

POLICY STUDIES

A Study of the Interrelated Bilateral Transactions in Credit Card Networks

Sujit Chakravorti
Federal Reserve Bank of Chicago

Alpa Shah
J.P. Morgan

Emerging Payments Occasional Paper Series
July 2001 (EPS-2001-2)

FEDERAL RESERVE BANK
OF CHICAGO

A Study of the Interrelated Bilateral Transactions in Credit Card Networks*

Sujit Chakravorti
Emerging Payments Studies Department
Federal Reserve Bank of Chicago
230 S. LaSalle Street
Chicago, IL 60604

sujit.chakravorti@chi.frb.org

Alpa Shah
J.P. Morgan
60 Wall Street
New York, NY 10260

shah_alpa@jpmorgan.com

July 2001

Abstract

Over the last decade, consumers have tripled their use of credit cards as more merchants have increased their acceptance of them. This increase suggests that incentives in today's marketplace favor greater credit card use by consumers and acceptance by merchants. In this paper, we study the set of interrelated bilateral transactions in credit card networks. First, we survey the recent theoretical papers using this approach and find that there is a lack of consensus regarding the optimal set of pricing policies. Second, we explore each of these interrelated transactions emphasizing common market practices and the underlying regulatory and legal framework. Third, we analyze the impact of certain credit card market practices on competing payment instruments such as debit cards.

* Shah worked on this paper while employed by the Federal Reserve Bank of Chicago. We have benefited from numerous conversations with credit card network participants and industry experts. We thank Ed Green, Ann Spiotto and Ted To for helpful comments on previous drafts and Tim McHugh for excellent research assistance. The views expressed are our own and should not be attributed to the Federal Reserve Bank of Chicago, the Federal Reserve System, or J.P. Morgan. All remaining errors are our own.

Address any correspondence about this paper to Sujit Chakravorti. Requests for additional copies should be directed to the Public Information Center, Federal Reserve Bank of Chicago, P.O. Box 834, Chicago, Illinois 60690-0834. (312) 322-5111. This paper is also available at <http://www.chicagofed.org/publications/publicpolicystudies>.

I. Introduction

The usage of third-party general-purpose credit cards in the United States has increased dramatically over the last decade.¹ Credit cards have surpassed checks as the most frequently used payment instrument at the point of sale and are the primary payment instrument for Internet transactions. From 1990 to 1999, credit card transactions more than tripled from 4.6 billion to 14.2 billion in the United States. Dollar volume increased from \$337 billion to \$1,096 billion over the same period (Credit Card News, 2000).

Although there are thousands of different financial institutions that issue credit cards, they usually participate in one of four major credit card networks operated by American Express, Discover, MasterCard or Visa.² The two largest networks—MasterCard and Visa—accounted for over 75 percent of the dollar volume in 1999. American Express and Discover operate their own “proprietary” networks, whereas Visa and MasterCard are credit card associations comprised of member banks.

Recently, some market participants have argued that the lack of competition at the network level may lead to unusually high rents. In this article, we will discuss two antitrust cases against Visa and MasterCard.³ In the first case, the U.S. Department of Justice (DOJ) claims that Visa and MasterCard through various policies limit competition in the credit card market. The three main policies being questioned are: exclusivity—member banks issuing Visa and MasterCard products are not allowed to issue products from other credit card networks,

¹ This article focuses only on general-purpose credit cards. Retailer-issued charge and credit cards preceded both general-purpose charge and credit cards in the United States. However, today general-purpose cards account for 5.5 times as many transactions and over nine times the total dollar value of retailer-issued cards excluding gas and telephone cards (Nilson, 1999, 6-7).

² Although primarily known for its charge card products, American Express also issues credit cards known as Optima and Blue cards. Unlike credit card balances, charge card balances must be paid completely at the end of the billing cycle.

