cash. Debit cards are used for cash withdrawal at ATMs and for “cash back” at certain point of

sale locations such as supermarkets. Credit cards may be used for cash advances at either ATMs or bank branches.

- Businesses use business credit and charge cards for travel and entertainment purchases and to make and receive payments from suppliers and customers.
- Both consumers and businesses use cards to make cross-border payments; one of the great strengths of the card payments industry has been its ability to conveniently provide this service to international travelers.

Card Volumes and Growth

Card volume by type looks very different if you look at transaction count vs. transaction amount. Debit transactions exceed credit transactions by count, but are less by amount due to the higher “average ticket” (purchase amount) on credit cards vs. debit cards. Debit cards are typically used for “everyday spend”—lower-value purchases—while credit cards continue to be used for higher-value purchases, travel, entertainment, etc.

Over the last fifteen years, debit card transaction volume has grown much more rapidly than credit. Debit card growth reflects the increasing comfort of consumers with using debit cards for daily purchasing (replacing checks, cash, and, to some extent, credit cards) and, in recent years, for low-value purchases (replacing cash). Widespread merchant acceptance, particularly for signature debit, which can be accepted without PINs, makes debit cards easy and very convenient to use. Some merchants that once accepted checks have also eliminated checks from the tender types they support—further fueling the growth in debit card usage.

Regulation

Law, as well as rules promulgated by regulators and the card networks, controls regulations aimed at protecting consumers. The scope of this regulation at the federal level in the U.S. has been increasing as certain payment card industry practices have come under scrutiny in recent years.

Card Network Operating Rules

The operating rules of open-loop networks—particularly Visa and MasterCard, and to a lesser extent the PIN debit networks—govern most aspects of card issuing, authorization, clearing, and acquiring.

Operating rules are both general (network membership criteria, brand standards, issuance standards, acceptance standards, settlement procedures,

arbitration) and specific to card product type and merchant type (as based on merchant category code). Network operating rules also help determine the potential profitability of certain card issuing businesses, because those rules also specify the card network interchange that flows to card issuers for each transaction.

Visa and Mastercard operating rules have historically been very similar. For many years, the common bank owners of the two associations pressured them for “conformance” of their respective rules—as most banks in the U.S. issued both Visa and Mastercard branded cards. With public card company ownership redefining and sharpening the competition between the networks, an increasing number of rules now differ from one network to another. This is particularly problematic for merchants that have to follow these inconsistent rules.

In some cases, primarily related either to fraud or to technologies for which standardization is important, the card companies continue to work together. Examples include jointly-owned organizations such as the PCI Standards Council (PCI-DSS data security requirements for the protection of payment card data) and EMVCo (which owns the standards and intellectual property for EMV chip cards, as well as the standards for EMV-compliant contactless cards, issuer tokenization, and 3D Secure). Typically, Visa, Mastercard, American Express, Discover, JCB and UnionPay are all involved in these organizations.

Card network operating rules may also differ by country and region. Visa and Mastercard have international operating rules that specify treatment of cross-border and interregional transactions. Because cross-border transactions typically involve currency conversion, these kinds of transactions can yield significantly more revenue on a per-transaction basis for both the card issuers (which typically surcharge them to their customers) and the card networks (which handle the currency conversion as part of their settlement function) than do purely domestic transactions. For both Visa and Mastercard, cross-currency transactions provide significant revenue through their management of the currency conversion process.

Changing existing operating rules for an open-loop card network, or creating a new set of rules for a new product, is a complex and time-consuming process. Proposed rules are defined by staff at the card networks and may also be reviewed with some of their client banks. Back in the card association days, multiple committees of member banks (technical, risk management, marketing) may have been involved in reviewing proposed rule changes prior to being formally adopted.

Historically, the board of directors of a card network would give final approval for changed or new rules. Under new public ownership structures today, the management of the card network is responsible for final rules approval. The card networks publish semiannual calendars of upcoming rule changes, giving client banks and their processors time for any system or policy changes needed to implement each new rule. The card networks have been criticized for the accumulated complexity of their operating rules—and recently have undertaken efforts to simplify them where possible. Under the new public ownership structures, the card networks’ operating rules have been made publicly available and can be inspected by regulators, potential customers, and other interested parties.

Network Competition

Keep in mind that card networks compete with each other for payments volume. Rule changes can make it possible for a card network to compete in a new market segment. For example, some PIN debit networks approved rule changes to allow PIN-less debit bill payment. The basic rules of the PIN debit networks require the entry of a PIN into a hardware-encrypted device. This rule effectively shut the PIN debit networks out of the eCommerce domain, and prohibited billers from routing Internet-initiated debit card bill payments through the lower-cost PIN debit networks. The rule change simply removed the PIN entry requirement for certain categories of billers—a segmentation strategy based upon billers not likely to be paid fraudulently. Voilà—the PIN debit networks can now compete for that volume.

Closed loop networks, such as American Express, have card issuance policies similar to some provisions of the open-loop card network rules, so as to ensure interoperability for merchants and other users of the payments system. Merchant agreements, for similar reasons, are much like those of open-loop card networks. But a closed loop network is free to change such policies and agreements without the involved

processes used by open-loop networks.

Federal Legislation

The Federal Truth in Lending Act of 1968 resulted in Federal Reserve Bank Regulation Z taking effect the following year. The Act and Regulation Z were aimed at protecting borrowing consumers by requiring full and clear disclosure of terms and rates. Provisions in Regulation Z were strengthened and clarified in 1988 when the Fair Credit and Charge Card Disclosure Act was enacted.

The Electronic Fund Transfer Act, which took effect in 1980, was implemented by Reg E for debit cards. This act was also amended in 2009 to cover gift cards.

In 2009, Congress approved the Credit Card Accountability Responsibility and Disclosure Act of 2009, which significantly increased federal regulation of certain aspects of credit card issuance. Again aimed at consumer protection, the Act specifies detailed requirements on interest rate setting, billing practices, and certain notifications to consumers. The Act stopped short of specifying fees or rate caps.

In 2010, Congress approved the Dodd-Frank Act—perhaps the most significant piece of financial reform legislation in recent history. The so-called

Durbin Amendment regulating debit card interchange and network routing was included in this legislation as was the creation of the new Consumer Financial Protection Bureau (CFPB) which consolidates most Federal consumer financial protection authority in one place. The bureau's activities related to credit cards has included building a database of credit card agreements from more than 300 card issuers, conducting and reporting on a semiannual survey of the terms of credit card plans offered by financial institutions, and examining credit card marketing agreements with universities, colleges, or affiliated organizations such as alumni associations, sororities, fraternities, and foundations. Every two years, the CFPB reports on the state of the consumer credit card market that covers how consumers use cards, the price they pay for using them, the availability of credit cards, the practices used by credit card companies, and innovation.

U.S. Congress in Action

The 2009 Credit CARD Act was most likely inevitable, given the level of consumer outrage over credit card issuers' practices in recent years. Certain issuer strategies such as "double cycle billing" and "universal default" were widely seen by consumers as both unfair and predatory. Consumer advocacy groups kicked into gear and were instrumental in educating legislators, who saw the opportunity to enact legislation popular with consumers. Banks were left with regulation that both constrained their business models and was costly to implement.

Network Economics and Interchange

In the sections that follow, we will discuss the business models for card issuance and card acquiring. But first, we'll discuss the card networks themselves as they are also now no longer bank-owned associations but real, publicly traded companies—with their own economic models and public shareholders.

The Network Business

Running an open-loop card network involves functions such as these:

- Transaction switching among banks participating in the network
- Net settlement among banks, usually on a daily basis and including multi-currency settlement
- Creation, updating, maintenance, and enforcement of operating rules, including setting interchange fees
- Management of network membership, including defining and enforcing criteria (such as financial strength) for membership
- Creation and maintenance of brands and brand promotion strategies
- Arbitration of disputes between network participants

Most networks also provide additional services to network participants. These may include additional processing services, including risk management, and a variety of information products. The network operating rules may mandate that participants use some services; others are optional.

The revenue models for the card networks consist of processing fees and brand-use service fees assessed on all transactions made with a card carrying the network brand. As they compete for the loyalty of card issuers to their brands, the card networks may offer larger issuer incentives in terms of additional services or reductions in assessments in exchange for issuer commitments to issue their network-branded cards. For a card network, obtaining issuance is fundamentally important—the network’s business begins with having cards issued that include their brand.

The global card networks also earn significant revenue from handling the foreign exchange aspects of all cross-currency transactions. A cross-currency transaction—with its “built-in” foreign exchange revenue opportunity—can be substantially more profitable to the card networks than domestic transactions where no currency conversion is required.

Offsetting a network’s revenues are the costs of operating substantial transaction processing centers; a global telecommunications infrastructure; staff required to handle the rules and perform product management and member relations functions; and the expenses associated with brand promotion and advertising.

