The New Debit Card Regulations: Effects on Merchants, Consumers, and Payments System Efficiency

By Fumiko Hayashi

Public authorities have recently intervened in the U.S. payment card industry to address controversy over the growing fees charged to merchants for processing debit card transactions. The interventions, by Congress and by the Department of Justice, aimed to give merchants and consumers some relief from the high fees and to promote competition within the payment card industry. The new regulations cap certain fees and give merchants more control in routing debit card transactions and in steering customers toward the payment methods that merchants prefer.

Merchants and the payment card industry took opposing sides in the controversy over fees. The merchants argued that lowering the fees through regulation would benefit consumers because the high fees charged to merchants were imposing costs on both merchants and consumers and reducing the efficiency of the nation's payments system. In the merchants' view, the high fees reduced consumer welfare because part of the burden of the fees was passed on to consumers in the form of higher prices for goods and services. Overall payment system efficiency was reduced according to the merchants because the payment card industry used some fee revenue to sustain inefficient payment methods that yielded the industry the most revenue.

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The industry argued exactly the opposite: that lowering the fees assessed to merchants would reduce both consumer welfare and payments system efficiency. Consumers would likely face higher banking fees as banks sought to offset lost revenue, and overall efficiency would likely decline as consumers switched from debit cards to less efficient payment methods, such as checks.

This article is the second in a series of two that examine the effects of the new regulations on the debit card industry, merchants, and consumers. The first article found that the new regulations have had significant impacts on card networks and banks (Hayashi 2012b). The present article focuses on the regulations' effects on merchants, consumers, and overall payments system efficiency. Merchants are affected by the regulatory changes directly, while consumers and payments system efficiency are affected indirectly by the reactions of the debit card industry and merchants to the new regulations. The changes have brought some benefits to some merchants, so far, but it is too soon to know whether consumers will benefit and whether overall efficiency will rise or fall. Those outcomes will depend largely on how networks, banks, merchants, and consumers continue to adapt to the new regulatory environment in coming years.

Section I of this article provides a brief summary of the recent regulatory changes. Section II discusses the effects of the new regulations on merchants and their reactions, including changes in the way they route transactions and, in some cases, in the payment discounts they offer to consumers. Section III considers the impact on consumers resulting from both merchants' and banks' reactions to the new regulations. Section IV finds that while efficiency is likely to rise in the debit card market, efficiency overall may decline in the payments system as a whole if consumers shift from debit cards to less efficient payment methods such as checks and credit cards.

I. RECENT REGULATORY CHANGES

As the use of debit cards grew rapidly over the past decade and the level of debit card interchange fees charged to merchants also grew (Hayashi 2012b), tensions rose between merchants and the debit card industry.[1] The composition and channeling of the fees charged to merchants for each debit transaction can be very complex. Although the

fees are set by debit card networks, such as MasterCard and Visa, they are paid to the banks that issue the debit cards.

Merchants contended that, due to competitive pressures and customer expectations, they could not reject debit cards even as interchange fees were driven higher by a lack of competition among networks for merchants. Instead, the competition among networks was aimed at attracting banks, with rising fee revenue paid to the banks. Merchants cited not only the costs to consumers, incurred as rising interchange fees led to higher retail prices, but also what they asserted was an adverse effect on efficiency in the payments system as a whole. According to the merchants, the interchange fees—which were higher for signature-authorized debit transactions than for PIN-authorized debit transactions—gave banks an incentive to promote signature-authorization, which is less efficient than PIN-authorization. Although signature-authorized transactions are more costly and less secure than PIN-authorized transactions (Federal Reserve Board 2011), banks were encouraging debit card users to authorize payments by signature to boost bank revenue.

Card networks and banks argued not only that capping interchange fees would increase banking fees for consumers as banks sought to offset lost revenue, but also that retail prices for consumers were unlikely to decline because merchants would retain their cost savings from lowered interchange fees. The banks also argued that overall payments system efficiency might fall because the regulations would reduce banks' incentives to promote debit cards and, as a result, consumers might shift from using debit cards to less efficient payment methods.

Interventions by Congress and the Justice Department

In 2010, Congress passed the Dodd-Frank Wall Street Reform and Consumer Protection Act, which required the Federal Reserve Board to develop a set of rules on debit card interchange fees and on the network routing restrictions imposed by card networks and banks. In June 2011, the Federal Reserve Board published the rules, known as "Regulation II," which became effective on October 1 of that year and included three main provisions: provision capped interchange fees, prohibited what are called "network exclusivity" arrangements between networks and banks, and a third gave more control to the merchant over the routing of debit card transactions.

The provision capping interchange fees sets the maximum permissible fee at 21 cents plus 0.05 percent of the value of the transaction, for both PIN- and signature-authorized debit transactions.[2] The cap applies only to large banks, defined as those that, together with their affiliates, have assets of $10 billion or more. These large banks, referred to as "regulated banks," may receive an additional one cent as a fraud-prevention adjustment.[3] Smaller banks are exempt from this fee cap, and are referred to as "exempt banks." Government-administered payment programs and certain reloadable prepaid cards are also exempt from the cap. As a result of this provision, regulated banks' interchange fee revenue per transaction decreased significantly (by 52 percent on average), while exempt banks' revenue per transaction remained almost the same (Hayashi 2012b).

Another provision prohibits "network exclusivity" arrangements, requiring all banks to make at least two, unaffiliated networks available for processing the transactions of any given debit card. This provision ensures merchants have some freedom of choice over the network they use for their debit card transactions. Prior to this rule, some card networks and banks were engaged in arrangements wherein the banks restricted transactions on their debit cards to a single signature network and a single PIN network affiliated with the signature network. After the regulations, many banks enabled their debit cards to process transactions over one signature network and two or more PIN networks.[4]

The third provision prohibits banks and networks from restricting merchants' freedom to route transactions over any of the networks available for a given debit card. Prior to the regulations, merchants' ability to route transactions to their preferred networks was limited not only by network exclusivity arrangements but also by banks' "priority-routing" settings, wherein the banks determined which networks would process the transactions on their cards and imposed the routing on merchants. Many merchants now take advantage of their new control over transaction routing.