³ There is also a new lawsuit against the two card associations concerning the proper disclosure of foreign exchange transaction fees.

duality—Visa and MasterCard cards can be issued by the same financial institution, and corporate governance—members of one association have significant influence in the other association. In the second antitrust case, the National Association of Retailers along with several large retailers claims that Visa and MasterCard use illegal tying arrangements to force retailers to accept all of their payment card products. Specifically, merchants are not currently allowed to decline Visa and MasterCard offline debit cards while accepting the associations’ credit cards.⁴

To better understand credit card antitrust issues, the underlying bilateral relationships in credit card networks are explored to investigate if any participant benefits or is harmed by various incentives existing in today’s marketplace. Recently, the overall effects of some pricing practices at the network level have been questioned. Some analysts have argued that the common practice of charging one price regardless of payment instrument used distorts the allocation of goods and services in the economy. These analysts argue that users of less expensive payment instruments subsidize credit card users. Others have argued that charging different prices would not necessarily benefit all consumers.

While there may be substantial competition in the issuer and acquirer markets, some analysts question the setting of interchange fees by the network operators. The interchange fee is the lower bound for the merchant discount, the fee merchants are charged for their credit card sales. DOJ’s antitrust case against MasterCard and Visa questions the competitive forces that exist among the two associations and in the credit card industry as a whole.

Whether the credit card market is competitive or whether certain participants are able to earn excessive rents is debatable. However, technological improvements in payment technologies may reduce transactions costs for all participants. Specifically, when online debit

⁴ Offline debit cards are processed via credit card networks as opposed to ATM networks used for online debit cards and are significantly more expensive than their online cousins.

cards are used, the time lag between when a payment is made and when it is converted into good funds has essentially been eliminated. If credit card customers do not require an extension of credit when they make purchases, their use of the less expensive and less risky online debit cards may improve overall welfare.⁵ However, incentives in today's marketplace may lead consumers to use more expensive alternatives when less expensive ones exist.

This article is organized as follows. In the next section, credit card networks are described. In section III, the consumer-issuer relationship is investigated. In section IV, the pricing of credit card transactions by merchants at the point of sale is discussed. The relationship between the merchant and its acquirer is explored in section V. In section VI, the relationship between the issuer and the acquirer is discussed. Competition at the network level is investigated in section VII. Finally, in section VIII, some conclusions are drawn.

II. Credit Card Networks

There are usually five participants in a credit card transaction—the consumer, the consumer's bank (also known as the issuer), the merchant, the merchant's bank (also known as the acquirer), and a credit card network such as American Express, Discover, MasterCard or Visa.⁶ In figure 1, the set of bilateral transactions that occur in a credit card transaction are diagrammed. Prior to making a credit card purchase, the consumer is granted a line of credit from a financial institution. In most cases, before the merchant accepts the credit card for payment, it requests authorization from the credit card network. If the transaction is approved, the merchant receives the funds usually within 48 hours. The network credits the acquirer's

⁵ A change from the status quo is defined to be welfare improving if all participants are at least as well off and some are better off.

⁶ In the case of American Express and Discover, the issuer, the acquirer, and the network operator are the same entity.

account and debits the issuer's account.⁷ Finally, the issuer sends the consumer a bill for all the purchases made during a given period.⁸

In figure 2, the main costs incurred by each participant are diagrammed. When establishing an account with an issuer, the consumer may be charged an annual fee and will face finance charges if the bill is not paid in full every month. In today's marketplace, merchants generally charge the same price regardless of the payment instrument used. The merchant receives a discounted value for its credit card receipts from its acquirer. The acquirer is charged an interchange fee by the issuer.

Most of the academic literature on credit cards has focused on certain sections of the credit card network instead of the set of interrelated transactions. However, a multi-market approach to studying the credit card market is developing. Such models are critical in understanding how each bilateral relationship affects others in the system. Baxter (1983), Chakravorti and Emmons (2001), Chakravorti and To (1999), Rochet and Tirole (2000), Schwartz and Vincent (2000), and Wright (2000) model the set of transactions to investigate the incentives for each participant to use the credit card network. Baxter suggests that side payments may be necessary to adequately compensate certain participants. The other papers extend upon Baxter and have varying conclusions based on their underlying assumptions.