Perhaps the most unusual—and interesting—aspect of the card industry is the networks’ role in card interchange fees. The networks set the interchange rates, but, as we will see, do not directly participate in the financial flow associated with interchange fees, nor do they receive any revenue from them.

Interchange is, however, a critical element of a card network’s business model. Since the card network’s issuing customers are the recipients of interchange fees, the level of interchange that a network sets is an important element in the network’s competitive position. A higher level of interchange on one network’s card products naturally makes that network’s card products more financially attractive to card issuers. In a market in which issuers are free to choose to issue card products from among multiple networks, interchange fee income becomes an important criterion in the decision made by an issuer as to which card brand and card products to issue.

Card Network Interchange

Interchange is a feature of open-loop card networks that was originally introduced to bring into balance the costs borne by the card issuer and merchant acquirer to provide the card payment service.

The rationale for the unusual economic structure of interchange rests on the concept that one “side” of the transaction, the merchant (and its acquiring bank), benefits from the use of the card (primarily through increased

merchant sales), while the other “side,” the card issuer, incurs costs associated with making this use possible. Interchange is the mechanism the card networks established early on to have the value-receiving merchant compensate the cost-incurring issuer for some of the issuer’s expenses. It would be too complex, according to this rationale, to have each issuer individually negotiate compensation with each merchant. The network, by defining the appropriate cost reimbursement between the parties, defines how the economics work.

In establishing the original framework for interchange, the card networks utilized third-party accounting firms to study issuer, acquirer, and merchant costs and to recommend a fee structure that would ensure a balanced approach was the result: what one network termed IRF, an “issuer reimbursement fee.” The framework used for this examination put costs into three categories:

- **Cost of guarantee.** The card issuer is extending a payment guarantee to the merchant—the merchant is paid even if the cardholder subsequently fails to pay the card issuer what he or she owes.
- **Cost of funds.** The merchant receives payment from the issuing bank (via the card network) before the issuing bank is paid by the cardholder.
- **Operating expenses.** The issuing bank has expenses in operating its authorization network, producing statements, handling customer service, etc.

Because much of the costs of providing the card payment service are borne by issuers, interchange fees provided the mechanism for issuers to be compensated for a portion of those costs by assessing acquirers who, ultimately, pass the costs on to their merchant customers.

Each card transaction involves two banks with interchange being a fee that one bank pays to the other as compensation for some of its costs. The network sets the interchange fee and determines the direction of payment (which bank pays the other). In the United States, interchange flows from the acquiring bank to the issuing bank on purchase transactions. As such, interchange is an expense to the acquiring bank and revenue to the card issuing bank. (Note that interchange on ATM transactions flows in reverse—the card issuer pays an interchange fee to the ATM deployer for servicing the issuer’s cardholder.)

The merchant’s acquiring bank, of course, passes this interchange expense along to its customer, the merchant. The acquiring bank’s fee to the merchant is known as the “merchant discount fee,” of which interchange is the largest single component. While interchange is often equated with the

merchant discount fee, it's not the same thing—just the largest component. This is illustrated below.

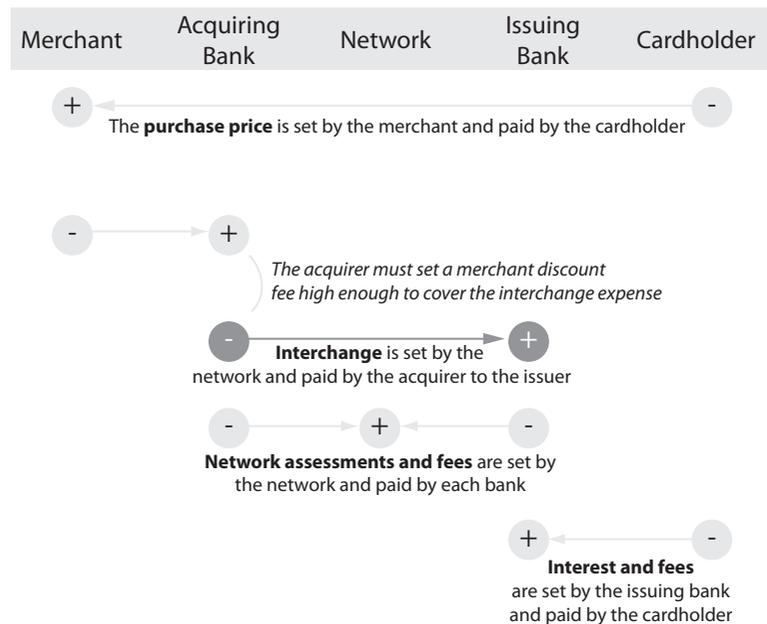


Figure 5-5:
Card Network
Interchange

Acquirers typically quote prices to larger merchants based on “interchange plus” pricing—meaning that interchange fees (along with card network assessments and transaction fees that the acquirers must also pay to the networks) are passed through to the merchant—with the acquirer’s additional fees priced on top of those. With this so-called “interchange plus” approach, acquirers are insulated from changes to interchange fees—they simply pass them through to the merchants, including any adjustments the card networks may make to the fees over time. Merchants also like the transparency that this approach provides, as they get to see the major expenses that the acquirer incurs.

Smaller merchants are typically quoted a blended rate for their merchant discount fee and may not have visibility to the underlying interchange and assessment components of the merchant discount fee. Many small merchants lack the sophistication to be concerned about that level of detail but, as merchants become more successful and handle higher volumes of payments, they will likely begin to pay attention and may want to move to an “interchange plus” pricing arrangement with their acquirer.

Interchange fees also vary based on the card product type used by the consumer and the merchant handling of the transaction. Interchange fees are

calculated and applied by the card networks, literally, on a transaction-by-transaction level.

	Mastercard & Visa Credit Card	American Express Card	Regulated Debit Card	Exempt Debit Card
Note: all rates are illustrative only, and meant to describe the relative levels of interchange (on open-loop networks) and the resulting merchant discount fee for a \$100 purchase. The acquiring markup will vary considerably based on the size of the merchant. "Regulated" and "Exempt" refer to Fed Reg II, discussed below.				
Interchange	\$1.75	N/A	\$0.25	\$0.51
Acquiring Markup	\$0.15	N/A	\$0.10	\$0.10
Total Merchant Discount Fee	\$2.00	\$2.50	\$0.34	\$0.61

*Table 5-4:
Comparative
Interchange*

The Evolution of Interchange

Although each card network originally had only one interchange rate, the networks, over time, realized that setting different rates to accomplish certain objectives was an effective segmentation strategy to help expand card acceptance to new merchant categories.

The first major incentive interchange rate was introduced in the 1980s, when the networks established a lower interchange rate for transactions handled by electronic draft capture POS terminals in lieu of paper sales drafts. This lower incentive interchange rate provided the primary economic rationale for merchants to migrate from paper-based to electronic draft capture POS terminals. Over the course of several years in the late 1980's, almost all of the merchants in the U.S. completed this migration—saving on interchange fees, but also improving the ease and convenience of paying by card.

Since then, many additional interchange rates have been defined, for particular merchant categories (for example, a low interchange rate was introduced to provide an incentive for grocery stores to begin accepting credit cards), certain types of transactions (eCommerce, bill payment), and certain types of cards (small business, premium rewards cards, etc.). Over the years, the complexity of the interchange schedules of the card networks has grown—for example, Mastercard's interchange schedule is over 100 pages long.

The interchange rate a merchant pays on a particular transaction is determined by the combination of all such factors. Not surprisingly, given this segmented approach, cost today does not appear to be the sole factor in determining card network interchange.

Interchange rates also vary by payments system. Signature debit card interchange is lower than credit card interchange, and PIN debit interchange is even lower for unregulated debit card issuers. Larger debit card issuers (with

over \$10 billion in assets) receive regulated interchange rates that do not distinguish between signature or PIN debit usage.

Closed loop networks do not have interchange, although the network assesses to the merchant a “merchant discount fee” which is generally similar to the merchant discount fee that an acquiring bank charges for a merchant’s access to the open-loop networks. In a closed loop network, the entire discount fee is kept by the network rather than being shared among three parties (acquiring bank, network, and issuing bank). As the traditional closed loop networks—American Express and Discover—have recently been opening up to working with acquirers to expand acceptance of their card brands, they have created an analogous structure which provides compensation to acquirers for their help in increasing acceptance.

In Australia, the EU, and some other countries, bank regulatory and competition authorities have stepped in and mandated reductions in interchange rates. In the U.S., interchange rates have been repeatedly, but unsuccessfully, challenged in court by merchants seeking to have them reduced.

The Interchange Controversy

Interchange has been controversial, in both the United States and other markets. Although the arguments are complex, the two general points of view can be summarized as follows:

Perspective One: Interchange is an economic structure necessary to enable a global network of great benefit to all participants; it is the most effective way of managing what economists refer to as a “two-sided market.”

Perspective Two: Interchange is a form of price fixing that unfairly constrains merchants’ ability to directly negotiate prices for a key service (card acceptance).