The Department of Justice also intervened in the payment card industry, through an antitrust settlement with MasterCard and Visa that was approved by a federal judge in July 2011. The settlement required card networks to relax rules they had imposed on merchants, constraining the merchants from offering discounts based on payment

method, card brand, or product.[5] As a result, merchants now can offer incentives for consumers to use PIN debit instead of signature debit, for example, or Visa instead of MasterCard. This new ability to offer discounts more flexibly allows merchants to steer customers toward payment methods that the merchants prefer. The settlement went further than the Dodd-Frank Act, which prohibited networks from restricting merchants' ability to offer discounts based on whether payment was made by cash, check, debit card, or credit card. Before the Act, merchants had been prohibited by the networks from offering discounts to consumers for paying with debit cards rather than credit cards, although they had been allowed to offer discount for the use of cash or checks instead of credit cards (Hayashi 2012a).

II. THE EFFECTS ON MERCHANTS

The effects of the new regulations have varied for different merchant groups, and the responses by different merchants have varied as well. As a result of the fee cap, the average interchange fee per debit card transaction declined, but the cost savings from lowered fees has varied by merchant. And while the new regulations give merchants more control over transaction routing and over the practice of offering discounts based on payment method, not all merchants take advantage of their new power. The new control over routing is relevant only for merchants that accept PIN debit because most banks, while enabling more than one PIN network on their cards, continue to enable at most one signature network–leaving merchants no choice among signature networks. Although the control over discount offers is relevant for all merchants, it may take time for them to decide whether and how to implement payment-based discount offerings.

Merchants' cost savings from interchange fees

After the regulations, some merchants saw much sharper declines than others in the costs associated with debit card interchange fees. The average interchange fee per debit card transaction declined from 48 cents in the first three quarters of 2011 to 30 cents in the fourth quarter of 2011 (Table 1), suggesting that many merchants experienced cost savings. Nevertheless, some merchants saw increases in the

Table 1
AVERAGE DEBIT CARD INTERCHANGE FEES IN 2011

Unit: cents

	Q1-Q3 Pre-regulation	Q4 Post-regulation
All debit	48	30
Signature debit	57	33
PIN debit	33	26

Source: Federal Reserve Board (2012).
Note: Figures represent the average fees for all banks, including both regulated and exempt banks.

fees they paid per transaction. Several factors have contributed to the variation in actual cost savings for different merchants.

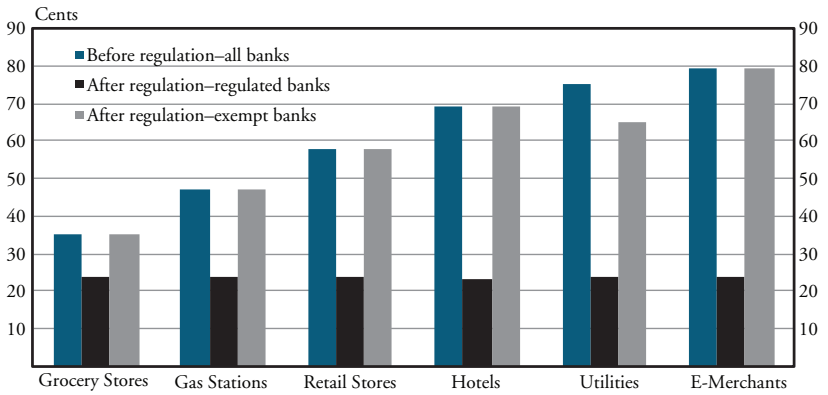
First, the cost savings vary by merchant sector, depending for example on whether a given merchant is a grocery store, a gas station, or a general retail store. Prior to the regulations, many debit card networks set different interchange fees for different merchant sectors (Hayashi and Weiner). After the regulations, most networks set interchange fees for regulated banks at the cap level without distinguishing among merchant sectors.[6] As a result, the savings are larger for the merchant sectors that were assessed higher interchange fees before the regulations. For example, higher interchange fees were charged to utility companies, hotels, and e-merchants (those that sell goods and services over the Internet) compared with general retail stores. The latter in turn were charged higher fees than grocery stores or gas stations. Thus the savings from the capping of interchange fees is greatest for utilities, hotels, and e-merchants, followed by general retail stores, and then gas stations and grocery stores (Chart 1).

Merchant sectors that typically generate small-dollar transactions (less than $10) saw an *increase* in interchange fees after the regulations. These sectors include coffee shops and quick service restaurants. For example, for a $5 signature debit transaction at quick service restaurants, MasterCard assessed a fee of about 12 cents before the regulations. After the regulations, it continues to assess the same fee for the same transaction on cards issued by exempt banks, but the fee is now about 22 cents on cards issued by regulated banks. For $5 transactions at quick service restaurants, a total of ten debit card networks now assess higher interchange fees for regulated banks compared with pre-regulation levels

Chart 1

VISA INTERCHANGE FEES BEFORE AND AFTER REGULATION

For a $40 Signature Debit Transaction



Source: Visa Inc.
Note: Fees shown as "before regulation" are the fees charged in April 2011. Those shown as "after regulation" are the fees charged in October 2011.

(Chart 2 Panel A). For $10 transactions at quick service restaurants, five networks now assess higher interchange fees than before for regulated banks (Chart 2 Panel B).

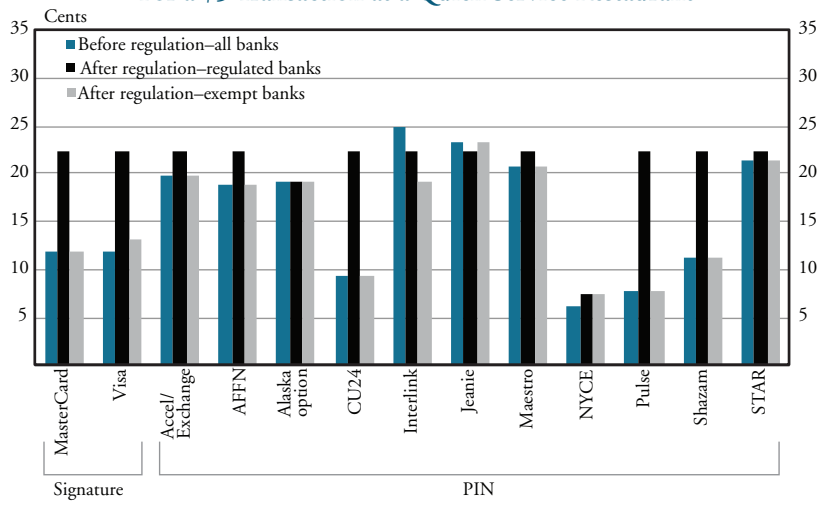
Merchant size, in terms of transaction volume, is another factor that has affected relative cost savings of different merchant groups. In the supermarket and general retail sectors, merchants that generate a larger number of transactions have seen less savings than their smaller counterparts. The large merchants formerly received volume discounts for all of their interchange fees, but now they receive volume discounts only for the fees paid to exempt banks. Formerly, due to the volume discounts, large merchants paid lower fees than small merchants, but now both large and small merchants pay the same fees to regulated banks.