Assuming competitive markets, Chakravorti and Emmons suggest that consumers that revolve balances pay for the credit card system. They find that allowing merchants to price discriminate based on the underlying cost of the payment instrument used would improve welfare by eliminating a cross-subsidy from revolvers to convenience users. Their result

⁷ Transactions are usually netted among issuers and acquirers and one amount is debited or credited at the end of the day.

⁸ Often, credit card transactions involve additional participants.

assumes a comparable payment instrument offering similar benefits for convenience users and merchants where there is no short-term lending of funds to make purchases.⁹

Chakravorti and To assume a continuum of monopolist merchants selling different goods to consumers that have random incomes and expenditures in each period. They assume the monopolist issuer also serves as the acquirer and network operator.¹⁰ Because merchants have little bargaining power, the issuer is able to fully extract rents on additional sales resulting from credit card acceptance. Given a relatively low probability of future sales to repeat customers, a prisoner's dilemma situation arises where each merchant chooses to accept credit cards but when all merchants accept credit cards, they are worse off. They also find that the ability to charge a higher fee is dependent on the number of liquidity-constrained consumers delivered by the issuer.

Schwartz and Vincent assume monopolist merchants and a monopolist issuer that also serves as the acquirer and the network operator. They assume that the proportion of card and cash users are exogenously set. If cardholder rebates are infeasible, a one-price policy can reduce card transactions as well as cash transactions.¹¹ They study the surplus-shifting between card and non-card users. They conclude that although overall surplus can increase or decrease with a one-price policy, total consumer surplus always falls with a one-price policy.

Rochet and Tirole construct a model using Hotelling competition where two merchants lie at the endpoints of a line and consumers are evenly distributed on the line. Both consumers and merchants receive benefits set exogenously.¹² They find under certain conditions that a one-price rule leads to greater provision of credit card services because merchants' resistance to card

⁹ They assume all consumers have access to credit cards and cash.

¹⁰ They also assume that there exists a payment alternative to credit cards that offers similar electronic transfer of funds with minimal or zero settlement risk for the merchant but does not extend interest-free credit to consumers.

acceptance is lowered. If price discrimination is allowed, the level of the interchange fee no longer affects the level of credit card services provided regardless of how the interchange fee is set.

Wright considers three market structures—monopolistic, competitive, and Hotelling. Similar to Rochet and Tirole, he assumes that consumers and merchants receive benefits from credit card use that are exogenously determined. For monopolistic markets, he finds a one-price environment is generally welfare improving and regulating interchange fees is probably inefficient. Furthermore, he shows that allowing merchants to price discriminate leads to merchants extracting the consumer surplus resulting in no consumers willing to join the credit card network for a positive fee. For competitive markets, he finds that allowing price discrimination does not reduce or increase welfare because two types of merchants would result—those that accept credit cards and those that do not. Similar to Rochet and Tirole, Wright finds that under Hotelling competition with price discrimination leads to under provision of credit card services. He also finds that the optimal interchange fee is rarely zero.

The academic literature does not provide a consistent view on the optimal bilateral pricing decisions. The different conclusions are based on a different set of assumptions. Future research should consider close payment substitutes for liquid credit card consumers such as debit cards using automated teller networks. Such substitutes may be underused by consumers because of incentives to use credit cards. Furthermore, empirical work that provides an integrated approach to studying the payment card networks in general should be encouraged. We next turn to analyzing each of the bilateral relationships outlined above.

¹¹ In this context, a one-price policy exists when merchants do not charge different prices based on the payment instrument used to make the purchase. We discuss such policies in Section IV.

III. The Issuer-Consumer Relationship

U.S. consumers can choose from over 6,000 issuers. Credit card services offered to consumers are bundled and competition exists on several dimensions (see Evans and Schmalensee 1999, Table 7.1, 142-3). Although the issuing market is fairly concentrated with the top 10 issuers accounting for over three-quarters of total credit card outstanding balances, many new entrants along with existing issuers continue to offer new and innovative services to consumers (see figure 3 for the top ten issuers). Thus, the market for issuers seems to be fairly competitive and contestable.