A middle ground holds that the mechanism is effective, but needs some form of governmental control to ensure that interchange rates remain reasonable. This group notes that network competition for issuance leads to rising, rather than falling, prices. This occurs because the network’s customer (the issuing bank, which decides which network to use) receives the price that the network sets. In a “normal” market, a customer pays the price their provider sets.

One concept that has growing appeal among some groups is to not regulate interchange, but instead prohibit card network rules that ban surcharges. This would allow merchants to charge consumers an additional fee for acceptance of high-interchange cards, for example. This has worked in some markets (e.g., Australia), but has proven impractical in the U.S. due to state laws in many states that prohibit merchants from surcharging customers.

Over the years, various merchant coalitions have lobbied regulators and legislators in the U.S. for “interchange relief.” To the banking industry’s apparent surprise, the 2010 Dodd-Frank financial reform bill contained a provision—known as the “Durbin Amendment”—that gave the Fed the responsibility to determine appropriate debit card interchange rates.

In 2011, the Fed fulfilled its new responsibilities under this legislation and published Regulation II that set interchange fees on debit cards for

“regulated” bank issuers—those with over \$100 billion in assets—as well as required that all debit card issuers provide two unaffiliated debit networks on their cards with merchants being able to choose which network would route the transaction on a transaction-by-transaction basis.

Litigation between merchants and the card companies has continued to evolve with new cases that continue to argue for various forms of relief. As with other jurisdictions around the world, interchange remains an important area of focus for merchants in the U.S. seeking to reduce payments acceptance costs.

Card Issuance—Credit and Charge Cards

The credit card has been called “the most profitable product in banking history” in the United States and the credit card market is one of the largest consumer markets in the nation. With industry revenues estimated at well over \$100 billion annually and revolving credit card balances exceeding \$925 billion, it is clearly a very attractive business.

In addition to its substantial revenues, three factors characterize the credit card issuance industry in the United States—factors that do not apply in many other countries.

- **Near-universal acceptance.** Almost all retail establishments in the U.S. accept credit cards, as do many non-retail enterprises, including billers, manufacturers, distributors and wholesalers, governments, non-profits, and educational institutions.
- **A saturated marketplace.** The CFPB reports that most adult Americans—about 63%—have an open credit card. Many Americans without access to credit have debit or prepaid cards.
- **Multiple cards.** Of Americans who have a credit card, most have nearly four credit cards each. They are used to choosing between those cards at the point of sale based on a wide variety of factors, including available credit lines, rewards, and purpose of the purchase.

Credit Concentration

Within the large credit card issuing banks, the organization responsible for credit card issuance is a separate business unit, removed from the retail bank organization that manages consumer checking accounts and issues debit cards. As a result, it's quite typical that a bank other than the one holding the consumer's checking account has issued a consumer's primary credit card.

These factors have contributed to a sharp increase in the concentration of the credit card issuing marketplace in the United States. The top ten U.S. credit card issuers handled over 80% of total general-purpose card purchase volume at the end of 2015—including (in the top 5) JP Morgan Chase, Bank of America, Citibank, Capital One and Wells Fargo.

What Credit Card Issuers Do

- **Determine card offerings.** Issuers choose which networks to use, which types of network-branded cards to offer, and which issuer-specific customizations to offer. Major issuers often have hundreds of product variations available. Determining the type and level of rewards offered on a card is an important part of this task. Some baseline card rewards levels are dictated by card network product standards; the issuer customizes others.
- **Solicit new cardholders.** Through mailings, “take-ones,” online sites, bank branches, and onsite event leads. Co-branded and affinity cards are a way for some issuers to find new customers at a reasonable cost by partnering with merchants or member associations. Credit underwriting and fraud scoring must be done before approving a new cardholder.
 - **Issue cards.** Card issuers must physically issue cards to cardholders, personalized with data on magnetic stripe and chips, and manage card activation (preventing fraud from cards lost in the mail).
 - **Compete for purchase volume and balances.** Card issuers strive for “top of wallet” positioning—for both POS and online purchases. (Online, a “card on file” at an eCommerce merchant or travel site equals a virtual “top of wallet”).
 - **Manage credit and fraud exposures.** The U.S. credit bureaus provide sophisticated tools, which issuers supplement with internal systems, to manage ongoing credit exposure. Other tools, provided by third parties or developed internally, help manage transaction fraud—often dynamically (prior to transaction authorization).
 - **Manage operations, including authorization, clearing, statementing, and customer service.** Part of this is responding to customer and merchant inquiries and handling disputes—including the so-called “chargeback.”
- **Manage the cost of funds.** Issuers also manage the sale of securities to fund additional receivables.
- **Manage collections.** Issuers attempt to collect bad debt from consumers who don’t pay off their debts. Issuers often sell bad debt to third-party collectors.

What is a Chargeback? (Part 1)

A chargeback is a card industry term referring to a set of rules that spell out issuer, acquirer, and merchant responsibilities in the event of a disputed transaction. The rules give issuers the right to reverse a credit to the merchant’s account (to “charge it back”) under certain circumstances based on a series of “chargeback codes” with associated rules and rights.

There are three broad types of disputes and corresponding types of chargebacks. A “fraud” chargeback is initiated when the consumer claims they don’t recognize the purchase or didn’t authorize the transaction. This is sometimes referred to as the I-didn’t-do-it chargeback. A “service” chargeback is initiated when the consumer has not received the goods or service as promised and the merchant refuses or is unable to make the consumer whole. A “technical” chargeback is initiated to correct a technical billing mistake. The consumer recognizes the purchase, is satisfied with the goods, but didn’t agree to be charged five times for the same purchase!

Credit Card Processors

Issuing processors may do some or all of the tasks listed above. A very small bank might entirely outsource its card program to an issuer processor handling all activity, including taking and managing credit exposure, with the bank simply putting its brand on the product. A larger bank may outsource authorization and clearing, but handle all other tasks in-house; some of the very largest issuers chose to perform essentially all functions in-house.

The two largest processors in the U.S. for credit card processing are First Data Corp. and TSYS. In addition to credit card processing, they also providing processing services for debit and prepaid cards along with merchant acquiring.

In addition to the card processors, issuers may also rely on other companies to assist in various business areas. These companies:

- Assist issuers in using a wide variety of consumer databases to help target potentially profitable consumers for solicitation and for other marketing programs.
- Provide issuers with card plastic production, independent of the processor or in-house production department.
- Help issuers with products that assist in predicting credit defaults, adjusting credit lines, and attempting to maximize portfolio profitability.
- Support issuers who choose to outsource collections to third parties and who may, ultimately, sell the debt for a small fraction of its value to a third-party debt buyer that pursues debt collections independently of the original issuer.

Credit and Charge Card Products

- **Charge cards** have no revolving credit associated with them and require the cardholder to pay the balance in full each month.
- **Revolving credit cards** are the basic credit card we all know so well: the cardholder is given the option to pay the balance in full each month (becoming, in industry parlance, a “transactor”) or to make partial payments over a period of time (becoming a “revolver”). Most consumer credit cards provide a “grace period” that allows the cardholder to avoid paying interest on purchases as long as the balance is paid in full. As a result, transactors almost never pay interest charges. Revolvers, on the other hand, carry a balance from month to month and pay interest charges based upon the amount of credit extended. Revolvers also generally are charged interest from the date of purchase.

- **Premium cards**, in gold and platinum and more, are defined by the card network and may offer a variety of special services as well as enhanced rewards.
- **Affinity and co-branded cards.** Affinity cards carry the name and brand of an organization (perhaps a school, alumni association, or football team). Co-branded cards are a joint product offering of the sponsor and the issuing bank. Terms of these deals vary, but generally the sponsor gets some financial benefits (particularly on purchases made at the sponsor’s outlets) and the issuer gets a lower-cost source of new customers. Both issuers and networks are typically involved in the competition for a new co-brand relationship.
- **Small business cards.** Revolving credit or charge cards offered to small businesses, often with specialized rewards programs.
- **Corporate cards.** Charge cards issued to the employees of a corporation, to be used primarily for travel and entertainment purchases.
- **Purchasing cards.** Charge cards issued to a corporation (to either employees or departments), used to buy goods and services from company suppliers.
- **Private label cards.** Closed loop cards offered by a single sponsor; most common are gasoline and department store cards. Private label cards are not usable at other merchants. Typically, a merchant contracts with a large issuing bank to do the work and take some or all of the credit exposure.

Credit and Charge Card Economics

The economics of the credit card industry are dominated by interest earned on revolving loans to credit cardholders who are revolvers. The interchange component of the merchant discount fee in an open-loop network, and the entire merchant discount fee in a closed loop network, are important, but secondary, sources of revenue. Charge cards, without the interest income from consumer borrowing, must rely exclusively on interchange and cardholder fees for revenue.

Offsetting revenue are credit losses, cost of funds, fraud losses and operating expenses. The costs of soliciting new cardholders and providing rewards programs both to attract new cardholders and to compete for “top of wallet” position on spending are also considerable.

