The New Debit Card Regulations:
Initial Effects on Networks and Banks

By Fumiko Hayashi

American consumers are using debit cards more than ever before, affecting how banks and merchants do business and triggering key changes in the payment card industry. At the same time, the growing fees levied on merchants by the payment card industry for processing debit purchases have stirred controversy. Congress and the Justice Department have intervened in the last two years, seeking to advance consumer welfare by promoting competition within the payment card industry. The new rules cap certain fees and give merchants the freedom to choose among rival card networks.

Proponents of these interventions argue they help bring fairness, transparency, and competition to the payment card market. According to this view, a lack of competition among debit card networks had led to unduly high fees for merchants. Part of the burden of the outsized fees ultimately fell on consumers, as merchants passed on the cost by raising prices for their goods and services.

Others argue, however, that the debit card market was already marked by intense competition, aimed not at winning merchants to a given card network but at attracting consumers to a given bank's debit

Fumiko Hayashi is a senior economist at the Federal Reserve Bank of Kansas City. This article is on the bank's website at ***www.KansasCityFed.org.***

cards. The growing fees charged to merchants enabled card-issuing banks to use some of the fee revenue to offer debit card rewards to consumers and allow debit card use without charge. According to this view, the interventions by Congress and the Department of Justice might make consumers worse off. Consumers could see rewards programs vanish and may face higher banking fees as their banks try to offset lost revenue. These changes in turn could lead consumers to switch away from debit cards to other payment methods.

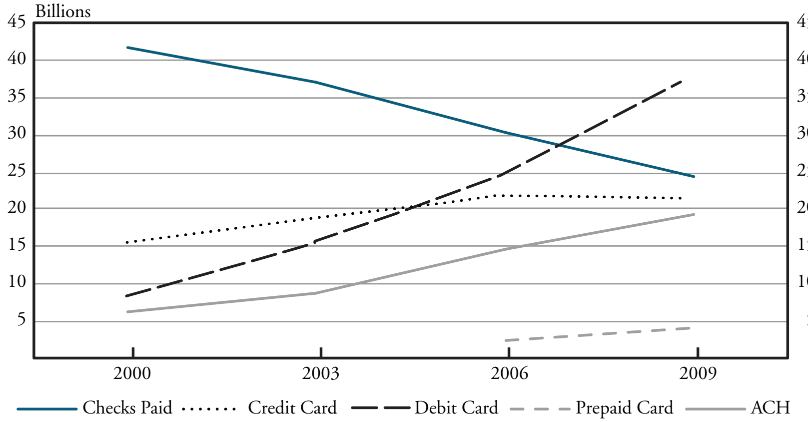
As new proposals emerge for encouraging competition and promoting consumer welfare, it is important for policymakers to review the early evidence of how the regulatory changes so far have affected debit card networks, banks, merchants, and consumers. This article, the first in a series of two, examines the regulations' initial effects on card networks and banks. The second article, appearing in the next issue of the *Economic Review*, will consider the regulations' effects on merchants and consumers.

A detailed review of how the new rules have affected card networks and banks—and how they have begun to respond—shows that fee structures have adjusted, incentives within the industry have shifted, and the market shares of the top card networks have changed. Early signs suggest the interventions achieved some of their intended purpose, fostering increased competition in some areas of the industry. But whether the broader public reaps benefit in the long run will depend, in part, on the results of new revenue-generating strategies adopted by key players in the industry.

Section I of this article provides background on the structure of the U.S. debit card industry and the regulatory and legal changes enacted in the last two years. Section II describes how the changes have affected card networks and what strategies the networks have adopted in reaction. Section III evaluates the impact on banks and reviews the banks' initial responses. Section IV summarizes the impact that these changes may have on the level of competition within the industry, now and in the future.

The second article in this two-part series—forthcoming in the First Quarter 2013 issue of the *Economic Review*—will examine the ripple effects of the regulatory and legal changes on merchants' business practices and costs and, ultimately, on the bottom line for consumers.

Chart 1
NONCASH PAYMENT METHODS:
NUMBER OF TRANSACTIONS PER YEAR



Source: The 2000, 2004, 2007, and 2010 Federal Reserve Payments Studies.

I. INDUSTRY STRUCTURE AND THE NEW REGULATIONS

The debit card market consists of a complex array of institutions, fees, and types of transactions, all affected by the new regulations and legal settlement that took effect in mid-2011. This section first provides an overview of the industry's rapid growth in recent years; its key institutions and their market shares; and the industry's complex fee structure, which has changed significantly over the last 15 years. The section then describes "Regulation II," the set of new rules mandated by Congress as part of The Wall Street Reform and Consumer Protection Act (also known as the Dodd-Frank Act). Just weeks after the new regulations were published, they were complemented by the provisions of an antitrust settlement between the Department of Justice and MasterCard and Visa.

Industry growth, key parties, and their market shares

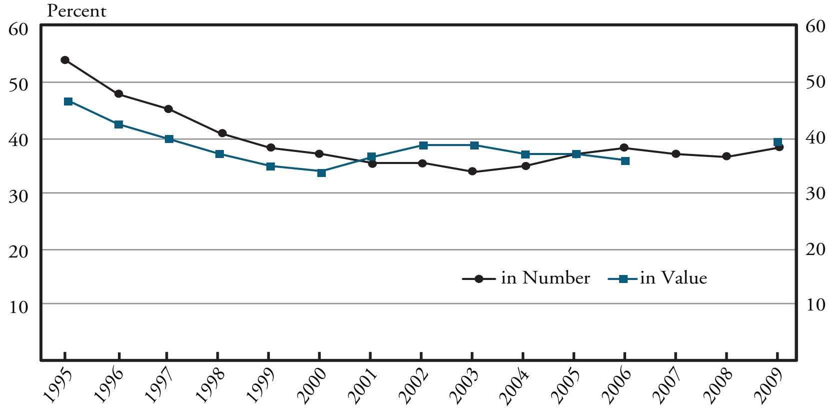
In the last decade, debit cards have been the fastest growing payment method among non-cash, retail payment methods (Chart 1). In 2000, debit cards ranked third behind checks and credit cards, accounting for just 12 percent of the total volume of noncash, retail payments made that year. But by 2009, debit cards ranked first, accounting for 35 percent of the total volume of noncash, retail payments. (In terms of total value, however, debit cards still ranked only fourth in 2009, behind checks, Automated Clearing House or ACH, and credit cards.)

Five key parties participate in every debit card transaction: a card network, a bank, a merchant acquirer, a merchant, and a consumer. Networks, banks, and merchant acquirers are jointly the providers of debit card payment services. Merchants and consumers are the end users. The networks, such as Visa and MasterCard, build and maintain the payment infrastructure that links consumers, merchants, banks, and merchant acquirers. Networks develop and enforce their own operating regulations and set the fees that merchants, banks, and merchant acquirers pay. Banks, meanwhile, issue debit cards to their customers, manage the customer relationship, approve or decline transactions, and maintain a database of customer accounts and transactions. Merchant acquirers—an industry group not covered in this review—are companies that perform a variety of merchant-related functions, including linking merchants to card networks and crediting merchant accounts for sales on card transactions.[1]

Debit card networks process either signature-authorized transactions or PIN-authorized transactions. Currently, about 60 percent of all debit card transactions are signature-authorized and 40 percent are PIN-authorized (Chart 2). There are only three signature debit networks, but there are about a dozen PIN debit networks. Visa, MasterCard, and Discover—the companies that own the three signature debit networks—also each own one of the PIN debit networks (respectively Interlink, Maestro, and Pulse).

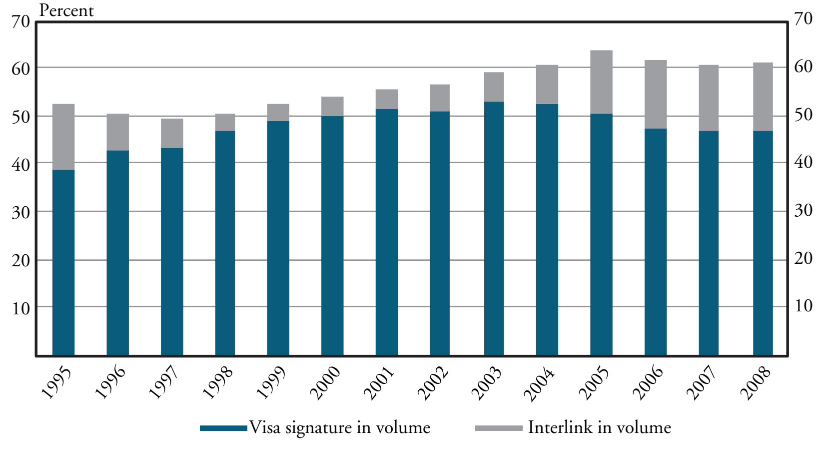
All of the networks have seen their market shares shift gradually over the years, but Visa has long held the largest share. The company has always carried the predominant share of signature debit transactions and, starting in 2005, has carried the largest share of PIN debit transactions (through its PIN debit network, Interlink). In terms of transaction volume, Visa's share of the combined market—the sum of its signature transactions and its Interlink PIN transactions—has been more than 60 percent since 2004 (Chart 3). Visa's share of the combined market has also been more than 60 percent in terms of transaction value, at least since 2006 according to the available data (Chart 4).