Both revolvers and convenience users benefit from credit card use. Revolvers, consumers that do not payoff their credit card balances in full each month, use credit cards as a source of long-term credit lasting more than a month. In addition to the credit component, both revolvers and convenience users enjoy various benefits for using credit cards such as extended guarantees and warranties on their purchases, dispute resolution services, car rental and travel insurance, and frequent-use awards.

The interest rate charged for credit card loans has received substantial attention in the academic literature. Unlike other consumer loans, credit card loans are usually uncollateralized and therefore more risky than other consumer loans such as mortgages and car loans. In the past, credit card rates remained high even when other consumer loan rates declined (see figure 4). Several economists have attempted to explain this stickiness. Ausbel (1991) argues that the issuing business is not competitive because of the persistence of abnormal profits. He along with Calem and Mester (1995) suggest that there is adverse selection whereby lowering interest rates would attract a disproportionate amount of low-quality borrowers. On the other hand, Brito and Hartley (1995) argue that credit card rates are not high when compared to other low-value

¹² They assume consumers pay annual fees to carry credit cards and do not consider the credit aspect of credit cards.

consumer loans. Evans and Schmalensee (1993 and 1999) argue that long-run credit card profits are not abnormally high. Chakravorti and Emmons suggest that finance charges to revolvers may capture other costs besides default risk.

More recent evidence suggests that competition has increased in the issuing business. Issuers such as Bank of New York, the Advanta Corporation and AT&T introduced more attractive fees to consumers including the elimination of annual fees.¹³ In 1999, issuers competed intensely on interest rates with average interest rates at 15.21 percent. Many issuers were offering introductory rates of 9.99 percent or lower (*Credit Card News*, February 15, 1999).

The other type of credit card consumers, convenience users—those that payoff their balances every month—benefit from interest-free short-term loans along with other card benefits extended to revolvers described above. Unlike revolvers that pay finance charges, convenience users do not often pay for these services.¹⁴ According to the Federal Reserve Board survey of credit cards (Board of Governors of the Federal Reserve System, 2000), 63 percent of issuers did not charge an annual fee. As a result, convenience users are sometimes referred to as deadbeats or freeloaders in the industry implying that they are not profitable to issuers. According to CardWeb.com, convenience use has gone up from 29 percent in 1991 to 44 percent in 1999 (Weber and Palmer, 2000). If there are real resource costs to credit card purchases made by convenience users, these costs are paid by other participants in the credit card network. Generally, for issuers to break even on convenience users, these consumers would need to make \$3,000 of purchases annually (Crenshaw, 1997).¹⁵

¹³ AT&T and Advanta have since left the credit card industry. In 1997, AT&T and Advanta sold their credit card portfolios to Citibank and Fleet Bank, respectively (Evans and Schmalensee, 1999).

¹⁴ We assume that these consumers do not take cash advances either. Unlike purchases, cash advances generally do not have grace periods.

¹⁵ This figure is based on certain assumptions about the cost of funds to issuers, fraud rates, merchant discounts and other factors.

Due to lower profits from an increase in convenience users and chargeoffs, issuers have started to increase various fees (see figure 5 for chargeoff rates). In 1998, late and over-the-limit fee income increased 23 percent from the year before (Daly, 1999). In addition, some issuers began to increase annual fees, cash advance fees, and certain punitive rates.

Issuers also reduced their grace periods for payments. In the 1980s, cardholders had an average of 25- to 30-day grace periods if the preceding month's bill was paid in full (Tolken, 1999). The Federal Reserve Survey of Credit Card Plans (Board of Governors of the Federal Reserve System, 2000) found less than 12 percent of the issuers offered grace periods greater than 25 days and three issuers offered no grace period. Some issuers have also become stricter about the imposition of late fees, which are now charged immediately after the grace period ends. A few years ago, most issuers allowed a couple of extra days after the due date before imposing late fees (Credit Card News, February 1, 1999). Another strategy used by issuers is to segment cardholders by different grace periods where convenience users would have fewer days, while revolvers that pay daily interest charges would have more days.

