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Is the PIN Mightier Than the Sword in Fighting Fraud?

by Ellen Richey
November 2010

Introduction

Nothing is more important to the future of electronic payments than maintaining consumer trust and, in particular, consumer confidence that sensitive financial information will remain secure. To preserve that confidence, stakeholders in the payment system have made enormous investments in data security and fraud prevention. As a result, Visa's fraud rates remain stable at or near their historic lows.

This achievement has been due to a combination of advancements that have been implemented both at the “edges” of the payment network, where payments are accepted, and at its center, where more efficient technologies detect fraud by using the processing platform.

Yet the payments environment continues to evolve. Innovations, such as mobile payments, are poised to revolutionize the acceptance environment. In a world of constant change, stakeholders are asking: What will the point of sale (POS) of the future look like?

At the same time, in the wake of the Durbin Amendment, one particular security solution has become embroiled in an entirely different debate grounded not in security, but in economics: namely, the routing of debit transactions over “signature” vs. “PIN” networks.

With these debates raging, it’s hard to keep one’s mind on security. However, we’ll attempt in this article to do just that. We’ll pose the following questions: How important are cardholder verification methods (CVMs) in general and personal identification numbers (PIN) in particular to preventing payment fraud, and how important will they be in the future?

An analysis of the marketplace suggests that PIN is currently playing a useful role, enhancing security and creating benefits for consumers and merchants. However, as is almost always the case when it comes to combating fraud, criminals are focused on cracking this now familiar and increasingly ubiquitous technology. This suggests that payment systems will need to evolve new solutions in order to stay ahead of the fraudsters.

The State of Play with PIN Today

The concept of PIN originated with the introduction of the Automated Teller Machine (ATM) in the 1960s, and a patent for PIN was filed in 1966 by a British engineer named James Goodfellow. Since then, the use of the PIN for authentication has crossed over to the physical point of sale with the introduction of debit cards. The use of PIN grew further in markets, such as Europe, where significant and growing fraud from counterfeit, lost and stolen cards was one of the key drivers for chip cards to be deployed using PIN verification.
The value of PIN in combating fraud is that it puts the cardholder in possession of both a physical asset (the card) and a piece of information (the PIN), creating a two-factor authentication model in which criminals must penetrate two layers to access cash. In addition to stealing or counterfeiting a payment card, the criminal must also obtain the PIN. With this security advantage, PIN allows merchants to offer cardholders further convenience via a cash-back option at the POS, minimizing the need for the cardholder to visit ATMs for cash.

Not all merchants have seized this opportunity, however. Only about a quarter of the 8 million merchant outlets in the United States have chosen to accept PIN debit transactions today. This group reports relatively low fraud rates from PIN-authenticated transactions, but one must look at PIN fraud more holistically. Does it follow that the future of security should include more widespread deployment of this authentication tool? Because data theft and fraud trends are interconnected, the question is not as simple as it looks. However, recent experience suggests that the answer is “no.”

As criminal attacks have evolved and PIN terminals have become more common, the PIN itself has become a target. As is so often the case in security matters, today’s solution is tomorrow’s problem. Fraud that doesn’t occur on “PIN networks” at the point of sale doesn’t disappear. It simply migrates to other channels, including the ATM. While ATM fraud is often not reported to payment networks like Visa, we believe it has increased significantly in the last few years. Aite Group recently wrote, “…criminals are increasingly attempting to steal PIN information alongside card data, allowing the simple extraction of funds from a victim’s account via ATM or POS withdrawal.” This reflects the more serious problem with the widespread deployment of PIN. With many millions of PINs now running through POS terminals every day, they are beginning to provide to the criminal set the same convenience they provide to legitimate customers, namely, ready access to cash.

Thus it is that a security solution, the PIN, has led to a costly security challenge – protecting the PIN. The industry has introduced ever-more sophisticated tools, stronger encryption and stringent rules to make PIN data more secure. Large investments by merchants, processors and others have made PINs harder to steal. However, organized criminal networks are striking back. They have modified their tactics and begun to conduct coordinated strikes against selected targets where PINs can be most easily accessed. Having pilfered both magnetic stripe data and PIN, they can...
avoid cumbersome intermediate steps, such as purchasing merchandise for resale. Instead, they
deploy their troops to withdraw cash at the next ATM or at multiple ATMs around the world.

One recent example is the coordinated attack on the ALDI grocery store chain this past summer.
The company reported that criminals illegally placed tampered debit card payment terminals
in some stores, intercepting card details along with PINs before they could be encrypted.
Moreover, hackers have devised clever phishing scams involving e-mails, websites or SMS text
messages to yield a harvest of ill-gotten PINs. Another tactic involves “skimming” devices that
criminals attach to ATMs or to automated fuel dispensers at gas stations. Skimmers may read
and store PINs and track data while allowing a legitimate transaction to occur. The device is
typically left in place for several days until the criminal returns to collect the data. In one recent
case, two Bulgarian brothers were arrested for reportedly using skimmers and hidden cameras
at Chase and Citibank ATMs in the New York area to steal more than $1 million.

These efforts have proved worth the criminals’ time and money, as each breached PIN yields a
greater harvest of fraud. In its “ATM & PIN Fraud” report, Javelin Strategy & Research reported
that the mean cost per fraud is 91 percent higher for debit card ATM PIN fraud and 70 percent
higher for credit card ATM PIN fraud than for non-PIN payment card fraud. Avivah Litan, fraud
analyst at Gartner, a research firm, estimates that fraud involving debit cards, PINs and point-of-
sale equipment has surged 400 percent over the past five years.

A reliable accounting of the total fraud losses from these types of attacks is difficult to piece
together. But the impact to financial institutions likely has been significant and is expected
to grow. Moreover, news reports of incidents involving fraudulent ATM withdrawals could
ultimately erode cardholder confidence, which is the foundation of the entire payments system.

The Evolution of Payments Security

Given the increased focus and sophistication of criminal attacks on PIN security, it’s clear that
payment systems must adapt. As Javelin observed, “It is expected that ATM PIN fraud will
Part of this layered approach will lie in the continuous improvement of network-based security solutions. Advanced neural network technologies now allow for real-time rating of the likelihood of fraud for each transaction. These systems can in many cases prevent fraud from occurring in the first place. Improved network security can even mean allowing for low-dollar, low-risk transactions to be completed without either signature or PIN. The security comes from the ability to spot fraud patterns rather than through verification tools.

Other layers have become increasingly sophisticated, including the ability to better identify data compromises through “common point of purchase” analysis, enabling more rapid shut down when breaches occur.

These advances will help the industry by preventing fraud when data theft has occurred. But a more fundamental step forward would be to attack the problem at its source by reducing the amount of vulnerable data available for the thieves to steal. The essential vulnerability of the data in our systems today, including PIN, is that they are static and unchanging. The data encoded on the magnetic stripe of payment cards in the market today, as well as the associated PIN, are the same for every transaction. Once stolen, this data can be used to create counterfeit cards and to commit fraud.

It is its static nature that makes payment data and PIN such a tempting target for thieves, which in turn creates a significant and ongoing burden on the industry to secure it. Initially, the costs were borne primarily by financial institutions, processors and payment system operators, who made massive investments to secure their environments. Over the last five years, however, merchants have been shouldering these costs as well. The National Retail Federation estimates that merchants spent more than $1 billion by 2010 to comply with the PCI Data Security Standards, not including PIN-specific security measures, such as the PIN Security Requirements and TDES (triple data encryption standard). These standards have mitigated the frequency and severity of data compromises. But as long as our collective payment system is largely dependent on static data, we are likely to find ourselves in an endless cycle of escalating costs, protecting static data 24 by 7. Seen in this light, our goal as an industry becomes clear: We must eliminate static data from the system in as many places as possible. Thus it is hard to see how the long-term solution to payment security includes the further proliferation of PIN.

"The essential vulnerability of the data in our systems today, including PIN, is that they are static and unchanging."
While it might seem helpful in the short run, the widespread deployment of static PINs will ultimately create more opportunities for criminal attacks and more costly security burdens on stakeholders. Instead, the solution is to adopt dynamic data authentication technologies: technologies that rely on dynamic data elements which – even if stolen – cannot be used in the next transaction and therefore cannot be used to commit fraud. By introducing dynamic data elements and using technology to authenticate those data elements in real time, we can create point-of-sale environments that contain no information valued by criminals and therefore are no longer the targets of criminal attacks.

While this may sound futuristic, the fact is that a variety of dynamic data solutions exist today and are used to authenticate both cards and cardholders. The EMV chip smart cards used in many parts of the world are only one example. In the card-not-present space, some issuers and merchants are using dynamic passcodes sent to cardholders by SMS text to make each transaction unique. These types of dynamic data solutions can be readily integrated into existing authentication platforms, and while still in their infancy, hold tremendous promise.

**Conclusion**

The bottom line is that security is evolving, as it must. After all, the fundamental truth of payment security is that it is a constantly moving process. Criminals don’t sit still. They innovate relentlessly. The solutions that worked yesterday may not be effective today, and those that work today are unlikely to be sufficient tomorrow. Flexibility, adaptability and multiple security layers are important tactics in our war against fraud.

Without question, cardholder verification methods of various types – PIN, signature, dynamic or none of the above – will always have a place in our security arsenal. Within this range of solutions, PIN authentication has played a useful role and will continue to play its part for the foreseeable future. But it is no silver bullet, and in the long run, may even increase the vulnerability of the system to fraud.

Merchant, financial institutions and cardholders will continue to make their own choices about whether and when to employ PIN as a solution based on conditions as they evolve. But for the future of payments security, the clear choice for all of us is ultimately to adopt dynamic data solutions for cardholder authentication.
Accelerating Deployment of Open NFC Mobile Commerce Applications
by Charles Walton
November 2010

Introduction

Driven by the convergence of standards, core technologies, devices and associated industry alliances, 2011 is poised to be the catalytic launch year for commercial Near Field Communication (NFC) handsets. Two key factors will influence the acceleration of open NFC mobile commerce application deployments in 2011 and beyond: First, the adoption of true open standard software protocol stacks within NFC devices, and second, the adoption of a common authentication framework for new NFC applications.

The Emergence of NFC Mobile Commerce

The tidal shift created by Apple’s introduction of the touch screen-based iPhone with multiple simple-to-use applications and the introduction of similar smartphones is changing consumer electronics, computing and communications markets. With smartphones, consumers’ retail commerce exchanges can become richer and finer-grained, giving retailers the ability to tailor applications for a specific shopping experience rather than having all roads lead to a shopping cart checkout.

Because many applications for new smartphones focus on retail sales and services, the mobile payment infrastructure is a perfect match for the app-centric smartphone world, in which the handset is the consumer point of interaction, and the requirements for facilitating commerce between a consumer and a merchant are vastly simplified.