Chart 2
PIN DEBIT SHARE IN THE U.S. DEBIT CARD MARKET



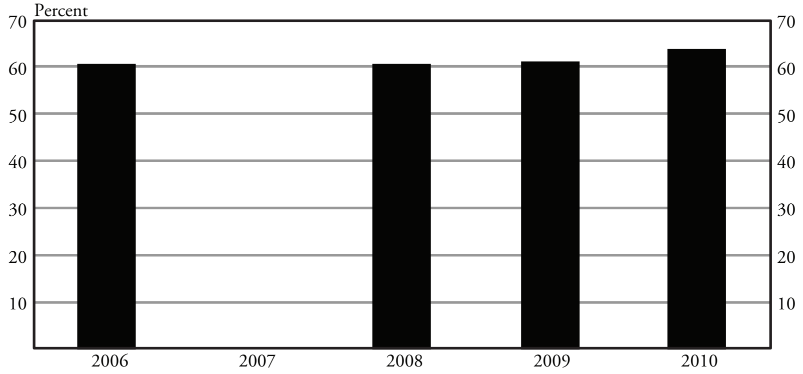
Sources: *EFT Data Book* (various years); *Nilson Report* (various issues); The 2010 Federal Reserve Payments Study.
Note: No data for PIN debit share in terms of value, for 2007 or 2008.

Chart 3
VISA'S SHARE OF THE DEBIT CARD MARKET BY VOLUME



Sources: *EFT Data Book* (various years); *Nilson Report* (various issues); The 2007 Federal Reserve Payments Study.

Chart 4
VISA'S SHARE OF THE DEBIT CARD MARKET BY VALUE

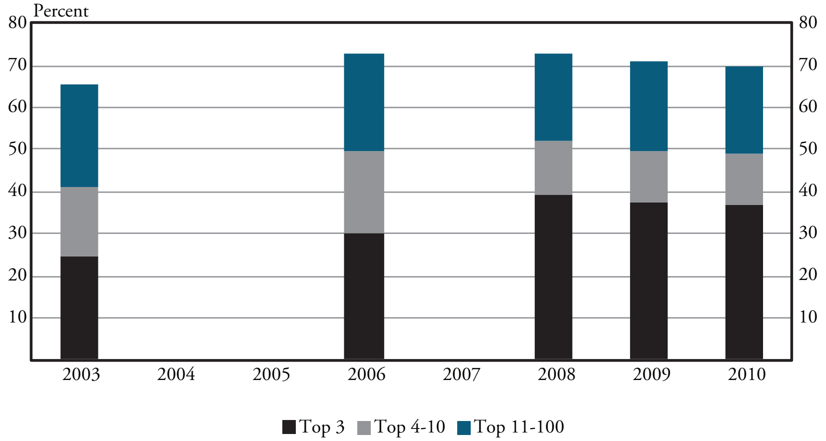


Source: *Nilson Report.*
Note: No data for 2007.

A small number of companies dominate the debit card network arena. In the signature debit market, Visa's dominant market share has been relatively stable for many years, in the range of 75 percent to 80 percent, with virtually all of the rest taken by MasterCard. (Discover entered the signature debit market recently and still holds very little market share.) In the PIN debit market, since the early 2000s, the top five PIN debit networks have processed approximately 93 to 95 percent of PIN debit card transactions (Hayashi, Sullivan, and Weiner 2006).[2]

Market shares among banks in the debit card market are also highly concentrated among several top firms. Most depository institutions are debit card issuers, and thus there are at least several thousand debit card issuers in the United States. But Bank of America, Wells Fargo, and JPMorgan Chase have been the top three debit card issuers since 2008, after each one merged with another large debit card issuer (respectively Merrill Lynch, Wachovia, and Washington Mutual). And in terms of total debit card transaction value, the three banks together accounted for 39 percent of the market in 2008, slipping just slightly to 37 percent in 2010 (Chart 5). U.S. Bank ranked a distant fourth. The combined market shares of the top 10 banks and the top 100 banks also both

Chart 5
MARKET SHARES OF THE TOP DEBIT CARD-ISSUING BANKS



Sources: *Nilson Report* (various issues); The 2004 and 2007 Federal Reserve Payments Studies.
Note: No data for 2004, 2005 or 2007.

peaked around 2008, at 52 percent and 73 percent respectively, and have decreased only slightly since then.

The fees paid by merchants

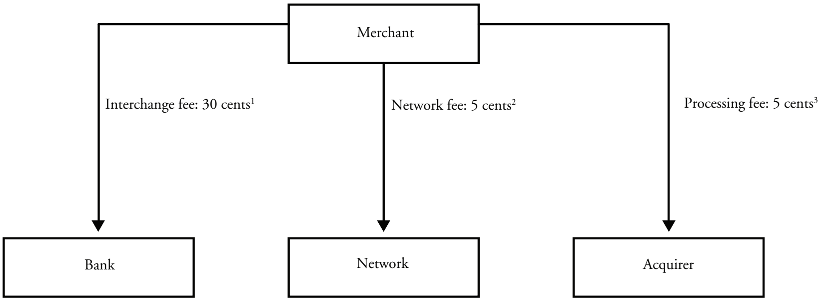
As the use of debit cards more than quadrupled over the past decade, from 8 billion transactions in 2000 to 38 billion in 2009, the fees charged to merchants to process debit purchases also grew sharply. From 2004 to 2010, the average fees charged to merchants rose from 1.39 percent of a transaction's value to 1.85 percent for signature debit purchases; and from 0.61 percent to 0.72 percent for PIN debit purchases.[3]

For each transaction, the overall fee paid by a given merchant is split into three parts, destined for three separate parties in the debit card industry. One part, known as the interchange fee, goes to the bank that issues the debit card. Another part, known as the network fee, goes to the network that processes the transaction. And a third part, considered a processing fee, goes to the merchant acquirer (Figure 1).

The interchange fees account for the largest part of the overall charges levied on merchants (Food Marketing Institute). Although interchange fees are set by networks, the banks receive the fees. A given

Figure 1

ILLUSTRATIVE EXAMPLE
THE THREE PARTS OF A MERCHANT FEE



[1]Interchange fees vary. The average is 30 cents.
[2]The network fees that card networks charge range from 3 cents to 7 cents, for a $40 transaction.
[3]Processing fees range very significantly by merchant type and size. A 5-cent fee is shown here as an example.

card network channels this fee revenue to banks as an incentive for the banks to choose that network for their cards.

Interchange fee structures are very complex. Each network's interchange fees typically vary by merchant type and size. Some networks also vary their interchange fees for different types of banks, creating "premium" and "non-premium" categories.[4] Some interchange fees are fixed fees, independent from a transaction's value, while some are proportional to the transaction value, and yet others combine a fixed component with a proportional component. Proportional fees often range between minimum and maximum levels.

Banks, networks, and merchants all face varying incentives determining whether they seek to encourage consumers to use either signature authorization or PIN authorization. Historically, PIN debit interchange fees have been lower than signature debit interchange fees, but the gap has narrowed over the last 15 years (Chart 6).[5] PIN debit interchange fees have risen significantly for both small and large merchants in the general retail sector, whereas signature debit interchange fees have risen only for small retailers and decreased for large retailers.

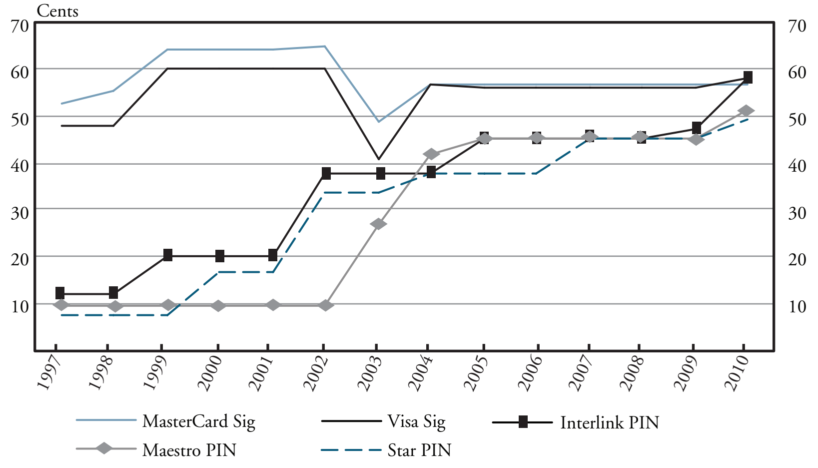
The new regulations

As debit card use surged in the United States and interchange fees rose significantly, merchants contended that fee levels lacked

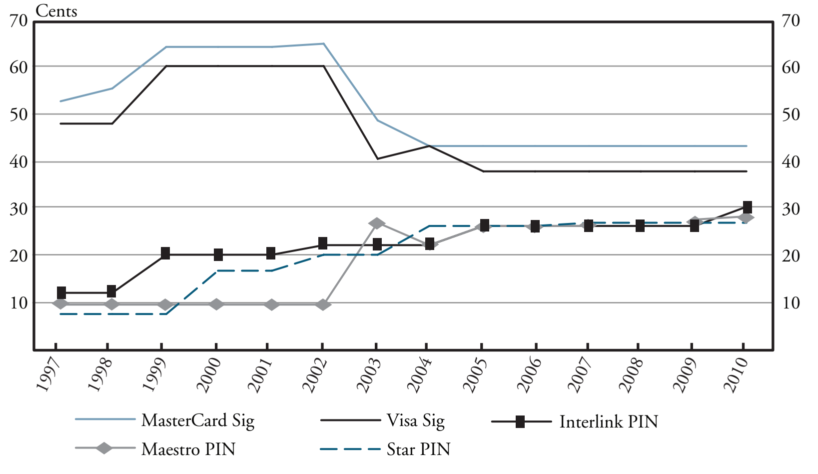
Chart 6

DEBIT CARD INTERCHANGE FEES

A: For a $40 Transaction at Small Retailers



B: For a $40 Transaction at the Largest Retailers



Sources: *American Banker* (various issues); *Credit Card Management* (April 1999); *EFT Data Book* (various years); Vantagecard.com; Pacificisland.publishpath.com.

transparency and were set unfairly by networks.[6] Some card networks and banks were engaged in exclusivity arrangements, wherein the banks restricted transactions on their debit cards to a single signature network and a single PIN network, both owned by the same company.[7] In other arrangements, banks set "priority routing" on their cards, determining which network would process the transactions and imposing the routing on merchants. With merchants having limited freedom of choice among card networks, competition among networks to attract merchants was limited. Lack of competition, the merchants argued, led to excessive interchange fees.

