

*The PIN
Debit Decade :
PIN Debit Emerges as
the Preferred Online
Payment Method*

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EXECUTIVE SUMMARY

Until recently, the credit card and its close cousin the signature debit card have held a virtual monopoly as the payment technology of choice for online consumer commerce. However, alternative payment methods are now making significant inroads into that monopoly as providers develop innovative technologies to offset the deficiencies of the credit/signature debit card as an online payment method, namely its difficulty of use, high cost, and, most importantly, susceptibility to fraud.

There are several competing alternative payment approaches in play, with instant credit provider BillMeLater and online wallets like PayPal already gaining significant traction. However, these technologies present their own trade offs for merchants and consumers alike.

PIN debit technology, originally developed for ATM networks in the form of everyone's familiar ATM card, and then extended to point of sale terminals, has the potential for rapid online adoption because it offers an attractive mix of benefits to consumers, merchants and financial institutions. PIN debit online authorization is substantially less risky and less expensive than credit card authorization. For merchants, PIN debit is much cheaper, easy to deploy, preserves the consumer relationship and is already widely deployed in consumer wallets and point of sale usage. For the consumer, it seems likely that their current preference for convenient, secure PIN debit transactions at the point of sale will carry over to online transactions once PIN debit is made available to them online. For the banks, PIN debit offers potentially attractive economics due to lower fraud and processing overhead. What has been missing has been an effective deployment of PIN debit for internet use.

This white paper provides more detail about the rapid rise in alternative payment technologies on the internet and the potential for PIN debit as a mainstream online payment technology.

“There is growing recognition among the online community that online payment alternatives ... can do far more than lower costs. They can serve as allies to merchants in their quest to convert more prospects into sales in a way that contributes positively to the customer experience and actually lowers risk.”

CELENT, MAY, 2006

ONLINE PAYMENTS : WHAT'S THE PROBLEM?

Credit Cards On The Internet : A Match Not Made In Heaven

For most of their 50 year lifetime, the dominant credit card environment has been a card present transaction at the point of sale (POS). Credit card technology, procedures and governing rules have evolved to operate efficiently in this offline, "card present" POS environment. The rise of e-commerce required a payment vehicle that was both widely deployed (i.e. cash and credit cards) and practical for use over the internet (i.e. credit cards). Thus the early success of credit cards on the internet has been a default victory. Fundamentally, in the online environment, credit cards are awkward to use, fraud-prone, and expensive to process. Like seals lumbering up on to a beach, credit cards find themselves in an environment for which they were not designed and are not very effective. Luckily for them, they were the first arrivals on an empty beach. However, other alternatives are evolving and making rapid headway among consumers and merchants.

Consumers: Credit Cards Are Risky

Consumers are looking for a simple, safe way to pay for their online purchases. Credit cards leave a lot to be desired on both counts. Finding and typing the embossed number on the card, the expiration date and the security code is time consuming and error-prone, sometimes requiring second and third attempts before success. Consumers also correctly understand the fraud and identity theft risks inherent in online credit card transactions. If they could get it, consumers would prefer a payment method that was safer and less painful than the awkward credit card solution with which they now must contend when making online payments.

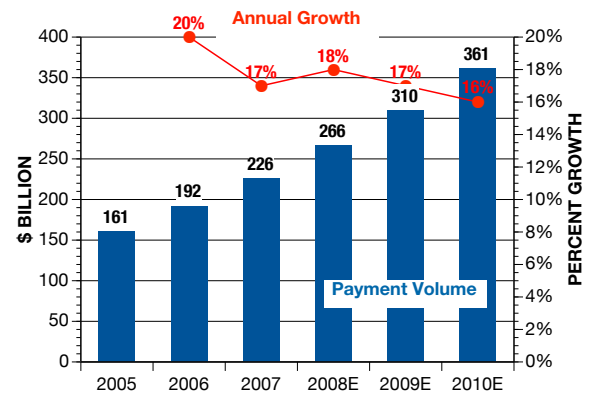
Merchants: Credit Cards Are Expensive

Merchants want to make it as easy as possible for consumers to buy their products, while keeping prices low. Because credit cards are clumsy and risky, merchants suffer well documented consumer reluctance to buy online and shopping card abandonment. Online merchants are also saddled with high credit card payment processing and support costs. Merchants would love a payment solution that was easy for consumers, less expensive for them and safer for everybody.