A third factor that has influenced cost savings is the distribution between signature debit and PIN debit among the total debit card transactions for a given merchant. After the regulations, the average interchange fee per signature transaction decreased by 24 cents (from 57 cents to 33 cents), while the fee per PIN transaction decreased by 7 cents (from 33 cents to 26 cents) (Table 1). Thus, merchants with a relatively large share of signature debit transactions saw greater sav-

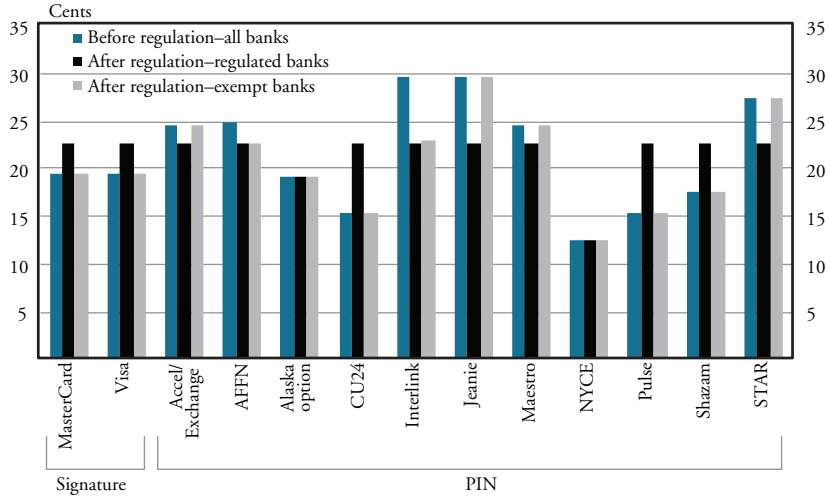
Chart 2

DEBIT CARD INTERCHANGE FEES BEFORE AND AFTER REGULATION

For a $5 Transaction at a Quick Service Restaurant



For a $10 Transaction at a Quick Service Restaurant



Source: Pacificisland.publishpath.com.
Notes: On $5 transactions at quick service restaurants, most debit card networks increased their fees for regulated banks. The only networks that did not increase their fees were Alaska Option, Interlink, and Jeanie. In contrast, for $10 transactions, only five networks increased their fees: MasterCard, Visa, CU24, Pulse, and Shazam.
Rates shown as "before regulation" are the rates charged in early 2011, prior to the regulatory changes. Rates shown as "after regulation" are those charged in October 2011.

ings than merchants with larger shares of PIN debit transactions. PIN debit is accepted by fewer merchants: two million merchant locations accepted PIN debit in 2009, while eight million accepted signature debit (Federal Register).

Finally, each merchant's cost savings from interchange fees has also depended on the fee structure chosen by the given merchant when it contracted with its "merchant acquirer." Merchant acquirers are entities that perform a variety of merchant-related functions within the payment card industry, including linking merchants to card networks, crediting merchant accounts for sales on card transactions, collecting the fees charged to merchants for each transaction, and channeling different parts of each fee to distinct parties in the debit card industry. For each transaction, the overall fee paid by a merchant is divided into three parts. One part is the interchange fee, which goes to the bank that issued the debit card used in a given transaction. Another part is the "network fee," which goes to the card network that processes the transaction. And a third part is the processing fee, which goes to the merchant acquirer. After a merchant acquirer collects the overall fee from a merchant, it sends each part of the fee to these distinct recipients.

Merchant acquirers use two types of fee structure, and the choice between the two types has been a factor affecting merchants' cost savings following the regulatory changes. In one type of fee structure, known as "interchange plus," the distinct parts of the fee are assessed individually to merchants. The other type is a "bundled" fee structure, of which the simplest kind involves a single flat fee rate—for example, 3 percent of the value of a transaction—that includes all the different parts of the fees charged, for all types of cards and all brands.

Larger merchants typically choose the interchange plus fee structure because it is more transparent and reflects any changes in interchange fees more fully and quickly. Smaller merchants tend to choose the bundled fee structure because it simplifies their budgeting for card transactions. If a merchant opts into the interchange plus fee structure, it must know all the different fees and stay abreast of any changes to predict its overall costs for card transactions. Unlike large merchants, small merchants may not have enough resources to take this approach. In contrast to the interchange plus fee structure, the bundled fee structure does not reflect recent changes in interchange fees, at least not

immediately. Before merchant acquirers will reset the bundled fees to reflect any recent, new fee reductions, the acquirers need to ascertain the distribution of a given merchant's debit card transactions between exempt and regulated banks. Small merchants that have chosen the bundled fees, therefore, may not immediately see cost savings.

New control in routing debit card transactions to preferred networks

The network exclusivity provision and the merchant routing provision of Regulation II both give merchants more control in routing transactions to preferred networks. However, most banks' way of complying with the prohibition of network exclusivity arrangements is to enable more than one *PIN network* on their debit cards, but not more than one *signature network.* As a result, those merchants that accept only signature transactions generally have not gained any increased scope to choose from among different networks.

Among merchants that accept PIN debit transactions, many have taken advantage of their new control. The routing provision of Regulation II allows them to pick the PIN network they prefer from among those enabled on a given card. Their exercise of this control has altered PIN debit networks' market shares. Many merchants now avoid Visa's Interlink network, the largest PIN network prior to the regulations, and instead choose other PIN networks whenever possible.[7] As a result, in terms of transaction volume, Interlink has lost significant market share to other PIN networks such as Maestro, Pulse, and STAR (Finkle; Daly).