Some issuers cancelled credit cards of consumers that did not revolve balances. Beneficial National Bank, which issues credit cards with BJ's Wholesale Club, dropped about 12,000 cardholders in 1997 because they had paid their balances in full every month for the preceding 12 months. BJ's sued the issuer, and in the subsequent out-of-court settlement, the cardholders were reinstated with the condition that they would carry a minimum balance at some point during the year or pay a \$30 annual fee (Crenshaw, 1997).

Thousands of issuers compete on various dimensions such as finance charges, frequent-use rewards, discounts, and various fees. Therefore, significant risk-adjusted long-term rents would likely be absent given the free entry and exit from the issuing business. Some analysts

have argued that convenience users and sometimes revolvers are subsidized by other participants (Chakravorti and Emmons, and Schwartz and Vincent). Future research should investigate if economic efficiency improves when each participant in the credit card network is charged at least the marginal cost of the services used. In the next section, the ability of merchants to recover credit card costs directly from credit card consumers is explored.

IV. Consumer-to-Merchant Pricing

The decision by most merchants not to charge higher prices to their credit card customers seems puzzling because merchants generally face higher costs to process credit card transactions. According to a survey of supermarkets in 1997, the average cost for a credit card transaction was \$1.07 compared to 45 cents for checks and 29 cents for online debit cards (Food Marketing Institute, 1998). If credit cards cost more to accept, why do merchants charge the same price for credit card purchases?

Merchants accept credit cards because they expect that their profits would be lower if they did not. In a survey of merchants, 58 percent thought that their profits would increase by accepting credit cards (Ernst and Young, 1996). By accepting charge and credit cards, merchants may be able to attract customers away from merchants that do not accept them.¹⁶ Merchants are also able to make sales to liquidity-constrained consumers without being directly exposed to the consumer's default risk. Furthermore, merchants may face less risk of acquiring good funds when accepting credit cards than checks, the most common form of noncash payment in the United States.

¹⁶ For a historical perspective on why merchants started to accept charge and credit cards see: Baxter (1983), Chakravorti (2000), Evans and Schmalensee (1993) and (1999), Mandell (1990), and Nocera (1994).

Some economists have modeled why merchants accept credit cards. Murphy and Ott (1977) suggest that merchants absorb some of the costs of credit card use in order to price discriminate among consumers. Chakravorti and To suggest that merchants accept credit cards to increase their sales. Evans and Schmalensee (1999), and Rochet and Tirole argue that merchants that did not accept credit cards would lose customers to those that did.

However, there is lack of consensus whether credit card customers should pay the same price as cash customers. Chakravorti and Emmons suggest that when issuers, acquirers, networks, and merchants operate in competitive markets, all credit card consumers should be charged higher prices from merchants that accept credit cards. Schwartz and Vincent find that while overall welfare can increase or decrease with a one-price policy, total consumer surplus always falls. On the other hand, assuming imperfect markets, Rochet and Tirole, and Wright suggest that consumers may benefit from one-price policies.

The issue of credit card surcharges has a long legislative and regulatory history.¹⁷ The 1969 Truth in Lending Act (TILA) requires credit providers to supply borrowers with standardized information on the cost of credit to allow consumers to make comparisons among different creditors. Initially, TILA treated any difference between cash and credit prices as a credit cost subject to disclosure rules. Thus, merchants had to translate the price difference into an annual percentage rate finance charge at the point of sale. Because this additional finance charge may have violated the usury laws of some states at the time, merchants and issuers were reluctant to implement prices based on payment instruments used.

In October 1974, Congress amended TILA to enable merchants to offer incentives to those consumers using cash. The amendments were included in the Fair Credit Billing Act of

¹⁷ For details, see Barron, Staten and Umbeck (1992), Board of Governors of the Federal Reserve System (1983), Kitch (1990), and Lobell and Gelb (1981).