Financial Institutions: Online Fraud Is A Building Headache

In today's security conscious world, the FIs are under pressure by consumers, merchants and the government to reduce the identity theft and fraud losses associated with online credit card use. In addition, they have their own fraud issues and costs; some estimates are as high as 5% to 8% of card revenues. If someone could show them a payment solution with attractive economics and dramatically lower fraud, they would embrace it.

ONLINE COMMERCE CONTINUES TO GROW RAPIDLY



Source: BernsteinResearch, June 2007

THE RISE OF ALTERNATIVE PAYMENT SOLUTIONS

A wide variety of payment technologies have emerged in response to the problems experienced by the various parties involved in an online credit card transaction. Different providers have experienced varying success commercializing these technologies. The most well known is PayPal, but there are others that have the potential for rapid adoption with transformational economics for merchants and spectacular returns for investors.

Online Wallets: PayPal Reigns

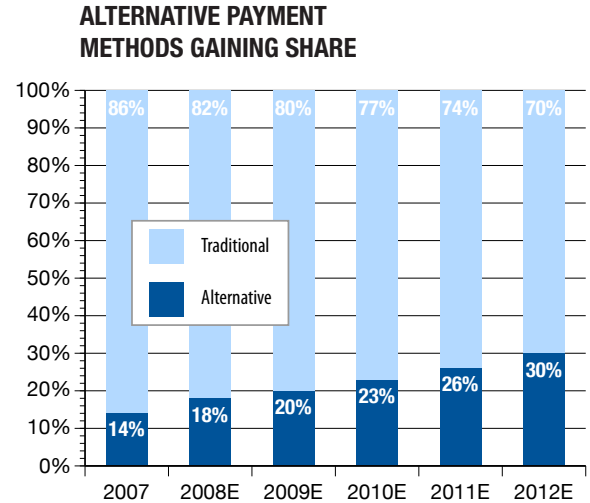
Originally founded in 1999, PayPal is the most successful online wallet, with millions of users and merchants, annual revenue north of \$1.5 billion and 35%+ annual growth. PayPal achieved initial success as an acceptably secure method for consumers to buy items from small eBay merchants who were not well known and did not accept credit cards.

PayPal offers the consumer the ability to use a variety of different accounts to make payments to an enormous number of merchants without revealing any sensitive information beyond a shipping address. Perhaps the greatest benefit of PayPal is acting as an escrow agent in person-to-person transactions when the buyer needs assurance of seller delivery.

However, these benefits are offset by the initial hassle of a setting up a PayPal account and the need to log in or be redirected to PayPal every time you want to make a payment.

For merchants, PayPal offers the potential for incremental sales, incremental customers and at least some protection from disputes and charge backs. The trade off for merchants is the need to integrate PayPal into their web sites, the loss of the complete customer relationship, since the payment details now reside at PayPal, and high processing costs.

PayPal's success has attracted heavy weight competition, mostly notably from Google in the form of Google Checkout and Amazon in the form of Amazon Payments. For both consumers and merchants, these two new entrants offer similar value propositions to PayPal, albeit with a fraction of the PayPal consumer and merchant base.



Source: Javelin Strategy & Research, 2007

Instant Credit: BillMeLater Creates A New Category

BillMeLater, founded in 2001, provides instant credit at the online point of sale. To make a payment using BillMeLater, consumers are asked to enter their date of birth and last four digits of their social security number. BillMeLater pulls a quick credit report and provides an instant credit decision. Assuming the consumer accepts the terms and conditions, BillMeLater pays the merchant and sends the consumer an invoice to be paid within 30 days of the purchase date. Consumers are encouraged to obtain online statements and pay their bills through ACH transfers from their checking and savings accounts, but they can also obtain a paper invoice and pay by check. Consumers electing to pay the balance over time are charged 17.9%.