The emerging mobile-commerce ecosystem requires security services that provide for...
strong authentication of the consumer and retailer, and the convenience of interacting via multiple wireless connectivity channels. The NFC wireless standard addresses both security and short-range wireless connectivity and will become a dominant force in consumer-to-retailer interactions starting in 2011.

Recent announcements from Google, RIM executives and wireless operators have confirmed the industry’s march towards commercial NFC rollouts. Google CEO Eric Schmidt initiated the flurry of action last month when he demonstrated a prototype NFC phone and pledged support for NFC services in the next Android release.

Wireless operators AT&T Mobility, T-Mobile and Verizon Wireless recently announced ISIS, a joint venture to build a nationwide mobile commerce network utilizing smartphone and NFC technology. The joint venture is working with Discover Financial Services’ network to develop an extensive mobile payment infrastructure with Barclaycard US as the first issuer on the network offering multiple mobile payment products.

The year-end rush to provide client-side viability to NFC validates Schmidt’s view that smartphones end users will accept mobile payments as virtual replacements for wallets and credit cards.

Opening Up the NFC Application Development

Over the course of the last 18 months, lead NFC solution providers have launched NFC software stack and their associated deployment strategies. While different in their approaches and the depth of the stacks provided, all aim at supporting multiple handset ecosystems. INSIDE Secure’s approach was to release its stack to the open source community, where it has been broadly downloaded. In this time of redefinition of the mobile offering between proprietary and open OS, this would tend to demonstrate the general interest of the mobile industry and the application development community to explore the potential of NFC-enabled services.

Generally, open stacks are architected to interface with different chip hardware using a distinct hardware abstraction layer. They should support open construction of NFC applications in multiple mobile device ecosystems with NFC hardware from various competitors through a simple interface of alternative NFC chip hardware abstraction layers.

To be truly open, such NFC stacks should support several levels of functionality – from low-level RF control to high-level NFC Forum tag handling, peer-to-peer communications, as well as Bluetooth and Wi-Fi pairing, interactions with single-wire protocol SIMs and other secure elements and compatibility with smart cards and RFID tags based on FeliCa, MIFARE and ISO 14443 standards. Similarly, an open stack will have to offers a comprehensive set of NFC APIs and code for different operating systems, such as Android, Linux, MeeGo and Windows Mobile. Lastly, support should be provided for payment applications standards driven by EMVco, OSPT Alliance, GlobalPlatform and other open standards communities.
NFC is a complex technology that must be made easy to integrate for device manufacturers and easy to develop for application developers. To drive the adoption of NFC technology, it is necessary to seed the NFC market by placing the software required to drive NFC-enabled devices into the open source community, encouraging public review, comment and evolution (the approach taken by INSIDE). This will lead to mobile device solutions that are open and unbiased with respect to underlying NFC hardware, compatible across mobile device ecosystems and facilitate creation of NFC applications.

The alternative – proprietary, vendor-biased and closed mobile device ecosystems and silos – will hamper the growth of the NFC application market. NFC software stacks in mobile device ecosystems must truly be open to deliver multi-sourcing options to mobile device manufacturers to ensure software developers have common and consistent interface definition and to allow the NFC ecosystem to grow.

A New Authentication Framework for Driving New NFC Applications

The vision of multiple NFC applications working seamlessly with flexible consumer choice of these applications on smartphones is compelling. However, achieving this in light of current legacy contactless applications, a proprietary bias among application owners and technology providers and the lack of an envisioned framework is daunting.

The introduction of common application protocols for contactless interface and authentication is a major hurdle. While core RF protocols are standardized, the current deployed base of contactless applications is a case study of proprietary, silo-oriented, heavy-to-migrate development. The 13.56Mhz contactless standards used for cards and NFC in North America have a large deployed base of contactless readers, including MasterCard PayPass, Visa payWave, American Express ExpressPay, Discover Zip, First Data CertiFlash, Interac Flash, HID iCLASS, NXP MIFARE, ICAO for ePassport and others. Each scheme performs an authentication function and provides for secure data exchange. Yet each is distinct and requires different implementations within the reader or acceptance device and the in-card or NFC-enabled device.

Each application and technology provider scheme works well on its own. However, challenges loom when you factor in multi-applications, the variety of mobile devices, a fast-moving mobile application market and expectations of flexibility from consumers. Extending this scenario to the global market creates an even greater cost, complexity, flexibility/extensibility challenge for device manufacturers. The situation for legacy infrastructure is complex and should not be replicated for new NFC contactless applications. Imagine Starbucks, Wal-Mart, Carrefour and Hertz all immediately demanding their own distinct contactless applications.
To have NFC applications and services flourish requires a simple, common authentication framework built upon a common core protocol and strong open standard authentication scheme. In this manner, user interface applications – along with cloud-based applications and services, such as secure NFC payment, retail commerce, transit and ID applications – can be more easily introduced. A close parallel is the introduction of SSL for browser/server authentication and message security in the mid-1990s. Imagine if Netscape, AOL, Yahoo, Amazon and other early eCommerce players had chosen not to implement a standard. The situation for secure NFC application enablement is similar.

Mobile Commerce, Circa 2015

Imagine using an NFC smartphone to “tap” into a retail shop, much like a physical login, then conducting a rich, interactive exchange with the retailer to compare products, take a survey, inquire about specials, redeem a coupon, make a payment or receive loyalty points. Such an NFC-enabled smartphone could easily support dozens of retailer applications and retailer payment schemes, dispensing with the inconvenience of dealing with multiple private label, retailer-specific payment cards.

Bringing NFC to an open application-development world is an important first step, as Google has acknowledged in its Android announcement. Now is the time to ensure that this Android release is truly open and supports a broad range of NFC hardware implementations while enabling the application developers for this new generation of secure applications. For Android and other mobile device ecosystems, the adoption of open standard NFC software stacks is essential to ensure that a vibrant ecosystem develops.

An explosion of NFC applications will only happen if the industry can agree on a framework for authentication and application messaging that is open, secure and consistent. As SSL was to eCommerce, such a new framework should be to NFC mCommerce.
Enabling Multi-Provider Services with Third-Party Service Providers

by Drew Weinstein

Managing secure credentials on smartphones to enable NFC (Near Field Communication) services is a dynamic new business opportunity, requiring actors sitting amongst legacy mobile, banking and retail industries to lessen the complexities of bringing these new services to market. The question of which parties are best positioned to enable the business rules of the future state is the subject of this article.

Without independent third-party service providers to minimize the short-term IT impact of early commercialization and long-term logistical and technological complexities related to access, administration and lifecycle management, it is possible that maturation of the ecosystem will take far longer than otherwise anticipated. The breadth of use cases and the resulting economic benefits are at the core of the NFC promise. For example, using NFC on a smartphone to provide credentials (room keys) to a hotel guest over the air means that the hotel can:

• Remove the overhead of physical check-in and check-out;

• Communicate with the guest throughout her stay through the smartphone to enhance the hotel experience without hassle; and

• Drive a 1:1 contextual dialogue, both inside and outside of the hotel, marketing time-sensitive offers during the stay at the hotel and more.

Use cases, such as the above, will demand new business rules to enable and manage third-party secure data on smartphones and possibly unique multi-party customer care situations.

The secure management of third-party data is required to straddle market dependencies of (i) a near-term state, where only a few actors are launching commercial NFC services with few select partners and few normalized rules, with (ii) a mature state where millions of consumers are activating thousands of diverse secure credential products on their devices from dozens of industries enabled across the majority of carriers and deployed on a multitude of devices.

In accordance with the standard set forth in GlobalPlatform 2.2, there are effectively three critical roles for any one use case where secure credentials are issued on a smartphone:

• The owner/issuer of the secure credentials

• The owner of the secure element on the smartphone, where the secure credentials are stored in the device
• The administrator of the secure element, responsible for secure credential lifecycle management and campaign management

The actors of the first two roles are straightforward. Banks, merchants, hotels, transit authorities and employers control facility access or others will issue the secure credentials. Carriers or smartphone OS providers will own the secure element. Because the condition precedent for the mature state demands that early players wishing to issue secure data be able to do so with as few internal resources as possible, the role of administrator is absolutely critical.

There is broad debate as to who could play such a role. Banks, carriers, smartphone providers and existing personalization bureaus all believe they are in a position to offer such services. While years from now, when defined business rules may allow many types of actors to provide this administrator function, third parties are the most viable option today.

Why? The most important role of an administrator is to enable win-win solutions that do not negatively impact any party’s objectives in deploying commercial NFC services. A bank, for example, seeks to ensure its secure credentials are available on all smartphone types across all carriers. Conversely, smartphone makers and carriers have incentive only to ensure that a bank’s card products are available to its subscribers rather than on a ubiquitous basis.

Carriers’ growing rivalry with banks at merchant point of sale creates an environment whereby banks and merchants are less incented to drive their legacy products and services onto devices in direct relationships with those same actors trying to compete with them. Rather, it is likely that third-party surrogates can (i) administrate on behalf of the merchants and banks, and (ii) in doing so for a number of such parties, create leverage to force those with competing agendas to ultimately be willing to provision these bank and merchant products on the devices.

The role of administrator is about far more than business models. The administrator must ensure the integrity of the credentials across new devices, lifecycles of device firmware, upgrades of applications on devices that interoperate with the credentials and restoring of credentials in the case of lost/stolen phones. This is an infrastructure role that is new for any actors, and the...
advantages of an independent third party that does not have legacy service obligations are several-fold:

- No need to learn mobility or focus on value proposition: A third-party administrator lets issuers of secure data maintain focus on leveraging the benefits of NFC smartphones without dealing with the technicality of device lifecycle.

- Minimizes IT integration: Banks, merchants and other issuers of secure credentials will not be able to support infinite integrations for endless number of carriers, devices, OS, etc., so the third-party single point of integration lowers the barriers to NFC viability.

- Neutrality forces normalization of business rules: Neutral third-party service providers reduce friction amongst service providers otherwise competing for control of the subscriber relationship.

The third-party service provider, if it is true to this mission, has but two enemies: the post office that loses out on mailing of plastic card products and the plastic card manufacturers. All other actors benefit from the role of a third-party service provider.

If an abstract consideration of the need of independent third-party service providers to enable a commercial NFC environment falls short, then examining customer care in an NFC-enabled world ends any debate.

The use case can be as simple as a failed consumer attempt to make a payment at a retailer using her smartphone with her bank-issued credit card. Who does she call? Whoever she instinctively thinks to call. It could be 611 to call her carrier; it could be that she dials the number on the back of her credit card (now present on the screen of her smartphone); or the consumer may prefer to ask the merchant to see a manager. Regardless of action by the consumer, the use case is very challenging for both the consumer to provide adequate description of the variables at play and for the care representative that is responsible for resolution. Why? Any care representative from a legacy industry will have inherent limitations as to his knowledge. The transaction in this case could fail for multitudes of reasons, including:

- Smartphone software problem (e.g. a bug)
- NFC hardware problem (e.g. secure element locks)
- Carrier account problem (e.g. unpaid bill)
- Credit card account problem (e.g. over limit)
- Reader failure
- Human error

The challenge for the care representative is discerning the correct resolution path as quickly as possible without aggravating the consumer by asking questions the consumer cannot reasonably be expected to answer.