The Dodd-Frank Act, amended by U.S. Senator Dick Durbin of Illinois to include new clauses regulating debit card interchange fees, was the first bill pertaining to those fees that had ever been introduced in Congress.[8] According to Durbin, the purposes of the amendment were to give merchants and consumers some relief from high interchange fees, to bring transparency to the way interchange fees are set—allowing only certain, specified costs incurred by card-issuing banks to be included in the fees—and to eliminate the conditions that had left networks with little need to compete for merchants.[9] The Department of Justice, in its recent antitrust settlement with Visa and MasterCard, also cited the goal of creating more competition among debit card networks for merchants.[10]

Enacted on July 21, 2010, the Dodd-Frank Act required the Federal Reserve Board to develop a set of rules on debit card interchange fees and on the network routing restrictions set by card networks and banks. The rules, entitled "Regulation II, Debit Card Interchange Fees and Routing," were published in June 2011.[11] They became effective on October 1 of that year.[12] Regulation II contains three main provisions: a cap on debit card interchange fees, a prohibition on network exclusivity arrangements, and a prohibition on routing restrictions for debit card transactions.

The new rules limit the size of the interchange fee that can be received by large banks, defined as banks with assets of $10 billion or more, to a maximum of 21 cents per transaction plus 0.05 percent of a transaction's value. These large banks—"regulated banks"—may receive an additional one cent as a fraud-prevention adjustment if they comply with the Federal Reserve Board's fraud-prevention standards.[13] Because the fee limit does not apply to banks that, together with their affiliates, have less than $10 billion in assets, these smaller banks are referred to as "exempt banks."[14] Government-administered payment programs and certain reloadable prepaid cards are also deemed exempt.

At most, 600 banks in the United States are large enough to fall into the regulated category, while more than 10,000 smaller banks are exempt. When the regulations took effect in the fourth quarter of 2011, the regulated banks were collectively generating 67 percent of the country's signature debit transactions and 60 percent of its PIN debit transactions, for a combined total of 64 percent of all debit card transactions (Federal Reserve Board 2012).

Regulation II also seeks to ensure that merchants will have some degree of freedom to choose among networks. It does this through its provision that prohibits "network exclusivity" arrangements, requiring all banks to make at least two, unaffiliated networks available for processing the transactions of any given debit card. Under this rule, a bank may comply by having two networks available for signature debit, or by having two networks available for PIN debit, or by having one network available for signature debit and a second, unaffiliated one available for PIN debit.

Banks and networks are also prohibited by Regulation II from restricting merchants' freedom to route their transactions over any of the networks available for a given debit card. Prior to this "merchant routing" rule, many banks' priority-routing settings had deprived merchants of any choice over which network to use.

Another important regulatory change ensures that merchants may, if they wish, offer discounts to customers contingent on whether payment is made in cash or by check, credit card, or debit card. Previously, some networks had restricted merchants from offering such discounts. Further flexibility in offering discounts is ensured for merchants by the antitrust settlement between the Department of Justice and MasterCard and Visa which was approved by a federal judge in July 2011.[15] Under the settlement, for example, merchants may offer their customers a discount for using either PIN authorization or signature authorization, thus enabling merchants to steer customers toward one authorization method or the other.

Table 1
AVERAGE DEBIT CARD INTERCHANGE FEES OF 2011

Unit: cents

	All banks		Regulated banks		Exempt banks	
	Q1-Q3: Pre-regulation	Q4: Post-regulation	Q1-Q3: Pre-regulation	Q4: Post-regulation	Q1-Q3: Pre-regulation	Q4: Post-regulation
All debit	48	30	50	24	45	43
Signature debit	57	33	59	24	54	51
PIN debit	33	26	34	23	32	31

Source: Federal Reserve Board (2012).

II. THE EFFECTS ON DEBIT CARD NETWORKS

The new regulations have had immediate and dramatic effects on debit card networks' incentives and business practices. The interchange fees that the networks set for large banks, now capped by the new regulations, have fallen on average to half the size they were before (Table 1). Meanwhile, networks have still been free to set fees at any level for the smaller, exempt banks. Networks are also free to alter the network fees that they charge merchants (distinct from interchange fees).[16] The results so far: a new, two-tier interchange fee structure that differentiates between regulated banks and exempt banks; a narrowing of the gap between the fees for signature transactions and the fees for PIN transactions; new incentives that affect how networks set their interchange fees for exempt banks; and new incentives that affect how networks set the network fees they charge merchants, including both fixed fees and fees charged per transaction.

Networks create a new, two-tier interchange fee structure

Many of the smaller, exempt banks had feared that networks, forced by the regulations to lower their interchange fees for the larger, regulated banks, would choose to lower their interchange fees for exempt banks also. However, nearly all debit card networks have set separate interchange fees for regulated banks and exempt banks, creating a two-tier fee structure after the regulations took effect.[17] The regulations forced the fees down for regulated banks, but the average fees for exempt banks changed little after the regulations took effect in the fourth quarter of 2011. While the average interchange fee received by regulated banks declined from 50 cents to 24 cents per transaction, the average interchange fee received by exempt banks slipped only from 45 cents to 43 cents (Table 1). Altogether, the average interchange fee for all banks declined from 48 cents to 30 cents per transaction.

All three signature debit networks and seven of the PIN debit networks set their interchange fees for regulated banks at exactly the maximum permissible level after the regulations took effect. In contrast, four PIN debit networks—AFFN, ATH, NYCE, and Pulse—set some of their interchange fees for regulated banks *lower* than the maximum permissible level, but only for small-value transactions or for certain merchant categories such as supermarkets, wholesale retailers, and gas stations.[18]

For exempt banks, some networks changed their interchange fees and others did not (Chart 7). While most networks continued offering volume discounts to merchants for processing exempt banks' debit card transactions, Visa stopped doing so. As a result, for exempt banks, Visa's interchange fees charged to large retailers and large supermarkets have increased because those categories of merchants are no longer receiving the volume discounts they used to receive. At the same time, Visa's interchange fees charged to small retailers and small supermarkets (for exempt banks) have decreased.

Visa also introduced interchange fees for prepaid cards (most of which are exempt from interchange fee regulation) at a level higher than its interchange fees for the regular debit cards for exempt banks.

Another important effect of the regulations was a significant narrowing of the gap between the average interchange fee for signature-authorized transactions and that for PIN-authorized transactions. Prior to the regulations, the gap was 24 cents: 57 cents on average for signature-authorized transactions compared with an average of 33 cents for PIN-authorized transactions. After the regulations took effect, the gap fell to 7 cents: 33 cents for signature authorization compared with 26 cents for PIN authorization (Table 1).

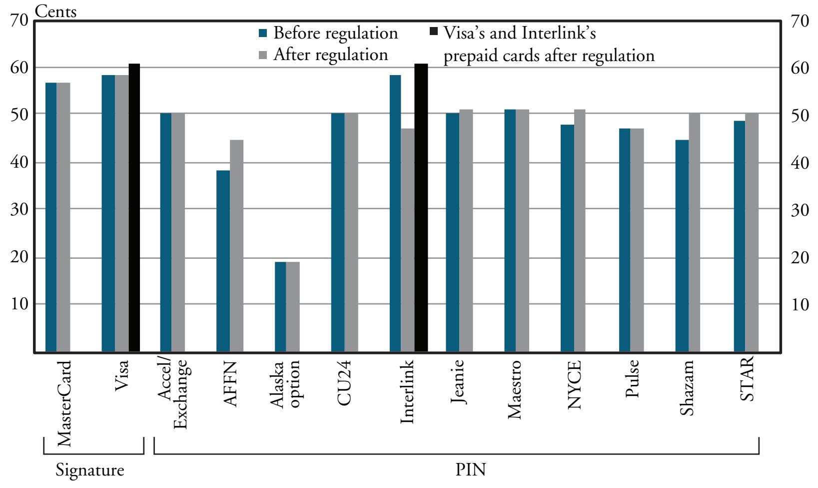
New incentives exert downward pressure on interchange fees

Prior to the regulations, debit card networks had an incentive to set their interchange fees at levels higher than those of rival networks. By charging higher fees to merchants and offering the fee revenue to banks,