For consumers, the advantages of BillMeLater are the instant credit line (up to 90 days), no requirement to set up and maintain an online wallet, and the ability to shop online but pay the bill using conventional offline methods like a check. The disadvantages are the addition of yet another credit line to their balance sheet and the inquiries added to their credit history every time they make a purchase. In addition, with BillMeLater, consumers must in essence make the payment twice, once when they pay the merchant using BillMeLater and then again when they pay BillMeLater.

For merchants, the advantages are lower costs and incremental sales to new customers. Like for PayPal, the trade off is the need to integrate BillMeLater into their web sites and the loss of some of the customer relationship, since the payment details now reside at BillMeLater.

ACH: The Electronic Check

Another credit card alternative in use is an electronic debit to the consumer's checking or other depository account. In this situation the consumer enters the routing and transit number of his or her bank and the account number to which they would like to charge the transaction. The merchant then generates an electronic debit which runs through the national automated clearing house network. For a one time payment, the ACH method is cumbersome, requiring the consumer to find and enter obscure numbers from a blank check, but the bigger problem is the lack of a secure authorization mechanism. Since there is no PIN associated with an ACH transaction, the consumer is essentially giving a blank check to the merchant, and a remote, virtual merchant at that. Due to security and convenience concerns, consumers are reluctant to use ACH except for small, ongoing transactions with a trusted merchant, for example a telephone bill.

For the merchant, ACH transactions, like checks, are low cost, but they suffer from the same drawback, namely repudiation. ACH transactions can be returned up to 60 days after receipt, depending on reason. Reasons include the typical check return reasons such as insufficient balance, account closed or consumer claims fraud. While most returns happen within 24 hours, the merchant can't be 100% sure he has a good payment until two months after the purchase, long after he has shipped the merchandise or delivered the service. Any returned payments must be

either manually collected or resubmitted electronically, which incurs additional transaction fees without any assurances of payment.

To address these concerns, the National Association of Automated Clearing Houses (NACHA), working with a handful of high profile banks and merchants, has introduced ACH Consumer Push. The initiative would allow consumers to select a participating bank from a drop down menu. The consumer would then be redirected to a special version of his online banking page to select the specific funding account (checking or savings) and authorize the transaction. Upon authorization, the consumer would be returned to the merchant site with sales confirmation information.

The drawbacks here are the complexity and considerable deployment challenge of adding even more steps to the consumer shopping experience.

PIN Debit: Made For Online Deployment

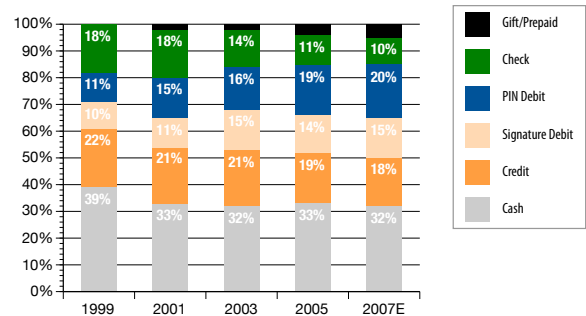
Consumers’ experience with debit cards goes back to the 1970s, when banks began deploying Automated Teller Machine networks. National EFT networks arose to link the various ATM networks, so that a consumer could get cash from more than just his own bank’s ATMs. It didn’t take too long to figure out that the same cards that worked in an ATM could be used at the point of sale and so the ATM networks were extended to POS terminals. Unlike credit cards, which evolved in an essentially offline environment, ATM cards evolved in an online environment. The technology was designed to be secure over an electronic network (the ATM network) with an anonymous user (the consumer at the cash machine) initiating the transaction. As a result, ATM cards have superior fraud prevention characteristics (namely the ubiquitous PIN) and substantially lower processing costs than credit or signature debit cards.

For the consumer, the PIN debit card is a great solution. Since it is PIN-based, it is highly secure and requires a quick PIN entry rather than a signature. The transaction hits the checking account immediately, without the hassle and cost of a side trip to their credit card, or worries about inadvertent overdrafts and overdraft fees. And the transaction is accurately recorded on the monthly statement, so they don’t have to worry about keeping an accurate register or wading through return checks or check images. As a result, PIN debit cards are very widely used. It is estimated that 90% of consumers with a bank account have a PIN-enabled debit card. At the point of sale, PIN debit cards now account for roughly the same payment volume as credit cards.