The challenge for care from any one legacy player is to have the necessary information or cross-
ecosystem pathways built to resolve the care concern. It would seem straightforward to have the consumer call the carrier’s technical customer support, and once device concerns are addressed, to roll over the call to a care representative of the issuing bank. Aside from the challenge apportioning the costs of care actions, this approach would require integrations and willingness to hand customers off between banks and carriers, which is highly unlikely. The process of case by successive elimination is simply consumer unfriendly.

A neutral third-party service provider measured on call resolution provides a completely beneficial alternative to all actors in the NFC ecosystem. Merchants can train all personnel that a single care point of contact has the highest chance of resolution, and consumers can be provided access to that care center by dialing a number or by transfer from their instinctive call to a carrier or a bank. The goal for such an intermediary is to provide a single point of contact for the consumer that is committed to helping them solve their problem and remain delighted with NFC. The challenge is the numerous exogenous issues that may impair the attempted transaction, of course, so this intermediary cannot operate in a vacuum. Rather, that intermediary must become a trusted third party of the major banks, carriers and merchants so that its representatives can: (i) open lines of communication with care representatives of the various actors for fast resolution; (ii) warm transfer care issues to banks’ or carriers’ billing, risk, fraud or account status groups; and (iii) serve as a resource for those third-party banks and carriers and others to develop a knowledge base of case resolution.

We are witnessing the early stage of a dynamic new ecosystem that promises exciting benefits for both consumers and service providers. However, unless the right actors are established early to drive the best business rules to enable cross-ecosystem interactions, there is risk that the benefits of NFC will remain elusive. The goal for all players should thus be to drive towards normalized integration as quickly as possible to generate positive opinions and use cases for consumers. Some legacy actors who anticipate playing broader roles will have to look in the mirror and realize that such objectives are not in the best interest of their long-term market objectives. Neutral third-party service providers will be critical to accelerating the market adoption not only of NFC technology but also of NFC-enabled services.
This article argues that the Durbin Interchange Amendment’s “multi-homing” provision, which prohibits exclusive routing arrangements on debit card transactions, should be understood to permit “cross-routing”—the routing of signature debit transactions over PIN debit networks and vice-versa—to encourage competition for best price execution on payment card authorization, clearance and settlement.

The Durbin Interchange Amendment, passed with bipartisan support over intense opposition from the financial services industry, marks the point the federal government has regulated payment card networks beyond the consumer interface. The goal of the Amendment is to improve competition in the payment card market, particularly for electronic debit transactions.

This article focuses on the Amendment’s so-called “multi-homing” provision that prohibits exclusive routing arrangements on electronic debit transactions. It argues that the multi-homing provision should be read as permitting “cross-routing”—the routing of signature debit transactions over PIN debit networks and vice-versa—as the best implementation of the Amendment’s goal of improving competition for best execution in debit transaction routing that is also consistent with statutory language.

The Durbin Amendment, section 1075 of the Dodd-Frank Wall Street Reform and Consumer Protection Act, has two basic operative parts. The first part of the Amendment requires that interchange fees on electronic debit transactions—the fee paid by the merchant’s bank to the bank that issues the debit card—must be “reasonable and proportional to the cost incurred by the issuer with respect to the transaction.” [1] The legislative history indicates that “cost” refers to:

the incremental cost incurred by the issuer for its role in the authorization, clearance, and settlement of a particular electronic debit transactions, as opposed to other costs incurred by an issuer which are not specific to the authorization, clearance, and settlement of a particular electronic debit transaction. [2]

The amendment also permits an issuer-specific variance above the incremental cost for a transaction for fraud prevention costs, provided that the issuer complies with fraud prevention standards established by the Federal Reserve. [3]

The second part of the Amendment prohibits various payment card network rules that have limited price competition among networks. [4] The interaction between the two parts of the Amendment for electronic debit transactions may be viewed as follows: The first part creates a price ceiling for interchange fees with its reasonable and proportional to incremental cost...
The cost to a merchant of an electronic debit transaction is not just the interchange fee. It also includes any network fees and the acquirer’s spread. Most merchants pay a merchant discount fee that is explicitly priced as “interchange plus,” meaning that the merchant pays a fee that is equal to the interchange rate plus network fees plus the acquirer’s spread. As acquirers’ spread is generally the same irrespective of the network over which a transaction is routed, the distinction in pricing between networks typically depends on the sum of interchange and network fees. It is the total pricing bundle of interchange and network fees, not the breakdown therein, which is relevant to merchants.

The first part of the Durbin Amendment addresses only interchange fees, a component of the total pricing bundle. The Amendment gives the Federal Reserve authority to directly regulate network fees—the other transaction-specific component of the total pricing bundle—only to prevent circumvention of interchange fee regulation. The second part of the Durbin Amendment, however, is designed to foment price competition for the total bundle of fees that merchants face, including the network fee, not just the interchange fee. In other words, while the first part of the Durbin Amendment involves regulatory price capping, the second part of the Durbin Amendment relies on market competition to control prices.

The key provision of the second part of the Amendment is the so-called “multi-homing” provision. Multi-homing refers to the ability to route a payment card transaction over multiple networks. When multi-homing is possible, the transaction can find its way “home” through multiple routings. The amendment’s multi-homing provision provides that:

> an issuer or payment card network shall not directly or through any agent, processor, or licensed member of a payment card network, by contract, requirement, condition, penalty, or otherwise, restrict the number of payment card networks on which an electronic debit transaction may be processed to—
> (i) 1 such network; or
> (ii) 2 or more such networks which are owned, controlled, or otherwise operated by —
> (I) affiliated persons; or
> (II) networks affiliated with such issuer.

The Amendment further provides that neither card issuers nor networks may restrict the ability of merchants to direct the routing of the transaction.

What does the multi-homing requirement mean in practice? The answer will, of course, depend on the Federal Reserve’s rule-making, as required by the Dodd-Frank Act. On its face, the Durbin Amendment appears to merely prohibit exclusive network arrangements in debit card issuance. Arguably, the requirement would be satisfied with the inclusion of a single signature and single PIN debit network on a card (as long as they are not affiliated with each other). Such a reading of the Durbin Amendment is too narrow, however, as it would likely yield an outcome at odds with the Amendment’s goal of fostering better price competition for the total pricing of accepting a debit card transaction for merchants. The only question would be whether a consumer used a signature or PIN at point of sale, at which point there would be no other restriction.
no competition on the total cost of the transaction. While the interchange fee would be limited to the “reasonable and proportional” fee, there would be no competition for the total cost bundle to the merchant, including network fees. Networks would have no incentive to reduce the total cost bundle in order to be competitive for the merchant’s routing decision.

This means that networks would be free to set their own network fees as high as they would like, and the problem of lack of market discipline on interchange fees (or, more precisely, too much market discipline from the issuer side of the interchange market relative to the merchant side) would merely be replaced with a problem of lack of market discipline on network fees. Capping interchange fees by themselves is meaningless when they can simply be replaced by noncompetitive network fees. While the networks are prohibited from kicking back network fees to issuers in lieu of interchange, enforcement may be difficult, given the networks’ other financial dealings with issuers, such as the “rebates” paid to large issuers. [12] Alternatively, even if networks do not effectively circumvent interchange price regulation by remitting network fees indirectly to issuers, they might, absent of meaningful competitive constraints, take advantage of interchange price regulation to shift merchant fee revenue from issuers to themselves.

Indeed, absent meaningful competition for the total pricing of an electronic debit transaction, networks would have no incentive to set interchange fees any lower than the “reasonable and proportional” price ceiling. Instead, all networks would set interchange fees at the maximum amount permitted under the Fed’s regulations in order to maximize their attractiveness to issuers. [13]

These results would be directly at odds with the intent of the Amendment. As Senator Durbin noted in his floor statement about the Amendment, the multi-homing provision

is intended to enable each and every electronic debit transaction—no matter whether that transaction is authorized by a signature, PIN or otherwise—to be run over at least two unaffiliated networks, and the Board’s regulations should ensure that networks and issuers do not try to evade the intent of this amendment by having cards that may run over only two unaffiliated networks where one of those networks is limited and cannot be used for many types of transactions. [14]

What type of network is “limited and cannot be used for many types of transactions”? Only a PIN debit network because there are many types of merchants that do not have PIN pads—e.g., many restaurants, utilities, landlords, mass transit and Internet merchants. [15] Thus, cards that can be routed over only a single signature and single PIN debit network (or even a single signature and multiple PIN debit networks) would frustrate the intent of the Durbin Amendment’s multi-homing provision. [16]

Another conceivable interpretation of the multi-homing provision (albeit with little textual
support) is that it only applies to PIN transactions. That result too would fail to result in improved competition. Card issuers would simply have an incentive to encourage consumers to use signature (exacerbating a trend that is already present today). This could be done by tying rewards to use of a signature (widely done already), by charging consumer fees for use of a PIN (currently done by some banks), by making claims that signature is more secure (as one major bank recently did, contrary to all evidence and the common sense that two-factor authorization is necessarily safer than single-factor authorization), by imposing longer debit card “holds” on PIN transactions or simply by decreasing convenience, such as through requiring excessively long PIN numbers.

These overly narrow readings of the multi-homing provision would both frustrate its purpose and defeat its stated requirement that merchants have the ability to choose the network on which any given electronic debit transaction is to be routed. Multi-homing can fulfill its potential only if it results in competition for each transaction on a field that card issuers cannot effectively control. A careful reading of the Durbin Amendment’s language shows that the multi-homing provision, in fact, requires something more than the narrow readings suggest. The Durbin Amendment should be read to permit signature debit transactions to be routed over PIN debit networks and vice-versa in order to improve price competition for debit routing.

The Durbin Amendment requires multi-homing for every electronic debit card transaction, not every electronic debit card. While multi-homing has traditionally been conceived as being card-based, meaning that a card would be capable of performing transactions on more than one network (as is already the case with some debit cards), the language of the Durbin Amendment is quite particular in requiring multi-homing on the transaction, rather than the card level. Indeed, given the imminent move away from physical plastic cards, the transactional rather than card-based focus makes sense. [17] As the legislative history notes, the multi-homing provision “is intended to enable each and every electronic debit transaction—no matter whether that transaction is authorized by a signature, PIN or otherwise—to be run over at least two unaffiliated networks…..” [18] The intent is to ensure that there are at least two unaffiliated networks competing with each other for processing every electronic debit transaction.