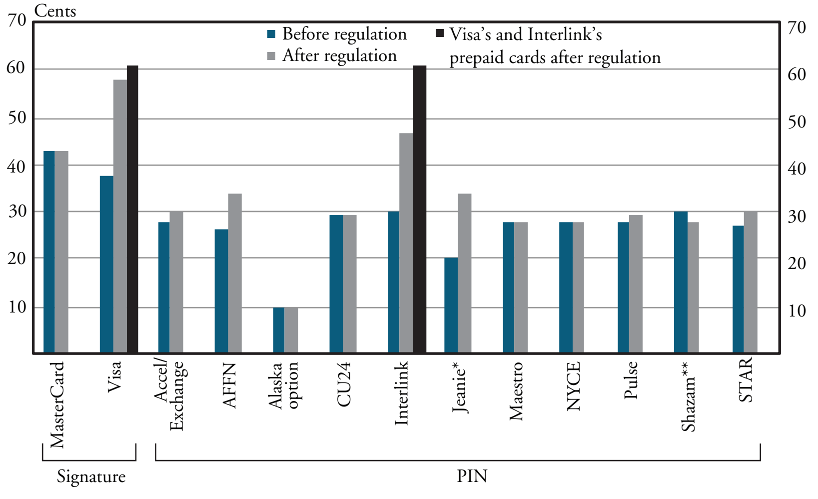
Chart 7

DEBIT CARD INTERCHANGE FEES FOR EXEMPT BANKS BEFORE AND AFTER REGULATION

A: For a $40 Transaction at Small Retailers



B: For a $40 Transaction at the Largest Retailers



Source: Pacificisland.publishpath.com.
Notes: Before rates are the 2010 rates. After rates are the October 2011 rates. Visa's and Interlink's prepaid cards rates are the October 2011 rates. Only Visa introduced prepaid card interchange fee rates that are different from debit interchange fee rates after the interchange fee standards took effect. *Before rate is the 2009 rate. **Before rate is the 2008 rate.

the networks were able to attract more banks and thus more transaction volume from banks' debit cards. In some cases, the higher fees could help attract banks into exclusivity contracts with a given card network. In other cases, banks imposed priority routing to favor whichever network offered the highest interchange fees. Either way, a network's high interchange fees could lead to high transaction volume.

The incentives have now changed. Although the interchange fees for regulated banks are now capped by law, networks still have flexibility in setting interchange fees for exempt banks. As of the fourth quarter of 2011, when the regulations took effect, interchange fees for exempt banks had moved down slightly. Whether the fees move further downward will depend in large part on the incentives created by the new regulatory environment. The incentives for PIN debit networks and for signature debit networks have shifted in different ways, but in both cases they put downward pressure on interchange fees for exempt banks.

For PIN debit networks, two provisions of Regulation II—the network exclusivity provision and the merchant routing provision—have altered the incentives. Any given PIN network seeking to maximize transaction volume now has an incentive to set its interchange fees for exempt banks lower than the highest level in the market at a given time (but not at the lowest level, as explained below).

The logic of such a strategy stems from the fact that most banks, complying with the prohibition on network exclusivity, now enable their debit cards to process transactions over one signature debit network and two or more PIN debit networks. Typically one of the PIN debit networks is affiliated with the signature debit network and the other one or more PIN debit networks are unaffiliated (Pulse). A PIN debit network with a relatively high interchange fee is more likely to be selected by a bank, but if the network's fee is too high it will be avoided by merchants. Empowered by the merchant routing provision of Regulation II, merchants will route their transactions over the network that has the lowest interchange fee among those networks enabled for a given card.

On the other hand, if the PIN debit network sets its interchange fee too low, it will be unable to attract banks and will lose them instead to rival networks. This combination of incentives means that any given PIN debit network is likely to try to avoid charging either the lowest interchange fees in the market or the highest.

Signature debit networks, in contrast to PIN debit networks, are not directly influenced by the network exclusivity provision or the merchant routing provision because a typical debit card still carries only one signature debit network. If a consumer decides to use the card to authorize a debit by signature rather than by PIN, merchants have no choice but to route the transaction over the one and only signature debit network associated with the card.

However, two other factors exert downward pressure on signature debit interchange fees for exempt banks. The first factor is the key provision of the antitrust settlement between the Department of Justice and MasterCard and Visa. By prohibiting the restrictions that the networks had formerly imposed on merchants, the settlement ensures that merchants can now offer discounts to consumers as a tool for steering consumers to use either PIN authorization or signature authorization. As a result, signature debit networks have an incentive to avoid setting their interchange fees significantly higher than PIN debit interchange fees. Otherwise, merchants would likely offer discounts to customers to steer them toward PIN authorization, or toward other payment methods.

The second factor exerting a downward pull on signature interchange fees for exempt banks is the potential for pressure on debit card networks from regulated banks. Regulated banks may want networks to avoid setting interchange fees much higher for exempt banks than for regulated banks (the latter being capped now by law) because, otherwise, exempt banks could use their higher fee revenue to gain a competitive advantage with customers. The higher fee revenue would enable exempt banks to offer incentives, such as rewards programs or fee-free banking, to win customers from regulated banks.

A countervailing incentive, however, could influence regulated banks' preferences with regard to the interchange fee levels set for exempt banks. Through prepaid cards, regulated banks may reap some benefit when debit card interchange fees for exempt banks stay high. In most networks, the interchange fee levels for exempt banks also apply to exempt prepaid cards. Prepaid cards that are exempt from the interchange fee cap have their exempt status regardless of whether they are issued by regulated or exempt banks. As a result, to the extent that interchange fees for exempt banks remain high, regulated banks will receive higher interchange fees as well for their exempt prepaid cards.

Unlike other networks, Visa has introduced a three-tier interchange fee structure: one fee level for regulated banks' debit card transactions, another fee level for exempt banks' debit card transactions, and a third fee level for all banks' exempt *prepaid* card transactions. This three-tier fee structure enables Visa to maintain high interchange fees for the exempt prepaid card transactions of all banks.

New incentives exert mixed pressures on network fees

The regulatory changes also created incentives for debit card networks to alter their complex structure of network fees. Distinct from interchange fees, which are charged to merchants and received by banks, network fees are charged to merchants and received by the networks themselves. (The networks assess the fees from merchant acquirers and the acquirers then pass the charges on to merchants.) Network fees traditionally have been assessed on a per-transaction basis, although very recently a fixed network fee was introduced. Network fees tend to be much smaller than interchange fees. For example, in 2009, the average network fee paid by merchants was 5 cents per transaction (Federal Reserve Board 2011).

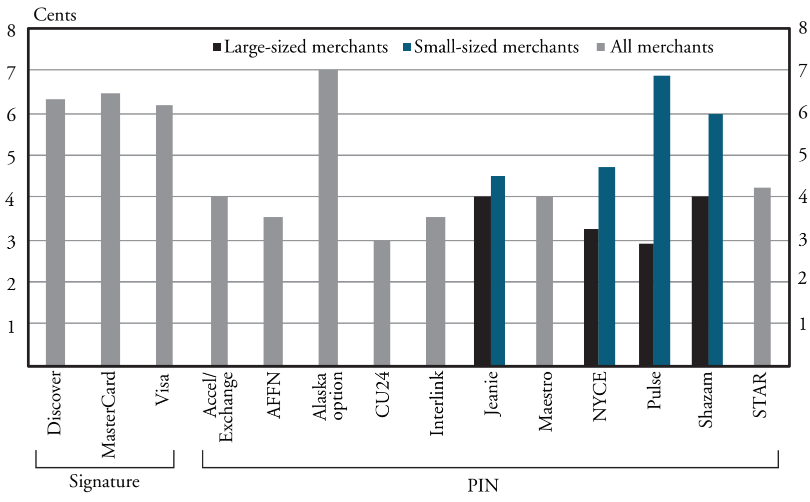
Since the new regulations took effect, some networks have raised the network fees that are charged on a per-transaction basis, while others have decreased them. Compared with the changes that have occurred in interchange fees, the changes in per-transaction network fees have been much smaller. Among the networks that raised their network fees, the increases ranged from 0.18 cent to 2 cents for a $40 transaction.[19] (Interchange fees have fallen by 18 cents, on average, from 48 cents to 30 cents as shown in Table 1.)

Two countervailing incentives have influenced networks as they made changes to the network fees they charge merchants for each transaction. First, there has been an incentive to raise the fees in order to offset revenue losses from regulated banks. Such losses can occur because card networks may find it difficult to charge regulated banks the same membership fees or other annual or monthly fees now that the revenue flows to the banks from interchange fees have been almost halved. Second, however, networks have an incentive to reduce their per-transaction network fees in order to attract more transaction volume. If a given network sets its per-transaction network fees lower than

Chart 8

PER-TRANSACTION NETWORK FEES

For a $40 Transaction, as of April 2012



Sources: Pacificisland.publishpath.com and Cardfellow.com.

its rivals, it can attract more merchants to route their transactions over that network. This is another result of the new scope afforded by the regulations for merchants to choose which networks they will use to process transactions.

A total of eight networks have raised their per-transaction network fees.[20] They include two signature debit networks (Discover and MasterCard) and six PIN debit networks (Accel/Exchange, Jeanie, Maestro, NYCE, Pulse, and Shazam). In contrast with these networks, Visa has reduced its per-transaction network fees. As a result, today, Visa has the lowest per-transaction network fees among all signature debit networks and has lower per-transaction network fees on its Interlink PIN debit network than its nearest PIN debit competitors, STAR and Maestro (Chart 8).

However, Visa has introduced a new "fixed acquirer network fee" (FANF) that is charged to merchant acquirers and passed on to merchants. The new FANF, which is a fixed fee as opposed to a per-transaction fee, allows Visa to offset the reduced revenue from its lowered, per-transaction network fees. The introduction of such fixed fees may reduce competition for merchants among debit card networks, as discussed in Section IV, and has become a subject of investigation by the Department of Justice (Green Sheet 2012).