Through their new control over routing, merchants' emerging influence over the market shares held by different PIN networks is likely to increase competition among PIN networks for merchants. Before the regulations, PIN networks had an incentive to set their interchange fees at levels higher than those of rival networks. By offering higher fee revenue to banks, the networks were able to generate more transactions because transaction routing was controlled by the banks. But the merchants' new control over routing has changed PIN networks' incentives. Now they seek to set their interchange fees lower than their rivals to attract more transaction volume.

The networks also have an incentive to set the *network* fees assessed to merchants lower than their rivals do. Network fees are now an important

determinant of merchants' decision making when they choose among PIN networks. Before the regulations, the fees that merchants paid per transaction were lower on networks that assessed lower *interchange* fees. After the regulations, fees have remained lower on cards issued by exempt banks but not for regulated banks because the interchange fees paid to the latter are now essentially identical across networks. Instead, the overall fee per transaction is now lower on networks that assess lower *network* fees for transactions on the regulated banks' cards.[8]

For merchants that accept only signature debit, usually because certain product attributes of PIN debit do not meet their business needs, the new provision allowing some control over routing does not yield influence over networks' market shares.[9] However, even these merchants may have such influence through a separate mechanism—offering discounts to consumers based on payment method, brand, and product. As described below, merchants' ability to offer payment discounts can cause networks to compete for merchants.

New control in offering payment discounts

Merchants' new freedom to offer discounts based on payment method, brand, and product allows them to steer customers toward the payment methods that the merchants prefer—and thus to affect the market shares held by networks. For example, if signature networks set their interchange fees for exempt banks higher than those set by PIN networks, merchants may offer greater discounts to customers who use PIN debit. To retain transaction volume, signature networks may avoid setting their interchange fees significantly higher than those of PIN networks. In this way, merchants' new flexibility in offering discounts causes networks to compete for merchants.

Most merchants, however, have not yet taken advantage of this new power. Given the many different payment methods, brands, and products that merchants accept and the complexity of the fee structures, it will take time for merchants to determine whether and how to offer discounts based on payment method. For example, Kroger, one of the nation's largest grocery store chains, considers payment-based discounts a very powerful tool for influencing customers' payment choices (Clifford and Strom), but has not decided how to offer the discounts. One choice is to display different prices for each good

that it sells based on the payment method. Another approach is to offer a discount based on payment method at one set rate, or amount, at the register.

Merchants also need to decide which payment methods will be discounted and what discount to offer. Moreover, they need to give careful consideration to how their decisions may affect their competitiveness with rival merchants. For example, setting "regular" non-discounted prices somewhat higher when customers use more costly payment methods (such as "high-end rewards" credit cards), and using discounts to encourage customers' use of preferred, less costly payment methods may be risky. The risk stems from consumers' potentially deciding which stores to patronize based on the stores' "regular," non-discounted prices.

Some merchants have used tools other than payment discounts to achieve the same goal. For example, several of the largest retail stores have successfully steered their customers toward payment methods they prefer by installing special point-of-sale devices. The devices automatically prompt debit card users for a PIN, leading more customers to pay with PIN debit instead of signature debit (Sidel). There are pros and cons to the use of such devices compared with the use of discount offers for preferred payment methods. By offering discounts for different payment methods or brands, merchants may exert more influence over customers' choice of payment method than they do over customers' choice of authorization method (such as PIN versus signature). But the implementation of payment-based discounting is likely to be a more complex undertaking than the installation of PIN-prompting devices.

The convenience store sector is the only sector in which payment discounts are relatively widespread. These stores most commonly offer discounts to cash-using customers. Some of them had offered cash discounts even prior to the new regulations once the Cash Discount Act made it possible to do so (Landsman; Hayashi 2012a). After the new regulations, however, more convenience stores reportedly started offering cash discounts, with some offering discounts to debit card users as well (Berlin). Compared with other merchants, certain convenience stores may find offering payment discounts easier because, in some cases, they can offer the discounts solely for gas sales.

It remains to be seen whether payment discounts will be adopted widely by merchants.[10] However, even if only a few merchants offer

payment discounts, merchants' freedom to do so if they wish has value. Some economists argue that even the threat of offering payment discounts could induce card networks to compete for merchants (Prager and others).

III. THE EFFECTS ON CONSUMERS

The new regulations did not affect consumers directly. However, the reactions of banks and merchants to the regulations will affect consumers' welfare and payment choices significantly. Whether consumers benefit will depend in part on the extent to which merchants pass on their cost savings, and in part on the extent to which banks pass on their revenue losses to consumers. Merchants' offers of payment-based discounts and banks' payment product promotions will, together, affect consumers' decisions on whether to switch from debit card use to other payment methods and whether to favor PIN debit authorization or signature debit authorization.

Consumer welfare

The degree to which the regulatory changes affect each consumer will be determined only partly by the retail prices set by merchants and the fees assessed and promotions (such as rewards programs) offered by banks to consumers. The welfare effects are also determined, for a given consumer, by that consumer's choice of payment method.

Previous studies suggest that merchants are likely to pass on at least some cost savings to consumers and banks are likely to pass on some revenue losses.[11] In theory, the proportion of any reduction in a merchant's costs that is passed on to consumers will depend mainly on the merchant's competitive environment and its market demand curve. Merchants would pass on 100 percent of their cost savings, theoretically, if they were operating in a perfectly competitive environment. Thus under hypothetical conditions of perfect competition, when the merchant's costs for the sale of a good decrease by $1, the retail price of that good will also decreases by $1. However, when a merchant holds market power in a given market, the pass-through rate may be either greater than or less than 100 percent, depending on the demand curve.[12] Empirical studies have found instances of pass-through rates of less than 100 percent and other instances of pass-through rates greater than 100 percent.[13] The

studies also have found that merchants tend to adjust prices faster for cost increases than for cost reductions, a phenomenon known as the "rocket and feather" effect. These studies may not apply fully to the banking industry, but banks are still likely to pass on to their customers some of the revenue losses from lowered interchange fees.