In theory, the goal of routing competition on each transaction could be satisfied in one of three ways. First, it could be satisfied by having at least four unaffiliated networks—two signature debit networks and two PIN debit networks on every card. This would mean that all cards are so-called “dual function” cards, [19] which would ensure that there would be at least two networks competing for every transaction, be it authorized by signature or PIN. While having at least two networks competing for every transaction is a vast improvement over no competition, this interpretation of the Durbin Amendment still has drawbacks in terms of fostering maximum competition and fulfilling the Amendment’s ultimate policy goal of fostering a competitive debit routing market.

Interpreting the Amendment to require two signature and two PIN network on each card (all unaffiliated) would essentially result in two separate markets—a signature debit and PIN debit market. The signature debit market only has three participants currently—Discover, MasterCard and Visa. At best, then there would be three-party competition in the signature debit market. While a triopoly is better than a monopoly, it is hardly ideal competition.

Moreover, requiring at least two signature networks on a card does not guarantee that every transaction can be routed by more than one network. The Durbin Amendment does
not require merchants to accept any particular debit card network, and acceptance varies by network. This could create an incentive for a strong signature debit network with high acceptance levels to offer a greater network rebate to issuers that agree to issue cards that pair it with a low acceptance rate network as the only other signature debit network on the card. If the differential in acceptance rates were significant, then even requiring two signature debit networks on a card would not result in competition for routing many signature transactions.

A second reading of the multi-homing provision consistent with promoting transactional routing competition is that multi-homing could be satisfied by permitting PIN debit networks to process signature debit transactions or vice-versa, an interchangeability I refer to as “cross-routing.” This would mean that every card would need at least two unaffiliated networks. This outcome too is less than ideal, as it also replaces a monopoly with a duopoly. In this scenario too, a dominant network could insist that issuer only include smaller network with less acceptance on the card. For example, Visa could offer rebates to issuers of its signature debit cards that include only a small PIN debit network, like Iowa-based Shazam, as the other network on the card. In such a situation, Visa would likely get the lion’s share of the routing.

The third and best reading of the Durbin Amendment’s multi-homing provision combines the other two readings and would both require at least two signature and two PIN debit networks, all unaffiliated, on each card and permit cross-routing. This would mean that there would be at least four networks competing for all debit transactions, which should result in better price competition than any of the alternatives. The interchange and network fees that would apply in a cross-routing situation would be those of the network that actually routed the transaction. [20]

Currently, debit cross-routing is not permitted by networks, but there is no reason that need be the case. If interchange fees are capped at “reasonable and proportional” to incremental cost ceiling, then as among networks approved by an issuer, the precise routing of a particular transaction should not matter. [21]
the withdrawal of funds from the deposit account or line of credit and settling the funds into an account controlled by the merchant’s bank. The networks provide the pipelines that transmit transaction authorization data to the issuer and then transmit the funds from the issuer to the acquirer.

While the pipeline technology used for payment card authorization, clearance and settlement (ACS) is impressive and proprietary, the service provided by the various networks is virtually identical from the perspective of any network participant—issuers, acquirers, consumers and merchants. ACS is essentially commodity work. The most significant variation is in terms of the credit risk issuers bear on chargebacks, as payment of chargebacks is ultimately guaranteed by the network.

The Durbin Amendment recognizes that the identity of the network might matter from the issuer’s perspective, even if there is no difference in interchange fees. Section (b)(1)(A) of the Durbin Amendment clearly contemplates issuers continuing to select the networks on a card within limits, rather than mandating open access, as exists in check clearing where there is unrestricted multi-homing. [22] But among those networks selected by an issuer, it should not matter to an issuer which one routes a particular transaction.

To understand why, it is important to recognize that electronic debit transaction authorization requires only the transmittal of the proper sequence of digits to the source of the transaction’s funding and the transmittal of further information regarding where the funds are to be sent. Although the authorization sequence happens to be encoded on debit cards and is embossed on its front (excluding additional PIN digits in PIN debit’s authorization sequence), the physical card is completely dispensable for an electronic debit transaction. All that is necessary for an electronic debit transaction is a means for the merchant to capture and transmit the proper sequence of authorization digits. [23] In theory, any network can capture and transmit that data.

A PIN debit network is easily capable of capturing and transmitting all the necessary data for signature debit authorization. Signature debit, which is now sometimes done on a signatureless basis, does not require a signature for authorization. Instead, the signature is an ex post validation device in case the transaction is challenged by the cardholder as unauthorized. The signature is transmitted to the card issuer well after funds have been released, and it is not examined unless the transaction is challenged by the cardholder.

Signatures’ value in terms of real-time fraud prevention is negligible, as shown by the advent of signatureless debit; if the signature had real value, there would not be a market for signatureless. Thus, a PIN debit network is easily capable of capturing and transmitting all the information required to authorize a signature debit transaction; capturing and transmitting the signature is not necessary for authorization; it is only necessary for dealing with chargebacks. If the PIN debit network does not capture and transmit the signature, the merchant would be on the hook for any chargeback, but that decision should be left to the merchant. [24]

A merchant that anticipates low chargeback rates might reasonably accept greater chargeback risk for lower merchant discount rates due to lower network and interchange fees. As the Durbin Amendment lets the merchant choose the routing among the menu of networks on the card, it should be the merchant’s decision whether to use a PIN debit network to execute a signature debit transaction. [25]
Similarly, a signature debit network should be permitted to perform PIN debit transactions. If an issuer issues any signature debit cards, it has expressed a willingness to forgo the security of two-factor authentication with a PIN. Thus, a signature debit network should be permitted to perform a PIN-less PIN debit transaction. The one caveat with this is that a consumer might conceivably have a preference with authorization method due to security concerns; even with issuers that have zero-liability policies that go beyond the requirements of the Electronic Funds Transfer Act and Reg E, payment card fraud imposes serious non-pecuniary costs on consumers. Thus, permitting PIN-less routing of PIN transactions over signature debit networks should probably require a consumer opt-in. It might be possible, however, for a signature debit network to capture and transmit PINs. For transactions in which this is done in real time, there would be no reason to require consumers to opt-in.

Thus, PIN debit networks should be able to compete for signature-authorized transactions, and signature debit networks should be able to compete for PIN-authorized transactions, with the merchant choosing the routing. Permitting debit cross-routing will increase the number of networks competing to route each transaction and thus improve competition for best price execution, which should be the ultimate regulatory goal for a commodity service like payment card clearance. Greater price competition for transaction routing will force networks to innovate to either find greater operational efficiencies or to meaningfully differentiate the services they offer through the provision of new value. [26] Either would be a net positive social welfare outcome.
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[2] 156 CONG. REC. S5925 (daily ed., July 15, 2010) [statement of Sen. Durbin] (“Paragraph [a][4] makes clear that the cost to be considered by the Board in conducting its reasonable and proportional analysis is the incremental cost incurred by the issuer for its role in the authorization, clearance and settlement of a particular electronic debit transactions, as opposed to other costs incurred by an issuer that are not specific to the authorization, clearance, and settlement of a particular electronic debit transaction.”)


[4] Durbin Amendment, codified at 15 U.S.C. § 1693r(b) (Section 920(b) of the EFTA).

[5] Presumably “reasonable and proportional” to incremental cost means that all electronic debit transactions would be (1) flat fees, as the cost of an electronic debit transaction does not depend on its size and (2) priced lower than the lowest existing debit card interchange fee, which is 18 cents for some networks for quick serve restaurants and grocery stores.

[6] Durbin Amendment, codified at 15 U.S.C. § 1693r(a)(8) (Section 920(a)(8) of the EFTA). It is unclear how broadly this provision should be read. Arguably any economic dealings between networks and issuers, including credit card interchange fees, raise concerns about circumvention of debit interchange fee regulation.


[8] See Jean-Charles Rochet & Jean Tirole, Platform Competition in Two-Sided Markets, 1 J. EUR. ECON. ASS’N 990, 995 (2003) (adopting the Internet protocol term “multi-homing” and applying it payment card network context in which “a fraction of end users on one or the two sides connect to several platforms.”).


[12] The easiest way to avoid concerns about kickbacks would be to require issuers to pay the network fees, as they do in check clearing.

[13] It is important to emphasize that although the interchange fee is set by the network, it is paid to the issuer by the acquirer (and often passed on explicitly to the merchant).


[15] While the use of PIN debit is theoretically possible in virtually every setting, Senator Durbin’s floor statement is clearly directed toward the actual state of the world, where PIN debit is not used by many types of merchants.

[16] To be sure, these merchants could add PIN pads, but consumers have shown themselves to be adverse to using PINs in some transactional settings because of a concern that use of the PIN would compromise the safety of their deposit account.

[17] See Durbin Amendment, codified at 15 U.S.C. § 1693r(c)(5) (Section 920(c)(5) of the EFTA) [defining “electronic debit transaction” as a transaction made using on a “debit card,” which is in turn defined as “any card, payment code or device, issued or approved for use through a payment card network to debit an asset account,” excluding checks).

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[19] The exception would be if an issuer refused to permit either signature or PIN transactions out of security or other business concerns. So limiting the functionality of a card would, of course, come at the expense of transaction volume. This choice should be permitted as long as there is not an honor-all-cards rule in place requiring merchants that accept a network’s PIN debit cards to also accept its signature debit cards or those of its affiliated networks.

[20] In a situation in which there were two signature and two PIN debit networks on a card, the only possible network and interchange fees are those of the network that actually routes the transaction. For example, if a signature debit transaction were routed over a PIN debit network, it would be impossible to know which signature debit network would have otherwise received the routing.

[21] Issuer approval would account for issuers’ satisfaction regarding credit risk, which is very small on debit in any case.

[22] Checks multi-home. A consumer can buy his or her own checks as long as they conform to the basic MICR encoding requirements, and those checks can be processed through any routing system. Check clearinghouses do not require specific check manufactures. A check can be cleared via the Federal Reserve system, via multilateral clearing houses, through bilateral correspondent relationships or direct presentment. How a depositary bank (analogous to a merchant in this context) chooses to route a check for presentment is solely its own decision, based, presumably, on lowest net cost. Neither the depositor nor the payor bank particularly cares about the routing, as presentment warranties reduce credit risk.

Open access has also proved successful in other network economy contexts. For example, with landline telephones, the routing of the call does not depend on the manufacture of the telephone. Any telephone can be plugged into any landline operator’s wall jack and serve as an access device. Similarly, in the wireless space, networks frequently restrict access to their networks to their approved devices, but an iPhone can be unlocked to run over networks other than AT&T’s without difficulty, and an iPhone can also be used for Internet telephony using WiFi, rather than AT&T’s wireless system.

[23] The dispensability of a physical card is ultimately what makes decoupled debit possible. Decoupled debit involves the use of debit cards issued by financial institutions unrelated to those that provide the funding for the transaction (through a deposit account). The card is merely an access device that holds the authorization sequence, but it need not be issued by the funding institution or even involve a card.

[24] Technically, it is the acquirer that is liable for any chargebacks, but acquiring contracts pass that liability through to the merchant.