The credit card issuing business can be very profitable. The figure below shows a typical large credit card issuer’s P&L—in “normal” economic times. Note credit losses are shown here as a percent of revenue. More typically,

the industry looks at losses as a percent of outstanding receivables. That loss rate is usually around 5%—but in times of recession can climb to 10% or more—resulting in losses for the issuer during those years.

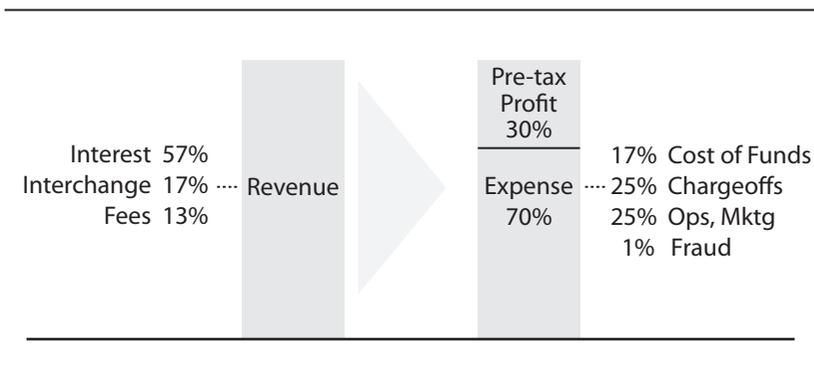


Figure 5-6: Typical Credit Card Issuer P&L

Credit Card Issuance Strategy

Bank strategies regarding credit vary considerably. Some banks take an aggressive posture, lending to riskier borrowers and compensating with aggressive credit line management and collection policies. Others are more conservative—perhaps choosing to only extend credit cards to existing customers of the bank and not the broader population.

Similarly, banks vary in terms of their marketing strategies: some market credit cards only to existing customers who have banking (checking account) relationships with them; others aggressively court new customers anywhere they may live. All banks, of course, are vulnerable to credit cycles in the economy and to how those cycles may affect consumers’ ability to repay debt.

Rewards Programs

The cost of developing and administering rewards programs is increasingly important to the credit card industry. The CFPB reports that, as of 2014, accounts with rewards programs represent nearly two-thirds of all credit card balances and four-fifths of all credit card spending.

Card issuers are becoming more active in their management of credit and charge card interchange revenue. From a credit card issuer’s standpoint, the level of interchange income received is based primarily upon the type of card issued. American Express (which now can be issued by other banks following the outcome of earlier litigation against Visa and Mastercard), Visa Signature, and Mastercard WorldCard products are higher interchange products, as are small business cards. To increase interchange revenue, issuers have migrated some existing cards to these products as they go through reissuance, as well as using them and their higher rewards features to try to gain new customers. The costs of network-mandated rewards programs and other network-defined product features can offset some of the increased interchange revenue.

Annual card fees, once a common feature of the card industry, have significantly declined in importance; competition has mostly reduced or eliminated annual fees for traditional credit cards. Punitive fees for over-limit or late payments are also important elements of issuer revenue.

Card Issuance—Debit Cards

A debit card enables a customer to make a purchase by using funds from the balance available in a checking account. As shown below, a debit card can be thought of as a hybrid of a credit card and a check; it has some similarities to both, but with the source of funds remaining in the checking account.

Attribute	Credit Card	Debit Card	Check
Type	Electronic, “pull”	Electronic, “pull”	Paper, “pull”
Source of Funds	Credit	Checking account	Checking account
Risk to Merchant	Guaranteed	Guaranteed	Not guaranteed
Economics for Issuing (Consumer) Bank	Loan interest, interchange, fees	Net interest income, interchange, fees	Net interest income, fees

Table 5-5: Debit Card Comparisons

Signature and PIN Debit

In the U.S., there are two primary types of debit transactions: signature debit, routed through the Visa or Mastercard networks (“riding the credit card rails”) and PIN debit, routed through one or more of the ATM or PIN debit networks. The physical debit card used for either of these transactions is the same, with the same PAN (primary account number) used regardless of the transaction routing. As mentioned earlier, the evolution of the credit card networks paralleled the evolution of the debit card networks; eventually they came together when Visa and Mastercard launched their signature debit card products.

The routing of the transaction, however, has meaningful differences in terms of the rules and interchange fees that apply to it.

The routing decision is actually made by a combination of consumer choice and merchant choice at the point of acceptance, and depends on several factors:

- If the merchant does not have a PIN pad, the transaction is always routed through the signature networks. The PIN debit networks require PIN entry at the physical point of sale.
- If the merchant does have a PIN pad, the merchant’s system may look up the PAN (using information provided by the merchant’s acquirer) and determine that the card transaction can be routed to a PIN debit network. If so, the merchant POS in real time may prompt the consumer for PIN entry, thereby “steering” the transaction through

the lower-cost PIN networks, unless the consumer is aware of the difference and asks that the transaction be routed through the “credit” networks (by cancelling the request for PIN at the POS). Note that the Durbin Amendment and the resulting Federal Reserve Regulation II eliminated any potential differential in cost between signature and PIN debit for regulated debit card issuers.

- Some merchants do not steer, but leave the choice up to the consumer.
- In card-not-present transactions, routing is almost always classified as signature debit. However, in recent years, the PIN debit networks have been allowing some low-risk transactions, such as online bill payment, to flow through their networks without a PIN—the so-called “PINless debit” acceptance category. Several startup companies are also attempting to bring PIN debit transactions to eCommerce merchants.
- With the passage of the Dodd-Frank Act in 2010 with the so-called Durbin Amendment, the Federal Reserve was given responsibility to set new rules with respect to routing of debit card transactions. These new routing rules apply to all debit cards, not just to debit cards issued by “regulated issuers” with over \$10 billion in assets. In general, the new Regulation II debit routing rules require that issuers equip their cards so they can be routed over at least two unaffiliated debit networks—and provide that the merchants shall have the ability to make the choice as to how to route on a transaction-by-transaction basis.

As shown in the table below, the differences between signature and PIN debit primarily relate to the authentication used and the routing/processing of the transaction. As overall debit purchases continue to grow, bank debit card issuer focus appears to be switching away from a “war between PIN and signature” and simply to more support for debit in general as the best alternative to consumer use of checks.

Attribute	Signature Debit	PIN Debit
Type	Pull payment	Pull payment
Authentication	Signature	PIN
Merchant Guaranty	Full (Card-present)	Full (Card-present)
Processing	Dual message	Single message
Network Interchange	Regulated for large banks	Regulated for large banks

Table 5-6: Signature and PIN Debit

Debit Volumes

Over the last fifteen years, debit card volumes have grown rapidly in the U.S. market and now account for more consumer purchase transactions and more spending, on an annual basis, than either credit cards or checks. Debit card growth has come as debit cards have replaced:

- **Checks.** Consumers find debit cards more convenient than checks at the point of sale and many merchants have found it more acceptable to simply not accept checks. Many consumers also use their debit card to directly pay billers online.

KYC

In order to open a checking account for a customer and issue a debit card, a bank must go through a “Know Your Customer” process mandated by the USA PATRIOT Act of 2001. Though this is not generally thought of as a debit card function, a bank can’t issue a debit card if it hasn’t completed this process.

- **Credit cards.** Some “convenience” users of credit cards, who routinely pay off their monthly balance, have switched to debit cards. Others continue to use credit cards, primarily to get the higher rewards available on credit cards.
- **Cash.** A more recent trend has been the use of debit cards for very small transactions—particularly now that, at many merchants, a signature on the receipt is not required for such transactions.

Debit Card Economics

For the consumer’s bank, the debit card is not a product in the same sense that a credit card is. A debit card is a component—now, a very important component—of the checking account product. This is true both for consumer and small business checking accounts. Unlike with credit cards—where a consumer might choose to have several cards from different issuers—only one debit card from their primary relationship bank is typically in the consumer’s wallet.

Although some revenues, and some expenses, can be attributed directly to the debit card, the consumer does not make a buying decision to acquire a debit card. Rather, the consumer chooses a bank for their checking account, and is then automatically issued a debit card (which, of course, is also an ATM card).

A retail bank P&L might look something like the example shown in the table below. Note that there is little direct relationship between sources of revenue and categories of expense.

Sources of Revenue
Net interest income: value of balances in checking account
Interchange from debit card transactions
Routine monthly fees
Exceptional fees (overdraft, etc.)
Categories of Expense
Branches, customer service centers
Systems: transaction processing, networks, statements, online and mobile banks, online bill payment, etc.
Risk management
Marketing and rewards programs

Table 5-7: Debit Card Issuer P&L

It is clear, however, that increasing the use of debit cards, particularly as they displace check and cash transactions, will grow revenue at a bank. This is simply because the bank earns interchange revenue on every debit card transaction, but nothing on cash or checks (except in the case of non-sufficient funds). Banks, therefore, spend time and attention on debit card activation, the industry term used for getting a consumer to start using the debit card—not just for ATM access but also for everyday purchases. Note that the Durbin Amendment and the resulting Federal Reserve Regulation II has significantly reduced interchange fee revenue for regulated debit card issuers.