The actual pass-through of the changes in interchange fees stemming from the new regulations is difficult to observe, however. The pass-through of cost savings from merchants to consumers is not easy to measure, even when merchants pass on all their savings to consumers. A hypothetical example can help illustrate the difficulty. Suppose that the total value of debit card transactions in 2012 was equivalent to that in 2011, namely $1.8 trillion. The savings stemming from lowered interchange fees, on average, may be calculated by multiplying $1.8 trillion by the average change in interchange rates before and after the regulations. The rates averaged 1.24 percent in the first three quarters of 2011 (before the regulations) and 0.78 percent in the fourth quarter of 2011 (after the regulations), yielding a total cost savings of 0.46 percent of $1.8 trillion, or $8.3 billion.[14] Suppose also that merchants were to pass on all of their savings to all of their customers—not only to those who use debit cards but also to those who use other payment methods. In this case, the retail price of a $40 purchase would decline by at most 7 cents.[15] Price changes this small are difficult if not impossible to measure.

The extent to which banks pass on their revenue losses to consumers is also difficult to measure. Compared with the changes in retail prices, changes in the fees assessed and rewards offered by banks may be more visible. But the percentage of consumers who actually pay higher debit card fees or checking account fees from one period to the next may not be easily observed.

The welfare improvement for consumers in aggregate will depend largely on whether the pass-through of lower merchant costs is greater than the pass-through of lower bank revenue. If the pass-through of merchants' cost savings is greater than the pass-through of banks' revenue losses, then consumer welfare will rise. Otherwise it will decline.[16]

For each consumer, the effects of merchants' and banks' pass-through will depend on whether the given consumer tends to use credit cards, debit cards, cash, or prepaid cards extensively. The welfare of consumers who use credit cards extensively will be the least affected. In contrast, the welfare of

consumers who use debit cards, cash or prepaid cards extensively will be greatly affected by merchants' and banks' pass-through.

The welfare of consumers who use credit cards extensively will remain at least the same or possibly rise. Because they are the most creditworthy consumers, they are more likely to qualify for waivers of the fees that banks may impose for debit cards or checking accounts. Credit card issuers may provide even more generous rewards to entice this category of consumer to use credit cards more often. Such consumers might also pay lower retail prices, if merchants choose to pass their cost savings on to all customers. On the other hand, if merchants choose to offer discounts based on payment method, credit card users will be unlikely to receive such discounts because credit cards are generally more costly than any other payment method for merchants.

Consumers who use debit cards extensively will not only benefit from any general lowering of retail prices by merchants. Such consumers will also benefit from discounts offered by merchants for debit card use. Many banks, however, have stopped offering debit card rewards, and in the future banks may elect to introduce debit card fees or charge higher checking account fees for these consumers. Consumers may be able to avoid such fees by switching to rival banks that do not charge the fees. But unless there is stiff competition among banks, some consumers will end up paying higher fees. As is the case for all consumers, debit card users' welfare will rise if they gain more from lower retail prices than they lose from higher banking fees.

Similarly, for consumers who use cash or prepaid cards extensively, net benefits will depend on the steps taken by both merchants and banks. Cash users will almost certainly pay lower retail prices than before, because—even in the event that merchants do not pass on their cost savings to customers in general—merchants are more likely to offer discounts for payments in cash than for any other payment method. Prepaid card users will pay lower retail prices in cases where merchants either have lowered their prices for all customers or have chosen to offer discounts for payments made with prepaid cards. Both cash users and prepaid card users who have checking accounts may be negatively affected in the event of higher account fees, whereas those who have no checking accounts will not be affected. Thus users of cash or prepaid cards who have no checking accounts will likely see their overall welfare rise, but those who do have checking accounts may experience declining

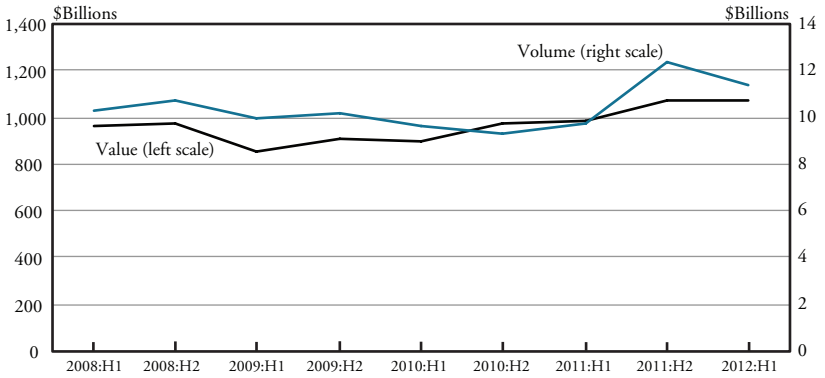
welfare if the impact of new or increased checking account fees is greater than that of lowered retail prices.

As suggested earlier, the extent of the pass-through by merchants and banks is highly correlated with the degree of competition among merchants and among banks. Under the new regulatory environment, stronger competition among merchants and among banks is likely to lead to the greater consumer welfare. In contrast, prior to the recent regulatory changes, competition among banks for cardholders led to higher interchange fees as banks sought to obtain revenue through the fees to support their offers of rewards to customers. That was a trend that did not necessarily result in greater consumer welfare, given that it may have led merchants to raise their retail prices. Any negative net effect in that scenario would have been especially adverse for cash-using consumers, since they reaped no benefit from payment card rewards programs (Hayashi 2009).

Consumer payment choice: debit cards versus other payment methods

It is too soon to know whether consumers will shift away from debit card use toward other payment methods as a result of the recent regulatory changes. Since the regulations took effect, banks have been promoting credit cards and prepaid cards (Hayashi 2012b), but the extent to which consumers have responded to those promotions is yet to be seen.[17] The data show both credit card use and prepaid card use are growing but also that debit card use is growing as well. Although comprehensive and exact information is not available for all payment methods in all years, the data that are available indicates growth on several fronts. Both the volume and value of total credit card transactions in 2011 exceeded the levels seen prior to the 2007-2009 recession, and the growth continued at least through the first half of 2012, according to available data (Chart 3). The share of consumers who own prepaid cards increased from 11 percent in 2010 to 13 percent in 2011 (Javelin Strategy & Research). The overall values of both total signature debit transactions and total PIN debit transactions have continued to grow, even after the regulations. The year-over-year growth rates of total signature debit value and of total PIN debit value were all positive in each month after October 2011, the new regulations took effect (First Data SpendTrend).[18]

Chart 3
CREDIT CARD TRANSACTIONS



Source: Nilson Report.