[25] Permitting cross-routing does not account for consumer choice. The Durbin Amendment itself does not guarantee consumers the choice of how a transaction is routed, but absent interference with consumer choice through either positive or negative incentives from issuers or networks, consumers are unlikely to prefer signature debit over PIN debit.

[26] Networks could try to compete through offering additional value, such as requiring settlement twice rather than once a day.
Why Are the Elderly Reluctant to Adopt New Payment Technologies?

by Andrew T. Ching
December 2010

Introduction

The advancement of electronic communication has led to the introduction of many new payment methods in the past three decades. They include ATM/debit cards, credit cards, mobile payment, contactless smart cards, etc. Like any new technology, these new payment methods face a similar challenge: Although we observe that younger consumers appear to be early adopters, it is quite common that the elderly are reluctant to use them.

The elderly population is increasing in both relative and absolute terms. For example, according to Carolyn Yoon and her co-authors, “the number of Americans aged 65 and over is expected to increase from 35 million in 2000 to … over 70 million by 2030.” [1] Many elderly are also financially well-off because of their life-time accumulated savings. Therefore, getting this segment of consumers to adopt could significantly change the implications on total consumer welfare and firms’ profits.

What Could Explain Why The Elderly Are Slow Adopters?

The explanations proposed by the existing researchers can be summarized as follows: (i) some elderly individuals may be slow learners due to their deteriorating cognitive ability; [2] (ii) others may not want to try new innovation; [3] (iii) or many simply may have strong attachment to old technologies. [4] In economics, all of these explanations can essentially be generalized to adoption costs or switching costs. However, given that the main goal of new technologies is to provide benefits to consumers, it is surprising that the literature has seldom considered the possibility that the elderly may not benefit much from adopting new technologies, which typically bring adopters a flow of benefits after a period of time.

Therefore, when consumers decide whether to adopt any new payment methods, it is plausible that they need to weigh the expected total discounted benefits against the initial adoption costs. In a recent paper, Botao Yang and I propose an alternative explanation that is orthogonal to the traditional explanations mentioned above. [5] We argue that even with just the benefits story, one can rationalize why some elderly individuals are more reluctant to adopt new technologies. The key argument is that elderly individuals have a shorter lifespan left. Therefore, even if we assume that per period benefits of the new technology are the same across age groups, the elderly would have lower expected total discounted benefits. As a result, given everything else the same (other than age), the incentive to adopt a new technology would be smaller for the elderly.
A Case Study: ATM Cards Adoption in Italy

Botao Yang and I are not the first who propose this explanation. Charles Swanson and his co-authors have made use of this hypothesis to build a theoretical model to study the impact of technological progress on economic growth. [6] However, their paper has not received much attention in the literature, and this hypothesis has never been formally tested before. This is probably because data on per period benefits of adopting a new technology are hard to obtain. To our knowledge, we have made the first attempt to incorporate this factor in an empirical structural model. In our paper, we study consumer adoption decisions regarding the ATM card, which is considered as one of the most important financial innovations in the past three decades. [7]

One of our objectives is to examine the potential bias in the estimate of the adoption costs when ignoring the heterogeneous adoption benefits across age groups. We use a biennial panel consumer survey conducted by the Bank of Italy (Survey on Household Income and Wealth) to estimate our model. In addition to ATM card adoption decisions, age and other demographic characteristics, the data also contain detailed information about cash management decisions at the micro level (how often and how much they withdraw on average based on whether they have ATM cards or not). We further supplement this data set with information on age-gender specific survival probabilities, ATM density and interest rates over time. The data on withdrawal decisions are very important for our study because it allows us to model how consumers manage cash inventory before and after adopting ATM cards. By estimating this cash management model and embedding it into a forward-looking consumer adoption decision model, we can “impute” per period monetary benefits of adopting the innovation even if consumers choose not to adopt in that period. This allows us to control for the expected total discounted benefits of adopting the ATM cards and recovers the adoption costs for different age groups based on their adoption decisions.

The implementation of our structural econometric model is quite technical, but the identification argument can be explained in a fairly intuitive way. At first, it may seem difficult to disentangle the relative importance of our explanation (which emphasizes adoption benefits) and the traditional explanations (which emphasize adoption costs). Our hypothesis implies that total expected discounted benefits of adopting decreases with age. The traditional hypotheses imply that the adoption costs increase with age. Both approaches can explain why consumers
become more reluctant to adopt as they become older. Indeed, if all we observe is consumer adoption decisions at different ages, it would not be possible to separately measure the relationship between costs and age versus that between benefits and age. To uncover the relationship between adoption costs and age, in addition to adoption decisions, we need to observe some factors that will shift the adoption benefits (i.e., benefit shifters) but not the adoption costs for any given age. [8] In general, the more data variation we have in benefit shifters, the more precise one can estimate the adoption costs parameter.

In the case of ATM card adoption in Italy, one of the main benefits is that it reduces the transaction time of making a withdrawal. Moreover, unlike in the United States, checking accounts in Italy offer the same interests as savings accounts. During the period that we studied, the interest rates were high for a subsample period (e.g., it was around 10 percent in 1993). Hence adopting an ATM card gives consumers an incentive to withdraw less in each transaction but more often in order to finance their daily consumption, because this allows consumers to earn more interests from higher average savings at their bank accounts. For the benefit shifters, we observe data on age-gender specific survival probabilities, interest rates, income and consumption of non-durable. We assume that the opportunity cost of time is a function of income, and the total amount of cash required per period can be approximated by the consumption of non-durable. Most importantly, we observe the withdrawal decisions of each consumer (how often and how much he withdraws) before and after adopting the ATM card. The data strongly support that consumers are doing cost minimization calculation when they make the withdrawal decisions.

Therefore, we formulate a cash demand model and use the observed interest rates, income, consumption of non-durables and withdrawal decisions to estimate its parameters. This cash demand model gives us an estimate of per-period benefits of adopting as a function of benefit shifters. By combining it with certain assumptions about how consumers form expectations about their future income, consumption, interest rates and survival probabilities, we are able to obtain an estimate of the expected total discounted benefits. [9] I should emphasize that we only observe the actual benefits of adopting when consumers decide to adopt. When consumers choose not to adopt, we must impute the missing adoption benefits in order to estimate the adoption costs. The estimated cash demand model allows us to achieve this goal. Since we are able to back out the adoption benefits for each observed benefit shifter, we practically observe variations in benefits for different age groups. This in turn allows us to recover the relationship between adoption costs and age for ATM cards.

Our results can be summarized as follows: Unlike the previous literature, which found that adoption costs are higher for the elderly, we find that the average adoption costs remain fairly stable across age groups in this case study. In terms of magnitude, our estimate is also much more reasonable. Our parameter estimates imply that the adoption cost ranges from US$137 to US$202 (2002 base); however, the previous parameter estimates from Attanasio and his co-authors imply that the upper bound of the adoption cost is only US$28 (2002 base), which appears to be too low if one wants to use it to explain the slow adoption behavior of the
elderly. [10] Why is our estimated adoption cost much higher? This is because we explicitly take the total expected lifetime benefits of adopting ATM cards into account, while the previous work simply incorporates the benefits of adopting in the current period.

How Can We Estimate The Adoption Benefits/Costs Of A New Payment Method?

I should emphasize that we estimate our model using field data after the technology has been introduced. While we can tell how to improve adoption rates for various groups of consumers, we cannot address an obvious question that interests firms: How can one estimate the benefits of adopting a new payment method before it is introduced? When firms need to decide whether it is worth introducing (or even start researching and developing) a new payment technology, there is no field data to do our exercise because this new technology does not even exist!

One possibility is that we take the adoption costs estimated from another existing payment method and assume that it would be the same for the new one. However, since the new payment method could be more complicated or simpler than the existing methods, the best we can hope for is that we obtain an upper bound or lower bound of its adoption costs. Another alternative approach is to run experiments, where researchers collect data from a laboratory. [11] A closely related method is called conjoint analysis, which is very popular in marketing. [12] The experimental approach requires researchers to carefully design discrete choice experiments where they describe how the new payment technology works and ask the subjects to decide whether to adopt or not. As in any laboratory experiments, there is an issue about how realistic the situation is. However, one major advantage of this approach is that researchers are able to manipulate the benefit shifters while controlling other factors. Often times, this allows us to bypass some complicated econometric issues that one needs to face when using actual field data.

Another complication is that the payment industry is a two-sided market. Consumers’ decisions on whether to adopt a new payment method also depends on their expectation about how quickly this method will be accepted by merchants. With field data, one can assume consumers have “rational expectation” and use the data to recover the expectation process. Again, for a technology that does not exist yet, we cannot use such an approach.

...an obvious question that interests firms: How can one estimate the benefits of adopting a new payment method before it is introduced?

My suggestion is that we try to simulate such adoption pattern by modeling both consumers and merchants in an equilibrium setting. Macroeconomists have long been using this general equilibrium approach in the last two decades. They usually assume all players are rational and forward-looking and define the equilibrium based on this assumption. Scott Schuh, Oz Shy
Andrew Ching
Adam Levitin
Rajiv Lochan
Ignacio Mas
Dan Radcliffe
Ellen Richey
Amit Sethi
Supriyo Sinha
Naveen Tahilyani
Charles Walton
Karen Webster
Drew Weinstein

and Joanna Stavins have applied this approach to the credit card market. [13] On the other hand, computer scientists use the agent-based approach to simulate outcomes of a market. Recently, this alternative approach has also been applied to analyze the payment card market. [14] The agent-based approach assumes consumers and merchants follow some machine learning algorithm to derive their strategies. Since the payment card market is complicated, and certain aspects are non-transparent to the players (e.g., merchant fees), I feel that introducing some agent-based elements into a general equilibrium model could provide a more appropriate framework for studying this market. A carefully calibrated agent-based model could be a fruitful approach (and an interesting research topic for academicians!) to examine the potential benefits and adoption patterns of a new payment method. As far as I know, researchers have not yet attempted to estimate or carefully calibrate such an agent-based model for the payment card market.

**Public Policy and Managerial Implications**

From the firms’ point of view, it is obvious that they would like to see consumers adopt these new payment methods as quickly as possible. The key message of my research with Botao Yang is that firms should at least pay more attention to understanding/estimating the expected total discounted benefits for various demographic groups before introducing another new payment method. They could be surprised to see that even though their new payment method looks very beneficial, some consumers (especially the elderly) could be very stubborn in resisting it!