Bouncing Cards?

In the early days of debit cards, many banks were wary that debit cards might reduce the NSF (“bounced check”) fees from the checking business. Since a debit card was authorized and, therefore, couldn’t bounce, the thinking went, banks stood to lose a lot of the money they were then earning from bounced check fees. After a few years, some smart bankers figured out that they could actually go ahead and authorize debit transactions against insufficient balances, and charge the cardholder an overdraft fee, thereby replicating the NSF income stream. This was so successful that banks increased both the rate and frequency of these charges. This led to a significant consumer backlash against the “\$35 overdraft fee on a \$5 cup of coffee,” leading the Federal Reserve Bank to impose new regulations requiring banks to have consumers “opt in” for overdraft protection.

What the Debit Card Issuer Does

- Issue cards to cardholders, personalized with data on magnetic stripe and (for some cards) contactless chips; manage card activation.
- Choose and manage the ATM and debit card networks, managing the expense of network fees against the interchange revenue (for debit cards) and revenue or expense (for ATMs) offered by the network.
- Manage fraud.
- Manage overdraft and collections on overdrafts extended.
- Manage operations, including authorization and clearing. Note that many operational tasks, including statement production and customer service, are done for the checking account product as a whole, and not specifically for debit cards.
- Define and manage debit card rewards programs. Generally, debit card rewards are less “rich” than credit card rewards, because of the lesser interchange revenue from debit card transactions, which funds the costs of rewards. With the reduction in interchange revenue post-Regulation II, debit card rewards programs have

Checking Debit Card Transactions

Debit card authorization is more challenging than credit card authorization, as the bank must check against an ever-changing account balance. In the early days of debit, banks would authorize transactions (or have a processor authorize them) against a “shadow file” that could be hours or even days out of date. Now, however, most large banks handle authorizations dynamically against the “real” balance in the checking account.

mostly disappeared for regulated debit card issuers but are still sometimes provided by exempt debit card issuers.

Debit Card Issuer Processors

As with credit cards, debit card processors provide debit card issuers with outsourced processing services for their debit card programs as an alternative to in-house processing. Major providers include Visa DPS, First Data Corp., TSYS, Vantiv, Mastercard Payment Transaction Services, FIS, Fiserv, and others.

Debit Card Competition

Banks' share of the debit card market naturally tracks the distribution of checking accounts. As the U.S. is not a concentrated retail banking market, debit card issuers are much less concentrated than credit card issuers. Also, a consumer may have multiple credit cards, but typically only one debit card. In general, debit card issuance follows a retail bank's checking account market share.

There is, however, competition in the debit brand and network areas—and it is a bit more complex than that for credit cards. Competition exists between the signature debit and PIN debit networks (discussed above), and among brands within signature and PIN debit. Visa and Mastercard compete for signature debit volume, but also own PIN debit networks (in the case of Visa, one of the major ones). There are multiple PIN debit networks, many operating on a local or regional basis. The national PIN debit networks (STAR, NYCE, and Accel/Exchange) are owned by major bank processors. Competition for debit issuance and merchant routing of debit card transactions has intensified since the Federal Reserve has imposed its new Regulation II debit rules on the industry.

<i>Debit Card Issuing Banks</i>	<i>PIN Debit Networks</i>
Bank of America	Interlink (Visa)
Wells Fargo	Maestro (Mastercard)
JPMorgan Chase	STAR (First Data Corp.)
All other banks and credit unions	NYCE (FIS)
<i>Signature Debit Networks</i>	Accel (Fiserv)
Visa	Pulse (Discover)
Mastercard	and others
Not all providers or all categories are shown	

Table 5-8: Major Providers—Debit Card Issuance

Debit Card Rewards

Some banks may provide consumers with rewards for debit card usage. This makes sense for “non-regulated” debit issuing banks, which want consumers to “activate”—and many consumers have come to expect card rewards.

The challenge to debit issuers is financial: there isn’t a lot of interchange revenue on debit cards—especially those of regulated debit issuers—to fund the cost of providing rewards. So consumers, used to high reward levels on most of their credit cards, are often disappointed with the relatively low levels of rewards on debit cards. Banks are using a variety of strategies to create rewards programs that satisfy both their desire for debit card activation and consumer expectations:

- Relationship rewards. These programs provide consumers with rewards points for a variety of checking account actions; there may be different points awarded for PIN and signature debit, for using the bank’s electronic bill payment service, for receipt of an electronic statement, etc.
- Merchant-funded rewards. These programs provide richer rewards when a customer shops at one of a set of merchants in the bank’s rewards network. The merchants fund the rewards. Typically, these networks are “category-exclusive”—they have only one merchant per category (e.g., hardware store or coffee shop).

New Types of Debit Cards

Although most debit cards in the U.S. use either the signature or PIN debit networks to access funds in a consumer’s checking account, it is possible to use the ACH network to accomplish nearly the same thing. A bank (or a non-bank service provider) can provide a consumer with a card (or a non-card token) that, when presented and authenticated, triggers an ACH debit transaction and pulls funds for the purchase from the consumer’s checking account.

Some department stores or gas companies use this technique today. A single-purpose card is given to the consumer, who presents it at purchase; an ACH transaction is triggered. The merchant saves by paying no merchant discount fee, but bears NSF risk. Some grocery stores are “payment-enabling” their loyalty cards in this fashion. While these single-purpose cards look like a traditional debit card, they are actually ACH POS cards and are governed by NACHA rules.

The Debit Card Brand Decision

When the card networks introduced signature debit to banks, they didn’t permit dual issuance of debit cards—meaning that a bank that issued a Visa signature debit card could not also issue a Mastercard signature debit card. Helped by this policy, Visa took an early lead in debit brand share. Visa’s strategy of providing complete debit card processing (card issuance, authorization, and clearing) for banks also helped win bank issuance decisions.

Another variation is referred to as a “decoupled” debit card. A “normal” signature debit card is issued to a consumer by a bank different from the one at which the consumer has a checking account. The issuer authorizes the merchant transaction through normal card authorization processing, and then uses ACH to pull funds from the consumer’s checking account—which the consumer registered upon enrollment. The issuer keeps the signature debit interchange, but bears the risk of NSF or fraud on the ACH transaction.

Debit or Credit?

At Glenbrook’s Payments Boot Camps, one of the most frequent questions we get is, “Why do people use debit cards instead of credit cards?” Our Boot Camp attendees, of course, are payments professionals—relatively affluent business people. Almost without exception, they use credit cards, not debit cards, for their “everyday spend,” and enjoy the rewards that come with this. Many of these people don’t carry credit card balances—they are “transactors” in card industry parlance. They don’t understand why someone would choose to use a debit card. They think of their credit card as a debit card with rewards.

There are several answers to this question. Some consumers have been “burned” by credit card usage, and avoid credit cards in order to avoid incurring debt and interest and fees related to this. Others have a philosophical or moral objection to the use of credit, and avoid credit cards even if paid off every month.

But we think the best answer is that most people aren’t asking themselves the question, “Should I use a credit or a debit card?” Instead, they want to spend the money they have in their bank account, and are asking the question, “How should I do this?” They can withdraw cash from their account, and pay that way; they can write a check on the account, or they can use their debit card. The debit card, for many people, wins on convenience and ease of use.

Card Issuance—Prepaid Cards

Prepaid cards are a special type of debit card. Purchases made with a prepaid card draw on funds already in an account—not upon a line of credit. But rather than drawing on funds kept in the cardholder’s checking account, a prepaid card draws on a different type of account, kept on behalf of the cardholder by the issuer of the card.

There are two types of prepaid cards: closed loop and open-loop cards. Closed loop cards are usable only at the sponsor’s store or stores. Open-loop cards carry a network brand and are usable anywhere that network’s brand is accepted.

In the U.S. market, closed loop cards account for roughly three quarters of the prepaid card “load” (value) each year, but the open-loop network-branded cards are growing much more quickly. Each type has its own value chain and economic model.

Closed Loop Cards

Most closed loop cards are gift cards. The sponsor of the card is a merchant, which is trying to drive increased sales.

The figure below shows the basic roles in the closed loop value chain. Roles other than sponsor and bank are optional: a merchant can handle program management and processing in house, and may choose not to use a distributor to have cards sold in other locations.