Several studies provide insight on how consumers' payment choices may change in the months and years to come. Ching and Hayashi (2010) predict that the elimination of debit card rewards programs will have little effect on consumer payment choices. Borzekowski, Kiser and Ahmed (2008) estimate that a fee per debit card transaction would significantly reduce the probability of a given consumer's use of a debit card. Hayashi and Stavins (2012) find that debit cards are heavily used by consumers with low credit scores, who either have no credit cards or have positive balances on credit cards, suggesting that those consumers will be less likely to shift their debit card transactions to credit cards. Studies in Australia and the Netherlands show consumers there shifted their payment method preferences when merchants set differing retail prices based on payment method (Reserve Bank of Australia 2011; Bolt, Jonker, and Renselaar). In those countries, merchants' approach to price differentiation is to impose surcharges when consumers use less preferred payment methods, whereas in the United States, the new regulations now allow price differentiation through payment discounts. But both are forms of retail price differentiation. The experiences in Australia and the Netherlands suggest that such price differentiation does influence consumer payment choice.

Each of these studies predicted how a single change, taken alone, would influence consumer payment choices—ranging from the elimination of rewards to the introduction of a per-transaction fee or the

offer of payment discounts—but in reality, multiple changes will occur at once. As a result, the ways that consumers shift their payment choices will stem from a combination of diverse reactions by banks and merchants to the new regulations and will depend on which changes have the stronger effects.

Consumer payment choice: PIN versus signature debit

Consumers appear to have shifted to some extent from signature debit to PIN debit as a result of the regulations. Regulated banks now have an incentive to promote PIN debit over signature debit, though that same incentive does not apply to exempt banks (Hayashi 2012b). Many regulated banks stopped offering rewards to debit card users, especially to signature debit users, and they may also have eliminated the PIN fees that were assessed in the past to some consumers for each PIN debit transaction. Merchants have also taken steps to steer customers toward the use of PIN debit.

Consumer payment surveys generally have found that consumers tend to prefer PIN debit over signature debit. For example, a survey conducted in 2008 found that 45 percent of consumers preferred PIN debit, 35 percent preferred signature debit, and 20 percent were indifferent between the two (Hitachi Consulting). The reasons for PIN debit preference include security, convenience, and speed. Those same three reasons are also offered by consumers who prefer signature debit, but with the addition of two other factors: "no fees" and rewards. These latter two reasons may fade as many banks stop charging PIN fees and offering rewards.

Not all signature debit transactions, however, will be replaced by PIN debit, at least in the short run. This is because some consumers still prefer signature debit over PIN debit and because many merchants that accept signature debit do not currently accept PIN debit.

IV. THE IMPLICATIONS FOR PAYMENTS SYSTEM EFFICIENCY

Although the new regulations were not aimed directly at improving the efficiency of the nation's payments system, some efficiency gains are likely at least within the debit card market as consumers shift from

signature debit to PIN debit.[19] Efficiency in the overall payments system will also rise as long as consumers do not shift from debit card use to other, less efficient payment methods. However, if consumers switch away from debit cards to more costly payment methods such as credit cards or checks, then overall efficiency might decline.

Efficiency in the debit card market

A shift toward PIN debit would raise efficiency in the debit card market because PIN debit is less costly, more secure, and more preferred by consumers than signature debit. Regulation II, by capping both signature and PIN debit interchange fees at the same level, effectively removed regulated banks' former incentive to promote signature debit over PIN debit. As a result, regulated banks now promote PIN debit over signature debit. This improvement in efficiency, however, will be limited for as long as PIN debit is accepted only by a subset of the merchants that accept debit cards.

Several likely changes may soon lead more merchants to accept PIN debit. First, technologies enabling PIN debit transactions over the Internet will help increase the acceptance of PIN debit by e-merchants (Hernandez). Second, a payment card security upgrade that is currently under way will require merchants to upgrade their point-of-sale devices so that they can accept a new type of payment card containing a computer chip and also chip-based mobile payments (Digital Transactions News). Merchants may install PIN-accepting devices at the same time as they install this upgrade, minimizing the costs of investing in the capacity to accept PIN debit. Finally, banks–particularly regulated–have an incentive now to encourage merchants to accept PIN debit. PIN debit is less costly for banks than signature debit and, with interchange fees capped by the regulations, signature debit no longer yields greater fee revenue.

Efficiency: debit cards versus credit cards

The efficiency of the payments system will fall if many transactions shift from debit cards to credit cards. Cost studies in other countries have typically found that credit card transactions are more costly to society as a whole than debit card transactions (Hayashi and Keeton; Schmiedel, Kostova and Ruttenberg). Both debit and credit cards provide consumers similar transactional benefits, such as convenience, speed, and

security, but credit cards provide additional benefits, such as grace periods and credit for liquidity-constrained consumers.

Merchants also benefit from accepting credit cards because they can sell goods and services to liquidity-constrained consumers (Chakravorti and To). However, as suggested by Hayashi and Stavins, it is unlikely that liquidity-constrained consumers (who have positive balances on their credit cards) will shift their debit card transactions to credit cards as a result of the recent regulatory changes. Instead, such a shift (if it occurs) is more likely to be made by "convenience users," who pay off their credit card balances in full each month. The two main drivers of these convenience users' credit card use are the grace periods and rewards (McKinsey 2011a). Some studies suggest that credit card use motivated by rewards makes the payments system less efficient (Simon; Hayashi 2009; Bolt and Chakravorti).[20]

Given the new regulations, however, merchants' offers of payment discounts may create countervailing incentives for consumers to use payment methods other than credit cards, thus possibly preventing the inefficiency caused by credit card reward programs.[21] Many economists agree that merchants' ability to offer discounts or impose surcharges based on the payment method that is used will result in a reduction of credit card interchange fees. Since these fees are used by banks in part to fund credit card rewards programs, their reduction is likely to improve efficiency (Prager and others).