But not only firms, public policy makers should also care about the slow adoption behavior of the elderly in this market. The adoption of new payment methods has important implications in household finance and money demand. By adopting ATM cards, credit/debit cards or other mobile payment methods, consumers can manage their transaction balances more efficiently. ATMs have significantly reduced the transaction costs of withdrawing cash from a bank account. The academic literature has already found strong evidence that the adoption of ATM cards allows consumers to keep more savings in an interest-bearing asset and hence reduces the costs of inflation. [15] It is conceivable that adoption of other newer electronic payment methods, such as credit/debit cards and mobile payment, would have even stronger impact on money demand, because they would also significantly reduce the needs of keeping cash at home.
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[7] Paul Volcker, a former chairman of the Federal Reserve, commented in Wall Street Journal’s Future of Finance Initiative in December 2009 that the ATM was the peak of financial innovation. (http://seekingalpha.com/article/177300-paul-volcker-atm-was-the-peak-of-financial-innovation)

[8] Strictly speaking, to identify the adoption costs, we need to observe a mix of adoption decisions. For instance, suppose that we observe no one adopts for a given age, even if we observe a range of adoption benefits, we can only identify the lower bound of the adoption costs at that age.

[9] Botao Yang and I are currently working on an extension by incorporating data on individual’s time preferences (i.e., how consumers discount future payoffs) into our framework. The data on time preference allow us to calibrate the “effective” lifespan of each consumer more accurately. This in turn should give us more precise estimates of the expected total discounted adoption benefits and adoption costs across different age groups.


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Social Commerce: Who’s Turning Visits into Cash?

by Karen Webster
November 2010

‘Tis the season to be shopping, and retailers have their fingers crossed that this year’s sales will shine a little brighter in comparison to the last two years. This article is Part Two of my piece on social commerce that was published in last month’s Lydian Journal. This article is a survey of how retailers are using Facebook to drive commerce.

Social commerce is about helping people connect where they buy and to buy where they connect. The point made in my prior piece is that a whole lot of the “connecting” is happening now on Facebook, even cannibalizing other online activities like e-mail and gaming since they can be done within the platform itself.

From my perspective, social commerce initiatives today can be grouped into three categories:

1. **Viral campaigns on Facebook that drive traffic to brand websites off Facebook.** Likely made famous by the Neiman Marcus Midday Dash and other promotions like this, these initiatives are classic social media promotional campaigns that use this channel as an advertising outlet for those offers. People who “like” these merchants are notified of these offers, which are then purchased on the merchant websites themselves.

2. **Deal sites that drive purchases on behalf of merchants to their own deal sites.** The granddaddy of this form of advertising is Groupon, which uses social media plug-ins so that buyers can share with their friends purchases made on Groupon’s site on Facebook or Twitter.

3. **Facebook fan page storefronts.** Payvment (powered by PayPal) and Alvenda both paved the way for what is essentially a shopping cart that creates a storefront on fan page

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**Figure 1:** Types of Social Commerce Initiatives on Facebook

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<th>Deal Sites that Drive Purchases to Their Own Deal Sites</th>
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<td>Promotion off Facebook: Purchase Off Facebook (but hopes of viral sharing)</td>
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tabs that enables merchants to sell products on their fan pages. Merchants can decide how to promote items for sale on those tabs to their fans and Facebook visitors.

With that as context, here is a representative sample of some of the more interesting and creative social commerce initiatives that are taking place on, but mostly off, social networks. These examples do not include gaming, which will be the subject of another Lydian Journal article, since it clearly drives commerce on these social networks.

**Groupon**
As this piece goes to press, the granddaddy of group buying, Groupon, is being courted by Google for something north of $5 billion, which is solid evidence that social commerce drives sales and the fortunes of those who saw the opportunity early and invested. Starting with an e-mail base from its days as “The Point,” nearly all Groupon offers “tip” since the service now has 25 million subscribers worldwide, including 15 million in North America. While it advertises on Facebook and encourages its buyers to share deals there and spark viral sharing (and makes it easy for customers to post on the Groupon site), it is not operating on social networks. Groupon goes after the long-tail of local merchants and at last count has roughly 175 knockoffs in the United States alone.

**LivingSocial**
LivingSocial offers a deal a day for services at local restaurants, bars, spas, theaters and more. After purchase, like Groupon, the buyer gets a voucher to use at the business for the merchant service that they purchased. LivingSocial started with a network of buyers. This was the company that popularized a series of fun “quizzes” on Facebook, querying users about their favorite shoes, TV shows and other likes and dislikes. They parlayed that list into a commerce application off Facebook that competes today with Groupon in roughly the same space of long-tail local merchants.

**Wal-Mart**
The granddaddy of retail was an early social network adopter. On MySpace around the holiday season, it operates its holiday gift store and gives visitors a chance to post wish lists and share favorite holiday items. In October 2010, Wal-Mart began running Facebook ads promoting a new service called CrowdSaver. This offer gives discounts off of current goods if a certain threshold of people “like” the offer (e.g. 18 percent off a plasma TV if 5,000 people like it). The move is a new and a more Facebook-centric twist on the Groupon model, which offers steep discounts on goods and services only if a critical mass of people say they like the product being offered.

**Lolligift**
Founded in 2008, Lolligift taps into the notion of “group gifting.” Anyone who wants to organize a group gift simply goes to the Lolligift website, selects the gift-giving occasion, creates a gift pool by estimating the gift cost and invites others to participate and make a contribution. Participants can chat with friends on the gift pool page, make a payment by credit card or PayPal and sign an e-card that will be delivered when the target goal has been reached.

**Macy’s**
In what is less social commerce and more PR/media hype, Macy’s has launched what it’s calling a “Magic Fitting Room.” This fitting room is in its New York Herald Square location and is equipped with a Facebook-connected, camera-enhanced mirror. Participants try on clothes
and can then snap a photo and “Friend Source” feedback. This application also hopes to boost sales by enabling people to scroll through to Macy’s product inventory and virtually try on clothes, sharing those images with friends, who then insist you buy them (or not).

**Sears**
Following on the heels of its success with its MySKU.com (Kmart’s social community launched a few years ago) Sears has given its own site a social commerce layer by allowing visitors to “message” and “follow” other users, see their profiles and their onsite social activity, like products (as well as dislike, want and own them) and join groups based on common purchases and interests.

**Visa/Rightcliq**
Described by some as a social version of PayPal, Rightcliq is a social bookmarking service with an image/price grabber that makes comparison shopping easy, using those product images to populate “wishspaces” that people set up on the site. Its autofill credit card payment feature streamlines purchases of offers presented on the Rightcliq site by a number of online retailers that provide users of Rightcliq special discounts (and also offers tracking services for online purchases).

**Pikaba**
Pikaba.com describes itself as a social shopping marketplace. It connects buyers and sellers by matching sellers with buying requests for products or services created by buyers. When merchants receive these requests (i.e. leads), they can give a direct quote to the buyer or simply get in communication with the buyer. Merchants also can put their products or services directly for sale at Pikaba.

**Amazon**
Amazon has made it easy for users to click on the recommendations link on their Amazon homepage, share those recommendations with their friends and to see what their Facebook friends also like. When shoppers connect their Amazon and Facebook accounts, they see their Facebook profile photo on Amazon’s site. They also see which of their Facebook friends have upcoming birthdays and can receive gift suggestions based on the music, books and movies those friends have said they like on Facebook and on their Amazon wish lists. At the same time, they see recommendations on what to buy for themselves, based on what their friends like.
Delta’s Facebook Ticket Window
Powered by Alvena, a social shopping cart on Facebook, Facebook users are now able to book flights with their friends directly on Facebook and many other websites. It allows people to share flight information and arrival details with friends from the confirmation page and represents the first time that travel can be booked on Facebook. Future releases will further leverage the social graph so that people can coordinate group travel more easily.

1-800-FLOWERS
Set up in 2009, registered users can now order all kinds of floral products from this Internet-based florist without ever leaving the social network. When the store was launched in 2009, it had less than 2,000 fans and struggled initially to make sales. More than a year later, it has 48,000+ fans and sales.

RetailMeNot
RetailMeNot is a site that provides links to and information about online coupons and discounts for a variety of retailers. It is a place for people across the Web to share deals and e-mail those deals to their friends. Established in 2006, people have contributed more than 300,000 discounts for sharing at more than 40,000 online stores. What makes it “social” is that every single coupon is rated and ordered by its usefulness, and every store is categorized and ordered by its popularity within that category. Users determine the “ranking” of the deals. The best deals quickly rise to the top, and expired or superseded coupons quickly drop down the list.

Payvment
Payvment is a free Facebook application that allows businesses, organizations and individuals to quickly set up virtual storefronts on their Facebook fan pages using PayPal as the payment back-end. It launched just a year ago (November 2009) and claims to have roughly 30,000 businesses and individuals who have used the app, with more than 500,000 Facebook users who have shopped for products in stores using it. It is a pure-technology play and provides a shopping cart, the ability to offer fan discounts, a search tool and the ability for customers to add comments and reviews.

Moms who love wine
In an interesting twist of “Facebook-fan-page-finds-commerce,” this group boasts more than 350,000 women who are bound by two common criteria: They are moms, and they like wine. Yet rather than monetize this group by advertising, it has decided to sell the product that keeps the group together – wine – by the box, the bottle or by the case.

Twitter
In 2009, JetBlue launched JetBlue Cheeps, a weekly Twitter promotion that features “cheap” fares for popular segments. JetBlue’s has roughly 1.6 million followers and started by engaging its customers in conversations and a running dialogue around key messages, including using it as a monitoring tool to hear real-time thoughts from customers on how to improve services. Their research suggests that their Twitter followers, in general, were more likely to complete other bookings with the carrier than visitors who did not visit Twitter.
**Best Buy**

Best Buy has taken its social commerce initiatives with Facebook an interesting step in another direction. It, along with Target and Wal-Mart, announced that it will sell Facebook Credits in the store right in time for the holiday shopping season. It is selling these prepaid cards in denominations of $10, $25 and $50, and they can be used anywhere on Facebook where Credits are now accepted (including gaming sites and virtual gifts).

**Foursquare**

With 4 million users worldwide (according to its website), the Foursquare mobile app enables people who use it to check into a place and to tell their friends, which includes posting that status to their Facebook newsfeed. Merchants, like Starbucks, provide incentives for users to visit, tell their friends and invite them to join them there.

**Facebook Deals**

In an effort to stymie the growth of Foursquare’s mobile social network, Facebook Deals was launched several months ago as a way for businesses to offer bargains and discounts to drive traffic and build customer loyalty via mobile offers. Merchants create deals, which are then promoted on their Facebook pages. Anyone who “likes” that merchant will be notified of that offer. Facebook Deals will also push notifications to the Facebook mobile app when a user is near a location offering one.

**YouTube/Old Spice Campaign**

The famous “Smell like a Man, Man” video campaign received almost 6 million views (that’s more than Obama’s victory speech) the day it was launched on YouTube. Day 2 had eight of the most popular 11 videos online. By the end of the first week, it had over 40 million views, and it has become the all-time most viewed channel. The campaign increased sales by 27 percent over six months since launching (year-on-year), and Old Spice is now the No. 1 body wash brand for men.

**getta!**

In beta on Facebook since August 2010, this social buying platform enables group commerce directly on merchant fan pages (without ever leaving that page) and messages fans when a deal is running. getta! has positioned itself as a “curator” of products that people see in stores and buy today, but that are also interesting, unique and a great value. getta! also taps into existing communities of interest on Facebook, drives them to the offers (bringing the merchant new fans and customers) and helps to create new groups around common interests (for example, the “I Love to Ski” buying group) on Facebook.