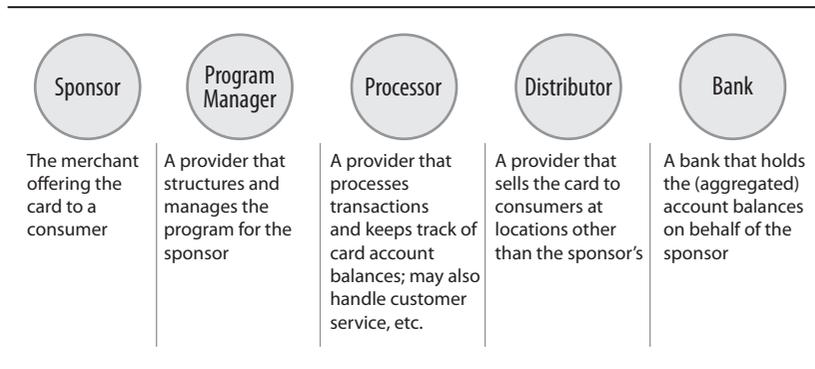


Figure 5-7: Prepaid Value Chain—Closed Loop

Gift card programs are often tied into merchant loyalty programs, specialized program managers and processors have designed increasingly intricate product offerings to meet the needs of their sponsor customers. Often, one company provides both program management and processing capabilities.

Gift cards are almost always sold to the consumer at face value. The merchant is looking for increased sales, and considers the expenses paid to others in the value chain a reasonable investment. Some merchants, for example, know that they will benefit each time a gift card recipient makes a purchase larger than the gift card amount.

In the early days, some gift card sponsors attempted to charge “inactivity fees” (decreasing the card balance each month), or assigned expiration dates to the card balance. These practices are becoming much less common, however, as they have provoked consumer outrage and regulatory attention.

The role of the prepaid card distributor is an unusual one in payments systems, but one which has proven to be highly successful for both the distributor and the distributor’s outlets (which sell the cards). Prepaid card distributors emerged as supermarkets and convenience stores figured out that they could profit from selling merchant-branded gift cards at their locations. Over time, consumers increasingly expected to be able to choose from a wide range of gift cards at so-called “gift card malls” in supermarkets, and distributors working with retailers enabled them to do so.

Open-loop Cards

Open-loop, or network-branded, prepaid cards are usable wherever that card network brand is accepted—including for purchases, bill payments, and withdrawals of cash at an ATM.

There are dozens of different variations and purposes for open-loop cards. Much of today’s innovation in the payment card industry is taking place with open-loop cards.

Segments of this market include:

- Business-to-consumer: rebates, refunds, promotions, insurance claims
- Government-to-consumer: benefits, social security, veterans’ compensation
- Employer-to-employee: payroll cards, incentive cards, bonus cards
- Consumer-to-merchant: open-loop gift cards, travel cards, youth cards
- Checking account replacement: as an alternative to a traditional bank checking account (sometimes called GPR or “general purpose reloadable” cards)

As shown below, the value chain and roles are similar to those of closed loop cards, with the important distinction of the network connection.

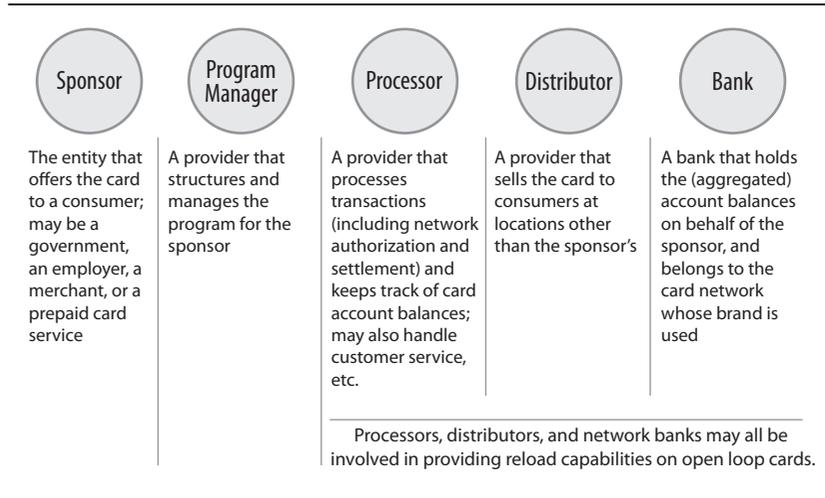


Figure 5-8: Prepaid Value Chain—Open Loop

Unlike closed loop prepaid cards, the primary motivation is not captive merchant sales at the sponsor’s stores. Instead, open-loop prepaid cards are designed to make money for the sponsor—the open-loop card is sold to the consumer with an activation fee on top of the face value of the card, and a long list of additional fees (monthly maintenance, transaction charges,

reload charges, etc.) are common. The prepaid card issuer also receives network interchange on purchase transactions.

Prepaid Card Regulation

Because of the newness and growth of prepaid cards, the regulatory environment has been both uncertain and evolving rapidly.

Closed loop cards have been subject to a variety of state laws and, with passage of the Credit Card Act of 2009, new federal regulations. The Act sets new minimum thresholds for fees and expiration dates, but doesn't prevent state laws from being even more restrictive.

Open-loop cards are also subject to regulation, including KYC (know your customer) requirements on the card issuer. Open-loop cards are also subject to Federal Reserve Board Regulation E. Regulators continue to keep a close eye on these cards to prevent their use in money laundering schemes.

The Consumer Financial Protection Bureau also plays an important regulatory role with respect to prepaid cards and is considering new rules that would require new disclosures, error resolution procedures, consumer liability limits for unauthorized transactions, fee limits, and added requirements for cards with overdraft or credit features.

A Bank on a Card?

Open-loop prepaid cards have been called "a bank on a card," and prepaid card providers have enhanced the capabilities of cards beyond simple purchases and ATM withdrawals. Often, these cards can accept direct deposit of payroll; can be used for online bill payment; and, increasingly, can be tied to savings accounts and/or limited lines of credit. Some highly specialized open-loop cards, such as healthcare cards, are good at any network merchant, but only for specific categories of spending approved by the sponsor.

Card Acquiring

Who is an Acquirer?

This term is frequently confusing, in part because there are at least two ways to understand it.

From a **merchant perspective**, the "acquirer" is the entity that sold the merchant a merchant account, and with whom the merchant deals on a day-to-day basis. This may be a bank, a processor, a gateway, or, perhaps most typically, an ISO (independent sales organization).

From a **card network's perspective**, the "acquirer" is the bank that belongs to the card network and has the contractual liability to the network for the actions of its clients in handling payments within that network.

From an **industry perspective**, the "acquirer" is the bank or non-bank processor bundling most of the functions in the value chain, delivered to the merchant either directly or via distribution channels.

The card acquiring side of the industry facilitates acceptance of cards by merchants. It can be a bit difficult to quickly understand because of the variations in roles played by acquiring-side stakeholders. Both processing and economic models vary widely, with significant differences occurring by

industry vertical and size of merchant. In this section, we describe core functions and major models in the current market.

The figure below shows the overall acquiring value chain. Core functions within the chain are usually grouped into “Front-End Functions” and “Back-End Functions”.

The Card Acquiring Value Chain includes two sets of processes; any provider may perform some or all of these processes.

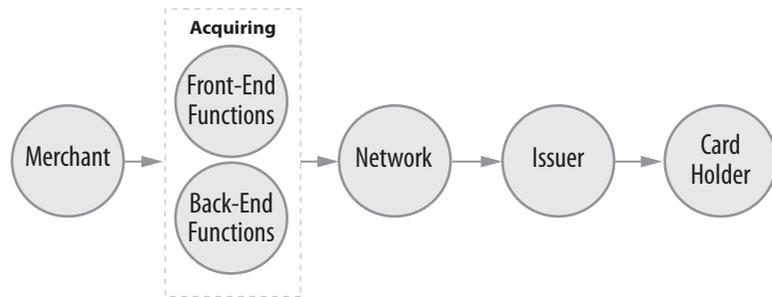


Figure 5-9: The Card Acquiring Value Chain

Roles and Functions in Acquiring

Many types of companies, in different combinations, may perform the roles described in this section. The only hard and fast rule is that the acquiring bank must be a network member. Otherwise, it is common to see both big and small providers offering a variety of services—either bundling services for a merchant, or providing one or more services as a part of a bundle that another company has assembled.

Large merchants are more likely to buy acquiring services on an a-la-carte basis, assembling the bundles themselves. Smaller merchants are much more likely to buy bundles of fully packaged services. The figure below depicts elements of the acquiring value chain.

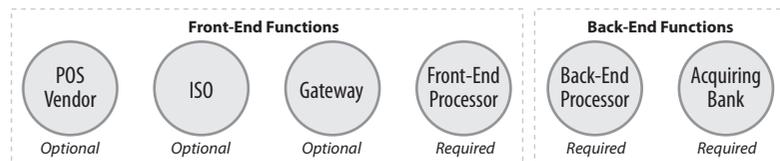


Figure 5-10: Card Acquiring—Specific Functions

- **POS vendor.** Merchants operating at the physical point of sale need a device to accept the card. This can be either a freestanding POS

terminal or a software component in an integrated system such as an electronic cash register. Merchants may buy (new or used) POS terminals or use PCs with card swipe capabilities added. Smartphones may also be used as terminals. Acquirers or their ISOs may supply the necessary hardware and software to merchants. Many industry verticals have specialized systems with integrated payments capabilities; for example, a hotel, restaurant, or doctor's office is likely to use a business management system with integrated payments acceptance capability. In some of these verticals, VARs (value-added resellers) play a critical role as authorized distributors of acceptance devices; VARs may also support POS installation and customized software. In the eCommerce domain, the shopping cart provider is the POS vendor.