What About Signature Debit?

Signature debit cards are just like regular credit cards except the transaction hits the consumer’s checking account rather than a credit line. They carry the Visa or MasterCard logo, they use the Visa/MasterCard payment network, they require a signature, and they carry roughly the same interchange cost to the merchant. Hence we believe that from the perspective of the consumer, and especially the merchant, “signature debit” is just another form of credit card and not a true alternative to the credit card.

DEBIT EXCEEDS—AND PIN DEBIT RIVALS—CREDIT CARD AT THE POINT OF SALE



Source: Mercator Advisory Group, 2006; Acculynk

As convenient as they are at the point of sale, PIN debit cards are also a great potential online payment vehicle. They evolved in an online world and as such are more secure, more convenient, and less expensive to process than credit cards and everyone already has one. Consumers show a preference for PIN debit where it is available today and merchants appreciate the guaranteed funds, lower cost, rapid settlement, and lack of charge backs.

The Online Deployment Challenge

In the real world PIN debit is a classic two factor authentication method. The user presents something he has (the card) and something he knows (the PIN) in order to authorize a transaction. A fraudster has to somehow duplicate the card, or at least the mag stripe, and then con the user out of the PIN, guess the PIN, or intercept the PIN in some way. While not impossible, pulling off both of these feats is daunting enough to make it a rare occurrence. As a result, the networks, the banks and in fact the law treats a PIN debit transaction as not repudiable. Unlike a credit card transaction or a check, it is very difficult for the consumer to make the case that a PIN debit transaction is fraudulent. This environment of non-repudiation, in addition to reducing fraud claims to infinitesimal levels, dramatically reduces processing costs.

The EFT networks have put in place very high standard for those wishing to deploy PIN debit, and for online deployment those standards are particularly hard to hurdle. Once past the technical challenges, a provider then has to be sponsored by a bank which agrees to take the ultimate risk for fraudulent transactions. Third, the provider must be certified by an EFT network or networks with enough card coverage to ensure that a critical mass of consumers will be able to use their PIN debit cards online.

The big technical challenge for online deployment is duplicating the time-tested point of sale two factor solution of card and PIN because, unless the consumer has a special mag stripe reader attached to his personal computer, there is no way to be 100% sure the card is present. One can ask the user to input the card number or other physical characteristics of the card, but can't be sure the user actually has the card.

There is considerable debate about how significantly the lack of physical card presence verification compromises PIN debit security. Until we see more real world PIN debit deployment, no one knows for sure, but our belief is that, with proper offsetting security measures, the security compromise will turn out to be quite small.

“EFT networks need to determine how they will compete with signature debit so they can begin to capture their fair share of internet transactions. The solution they bring to bear must do so in a way that implements a single solution across all issuing banks and card holding consumers, otherwise the solution will simply create a balkanized environment that will make it extremely unlikely to be deployed broadly.”

MERCATOR ADVISORY GROUP, 2006



Source: Digital Transaction News, 2005

Secure online PIN debit deployment must guard against three basic avenues of attack. The first broad category is attacks on the server. It must be very difficult for a thief from either outside or inside the organization to obtain PIN/card number pairs, for example by automated PIN “guessing” or by intercepting and decrypting network traffic. Second is attacks on the user’s personal computer. A thief must not be able to obtain PIN/card number pairs by attacking the client PC, for example by surreptitiously installing a key logger. Third, the thief must not be able to obtain the PIN by attacking the user, somehow fooling the user into giving up the PIN/card number pair, for example by creating a bogus web site that masquerades as a legitimate merchant, or by calling the consumer pretending to be the bank. Finally, as an extra measure, it must be difficult for a successful thief to use the PIN/card number pair profitably, for example by setting relatively low transaction frequency and amount limits.

Hardware-Based Deployment

To date, we have seen two basic approaches to online PIN debit deployment: hardware-based and software only. In a hardware deployment, the user must obtain a specialized piece of hardware, typically a mag stripe card reader and/or a PIN pad which they connect to their PC’s USB port. These devices solve many of the technical challenges, since they can effectively duplicate the ATM or POS terminal fairly effectively. With these devices, the networks can be very nearly as sure as at a POS terminal that the card is present and the PIN has not been tampered with. The problem with hardware PIN debit deployment is consumer acceptance: convincing a critical mass of consumers to obtain these devices and then use them is an enormous challenge. We doubt that the benefits of PIN debit are sufficient to overcome these added costs.