Although many merchants are keen to the idea of using social networks as platforms for conducting commerce, only a small number of them actually transact on those platforms, and
fewer still have tapped into the “mother lode” of group dynamics that these networks can foster. A quick (and non-scientific) review of retailer sites shows scant few offering the ability to transact on their fan pages. Yet nearly all promote offers and incentives to shop either online or in-store. For the holiday season, most of the larger national brands motivated their fans to “like” them as a way to get a preview of Black Friday/Cyber Monday sales, for example. However, we’re still in the early days, and the amount of activity in this space by merchants and entrepreneurs alike is evidence of the opportunity that is about to be unleashed.

My observation is that most social commerce activities have not harnessed the potential of the platform to leverage the social graph for the benefit of not just one person – but for many at the same time, which is where the opportunity for merchants, consumers and social networks lie. At the moment, simply powering “deals,” even if they are on Facebook, is a strategy that is untenable over the long term for merchants. This plan relegates retail and any channel in which it is conducted to one big commodity-price driven environment, frankly where Amazon and large big box merchants win most of the time. That may be what retail needs now to survive the current economic malaise, but it won’t be how they grow their way back to prosperity.

The multi-billion dollar opportunity that will define the future of this fourth retail channel is the one that will help merchants use it to create long-term profitable relationships with their customers in much the same way the Internet did in the late 1990s. There were lots of well-funded startups back then that evaporated because they failed to recognize the long-run potential of the channel and built businesses on the fads that were created by the Internet Bubble (remember Beenz, Pets.com and Webvan?) But that was also when a lot of smart new concepts – much less sexy but no less powerful – were started and quietly honed. Bill Me Later, to take one example, was started right around that time as a way to shop online without having to enter card information – something that was a big hindrance for consumers buying online at that time, obviously crimping merchant sales. They had no sock puppet mascot but built a business that sold to PayPal for nearly $1 billion in the midst of the financial crisis. My prediction is that the social commerce winners will evolve in much the same way – platforms and applications that simply help people connect where they buy and buy where they connect, sock puppets not included.
The Benefits to Government of Connecting Low-Income Households to an E-Payment System: An Analysis in India

by Rajiv Lochan, Ignacio Mas (pictured), Dan Radcliffe, Supriyo Sinha and Naveen Tahilyani [1]
December 2010 [2]

Introduction

Governments around the world have within their hands a powerful catalyst to promote financial inclusion – their own payment interaction with low-income households. Indeed, government is frequently the largest micro-payer and bill payer in the country. Delivering government payments electronically will not only connect low-income households to an electronic grid, but the government itself will derive sizable benefits from automating these flows.

A recent study by McKinsey, which was commissioned by the Bill & Melinda Gates Foundation, explores the inefficiencies in India’s government payment systems and estimates the monetary and non-monetary benefits of making all of India’s government payment flows electronic. The study finds that automating these payments could save the Indian government US $22.4 billion per year, equal to nearly 8 percent of the total payment flows between the government and its citizens.

To put these benefits into perspective, these savings could alternatively reduce India’s fiscal deficit by 20 percent, boost India’s welfare spending by 25 percent or fund the entire cost of India’s Food Security Act (estimated at $12 billion annually) for nearly two years. Connecting all Indian households to an e-payment system will also generate large but less measurable benefits by increasing uptake of social welfare programs, making it easier to monitor suspicious transaction flows and boosting tax collection.

Sources of Inefficiencies in Government Payments

In FY2008-2009, payments between the Indian government and individual households – in the form of social welfare payments, salaries, tax receipts, subsidies and other transactions – amounted to $296 billion, or $250 per capita (almost one-third of India’s per capita income). A substantial portion of these flows falls into the wrong hands or is spent administering these payments through costly cash- and check-based systems. The inefficiencies in government payments can be classified into three types:

Leakages (75-80 percent of total losses). These occur due to the diversion of benefits to unintended individuals or groups. The government incurs a loss when it makes payments to people who are not the intended recipients, and beneficiaries lose when they fail to receive their full entitlement because some or all of it is extracted by intermediaries, often illegally. A government investigation of India’s National Rural Employee Guarantee Scheme (NREGS) [3] in a district in Tamil Nadu, for example, found that the beneficiary rolls contained names...
of deceased individuals and absentee workers. [4] Another investigation of over-invoicing for works programs found that nearly $900,000 was embezzled in the purchase of materials for 18 local governments. Misrepresentation of man-hours in public works programs is also prevalent. The size and scope of these abuses would be reduced if each of these payments were made electronically using a secure verification system.

**Transaction costs (15-20 percent of total losses).** These comprise the higher cost of making payments manually (using cash or checks) compared to electronic processing. Time and effort are spent transferring checks between central, district- and village-level distributors and searching for misplaced checks, often resulting in delayed payments into the necessary accounts. One director of India’s flagship primary and secondary education program, Sarva Shiksha Abhiyan (SSA), pointed out that, prior to the automation of payment flows in his district, he would spend one to two full days each month signing checks for vendors, contractors, teachers and schools. While automating these payments required a fair amount of time upfront gathering bank account information and implementing the process, once the system was fully automated, the director could devote more of his time to overseeing the program.

**Administrative and overhead costs (5-10 percent of total losses).** Most payment flows are accompanied by an audit or reconciliation process, and the use of manual payment mechanisms substantially increases these burdens. The state of Maharashtra, for example, audits every publically-owned grocery store (called “fair price shops”) in the state twice a year. Each audit involves examining thousands of individual handwritten entries in the shop register and then auditing and reconciling those entries. These functions could be performed faster and at lower cost were all government disbursements to and from these stores made electronic. Similarly, welfare budget planning is especially cumbersome when the data to inform this analysis (such as regional and local disbursements for the previous year) are maintained in manual records, making data aggregation and analysis costly and complex.
Who Bears the Costs of Payment Inefficiency?

McKinsey estimates that automating these payments could reduce inefficiencies and leakages endemic to current payment flows and save the Indian government up to $22.4 billion ($250 per capita) in total annual payments. The bulk of savings ($18.3 billion) would come from welfare schemes, where payment inefficiencies in the form of leakages and administrative costs reach 30 percent or higher (see table below). The potential for savings is as high as 58 percent for India’s food subsidy scheme, but otherwise varies from 10 to 30 percent across other programs. Of the $22.4 billion in savings, roughly $15.8 billion would accrue to the government, $6 billion to individual beneficiaries and $0.6 billion to intermediaries, such as banks, contractors and suppliers.

Just as important as monetary benefits, the government will reap considerable indirect benefits from connecting households to an e-payment system. A transparent payment trail (coupled with a robust identity verification system) will make it considerably easier for the Reserve Bank of India (RBI) and the India’s Home Ministry to monitor suspicious financial transactions, reducing instances of misappropriations or money laundering. Similarly, as cash transactions decline, so will the size of India’s cash-based informal economy, leading to more money in legitimate systems and improved public revenues through increased tax collections for the Ministry of Finance. Even a 10 percent reduction in India’s informal economy could result in an estimated $11 to $13 billion tax windfall for the nation. [5]

Implementing e-payments will also reduce stress on government administration, as it ultimately
leads to reduced corruption and improved law and order. As audit reports uncover multiple transgressions, a significant workload falls on the state policy and judicial machinery to prosecute these cases. E-payments would not only reduce the number of such cases but would also reduce the time required to process each case, as the systems underpinning these transactions will be far more transparent.

Service institutions, like clinics and schools, could also benefit from an e-payment system. Take, for example, the Indian government’s maternity program, Janani Suraksha Yojan (JSY). Despite significant government outreach, institutional child births in India account for only 44 percent of total births. The JSY program provides rural women with financial incentives to have safe institutional childbirths. However, take-up of JSY has been spotty in part due to inefficiencies in benefit payouts. Some reports suggest that it takes anywhere from three weeks to a year to receive a JSY payment. [6] More timely delivery of these payments will likely induce greater uptake of the JSY program and others like it across India. Government payments could also serve as a vehicle to extend financial inclusion to low-income households. The Government of India has taken a big first step in this regard by encouraging social welfare ministries to deposit payments electronically into entry level “no-frills” bank accounts. This gives low-income households a safe place to store and access their funds. If funds are delivered into the account electronically, outbound domestic remittances, bill payments and other transactions could also be enabled, thus giving welfare recipients both monetary storage and transactional functionality. [7]

What Will It Take To Build An E-Payment Platform That Reaches Everyone?

It’s a grand vision, but what is needed to make it happen? Connecting all Indian households to an electronic grid will require a concerted effort by government and commercial stakeholders to get three elements right: 1) building the necessary infrastructure to capture government flows electronically; 2) solving the last-mile challenge of getting these payments to the end customer; and 3) finding a business model that incentivizes banks to serve low-income customers. We discuss each of these elements in turn.

Creating the necessary infrastructure. Fully automating these payment flows will require significant government investment in infrastructure. All government departments and agencies will have to be fully networked to ensure that all information transfer is electronic. This includes investment in basic computer and software application infrastructure as well as broadband connectivity to a centralized network. Making e-payments a convenient service for citizens will also require installing transaction points in every village and every urban neighborhood. To ensure payment reliability, a tamper-proof identity authentication infrastructure will have to be installed, especially at payment points that serve rural sections of India with low-income, illiterate
households. This will enable the government to direct all payments into an individual bank account that can be accessed only through a secure authentication device. [8] As shown in the exhibit below, we estimate that this will entail a one-time cost of $13 billion to $15 billion that will pay for itself in a year against potential savings of $22.4 billion annually.

Solving the last-mile problem. Automating government payments and directing these flows into an account is not enough. Low-income individuals will not use the account (other than to withdraw their benefits in full) if they must travel long distances and wait in long lines to access it. Take, for example, a recent study commissioned by the RBI that analyzed the financial access profile of a district that had been declared 100 percent financially included. [9] The study found that 87 percent of accounts (many of which were opened by customers to receive NREGS payments) were dormant 12 months after account opening, largely because banks had made little effort to establish transaction outlets close to remote households.

Banks are reluctant to build these outlets due to the high fixed costs of deploying branches and ATMs and staffing bank employees in low-income and rural areas. These fixed costs put banks on a slow path to universal financial inclusion and mean that most government payments will “land” in accounts that are inconvenient for low-income individuals to use on a day-to-day basis. Banks should seek to minimize their fixed costs by embracing branchless banking models that take small-value transactions out of banking halls and into local retail shops, where merchants – such as airtime vendors, petrol station attendants and shopkeepers – register new accounts and convert customers’ cash into electronic value and vice versa. Branchless banking turns banks’ fixed costs (branches, ATMs, staff salaries) into variable costs (paying merchant commissions based on transaction volume). This dramatically reduces the revenue threshold needed to
establish a viable transactional outlet. In September 2010, the RBI took a major step to enable banks to deploy branchless banking networks by allowing them to engage for-profit companies with extensive distribution networks, such as mobile operators and petrol companies, to set up and manage cash-in/cash-out networks on their behalf.