- **ISO.** A merchant may buy card acceptance from an ISO, or independent sales organization; an ISO can be a one-person operation or a large organization. The ISO may be “captive”—selling merchant services on behalf of a single acquirer—or may shop for processors and acquiring banks and assemble packages of services for merchants. The ISO business model may be a simple sales commission, or may involve a small share of the discount rate revenue earned from the merchant; in some cases, the ISO takes responsibility for any associated merchant credit risk.
- **Gateway.** A specialized processor that serves the unique needs of a specific merchant vertical group. Gateways may combine the ISO function as well as other value-added services specific to that industry. In the U.S. market, the eCommerce industry vertical is one major user of gateway services. eCommerce gateways played an important role, early in the development of online retailing, by helping online merchants connect to the proprietary formats and systems of acquiring processors. Because of the unique fraud risks borne by merchants for eCommerce payments, these gateways also developed substantial risk management capabilities. Hotels, restaurants, and airlines are among the other industry verticals that use a variety of gateway services. Gateway fees are typically fixed “cents per transaction” charges.
- **Front-end processor.** Handles authorization message processing for the merchant. This is a real-time processing business, and again tends to be somewhat specialized by industry vertical. The business model here is also a fixed fee. The technical interface to most front-end processors uses proprietary formats, making it difficult for merchants to switch processors. Some gateways provide “insulation” by

Pounding the Pavement

ISOs have frequently been referred to as “feet on the street” for acquirers. They have played an essential role in reaching small merchants, in particular, for acceptance of card payments.

What Is A Chargeback? (Part 2)

Helping an eCommerce merchant fight chargebacks (“chargeback the chargeback”) is an important part of the job for any acquirer hoping to service this merchant segment. Acquirers, and some specialty service providers that specialize in this function, will help a merchant understand which chargebacks are worth fighting about, which issuers are especially aggressive in using chargebacks, and, perhaps most importantly, how to deal with the customer to set appropriate expectations.

supporting many different front-end processors, thereby allowing a merchant to switch processors more easily without significant system changes.

- **Back-end processor.** Handles the settlement and clearing messages delivered in batch, most typically at the end of a processing cycle, by the merchant. The back-end processor applies interchange to transactions (including “downgrading” transactions that don’t meet the requirements for lower interchange rates) and provides a consolidated financial settlement to the merchant. Chargebacks and disputes come back to the merchant via the back-end processor, and can affect the financial settlement. Reporting to the merchant (helping the merchant reconcile actual with expected receipts) is an important part of the back-end processor’s function. In addition, the back-end processor most typically generates the bill for acquiring services that it (or the acquirer that has selected it) sends to the merchant. The business model is a fixed fee per transaction with an additional charge for exception items.
- **Acquiring bank.** Every card network transaction must use an acquiring bank. This bank can be the visible “acquirer” in the market or, at the other extreme, a “rent-a-BIN” bank providing card network access to another entity that is the visible “acquirer” in the market. Even in the latter case, the bank is contractually responsible to the network for the merchant’s and processor’s actions and conformance to network rules. The acquiring bank’s revenue model may be a share of the discount fee or a flat fee for use of the BIN.

Acquiring Competition and Market Share

Competition naturally exists within each of the functions listed above. The large players in the acquiring side of the industry often provide all such functions; other businesses may provide only some, outsourcing other elements of the value chain to different processors (sometimes even to competitors).

The Economics of Acquiring

Given the complexities of the multiple providers and bundles involved, we will now take a step back and describe the overall economics of acquiring. The comments in this section apply to the fees paid by a merchant (to one or more providers) and the costs of servicing a merchant (although the service may be performed by one or more providers).

Acquiring revenue is largely based upon the merchant discount fee—the price charged by the acquirer to the merchant. This is normally expressed

as a fixed fee plus a percentage of the value of the transaction. Since card interchange fees (charged by the issuer to the acquirer) are such an important component of acquiring expense, the acquirer often prices services to the merchant on an “interchange plus” basis. A merchant discount fee, therefore, may have a price of “interchange plus assessments” (the card network fee assessed to the acquirer) plus “x cents per transaction plus y% of the transaction value.”

Other sources of revenue include float (funds received from the card issuer but not yet paid out to the merchant), monthly fees, and exception handling fees.

The expense side of acquiring includes:

- Interchange fees
- Card network assessments
- Merchant acquisition costs
- Systems development, maintenance, and compliance
- Processing costs
- Merchant servicing costs
- Credit losses
- Fraud losses

It may seem surprising that the acquiring side of the business is exposed to credit and fraud losses. But the acquirer is responsible to the card network (which is responsible, in turn, to the issuer) for the good behavior of its merchants. A fraudulent merchant who, as an example ships “empty boxes” or knowingly sells fraudulent goods, will result in cardholder disputes and chargebacks on those transactions back to the merchant. If the merchant has disappeared, or if its account cannot fund the chargebacks, the acquirer bears the financial responsibility. Because of this, fraud management of merchant accounts is an important part of the acquirer’s job.

Reading the Fine Print

Acquirers’ statements to merchants are notoriously complicated and long—a real case of “the devil is in the details.” More recently, new entrants such as Square have dramatically simplified merchant statements—and associated pricing and terms.

Credit exposure can be an even more serious risk to acquirers. Certain types of merchants, such as airlines and others, sell tickets and receive payment in advance of service delivery. If an airline goes out of business between the time it collected payment from the cardholder and the scheduled use of the ticket, the cardholder will often, under the card network rules, be able to charge back the transaction for services not received. The financial obligation in this case falls on the acquirer. Because of this risk, many acquirers demand hefty guarantees, or hold funds in escrow, for at-risk merchants and merchant categories—or simply choose not to service those merchants/categories because of the potential credit risk.

What is a “Payment Facilitator”?

In recent years, card networks have added new operating rules that allow a firm to act as a “Payment Facilitator” to sign up and process payments for small merchants.” Examples of Payment Facilitators include PayPal, Square, and Stripe—who all board small merchants as “sponsored merchants” within their systems. Payment Facilitators then have a relationship with an acquirer.

The card network rules typically contain certain maximum volume thresholds (in terms of annual card payment volume) above which a direct relationship with an acquirer is required. These rules have enabled card payment acceptance to be cost effectively extended to a much broader base of smaller merchants than was historically the case. Payments Facilitators are sometimes referred to as “aggregators” because they aggregate a number of smaller merchants to be processed by a single acquirer.

Card Risk Management

Risk in card systems takes many forms and touches all stakeholders in one form or another. The two primary forms of risk are credit risk and fraud risk. On an industry-wide basis, fraud losses are much smaller than credit losses.

Credit Risk

A credit card issuer is obviously taking on credit risk when extending a line of credit to a new cardholder. Issuers control this risk through a credit approval process at the time of account opening, and via periodic reviews of the cardholder’s account and behavior.

Credit bureaus are a critical component of the credit risk management process: they provide a comprehensive view of a cardholder’s credit exposures and payment behavior with multiple lenders. Credit bureaus and card issuers have become increasingly sophisticated in using—and automating—the tasks of reviewing a cardholder’s status and deciding on actions (increasing or decreasing lines, sending an account to collection, etc.). Credit bureaus, issuers, and third parties use scoring techniques to evaluate a cardholder’s potential for loan repayment. In recent years, credit bureaus have developed products that can deliver credit scores on potential new cardholders in real-time, thereby enabling “instant issuance” of credit card accounts.

Charge card issuers also take credit risk, but for a shorter time period, as cardholders are expected to repay account balances at the end of each billing period.

Debit card issuers take no credit risk unless they authorize a transaction against insufficient funds, thereby approving an overdraft loan to the consumer. In doing so, they have credit risk exposure similar to that of the charge card issuer—though the consumer is expected to repay the overdraft quickly, usually within the next day.

Prepaid card issuers take no credit risk, as card system rules do not permit the extension of overdraft protection to prepaid cardholders.

Fraud Risk

Credit and debit card fraud, and fraud risk management, is a highly developed science—on the part of fraudsters and the card issuers, acquirers, and merchants that manage the fraud risk. There are a few important concepts to recognize in understanding card fraud:

Fighting card fraud requires sophisticated analysis techniques—and real data. One of the most important functions played by the card networks in this area is the accumulation of fraud data from issuers (issuers must report fraud when discovered), and the analysis of that data.