Merchants are assessed a monthly fee based on their number of locations (for most types of merchants with physical presence) or on their gross sales volume (for online merchants and for fast food restaurants). The FANF also varies depending on whether a merchant is in a high-volume sector. For example, grocery stores, which are categorized as high-volume, pay different fees depending on how many store locations they have. A grocery with one to three store locations pays a monthly fee of $2.90 per location, while a grocery chain with more than 4,000 locations pays $85 each month per location. Online merchants and fast food restaurants are assessed a monthly fee based on gross merchant sales volume on any Visa-branded cards. The monthly fee ranges from $2 to $40,000. These fixed fees do not vary depending on whether a merchant accepts only a subset of Visa-branded cards or all of them: the monthly fee must be paid in order to accept any Visa-branded cards.

Visa has asserted that the reduced, per-transaction network fees will result in savings for merchants even with the FANF (Digital Transactions News). However, lower per-transaction fees through Visa do not necessarily translate to lower overall costs per transaction for at least some merchants. Given that the calculation of total, network fee costs for debit card transactions must take into account the monthly FANF, merchants may face higher overall network fees for a debit card transaction with Visa than with other networks.

The new network fee structure could help Visa maintain its market share. Merchants must pay the fixed fee up front if they decide to accept any Visa-branded cards. Most merchants are likely to accept at least some Visa-branded cards, given the high number of Visa-branded credit cards and debit cards held by U.S. consumers.[21] Once merchants have decided to opt in and pay the fixed fee, their choice of which network to use for a given transaction will be based on the networks' *per-transaction* network fees and interchange fees. Because the FANF is a sunk, fixed cost for the merchants, they do not take it into consideration when subsequently choosing which network to use for transaction routing. As long as the sum of the *per-transaction* network fee and the interchange fee is lower with Visa than with other networks, merchants are likely to route as many transactions as possible over the Visa network.

III. THE EFFECTS ON BANKS

The decline in debit card interchange fees has reduced revenue for many banks and changed the incentives they face. But the impact has differed from bank to bank. How different banks have fared has depended on whether they were regulated or exempt, how their debit card transactions were distributed between signature- and PIN-authorized transactions, and how much of their revenue flowed from exempt prepaid cards, among other factors.

This section describes how revenue has decreased among different groups of banks. It then considers whether the new structure of incentives may steer banks toward encouraging their customers to shift from one payment method to another: either from signature debit to PIN, or vice versa, or from debit cards to other payment methods. Finally, it discusses how regulated banks have responded to revenue losses by attempting to introduce new, monthly debit card fees, and how exempt banks have responded by competing with their larger, regulated counterparts for customers.

Banks and the new, two-tier interchange fee structure

Regulated banks experienced much sharper declines in revenue than exempt banks due to the new, two-tier interchange fee structure. Both groups saw shifts in the difference between signature debit revenue and PIN debit revenue. And banks with a significant proportion of transactions coming from exempt prepaid cards may have benefited from the exempt status of those transactions.

For regulated banks, the drop in the average interchange fee per debit transaction, shown above in Table 1, suggests that regulated banks' revenue from interchange fees decreased on average by 52 percent. However, the decline was far steeper for transactions authorized by signature than for those authorized by PIN. While regulated banks' average interchange fee per PIN debit transaction fell only 32 percent (from 34 cents to 23 cents), the average fee for signature debit transactions slid 59 percent (from 59 cents to 24 cents). Thus each regulated bank's actual reduction in interchange fee revenue depended in large part on how its debit card transactions were distributed between signature and PIN debit. On average, among regulated banks in 2011, 65 percent of all debit and prepaid card transactions were authorized by signature and 35 percent were by PIN.[22]

Regulated banks with large proportions of their transactions coming from prepaid cards might have seen only a relatively moderate reduction in their interchange fee revenue. Top regulated banks for which prepaid card transactions account for more than half the total volume of their debit and prepaid card transactions include Comerica Bank, GE Money, Synovus/Columbus B&T, and UMB. The actual reduction in revenue for these banks, however, depended on how many of their prepaid card transactions were exempt from interchange fee regulations. Not all prepaid cards are exempt.

Exempt banks' interchange fee revenue per transaction has decreased only slightly—far less than the decline seen by regulated banks—registering an average decrease per transaction of 2 cents from 45 cents to 43 cents (Table 1). The average fee for signature debit decreased 3 cents (from 54 cents to 51 cents), while the average fee for PIN debit decreased by only 1 cent (from 32 cents to 31 cents). Thus, like regulated banks, exempt banks with transactions more concentrated in PIN debit have seen their interchange fee revenue decrease less than those with transactions more heavily concentrated in signature debit. Altogether, for exempt banks, 59 percent of total debit and prepaid card transactions were authorized by signature in 2011 and 41 percent were authorized by PIN.[23] In the same year, top exempt banks, such as BECU, American First Credit Union, and The Golden 1 Credit Union, had higher PIN debit shares than average.[24]

When all banks are ranked according to the total value of their debit card transactions, exempt banks generally rank lower than the larger, regulated banks, but a few exempt institutions rank fairly high, including Metabank, Bancorp Bank and H&R Block. Because of their exempt status, these institutions receive higher interchange fees than regulated banks of similar rank.[25]

New incentives: PIN versus signature

Prior to the new regulations, many banks encouraged their customers to authorize debit card transactions by signature rather than by PIN. The banks variously offered rewards for signature-authorized transactions, charged fees for PIN-authorized transactions, or emphasized superior consumer protections for signature-authorized transactions (offering zero liability for customers). The incentive for these measures was the greater profit margin associated with signature authorization. Although the operational costs were higher for signature authorization than for PIN authorization, the cost difference was more than offset by the higher interchange fees obtained from signature debit transactions.

However, following the recent regulatory changes, regulated banks now have an incentive to promote PIN debit over signature debit. Due to the new caps on interchange fees, regulated banks' revenue per debit card transaction is no longer higher when authorized by signature rather than by PIN. As shown in Table 1, the revenue for regulated banks from a debit card transaction is roughly the same whether it is authorized by signature or PIN (differing by only 1 cent on average). But the *costs* associated with signature authorization are still higher. According to a survey of regulated banks conducted by the Federal Reserve Board, the sum of all processing costs, card program costs and fraud-loss costs for signature debit transactions is 30 cents on average per transaction—12 cents more than the 18-cent cost per PIN debit transaction.[26]

Exempt banks, on the other hand, may continue to have an incentive to promote signature debit over PIN debit. As shown in Table 1, exempt banks still receive much higher interchange fee revenue from a signature transaction than from a PIN transaction, although the gap narrowed slightly after the regulatory changes took effect, from a 22-cent difference to a 20-cent difference per transaction. The difference in revenue is partly offset by higher costs associated with signature-authorized transactions. Nevertheless, as long as the 20-cent difference in revenue exceeds the cost difference, the profit margin from a debit card transaction will be higher when it is authorized by signature rather than PIN. Whether this is the case is uncertain: there are insufficient data to determine the exact cost difference for exempt banks.[27]

New incentives: debit cards versus other payment methods

The shifts in incentives created by the new regulations may lead regulated banks to encourage their customers to switch from debit card use to alternative forms of payment, such as credit cards, prepaid cards or Automated Clearing House (ACH) transactions. (Banks are unlikely to have an incentive to promote checks over debit cards, however.) [28] In contrast with regulated banks, exempt banks may have less incentive, if any, to encourage customers to switch away from debit cards.

Regulated banks in some cases have a strong incentive to promote credit cards over debit cards, at least to creditworthy customers. The average profit margin from a credit card transaction, greater than $1.00 in the mid 2000s, swung negative in 2009 due to high charge-offs caused by the economic crisis. But it turned positive again in 2010, reaching 21 cents per transaction as the average charge-off rate fell.[29] Thus for regulated banks, profit margins are much higher from credit cards than from debit cards.

In contrast, most exempt banks may have little or no incentive to promote credit cards. Many have no credit card program of their own because their customer bases are too small to exploit economies of scale and make such a program profitable (Hayashi 2003). For those that do have a credit card program, its costs per transaction may make its profit margins smaller than the profit margins from the banks' debit card transactions, particularly signature debit transactions.

Some regulated banks, including JP Morgan Chase and U.S. Bank, promote prepaid cards to some customers, whereas exempt banks have weaker incentives to promote such cards. Even regulated banks are unlikely to promote prepaid cards to customers who already have checking accounts and debit cards, for two reasons. First, it is uncertain whether prepaid card accounts for customers with existing checking accounts at a regulated bank can be deemed exempt from regulation.[30] Second, the costs per transaction are higher for prepaid cards than for debit cards (Federal Reserve Board 2011), so substituting prepaid cards for the debit cards of customers already holding checking accounts at a bank would not increase the bank's profit. However, promoting prepaid cards to *non-checking account customers,* including "unbanked consumers" (those with no accounts and little access to financial services), may be profitable. Regulated banks may receive higher fees per transaction from exempt, prepaid cards than from debit cards. In any case, the banks can boost their overall transaction volume by adding prepaid card customers who do not have checking accounts to their existing customer base of debit card holders.