Software Only Deployment

The “software only” approach avoids the consumer acceptance headaches of hardware deployment, but faces a tougher technical challenge. The software must be easily deployed and yet contain a sophisticated arsenal of features to ensure the security of the server, the network and the consumer’s PC. Ultimately the deployment has to make it as difficult as possible for a “social engineering” con to be successful and then limit the damage should such a con occur. Providers have been working on these technical and organizational challenges for several years now. At least one now appears to be very close to success. From an investor perspective, the considerable challenges that face an online PIN debit provider create natural barriers to entry that are likely to generate attractive economics for the providers who get there successfully, early.

A PIN Debit Case Study

Acculynk is an example of a company at the forefront of online PIN debit deployment. Having recently purchased the assets of PIN debit technical pioneer ATM Direct, Acculynk now has assembled the critical elements for successful PIN debit deployment.

- An experienced, sophisticated management team.
- Processing agreements with major regional EFT networks covering a critical mass of all consumers.
- Patent protected technology for safely acquiring the PIN and transmitting it across the internet.
- Early beta tests in play with several top 50 online merchants.

The Outlook for PIN Debit Deployment

In an abundance of caution, today the EFT networks are putting a substantial data entry burden on the consumer for online deployment, including most of the information required for a credit card transaction, plus the PIN. However, over time, we think the EFT networks, in the absence of fraud, will gradually relax their data entry requirements. At the same time, faced with increasingly sophisticated fraudsters, the credit networks will put the consumer through increasingly complex authorization procedures to keep fraud at bay.

PIN debit offers a very appealing solution to both consumers and merchants. There is no need for the consumer to sign up for anything, open any accounts, or set up any online wallets. The consumer already has an ATM PIN debit card in their wallet given to them by a bank they know and trust. They use their PIN debit card today to get cash and make POS payments, so they already know and remember the PIN.

There are huge incentives for the merchant to steer customers towards their PIN debit card. The cost of a PIN debit transaction to the merchant is as little as half the cost of a credit card transaction. There are no charge backs and associated offline support costs. And the payoff for the merchant on deployment is immediate, since the vast majority of customers already have a PIN debit card that they are using every day anyway for POS and ATM transactions. Finally, integration of PIN debit technology is straight-forward since most of the processes are similar or identical to those in place today for both merchants and FIs.

Other Payment Methods

In addition to the more conventional approaches described above, there are a number of other alternative payment technologies being deployed, including biometric hardware, like finger print readers; non-biometric hardware, like USB encrypted pin pads, card readers and RSA tokens; and software only solutions like one time numbers. However, none of these methods represent a fundamentally different payment method. Rather, these technologies are designed to make the existing payment methods more secure or convenient or both. A significant drawback for most of these methods is they require a fairly significant behavior change on the part of the consumer and a large deployment investment. For example, a USB PIN pad costs money to produce, must be shipped to a consumer and validated. Once installed, the consumer can only use that method at one computer or must carry the PIN pad with him.

From the consumer perspective the advantages of these devices is the improvement in security, but at the cost of a significant acquisition and learning acquisition and often increased ongoing payment hassle. Merchants like the security features, but are challenged by the enormous deployment effort and risk.

“The online payment environment, so long a stronghold of credit, may also simply be evolving toward debit, as has the POS world. Just as PIN debit could not take hold without the deployment of PIN pads at the point of sale, it will require special enabling in the online environment.”