Card fraud is responsive to efforts to control it, although it mutates. When the industry identifies a fraud technique as significant enough to merit a concentrated response against that form of fraud, actions are taken to drive it down. Almost always, however, fraud pops up again with another technique, or a different angle or target.

Credit card issuers have learned that it works best to band together and share resources in fighting fraud. The card networks play a primary role in facilitating those efforts. (Credit risk, on the other hand, is dealt with very much on an issuer-by-issuer basis, and managing credit risk is seen as a key competitive differentiator.)

For both credit and debit cards, there is a major difference in rules between card-present and card-not-present environments. At a macro level, card network rules allocate fraud liability to the card issuer in card-present acceptance environments, while the fraud liability in card-not-present acceptance environments is allocated to the card acquirer (and, therefore, is ultimately borne by the card-not-present merchant). If a cardholder claims, “I didn’t do it,” (that is, I didn’t make the purchase that appears on the statement) and the transaction occurred at a physical store, then, when the cardholder’s account is credited, the card issuer bears the loss—the merchant keeps the sale. In a similar situation, if the transaction occurs at an online retailer, the card issuer can charge back the transaction to the acquirer—which then debits the merchant’s account.

There are exceptions to these macro level rules for fraud assignment. Transaction fraud in the card-not-present acceptance environment, for example, shifts fraud liability from the merchant to the issuer when the merchant uses the 3D Secure “buyer authentication” protocol. Transaction fraud

Who Needs Signature?

Card networks have recently eliminated the signature requirement for many merchant category codes for purchases—no signature is required for purchases under \$15 when conducted in an unattended environment, under \$25 when conducted in a face-to-face environment, and under \$50 when conducted in discount stores or supermarkets. Convenience and speed of payment trumps any potential increase in fraud.

in the card-present acceptance environments, likewise, shifts fraud liability from the issuer to the merchant if the merchant is required to capture the cardholder's signature but fails to do so.

Types of Card Fraud and Fraud Control Mechanisms

- **Lost and stolen fraud.** Someone other than an authorized individual uses a legitimate card account in a card-present environment. The earliest and most basic defense introduced to deal with this type of fraud was signature checking. Recognizing the limitations of this as a control, issuers (or their processors) use sophisticated decisioning tools as part of their authorization systems, to try to detect unusual and suspect transactions. When a cardholder reports a lost or stolen card, the account is closed, subsequent authorizations are denied, and a replacement card is sent to the cardholder. The ultimate step to mitigate lost and stolen fraud is to mandate the use of PINs for cards—something that is not currently required in the U.S. market.
- **Counterfeit fraud.** The card's magnetic stripe data has been duplicated on a new piece of plastic and is used by a fraudster. This very popular fraud was particularly easy to pull off in the early days of credit cards, when a counterfeit card could be created from just the data visible on the card (name, expiration date, account number). In the 1980s, to counter increasing counterfeit fraud, the card networks enhanced the mag stripe with the addition of the CVN, a security code in the magnetic track that does not appear physically on the card

itself. As a result, to create a counterfeit, a fraudster must read the mag stripe (“skimming”) or intercept a stored image of it. In recent years, the PCI-DSS standards have imposed a stringent requirement on industry stakeholders preventing storage of any mag stripe data—because of the significant value of stripe data to counterfeiters. Another defense against counterfeit fraud is the authorization decisioning systems mentioned above. In today's market, the card system is moving to chip cards, which should make counterfeit fraud much more difficult for fraudsters.

The Stripe Stays

Dealing with counterfeit fraud is one of the primary arguments for adopting chip card technology in lieu of magnetic stripes. However, as long as the card also has a magnetic stripe, and can be used in acceptance markets with just that stripe, it is not a perfect defense. Indeed, counterfeit fraud can be expected to migrate to those magnetic stripe-only acceptance locations.

- **Card not received fraud.** A newly issued card stolen en route to the legitimate cardholder and used by a fraudster. This form of fraud has been successfully countered by requiring cardholders to call the card issuer to authenticate themselves and activate a new account.
- **Identity theft.** A card account has been fraudulently opened in the name of another consumer (real or fictitious). Card issuers rely on a number of shared databases, operated by the card networks and by

third parties, to identify potentially fraudulent new account applications. Such a database might highlight, for example, a phone number associated with a previously identified fraudulent account.

- **Identity creation.** A fictitious identity has been created, and a card account opened in the name of the fictitious person. Again, the control against this is the use of shared negative identity databases.
- **Unauthorized use.** In this form of fraud, a legitimate card account is used by an unauthorized individual in a card-not-present environment (Internet, mail, or telephone order). The risk in this case is borne by the card-accepting merchant, not the card issuer. Merchants use a wide variety of techniques—both internal and third-party services—to identify potentially fraudulent transactions. One popular method is the use of address verification services provided by the card networks. The three-digit CVN security code that appears on the signature panel of a card is sometimes requested by the merchant to provide some proof of physical possession of the card.
- **“Bust out” fraud.** A legitimate card account is used by an individual who has no intent to pay off the balance. This type of fraud is controlled with the same tools used to monitor credit risk exposures.
- **PIN debit fraud.** The rules of the PIN debit networks require hardware-encrypted devices for PIN entry, to verify the consumer. As a result, fraud in card-present environments is limited. When it does occur, it is typically because of theft of both the PIN and the physical card. In one scenario, a fake ATM front accepts and reads the magnetic stripe of a debit card, while a hidden camera records the PIN entry.

Data Security and PCI

The growing sophistication of fraudsters in hacking computer networks and stealing payment card data has created a huge problem for the card payment industry. Processing system intrusions have compromised millions of card accounts simultaneously. In addition to leading to fraudulent card usage, these attacks have been costly for issuers (which must both handle the public relations issues and decide whether to reissue cards on potentially compromised accounts) and detrimental to the industry as a whole (as they reduce consumer confidence in the integrity of the card systems).

But the primary weight of addressing the problem has fallen on the shoulders of merchants and their acquirers. Most such attacks have

Big Dollars

Some industry experts have estimated total cost of PCI-DSS compliance in the United States, on the part of all parties in the industry, at several billion dollars. Merchants and processors are also realizing that these compliance costs are not one-time events, and that “security is a journey, not a destination.” Some merchants are moving toward—or thinking about—PaaS, or payments as a service, as a way of outsourcing the entire payments process, thereby reducing PCI “scope” and the associated costs of PCI-DSS compliance.

been made on merchant payments acceptance systems, or on acquirers or processors. To combat this problem, the card networks joined forces to form PCI-DSS—the Payment Card Industry Data Security Standard. Known as PCI, it is a set of requirements designed to protect cardholder data on merchant and processor systems.

Following agreement on the requirements to drive compliance, the card networks began to require compliance assessment for stakeholders, and to fine violating merchants and processors—sometimes significantly. PCI compliance is an important step, but it is becoming evident that attacks are still possible. Several other initiatives are underway to further protect card data, including tokenization (see below) and end-to-end encryption (to protect card data from being entered into point of sale acceptance locations).

As data breaches continued to proliferate even in the face of increasing PCI-DSS compliance, the card networks also implemented additional fines and assessments used to help card issuers cover some of their costs associated with card re-issuance following exposure of cards in a data breach. In one major data breach, the CEO of the merchant involved ultimately resigned as the company’s sales were affected by a loss of consumer confidence in shopping at that merchant. Protection of card credentials is serious business—with serious consequences when failures occur.

To help address the data breach issue, the card industry has also embarked on joint initiatives to reduce or eliminate the storage of card credentials. These initiatives—called “tokenization”—involve the use of alias or proxy card numbers which have limited utility and, even if compromised, will result in significantly lower levels of potential fraud loss. Apple Pay was one of the first adopters of this tokenization technology and uses it to store a totally different card number in the mobile device than is on the cardholder’s card. The card networks play a critical role by both defining the standards for tokenization to work as well as providing the translation layer between a tokenized number and the real number known to the card issuer.

Summary: Cards

The card payments systems in the United States have shown dramatic growth for both consumer and business payments, and offer significant utility to both users (cardholders, merchants) and providers (networks, processors, banks) of the systems.

In many ways because of their success, card systems are likely to see, however, increasing regulatory oversight, ongoing pressure on interchange, and competition from alternative products and providers.

Key Trends in Cards

- Continued concentration among credit card issuers
- Continued growth of debit transaction volume at the expense of cash and checks
- New regulatory pressures on both credit and debit issuers—providing increased consumer protection
- New financial pressures on “regulated” debit issuers as a result of Federal Reserve imposition of reduced interchange fees and network routing requirements
- Ongoing debate, litigation, and regulation about merits and levels of card interchange
- New form factors: chip, contactless, mobile, etc.
- New mobile POS acceptance environments using smartphones, tablets, etc. and a migration away from purpose-built POS devices
- Continued support of rewards programs for credit

Sources of Information – Cards

- PaymentsNews.com
- The Nilson Report
- Visa, Mastercard, American Express, Discover Financial Services
- Philadelphia Federal Reserve Bank Payments Card Center