Exempt banks' incentives for promoting prepaid cards may be weaker. Visa is the only card network that sets higher interchange fees for exempt prepaid cards than for exempt debit cards, and the costs per transaction are also higher for prepaid cards than for debit cards. As with credit card programs, many exempt banks do not have prepaid card programs. Although the introduction of a prepaid card program could increase an exempt bank's transaction volume, setting up such programs entails significant fixed costs that may not be offset by the programs' expected revenue.

ACH payments are yet another alternative to debit cards that, following the regulatory changes, may have become more attractive to regulated banks. In particular, for transactions over the Internet, ACH payments may yield greater profit margins than debit card payments. The authorization method for debit card transactions over the Internet is most often by signature, not PIN, and the costs of fraud loss and fraud prevention for those transactions are significant.[31] With debit interchange fees capped for regulated banks, the banks' revenues from signature debit transactions might not cover the costs. The resulting "negative profit margin" could create a substantial incentive for encouraging customers to use ACH payments instead, as long as the cost of an ACH transaction is lower than the loss from a signature debit transaction.[32] In contrast, exempt banks—which are permitted to receive higher debit interchange fees—may be able to earn profit from signature debit transactions.

New fees levied on consumers

The regulatory changes have prompted a variety of responses by regulated banks, ranging from the termination of debit card rewards programs to the introduction of new monthly fees either for debit cards or for checking accounts. Some community banks and credit unions, exempt from the interchange fee cap, have reacted to the larger banks' moves by going in the opposite direction: introducing new rewards for debit card purchases or for opening checking accounts—and in some cases these smaller banks have gained a significant number of new checking account customers.

Many regulated banks dropped or scaled back their debit card rewards programs once the new regulations took effect, including Wells Fargo, JP Morgan Chase, US Bank, PNC, SunTrust, and Citibank (Bell).

These measures immediately reduced the costs of offering rewards and thus partially offset the revenue losses from lowered interchange fees.

Several large regulated banks attempted to introduce new monthly debit card fees for some customers. However, after receiving heavy criticism from consumers and politicians, they dropped the new fees (Johnson 2011).[33] In other cases, regulated banks have raised their fees on checking account customers or tightened the requirements for free checking accounts.[34] To what extent these changes in fees and requirements are attributable to the recent debit card regulatory changes is unclear, however, because the banks may also be reacting to other new regulations that have taken effect recently, including overdraft fee regulation.

Community banks and credit unions have reacted with a range of tactics. Some have offered monthly rewards to prospective customers for opening a checking account. Others have offered cash back for every debit card purchase made by customers during a specified period. Yet others have publicized offers of free checking accounts, with no requirements and no debit card fees. These small institutions reportedly gained a significant number of new checking account customers within a month of the announcement of Bank of America's $5.00 monthly debit card fee plan (Kim).

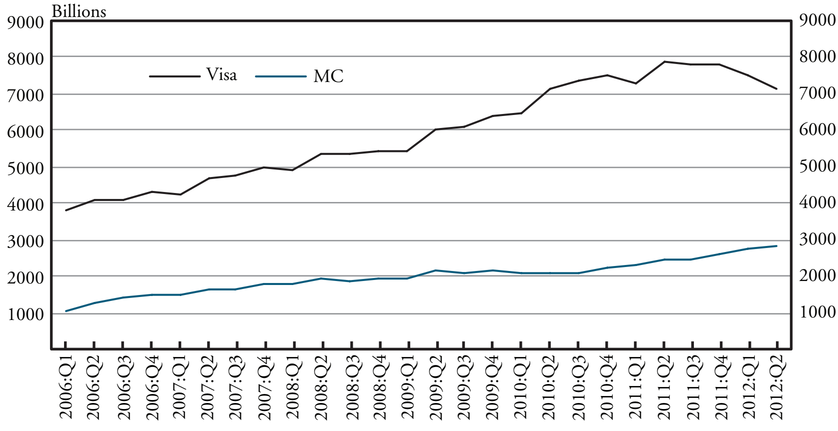
IV. THE IMPLICATIONS FOR COMPETITION

One of the main purposes of the new regulations was to promote competition for merchants among card networks. But the regulations also have the potential to alter the nature of competition among debit card-issuing banks. This section considers whether the competition among networks for merchants has been enhanced so far, whether it may intensify going forward, and how competition among banks may change as well.

Competition among card networks

The distribution of market shares among firms in an industry is one metric suggestive of the level of competition within the industry. Regulation II, especially its network exclusivity provision, had an immediate impact on Visa's market share. In the second quarter of 2012, immediately after the network exclusivity provision took effect in April, Visa's combined PIN and signature debit card volume declined

Chart 9
VISA AND MASTERCARD DEBIT CARD TRANSACTIONS BY QUARTER



Sources: MasterCard Worldwide and Visa Inc.

compared with the same quarter of 2011. This was the first time since 2006 that Visa had seen its quarterly debit card volume decline compared with the same quarter in the previous year (Chart 9). Because total U.S. debit card transaction volume continued to grow from 2011 to 2012, Visa's decline in transaction volume means that its market share has declined and other networks' shares have increased.[35]

It is quite likely that PIN debit transactions are now more evenly distributed among the networks than prior to the regulation.[36] Visa's PIN debit network, Interlink, reportedly lost significant market share to other PIN debit networks, such as Maestro, Pulse, and STAR (Finkle). It is unknown exactly how much of Interlink's share in the PIN debit market has shifted to each of these other networks.[37] But MasterCard has reported that Maestro's market share in the PIN debit card market surpassed 20 percent in April (Johnson 2012). And Pulse and STAR have stated that they added, respectively, 129 and 35 new banks to their networks in 2011 and early 2012.[38]

Whether Visa's signature debit market share has shifted to the other two signature debit networks, Discover and MasterCard, has yet to be reported. The available data does show that MasterCard's combined PIN and signature debit card volume was higher in each of the first two quarters of 2012 than it was in the corresponding quarters of the previous year (Chart 9).

The decline of Interlink's market share suggests that merchants are now actively choosing other networks over Interlink.[39] Since merchants' new flexibility in routing their transactions can have significant influence over the relative market shares of the various PIN debit networks, competition for merchants among PIN debit networks will likely increase. Competition will also likely rise between PIN debit networks and signature debit networks due to merchants' new freedom to offer discounts either for PIN debit or for signature debit as they see fit.

Two other factors may also influence card networks' competition in the near future. The first is the introduction of fixed network fees (that is, monthly fees, rather than per-transaction fees). These fees may decrease competition among card networks for merchants. Prior to Visa's recent introduction of its fixed network fee, merchants traditionally were assessed only per-transaction fees to accept payment cards.[40] With per-transaction fees only, merchants could accept as many types and brands of payment cards as they wished. However, if it becomes more common for networks to assess fixed fees, merchants may limit their card acceptance to fewer networks. This will play to the advantage of networks currently holding large market shares, because merchants are more likely to accept the cards of networks with large market shares than those with small market shares. Fixed network fees are thus likely to limit competition to only a few large networks.[41]

The second factor affecting card networks' competition is the U.S. payment card industry's announced plan to adopt computer-chip cards, a change that is likely to drive increased competition in various ways. Today, although competition *between* signature and PIN debit networks does exist, it is the network competition *within* each authorization method that is more intense. The industry's plan to transition to the new technology might intensify competition among networks.[42]

If all networks migrate to the more secure chip-and-PIN technology, the segmentation of network competition within separate signature and PIN authorization methods will disappear. As a result, all debit networks will confront more serious competition. But if some networks adopt chip-and-signature cards instead of chip-and-PIN cards, the segmentation of network competition within each of the authorization methods will continue. Some networks also may migrate to the new chip technology while other networks continue to use the old magnetic stripe technology, in which case network competition would be circumscribed within each technology.

Competition among banks

The new regulations aim mainly to encourage competition among card networks, but they will likely heighten competition among certain groups of banks in the debit card industry as well. In some cases, while it is uncertain whether the market will become more competitive or less, it is certain that the nature of the competition will change.

Competition between regulated and exempt banks may increase to some degree due to new incentives created by the changes in their respective interchange fee revenues.[43] The card networks' new two-tier structure for interchange fees makes debit card transactions likely to be more profitable for exempt banks than for regulated banks. The exempt banks' higher profits can be used to offer rewards programs or free checking to customers—precisely the kinds of promotional methods that are being scaled back by regulated banks in the wake of their reduced interchange fee revenue. When regulated banks attempted to offset their revenue losses by introducing new fees on debit cards, some exempt banks gained customers from the regulated banks by offering rewards programs and fee-free checking accounts. Whether exempt banks will be able to continue attracting customers from regulated banks may depend on the differentials in interchange fees between regulated and exempt banks, as well as any fees charged by regulated banks to their customers. It is too early to determine with certainty whether market shares have shifted from regulated banks to exempt banks. The data available so far suggest that no systematic shift had yet occurred by the end of 2011, in the very first few months after the regulations took effect.[44]

Aside from increased competition *between* regulated and exempt banks, competition *among* exempt banks will also likely increase. Exempt banks, as they compete with regulated banks by trying to attract the regulated banks' customers, must also compete against each other to gain those customers from regulated banks. For example, some of the customers who switched their bank accounts from regulated banks chose to move to credit unions while others chose to move to community banks—and therein lies the potential for intensifying competition between credit unions and community banks.

Whether the regulatory changes have increased competition among large, regulated banks is difficult to assess, but clearly the nature of competition among them has changed. Before the new regulations, many regulated banks used rewards on debit cards as a tool for attracting prospective customers and encouraging existing customers to use debit cards more often. Because many banks offered more generous rewards for signature debit transactions than for PIN debit transactions, consumers were often led to use signature debit, which is the more costly and less secure authorization method. After the new rules removed the regulated banks' incentive for promoting signature debit over PIN debit, the banks stopped offering rewards programs. They now have an incentive to compete for customers by reducing or eliminating the fees associated with checking accounts and debit cards.