Efficiency: debit cards versus cash and prepaid cards

If the regulations cause a shift from debit card use toward the use of prepaid cards or cash, the payments system will become less efficient. Prepaid cards are less efficient than debit cards because they are generally more costly for banks to provide. (Federal Reserve Board 2011).[22] Cash is likely to be less efficient than debit cards, especially when cash is used for mid- to large-dollar transactions. Cash may be faster and more convenient than debit cards for consumers when they make small-dollar transactions, but the use of cash may bring more risk (risking robbery, for example) if consumers and merchants use cash more often for mid- to large-dollar transactions. Cost studies in other countries have found that cash transactions are less costly to society

than debit card transactions if the value of the transaction is small, but as the value of the transaction increases, debit card transactions become less costly than cash transactions.[23]

It should be noted, however, that replacing the cash transactions made by unbanked consumers with prepaid card transactions may improve efficiency. Many banks now promote prepaid cards as they seek alternative revenue sources beyond the debit card interchange fees, which were reduced by the new regulations. Prepaid cards will likely enhance the welfare of unbanked consumers, who currently do not access payment methods other than cash. For example, prepaid cards will allow them to make transactions over the Internet, which are difficult to make with cash. Unbanked consumers can also receive wages and salaries or government benefits on prepaid cards instead of checks, allowing them to avoid check cashing expenses. Although a prepaid card transaction might be more costly to society than a cash transaction, the increase in cost may be offset by the enhanced welfare of unbanked consumers.

Efficiency: debit cards versus checks and ACH transactions

The efficiency of the payments system also will decline if debit card use is replaced by expanded use of checks. Although check payments have been declining, consumers still write many checks for bill payments. Outside the United States, checks have been found to be more costly for society as a whole than electronic means of payments (Schmiedel, Kostova and Ruttenberg). Although most checks are now processed electronically in the United States, each check costs banks more than a debit card transaction (McKinsey 2011b).

Efficiency may rise if ACH transactions replace some of the debit card transactions currently transacted over the Internet or for bill payments. For banks, the processing costs of an ACH transaction are much less than those of a debit card transaction (McKinsey 2011b). For transactions over the Internet and bill payments, most consumers may consider ACH a close substitute for debit cards. Both methods are linked to consumers' bank accounts, and the consumer protections for both methods are bound by the same regulation.[24] Thus, shifting some debit card transactions to ACH transactions would reduce the costs to banks while retaining all benefits for consumers.

Overall efficiency

In summary, the overall efficiency of the payments system will be improved if the recent regulatory changes induce consumers simply to switch from signature debit to PIN debit, without shifting their debit card transactions to other payment methods. However, if consumers shift their debit card transactions to more costly payment methods such as credit cards and checks, the resulting efficiency loss might offset the efficiency gain from any move to PIN debit. An increase in prepaid card use may also improve efficiency if prepaid card transactions replace the cash transactions made by unbanked consumers. But an increase in prepaid card use that replaces debit card transactions would make the payments system less efficient.

Thus any definitive answer to the question of how the recent regulatory changes will affect overall efficiency in the payments system will require more time and data. The overall change in efficiency will depend on how consumer payment choices shift and that, in turn, will depend on how other parties, including networks, banks, and merchants continue to react to the new regulatory environment. These parties may adjust their behavior only slowly, and consumers may take time in changing their payment choices in response. More information on the costs of the various payment methods is also needed to assess questions of overall efficiency. Although cost studies conducted in other countries are informative, applying their conclusions in any assessment of the U.S. payments system may be misleading because the U.S. system is unique in many ways.

V. CONCLUSION

The first article in this two-article series, which appeared in the Fourth Quarter 2012 issue of the *Review,* assessed the effects of the recent debit card regulations on networks and banks. It found that incentives have shifted, the nature of competition has changed—increasing in some cases—and both networks and banks have made various attempts to defend their market shares and offset lost revenue. It concluded that the new regulations have had some of their intended effects so far. The regulations have enhanced competition among card networks for merchants and have reduced the burden on merchants of high interchange fees.

The present article, with its focus on how the regulations and the industry's reactions to them have affected merchants, consumers and overall payments system efficiency, finds that the effects have varied for different groups. Many merchants experienced declines in their debit card interchange fee expenses, while others experienced an increase in the fees they pay per transaction. Some merchants that accept PIN debit are now taking advantage of their new control over transaction routing, increasing competition among PIN debit networks for merchants. Whether merchants will take advantage of their new flexibility in offering payment discounts is yet to be seen.

Ultimately the improvement of consumer welfare—one of the goals of the new regulations—will depend on the degree to which merchants pass on their cost savings to consumers and the degree to which banks, seeking to offset revenue losses, impose new costs on consumers. Consumers' welfare may yet worsen if there is insufficient competition among banks and among merchants. So far, several regulated banks that had attempted to introduce a new debit card fees backed off due to consumer protests and, to some degree, increased competition from exempt banks. But they may introduce new banking fees to consumers in the near future. And if some merchants have sufficient market power, they may not share with consumers their cost savings from lowered fees.

It is too soon to evaluate exactly how the new regulations will affect the efficiency of the nation's payments system as a whole, because various changes in efficiency will result from the diverse reactions of all parties to the regulations. Merchants and banks have taken steps that influence consumers' choices of payment method. In response, consumers appear to have shifted from signature debit to PIN debit to some extent, a trend that improves efficiency. However, it remains to be seen whether consumers will switch away from debit cards to more costly payment methods, such as credit cards and checks—a trend that would reduce efficiency. The decline in efficency is more likely to occur if networks, banks, and merchants are faced with incentives that do not align with maximum efficiency. In cases where these parties find that less efficient payment methods help them retain or increase market share, generate more revenue, or reduce costs, they may seek to induce consumers to switch to these less efficient payment methods. To avoid

such negative consequences, policymakers will need to monitor industry developments closely and continue to assess their effects on competition for merchants, consumer welfare, and payments system efficiency.

ENDNOTES

[1]For more detail on the interchange fee debate, see Federal Reserve Bank of Kansas City.

[2]A typical U.S. debit card can carry out both PIN and signature debit transactions. Three card networks—Discover, MasterCard, and Visa—process both PIN and signature transactions while nearly a dozen networks process PIN debit transactions only.