Finding a business model that incentivizes banks to service low-income customers. While branchless banking may make it easier for banks to expand their physical footprint, banks will not establish and manage transactional outlets in areas with low-income individuals unless they can find a revenue model that makes it profitable to serve low-income customers. To do this, banks must rework their business models away from those things that low-income individuals don’t do much of (leave large balances, take on lots of credit) and embrace what they do want to do abundantly: make frequent transactions to help make ends meet on a daily, weekly, monthly or seasonal basis. [10] Banks might make it easy for low-income households to park money when they’ve had a good day at the market, save up for school fees that are due next month, save down on the crop proceeds they got three months ago or send money to support relatives in need. This means shifting from a float-based to a transaction-based pricing model, so that banks make money every time customers do something. That is a model that has served mobile operators well: no commitments, no monthly fees, no minimum spend – but you pay each time you call or send a message. The key principle here is to make transactions profitable. If each transaction is profitable, then by definition, every customer is profitable. This financial certainty should push banks to adopt mass marketing approaches, and that is what it will take to expand transactional points to low-income and rural areas. Only then will government payments provide these households a genuine entry point into the formal financial system.
Endnotes

[1] Rajiv Lochan, Supriyo Sinha, and Naveen Tahilyani are with McKinsey & Co. Ignacio Mas and Dan Radcliffe are with the Bill & Melinda Gates Foundation’s Financial Services for the Poor team.


[5] India’s grey economy is estimated at 40% of GDP – Dr. Arun Kumar, Professor of Economics at Jawaharlal Nehru University and the author of “The Black Economy of India.”


[8] The Indian government has launched an ambitious Unique Identification (UID) initiative to provide secure identification to all Indian citizens in order to ensure (among other aims) efficient delivery of welfare services.


Introduction to India: A Rapidly Evolving Market for Cards & Payments

by Amit Sethi

July 2010

As the 11th largest card market in the world that is projected to rank 7th by 2011, India promises a wealth of opportunities. Global payment trends, such as the rise of mobile-based payment technologies, Internet payments, contactless payment products and the rise of debit and prepaid, are just some of the market shifts that have taken hold in India’s payments market and are set to transform it.

The growth opportunity in India’s cards and payments market has been witnessed by many market outsiders over the past few years. Consequently, India has become a key target for foreign investment with issuers and acquirers alike, including HSBC, Standard Chartered, Citibank, RBSG, Deutsche Bank and Barclaycard, who are all engaged in the market through organic or acquisition strategies.

At the heart of market demand is a growing population of more than 1.17 billion, the second largest after China. The relatively young, technologically savvy population (more than half of the population is under the age of 25, and more than 30 percent are age 14 or younger) is fueling demand for new payment options and innovative payment channels that offer more convenience and safety than traditional cash and checks.

Cited as one of the first countries to emerge from the global crisis by the International Monetary Fund, with GDP growth pegged as the second highest in the world among major economies and a growing affluent middle class, it is easy to understand why India continues to evolve at such a fast pace. Still, relatively underdeveloped in terms of infrastructure — largely due to its vast rural
landsaces — India has a large population of unbanked or underbanked, estimated to make up more than 70 percent of its total population. This high concentration has given rise to rapid mobile adoption, which has seen mobile subscriptions grow from an astonishing 150 million in 2007 to more than 600 million in 2010.

The Indian regulator, the Reserve Bank of India (RBI), has also undertaken several initiatives to encourage financial inclusion and has actively focused on promoting electronic payments. This stewardship continues to strengthen the cards and payments market and has helped encourage payment innovation. Although India is still a cash-based society, there is an evident market shift to electronic payments with growing card acceptance. It is estimated that more than 190 million debit cards are currently in circulation with 400 million forecast by 2013, with a similar rapid growth projected for prepaid cards. From a merchant acceptance standpoint, there are an estimated 500,000 point of sale (POS) terminals with rapid growth of acceptance locations and diversification of acceptance locations from beyond major metropolitan cities to smaller cities and rural areas across India. Until recently, credit cards had seen little movement, but forecasts predict that 30 million credit cards will be in circulation by 2013.

With the increasing use of multiple payment options and the shift away from cash in India and across Asia, issuers and acquirers face an abundance of challenges — not the least of which is cost. There are a number of key influences that drive payment strategies, such as rising technology costs, increased regulatory oversight, bank consolidation and rising fraud and security challenges. To meet these demands, issuers and acquirers are faced with a number of options, such as the developing a new payments platform in house, licensing an existing platform or outsourcing the work. With India being a leading market for outsourced solutions, outsourcing is a familiar concept, and many financial institutions are partnering with a global third-party processor, such as TSYS. Other financial institutions are opting to license payment platforms from large software and service providers, like TSYS, and customizing the platforms for their unique needs to create market differentiation for their payment products.

Payment processors can provide platforms that can be scaled and enhanced as the issuer or acquirer grows its cards business, and the market evolves and matures. The flexibility of the licensing and processing models that are offered, along with the breadth of global experience, knowledge of best practices and local presence, act as a key differentiator for processors in the industry. Although still at a nascent stage, the prepaid market is rapidly evolving, having grown by more than 40 percent in 2008 and projected to grow 75-100 percent in the years ahead. Notably, more than 95 percent of mobile subscribers are prepaid, and users are therefore experienced with the concept of prepaid. The opportunity for prepaid products and services in the world’s second-fastest growing economy appear to be vast. Research from ICICI Bank suggests that there is potential for prepaid payments to grow by US$7.6 billion by 2010.
2011, eventually overtaking debit card payments. Other prepaid opportunities include public distribution of funds and essentials, government benefits, healthcare, transport (automated fare collection) and global and domestic remittances.

TSYS has taken a leading role in the development of Prepaid in India, sponsoring the creation of an India chapter of the UK-based not-for-profit Prepaid International Forum (PIF) in 2009. It is also working with the forum and its prominent bank, scheme and non-bank members to approach RBI with a view of how PIF India can help shape legislation and stimulate the growth of Prepaid. According to an Edgar Dunn 2009 survey, regulators are expected to be the most influential market participant over the next five years in Asia.

Previously limited, the Indian market has started to focus on acquiring — a market segment with enormous potential for growth and one of the lowest POS penetrations in the world given its market size: 0.45 POS per 1000 capita in India compared with 16 POS per 1000 capita in Brazil, 1.8 in China and 17 in the UK. We are currently witnessing Indian banks broadening their ATM networks to expand distribution reach and installing increasing numbers of POS terminals at merchant establishments across the country. Industry research analysts also predict that the Indian retail e-payment market is likely to grow by more than 50 percent annually during the next few years. Future growth potential in this market is tremendous, given the current low payment card penetration coupled with low card spending. These trends are projected to change with growing card acceptance, proliferation of electronic payment options and increasing consumer education and awareness.

Overall, the Indian market is evolving at a rapid pace, and some predict that it may leapfrog established Western payments markets in the near future.

### Statistical Profile: Tender Types

**Credit**
- Number of credit cards issued by banks (2010) – 23 Million
- Number of credit card payment transactions (2009) – 259.6 Million
- Number of credit card payment transactions by value (2010) – 751.5 Billion INR

**Debit**
- Number of debit cards issued by banks (2010) – 190 Million
- Number of debit card payment transactions (2009) – 127.7 Million
- Number of debit card payment transactions by value (2010) – 250.4 Billion INR

**ATMs**
- Number of ATMs (2009) – 43,700

**POS**
- No. of POS (2009) – 0.43 Million
About the Editors

Tim Attinger
As the former head of Global Head of Product Innovation and Development for Visa Inc., Tim had global responsibility for product strategy, platform development, and P&L management for Visa’s mobile, money transfer, and eCommerce business units, as well as product innovation, security solutions, healthcare, and IP strategy. In this role, he led a number of innovation efforts related to debit cards.

Tim has recently joined as Managing Director for Market Platform Dynamics with the Firm’s San Francisco office. In this capacity, Tim advises executives of global clients on innovation and growth strategies, establishing corporate direction, finding and assessing partners, and catalyzing new product revenues.

Tom Brown
Tom Brown is a partner in O’Melveny & Myers’ San Francisco office and a member of the Financial Services Practice. Tom’s practice focuses on competition law and legal issues affecting the financial services industry.

Tom has been litigating cases, including class actions, in the financial services industry for more than a decade. He was a member of the trial team that handled the defense of the then largest civil antitrust class action in U.S. history for Visa U.S.A. Inc., In re Visa Check/MasterMoney Antitrust Litigation. He has helped numerous other financial services companies, including Capital One and PayPal, defend against class actions, including an ongoing case challenging the use of PayPal in the eBay marketplace.

David S. Evans
David S. Evans is the author of “Paying with Plastic: The Digital Revolution in Buying and Borrowing,” which is the definitive source on the payments industry. His more recent work is “Innovation and Payments,” which describes how the combination of data-driven marketing, cloud-based computing, and mobile telephony will transform the payments industry.

David is an economist, business advisor, and a recognized global authority on the design and implementation of complex business strategies and business models. He has more than 25 years of experience helping companies worldwide design business strategies in multi-sided markets to overcome the “chicken and egg” problem of getting multiple customer groups on board the same platform at the same time.

Patrick Gauthier
Patrick Gauthier is the Head of Market Intelligence at PayPal, the leading online payment solution provider. In this capacity, he can leverage 20 years of experience in product innovation across several industry (semiconductors, payments and digital media) and multiple geographies to deliver strategic insights to PayPal’s executive management.

Prior to joining PayPal, Patrick advised a number of m-commerce and e-commerce startups, and held the position of SVP Product Marketing and Strategy/Chief Privacy Officer for ZillionTV, an early stage start-up building an ad-supported on-demand entertainment service for the connected televisions.

About

The Lydian Payments Journal publishes articles from thought leaders across the globe on one of the most important industries in the world — payments, the industry that makes trade, the source of all economic prosperity, possible.

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**ARTICLES**
- Is the PIN Mightier Than the Sword in Fighting Fraud?
- Accelerating Deployment of Open NFC Mobile Commerce Applications
- Enabling Multi-Provider Services with Third-Party Service Providers
- Cross-Routing: PIN and Signature Debit Interchangeability under the Durbin Amendment
- Why Are the Elderly Reluctant to Adopt New Payment Technologies?
- Social Commerce: Who’s Turning Visits into Cash?
- The Benefits to Government of Connecting Low-Income Households to an E-Payment System: An Analysis in India
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**ABOUT**
The Lydian Payments Journal publishes articles from thought leaders across the globe on one of the most important industries in the world — payments, the industry that makes trade, the source of all economic prosperity, possible.

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