The new rules also removed an easy source of profit growth for regulated banks: the rise in interchange fees. To increase profits now, regulated banks must either increase the fees they charge customers or reduce costs. The failed attempts by some regulated banks to impose new fees on customers may presage an ongoing inability to charge such fees, as long as there is sufficiently strong competition either among regulated banks or between regulated and exempt banks.

V. CONCLUSION

The recent regulatory and legal changes imposed on the debit card industry have had diverse effects, with several distinct implications for market competition among card networks and card-issuing banks. Most card networks have set two separate interchange fee schedules: one for regulated banks, conforming to the new caps on interchange fees for those banks, and a separate one for exempt banks. Although the card networks can still set interchange fees as they see fit for exempt banks, the regulatory and legal changes have created new incentives that exert downward pressure even on the exempt banks' fees.

Apparent changes in market shares among debit card networks over the past two years suggest that competition has risen among debit card networks. The decline of Visa's market share, especially in the PIN debit card market, is likely to be a sign of increased competition among the networks for merchants. Some networks have reacted by altering the network fees that they charge to merchants. Visa has introduced a fixed, monthly network fee that may help it avoid losing further market share. However, the introduction of such fixed network fees has the potential to impede competition in the debit card market.

Regulated banks have seen their interchange fee revenues fall while exempt banks' revenues have remained roughly the same, on average. Regulated banks' new incentives are likely to drive marked changes in their product promotion efforts as they encourage customers to shift from signature debit to PIN debit and from debit card use to other payment methods. So far, the attempts by some regulated banks to charge new debit card fees to consumers have run into stiff opposition from consumers.

It is too early to determine whether shifts in the banks' market shares have occurred. Competition is likely to rise *between* the regulated and exempt banks and within the exempt group. Whether competition among regulated banks will rise or not is uncertain, but clearly the nature of competition among them has changed. Regulated banks may no longer seek to attract customers by offering rewards, but they now have more incentive to compete for customers by reducing or eliminating the fees associated with checking accounts and debit cards.

So far, the interventions appear to have had the effects they intended, raising the level of competition among card networks and shrinking the fees charged to merchants—but the threat of unintended consequences looms ahead. Prompted by the effects of the new regulations, large card networks and banks may seek to use their market power to introduce new fees on merchants or consumers. Examples include the largest card network's introduction of fixed monthly fees charged to merchants, and the attempts by several banks to introduce new fees charged to consumers for debit cards and checking accounts. Policymakers will need to be vigilant in monitoring these developments and their impact on network competition for merchants and consumer welfare.

Appearing in the next issue of the *Economic Review,* the second article in this two-article series will examine evidence on how the recent regulatory and legal changes—and the debit card industry's reactions to them—have affected merchants and consumers.

ENDNOTES

[1]Many banks also act as merchant acquirers. This article focuses only on banks' role as debit card issuers, however.

[2]STAR was the top network in the PIN debit market until 2004, processing at least twice as many transactions as its nearest competitor, Visa's Interlink. In 2005, however, Interlink surpassed STAR; and since 2007, Interlink has held a market share of more than 40 percent. The PIN network owned by MasterCard—Maestro—held a market share much smaller than STAR's and Interlink's, not ranking among the top five PIN networks until 2009. In 2009, however, Maestro's market share rose rapidly to about 10 percent (Food Marketing Institute).

[3]Using data from *The Nilson Report* (2011c), the author estimates the average fee on signature debit purchases in 2010 by assuming the 2010 market share of PIN debit networks was the same as the 2009 share. The average fees in 2004 are provided by *The Nilson Report* (2005).

[4]Since 2010, four networks—STAR, NYCE, Pulse, and Accel/Exchange—have charged merchants "premium interchange fees," which are higher than regular interchange fees and are channeled to banks that commit to a specific level of transaction volume on the given network. The Jeanie network also implemented premium interchange fees in March 2012. For details, see *http://www.vantagecard.com.*

[5]When PIN debt was introduced in the mid-1980s, PIN debit interchange fees were paid by card-issuing banks to merchant acquirers. PIN debit interchange fees that flow in the opposite direction—from merchants to banks—were introduced in 1994. In the late 1990s, some PIN debit networks adopted the term "transaction authorization fee," instead of interchange fee, because a flat fee was paid to banks to compensate them for the costs of transaction authorization. PIN debit interchange fees that are proportional to the transaction value were introduced by Visa's Interlink, in the mid 1990s. Other PIN debit networks adopted similar fee structures in the early 2000s (Hayashi, Sullivan, and Weiner 2003).

[6]For a detailed account of various issues surrounding interchange fees, see Federal Reserve Bank of Kansas City (2005).

[7]Daly (2011) shows a list of top debit card issuers with an exclusivity arrangement.

[8]Bills pertaining to credit card interchange fees, however, were introduced in Congress in 2008 and 2009.

[9]See, for example, *http://durbin.senate.gov/public/index.cfmpressreleases?ID=d9c6780f-de62-4a9e-86a6-dc3ca27eca72.*

[10]The announcement by the Department of Justice is available at: *http://www.justice.gov/opa/pr/2010/October/10-at-1115.html.*

[11]The final rule is available at: *http://www.gpo.gov/fdsys/pkg/FR-2011-07-20/pdf/2011-16861.pdf.*

[12]One of the three main provisions of Regulation II—the network exclusivity provision—took effect on April 1, 2012.

[13]The final rule on fraud-prevention adjustment was published in July 2012 and is available online at: *http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20120727a1.pdf*.

[14]The Federal Reserve Board publishes separate lists of regulated issuers and exempt issuers, available online at: *http://www.federalreserve.gov/paymentsystems/regii-interchange-fee-standards.htm*.

[15]The announcement by the Department of Justice is available at: *http://www.justice.gov/opa/pr/2010/October/10-at-1115.html*.

[16]Regulation II does however prohibit card networks from using network fees to circumvent the restrictions on interchange fees.

[17] The only exception was the Alaska Option network, which did not need to change its interchange fees because its fees were already below the maximum permissible level.

[18]See *http://pacificisland.publishpath.com*.

[19]See *http://pacificisland.publishpath.com*, *http://www.cardfellow.com/blog/credit-card-processing-fees/*, *http://www.sterlingbuyinggroup.com/2012-interchange-update.html*, and *http://www.vantagecard.com*.

[20]See *http://pacificisland.publishpath.com*, *http://www.cardfellow.com/blog/credit-card-processing-fees/*, *http://www.sterlingbuyinggroup.com/2012-interchange-update.html*, and *http://www.vantagecard.com*.

[21]The number of Visa-branded credit cards in the United States at the end of 2011 totaled 263 million, accounting for 48 percent of all network-branded credit cards circulating in the country. The number of Visa-branded debit and prepaid cards totaled 441 million at the end of 2011. (The percentage of all debit and prepaid cards that are Visa-branded is unavailable due to a lack of data on the total number of debit and prepaid cards circulated in the United States.)

[22]Federal Reserve Board (2012) provides data showing banks' transaction distributions between signature and PIN debit. Among the top regulated banks, Fifth Third Bank, Navy Federal Credit Union, M&T Bank, and TCF Bank have more than 80 percent of their debit card transactions authorized by signature and thus their interchange fee revenues have dropped more sharply than others. In contrast, some banks such as Bank of America, Regions Bank, BB&T, and State Employee Credit Union in North Carolina have a relatively higher share of PIN debit transactions and as a result their revenue reductions were relatively modest. Each bank's transaction distribution is calculated by the author from the top 150 debit card issuers listed in *The Nilson Report* (2012a, 2012b, and 2012c).

[23]The author calculates the transaction distribution using the data provided by Federal Reserve Board (2012).

[24]The author calculates each bank's transaction distribution from the top 150 debit card issuers listed in *The Nilson Report* (2012a, 2012b, and 2012c).

[25]Metabank—which ranks highest among exempt banks in terms of the total value of debit card transactions—ranks among the top 11 debit card-issuing banks (including both exempt and regulated banks). Bancorp Bank ranks among the top 15 and H&R Block ranks among the top 22. No exempt banks ranked among the top 10, but eight exempt banks were in the top 50; 38 exempt banks were among the top 51 to 100; and 46 exempt banks were among the top 101 to 150.

[26]According to the survey of regulated banks (Federal Reserve Board 2011), the processing costs alone for signature debit transactions are higher by 3 to 5 cents than those for PIN debit transactions. In addition, card program costs per transaction, excluding processing costs, are also higher for signature debit than for PIN debit. Also, banks incur greater fraud losses from signature debit than from PIN debit. Among transactions at physical locations (known as "card-present environments"), the banks lost an average of 3 cents per transaction from fraud losses on signature transactions but only 1 cent per transaction from fraud losses on PIN transactions. Over the Internet or by telephone or mail—where transactions are most often categorized as signature debit rather than PIN debit—banks lost an average of 2 cents per signature debit transaction. For merchants, the same pattern also holds, with signature transactions costing more than PIN transactions: the average signature debit fraud losses incurred by merchants were 1 cent per transaction at a physical location and 5 cents per transaction over the Internet, telephone or mail. Merchants lost less than 1 cent from a PIN debit transaction.