MERCATOR ADVISORY GROUP, 2006

EVALUATING THE ALTERNATIVES

Payment Method	Consumer Perspective	Merchant Perspective	Outlook
Credit Cards (includes signature debit)	Usable almost anywhere on-line; well understood; provides credit terms, BUT risky from an identity theft perspective and a bit awkward to use; encourages use of high cost credit.	Widely used by consumers; easy to deploy and safer than ACH, BUT relatively easy fraud target, so expensive and subject to charge backs. Also somewhat awkward for consumers.	Gradual share loss online as alternative technologies gain wider merchant deployment.
eWallets	Protects private information and in some ways more convenient than credit cards, BUT requires consumer to set up and remember how to use another account.	Relatively easy to deploy and lower interchange rates than credit cards, BUT merchant loses access to transaction details.	Continued growth as major online players chase PayPal's continuing success.
Instant Credit	Convenient, protects private information and permits online payments using offline methods (e.g. check), BUT requires consumer to pass a credit check and deal with another bill to pay.	Has been shown to generate incremental customers and sales, BUT merchant loses access to transaction details.	BillMeLater's success will attract competition, but the off beat nature of the method probably limits adoption to certain consumer and merchant niches.
ACH	Electronic version of the familiar check, BUT awkward interface and lack of authorization mechanism makes it too risky for use with any but the most trusted merchants. Best for ongoing low risks payments.	Low cost and easy to process, BUT lack of authorization mechanism makes fraudulent charge backs too risky for anything other than low risk payments.	Will remain a niche method for use in repetitive, low risk payment environments like utility bills or loan payments.
ACH Push	Solves the ACH authorization problem, BUT requires additional trip to financial institution web site for authorization. Not widely deployed.	Solves charge back problem, BUT takes consumer away from the merchant site. Not widely deployed.	Depends on how hard merchants and financial institutions push deployment.
PIN Debit	A familiar payment method at the POS, BUT not widely available for online payments; some confusion with signature debit.	Low cost, non-repudiable payment mechanism with immediate settlement and nearly universal consumer deployment, BUT requires the merchant to complete numerous EFT network integrations or work through an EFT network aggregator.	Rapid growth once ATM EFT network acceptance issues are worked out.
Others	Adds additional security or convenience features to existing payment methods, BUT requires significant behavior change. Not widely deployed.	Solves fraud problem, BUT potentially at a total cost that exceeds the benefit.	Consumer and merchant deployment issues limit usage to niches.

KEY CONCLUSIONS

While in the past credit and signature debit cards have been the overwhelming favorite of merchants and consumers for online payments, alternative payment methods are enjoying spectacular growth as merchants and consumers search for payment technology that is easier and safer to use online.

PIN debit, which was developed as an online payment method for authorizing ATM transactions and was then extended to POS payments, enjoys clear consumer preference at the point of sale and has grown accordingly. When PIN debit is enabled for online commerce, we expect to see rapid growth in PIN debit use online. Unlike credit cards, PIN debit technology and networks were designed to provide a secure payment method in an online environment. Unlike other alternative methods, PIN debit cards are already widely deployed to consumers, who use them everyday at the point of sale and to get cash.

Historically, the major barrier to PIN debit deployment has been overcoming the considerable technical challenges required to obtain agreement from the various ATM EFT networks for deployment of their technology for online use. The EFT networks have been concerned that due to the 'card not present' nature of the internet, online card acceptance might create significant security holes, raising costs for everyone. However, the networks are now beginning to open their networks to transactions generated over the internet.

Because PIN debit avoids almost all the fraud losses and about half the processing costs of credit and signature debit cards, there is plenty of room to reduce costs for the merchants and still be very profitable for banks. We think when a fully informed bank does the math, PIN debit is going to look very attractive, both economically and politically.

Once the technical challenges are shown to be resolved, online PIN debit should find rapid acceptance because of its superior security characteristics, which produce great economics for all participants.

SOURCES

_____, "Online Consumer Payment Poll 2006 Annual Survey: Why Consumers Don't Buy," Javelin Strategy & Research, 2006

_____, "VISA Payment Panel Study: 2006 Payment Trends Summary," VISA USA Research Services, 2006

Lindsay, Jeffrey and Aaron Byrd, "EBAY: Money for Old Rope? Initiating Coverage with a \$39 Target Price, Outperform," BernsteinResearch, June 28, 2007

Paterson, Ken, "The Online Opportunity for PIN-Based and PIN-Less Debit, Mercator Advisory Group, April 2006

Schatt, Dan, "Online Payment Providers: Disrupting the Status Quo," Celent, May 2006

Sloane, Tim, "Extending The PIN: Evaluating the Growth of EFT Networks Into New Markets," Mercator Advisory Group, 2006

World Wide Web