[3]The adjustment can be received by a regulated bank if the bank complies with the Federal Reserve Board's fraud-prevention standards. The rules on fraud-prevention adjustments are available at: *http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20120727a1.pdf*.

[4]Typically, one of the PIN networks is affiliated with the signature network and the other one or more PIN networks are unaffiliated (Pulse).

[5]See *http://www.justice.gov/opa/pr/2010/October/10-at-1115.html*.

[6]The networks continue to differentiate interchange fees received by exempt banks for different merchant sectors, however.

[7]Visa provides an additional PIN debit option for merchants. The PIN-Authenticated Visa Debit (PAVD) system allows merchants to route PIN debit transactions over Visa even for debit cards that do not enable Visa's PIN network, Interlink, as long as the cards do enable Visa signature debit. Visa requires all of the banks that enable Visa signature transactions on their debit cards to support PAVD transactions as well. Reportedly, the interchange fees paid to exempt banks for PAVD are higher than the interchange fees of most PIN debit networks (Rosenbeck). The Department of Justice is currently investigating PAVD (Finkle).

[8]Network fees were traditionally assessed to merchants on a per-transaction basis. However, Visa has recently introduced a new fixed acquirer network fee (FANF) that is passed onto merchants. Fixed network fees may potentially limit competition among networks for merchants (Hayashi 2012b). The Department of Justice is investigating FANF (Finkle).

[9]PIN debit is not readily used for transactions in which the exact transaction amount is not known at the time when the card is presented to the merchant, as is often the case for hotel stays or car rentals. This is because PIN debit immediately debits the funds from the account at the time of card presentment. Also, PIN networks formerly did not support transactions over the Internet except for certain bill payments, but recently new technologies have become available to overcome this obstacle (Hernandez).

[10]The experience in some other countries also suggests it is likely to take time before the practice of offering discounts becomes more prevalent. For example, in Australia, two years after the abolition of "no-surcharge rules," a gradual increase in the practice of surcharging has only resulted in 10 percent of smaller merchants and 20 percent for larger merchants adopting that approach (Reserve Bank of Australia 2008).

[11]Card networks and banks generally express skepticism about the likelihood of merchants' lowering retail prices. Merchants insist that cost savings do lead them to lower prices. Home Depot, one of the nation's largest retail stores, has stated that it has lowered its prices for more than 3,000 products since the implementation of Regulation II, although these price cuts were attributed not only to the reduction in debit card interchange fees but also to reductions in other operational costs (Aspan).

[12]For a monopolist facing a linear demand curve, the rate of pass-through is 50 percent, while for a monopolist facing a constant, elastic demand curve the pass-through rate is greater than 100 percent (Bulow and Pfleiderer 1983).

[13]Such studies include Chevalier and Curhan (1976), Walters (1989), Armstrong (1991), Poterba (1996), Besley and Rosen (1999), Besanko, Dubé, and Gupta (2005), and Kenkel (2005).

[14]According to the Federal Reserve Board (2012), the total value of debit card transactions was $1.8 trillion in 2011 and the average interchange fee rate was lowered from 1.24 percent in the first three quarters of 2011 to 0.78 percent in the fourth quarter of 2011, when the regulations took effect.

[15]The author also assumes that all of the cost savings from lowered debit card interchange fees were realized in the retail and food service sectors because most debit card transactions are likely to be made in these sectors. This assumption estimates the upper-bound price decline. The cost savings of $8.3 billion represent 0.18 percent of these sectors' total sales—including not only sales with debit cards but also sales with other payment methods—in 2011. If merchants in these sectors were to pass on all of their savings to all of their customers, prices would decline by 0.18 percent on average, which is equivalent to 7.2 cents for a $40 purchase.

[16]Consumer welfare trends in aggregate will also depend on how and whether consumers shift their payment choices.

[17]Banks, especially regulated banks, now have stronger incentives to promote credit cards or prepaid cards than they did before the regulations because their revenues from debit card interchange fees were reduced by the regulations. Credit card interchange fees are not currently regulated and certain prepaid cards are exempt from the interchange fee cap.

[18]First Data's SpendTrend tracks same-store consumer spending by credit, signature debit, and PIN debit cards at U.S. merchant locations and reports year-over-year growth rate each month. Reports on more recent months are available at: http://www.firstdata.com/en_us/products/other-industry-solutions/financial-analyst-solutions/about-spendtrend.html.

[19]Efficiency does not necessarily coincide with consumer welfare, because efficiency encompasses both the welfare of consumers and other parties' profits or welfare. It is possible theoretically for consumer welfare to be higher given one distribution of payment methods that costs more to society than with another

that costs less. If the increase in consumer welfare is not large enough to offset the higher costs, the former distribution is likely to be the less efficient one.

[20]Credit card rewards that are funded by interchange fees reduce the welfare of consumers who do not use the rewards-yielding credit cards. This is because the credit card interchange fees that fund the rewards have the effect of raising retail prices for all consumers. The rewards may be sufficient, for those who receive them, to offset their welfare losses from higher retail prices, but they do not offset the welfare losses of consumers who use other payment methods and therefore do not receive the rewards. In the end, society as a whole incurs more costs as a result of credit card rewards programs because they encourage credit card use, and credit cards are more costly than debit cards or cash in some cases.

[21]Starting January 27, 2013, Visa and MasterCard began allowing merchants to impose surcharges on their credit card transactions. Their rule changes stemmed from a class action settlement agreement between merchant groups and the card networks and their large member banks, which was preliminarily approved by the U.S. District Court for the Eastern District of New York in November 2012 (Wack).

[22]In terms of the benefits to consumers and merchants, prepaid cards and debit cards are almost equivalent.

[23]In Belgium and the Netherlands, a cash transaction in the early 2000s was found to be less costly to society than a debit card transaction if the transaction amount was 10 euros or less. (National Bank of Belgium; Brits and Winder). The threshold transaction amount is now likely to be lower than 10 euros (Schmiedel, Kostova and Ruttenberg).

[24]Regulation E limits consumer liability for unauthorized ACH and debit card transactions. However, some debit card networks require banks to provide greater protections for debit card users (such as zero liability), and some banks do so voluntarily.

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