[27]Although there are no available data from which to determine whether the cost difference between signature and PIN debit transactions is less than 20 cents for exempt banks, there are data for regulated banks. The Federal Reserve Board's survey finding (Federal Reserve Board 2011)—that the sum of regulated banks' processing costs, card program costs and fraud-loss costs was 30 cents on average per signature debit transaction and 18 cents on average per PIN debit transaction—implies a cost difference that, at 12 cents on average, is considerably less than the 20-cent threshold.

[28]For banks, processing a check is more costly than processing a debit card transaction (McKinsey). Although some depository institutions charge check-writing customers a relatively high fee per check, the fees do not always offset the costs.

[29]Based on the author's calculations using data provided by *Cards&Payments* and *The Nilson Report*. *Cards&Payments* releases an annual report, its "Bankcard Profitability Study," which estimates aggregate costs and revenues for Visa and MasterCard credit card-issuing banks. *The Nilson Report* publishes the volume of credit card transactions for each of the four major credit card networks every year.

[30]Regulation II sets several criteria that prepaid cards must meet to qualify for exempt status.

[31]PIN debit use over the Internet is limited, though it is often used for bill payments.

[32]McKinsey (2011) estimated the cost of ACH for a consumer's bank to be 1 cent per transaction.

[33]Wells Fargo and JP Morgan Chase launched pilot programs in a few states, charging monthly fees of $3.00 for the use of debit cards, but later canceled the programs. Regions Bank and SunTrust started imposing monthly fees of $4.00 or $5.00 on customers who use debit cards but soon eliminated and refunded the fees. Bank of America initially announced that it would charge a $5.00 monthly fee on debit card users starting in 2012, but it dropped the plan before it took effect.

[34]For example, Citibank raised the monthly maintenance fee on its basic checking account from $8.00 to $10.00 and added a $1,500 minimum balance requirement (White). Customers with less than a $1,500 balance in their accounts can have their monthly fee waived only if they have, in a given month, at least one direct deposit made to their account and one online bill payment made from their account.

[35]According to First Data's SpendTrend, which reports monthly trends in various payment methods, both signature debit transaction volume and PIN debit transaction volume have continued to rise.

[36]From the second quarter 2011 to the second quarter 2012, about half of Visa's loss in debit card volume was gained by MasterCard. This means that the other half of Visa's loss, plus the overall growth in the market's debit transaction volume, was distributed among other debit card networks.

[37]Although the Federal Reserve Board collects information on each card network's debit card transaction volume and value, it releases neither that data nor the network's market shares (in volume or value). The data are used to calculate and report average interchange fees.

[38]See *http://www.istockanalyst.com/finance/story/5708119/durban-exclusivity-rules-to-benefit-discover-financial-s-pulse-network* and *http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9NDY1Njk1fENoaWxkSUQ9NDk1MTQ3fFR5cGU9MQ==&t=1*.

[39]Interlink's loss of market share is most likely due to merchants' exercising their expanded freedom of choice, rather than a scenario wherein Interlink's declining market share stems from banks' enabling fewer debit cards to route transactions over Interlink. In fact the share of debit cards enabled for Interlink routing remained the same, even after the network exclusivity provision took effect, according to Pulse.

[40]Some networks assess one-time membership fees or small periodic fees.

[41]Limited card acceptance by merchants will also reduce the value of payment cards for consumers. Consumers will not be able to use their cards at as many merchant locations as before.

[42]All credit card networks have announced plans to migrate to more secure chip cards, and PIN debit networks have formed a working group to adopt a chip-card standard (Fitzgerald).

[43]Previous studies have found that competition between large and small depository institutions is weaker than competition among large institutions or among small institutions (Adams, Brevoot, and Kiser; and Cohen and Mazzeo).

[44]Based on data shown in *The Nilson Report* (2010a, 2010b, 2011a, 2011b, 2012a, and 2012b), the author calculates each of the top 100 debit card-issuing banks' market shares in terms of debit card transaction value. The regulated banks among the top 100 collectively saw their combined market share decline by 1.29 percent, from 2010 to 2011, while the exempt banks among the top 100 collectively gained market share by 0.26 percent. These market share changes, however, are unlikely to be attributable to the regulatory changes because similar market share changes were observed before the regulation took effect. From 2009 to 2010, the same regulated banks collectively lost market share by 2.41 percent, and the same exempt banks collectively gained market share by 0.29 percent.

REFERENCES

Adams, Robert, Kenneth Brevoort, and Elizabeth Kiser. 2007. "Who Competes with Whom? The Case of Depository Institutions," *Journal of Industrial Economics*, 55(1): 141-167.

Bell, Claes. 2011. "Debit Card Rewards Falling Out of Favor," Bankrate.com, available at: *http://www.bankrate.com/finance/banking/debit-card-rewards-falling-out-of-favor.aspx*.

Cohen, Andrew M. and Michael J. Mazzeo. 2007. "Market Structure and Competition among Retail Depository Institutions," *Review of Economics and Statistics*, 89(1):60-74.

Daly, Jim. 2011. "Rewriting the Transaction Routing Rules," *DigitalTransactions*, January.

Digital Transactions News. 2012. "Visa to Launch New Acquirer Fees in April That Could Run Up To Big Numbers," February 23.

Federal Reserve Board. 2011. "2009 Interchange Revenue, Covered Issuer Cost, and Covered Issuer and Merchant Fraud Loss Related to Debit Card Transactions," available at: *http://www.federalreserve.gov/paymentsystems/files/debitfees_costs.pdf*.

Federal Reserve Board. 2012. "Average Debit Card Interchange Fee by Payment Card Network," available at: *http://www.federalreserve.gov/paymentsystems/regii-average-interchange-fee.htm*.

Federal Reserve Bank of Kansas City. 2005. Interchange Fees in Credit and Debit Card Industries: What Role for Public Authorities? Proceedings of Federal Reserve Bank of Kansas City International Payments Conference, available at: *http://www.kansascityfed.org/publications/research/pscp/pscp-2005.cfm*.

Federal Reserve System. 2001, 2004, 2007, and 2011. The Federal Reserve Payments Study.

Finkle, Victoria. 2012. "Down, But Not Out: Visa Tries to Claw Back PIN Debit Business," *American Banker*, August 13.

Fitzgerald, Kate. 2012. "PIN-Debit Networks Form EMV Technology Working Group," *PaymentsSource*, April 27.

Food Marketing Institute. 2011. "Food Marketing Institute Debit Card Swipe Fee Litigation Backgrounder," November, available at: *http://www.fmi.org/docs/interchange/FMI_Litigation_Backgrounder.pdf*.

Green Sheet. 2012. "Visa Discusses DOJ Probe, Explains FANF, Raises 'No Signature' Limit," May 28.

Hayashi, Fumiko. 2003. "Community Bank Access to Payment Card Networks: Has It Become More Expensive," Federal Reserve Bank of Kansas City Payments System Research Working Paper WP03-02.

Hayashi, Fumiko, Richard J. Sullivan and Stuart E. Weiner. 2003. *A Guide to the ATM and Debit Card Industry*, Federal Reserve Bank of Kansas City.

Hayashi, Fumiko, Richard J. Sullivan and Stuart E. Weiner. 2006. *A Guide to the ATM and Debit Card Industry: 2006 Update*, Federal Reserve Bank of Kansas City.

Johnson, Andrew. 2011. "Regions Financial Joins Banks Scrapping Debit Fee," MarketWatch.com, October 31, available at: *http://www.marketwatch.com/story/regions-financial-joins-banks-scrapping-debit-fee-2011-10-31*.

Johnson, Andrew. 2012. "2nd Update: MasterCard 1Q Profit Rises 21.2% on Higher Transaction Volume," *online.wsj.com*, May 2.

Kim, Susanna. 2011. "Should You Join the Credit Union Boom?" abcnews.go.com, November 2011, available at: *http://www.istockanalyst.com/finance/story/5708119/durban-exclusivity-rules-to-benefit-discover-financial-s-pulse-network*.

McKinsey & Co. 2011. "Payments Matrix," The Clearing House.

The Nilson Report. 2005. "Merchant Discount Fees," Issue 833, p. 10, May.

______.2010a. "U.S. General Purpose Debit Card Issuers 2009 – Top 50," Issue 947, p. 11, April.

______.2010b. "U.S. General Purpose Debit Card Issuers 2009 – Second 50," Issue 949, p. 11, May.

______.2011a. "Top 50 Largest Debit Card Issuers in the U.S. Ranked by Purchase Volume, Year-End 2010," Issue 970, pp. 10-11, April.

______.2011b. "Second 50 Largest Debit Card Issuers in the U.S. Ranked by Purchase Volume, Year-End 2010," Issue 972, pp. 10-11, May.

______.2011c. "Merchant Card Fees 2010," Issue 983, p. 8, November.

______.2012a. "Top 50 Largest Debit Card Issuers in the U.S. Ranked by Purchase Volume, Year-end 2011," Issue 993, pp. 10-11, April.

______.2012b. "Second 50 Largest Debit Card Issuers in the U.S. 2011," Issue 995, p. 11, May.

______.2012c. "Top U.S. Debit Card Issuers Third 50 – 2011," Issue 996, p. 11, June.

Pulse. 2012. *2012 Debit Issuer Study Executive Summary*.

White, Martha. 2011. "Et tu Citi? Bank Raises Balance Requirements and Fees," *Time Moneyland*, available at: *http://moneyland.time.com/2011/10/05/citi-raises-balance-requirements-fees-on-accounts/*.