1974, and specifically outlawed issuers from prohibiting cash discounts. At the time, Congress concluded that cash customers were subsidizing credit customers through overall price increases because merchants faced higher costs with credit cards. The amendments prevented issuers from contractually prohibiting merchants from offering cash discounts and exempting cash discounts of up to five percent from TILA disclosure laws.

In 1976, Congress responded to a request for clarification from the Federal Reserve on whether Congress had intended special treatment to be applied to both cash discount and credit card surcharge pricing systems. Although economically there is no difference between a cash discount and a credit card surcharge, Congress decided that a discount was not equivalent to a surcharge and prohibited the imposition of surcharges until February 1979. A U.S. Senate report offers the following justification:

By permitting only cash discounts, the Committee intends to assure that consumers will be seeing at least the highest possible price they will have to pay when they see a tagged or posted price. In other words, consumers cannot be lured into an establishment on the basis of the “low, rock-bottom price” only to find at the cash register that the price will be higher if a credit card is used (Kitch, 1990, 227 citing U.S. Senate, 1981, 4).

Additionally, Congress ruled that discounts offered for cash purchases would not be considered credit charges under any state usury or disclosure laws and also extended the surcharge prohibition until February 1981.

In 1981, the provision was altered again through the Cash Discount Act, which reduced requirements and limits on the amount of discount. The act also extended the ban on surcharges until 1984. Congress let the ban on surcharges expire in 1984 because of the varying nature of merchant costs and pricing (U.S. Congress, 1981). At the time, Congress considered an extension of the ban and an exemption of TILA requirements for credit card surcharges but both failed to pass (Kitch, 1990).

Currently, a provision of Federal Reserve Regulation Z allows all merchants to offer discounts to their non-credit card consumers but is silent on the issue of credit card surcharges. However, surcharges are not exempt from TILA disclosure rules resulting in few merchants imposing them. Furthermore, some states established their own credit card surcharge laws. In 1999, the states that specifically prohibited merchants from imposing credit card surcharges were California, Colorado, Connecticut, Florida, Kansas, Maine, Massachusetts, New York, Oklahoma, and Texas. The remaining states either allowed merchants to impose surcharges on credit card purchases or did not have laws prohibiting such practices.

Examples of price discrimination at the point of sale based on payment instrument used is rare in today's marketplace. There exists anecdotal evidence of both surcharges and discounts based on the payment instrument used. One small merchant in Chicago recently offered a 20 percent discount for cash purchases. According to the merchant, the cash discount was used as a marketing tool to attract more customers. Some merchants in California impose surcharges for online debit card transactions. These charges are usually around 25 cents. However, California merchants are prohibited from imposing credit card surcharges. Additionally, issuers may discount purchases made at certain stores or offer free goods or services if their card is used in addition to existing frequent-use awards.

The major exception to the practice of charging the same price regardless of the payment instrument used occurred at gasoline stations in the eighties when both cash and charge prices were explicitly posted. Barron, Staten, and Umbeck found that gas stations that charged a single price to all consumers charged a higher price to cash consumers than gas stations that price discriminated based on cash or credit. They found that gas station operators imposed such policies when their credit card processing costs were high. In the late 1970s, credit issuers began

to see a rapid rise in the cost of financing, as short-term interest rates escalated and peaked in 1982. In 1985, credit card processing costs began to drop rapidly in the gasoline market, due to new technology such as electronic terminals at the point of sale. As a result, cash discounts became less and less prominent, and by 1991, only two major gasoline retailers were still offering discounts.

However, credit card associations continue to prohibit surcharges in the United States.¹⁸ Visa and MasterCard's policies state that merchants who choose to accept their products may not impose a credit card surcharge. Economic models investigating welfare implications of a one-price policy differ depending on the underlying market structure of retailers, acquirers, and issuers. The fact that most merchants do not price discriminate when they are allowed to offer discounts may indicate that they do not prefer a two-price approach. If merchants are unable or unwilling to price discriminate and financial institutions provide greater incentives to use credit cards than other payment forms, consumers should always use their credit cards to make purchases and pay their balances in full each month (Chakravorti, 1997).

V. Merchant-to-Acquirer Pricing

Today, the top 10 MasterCard and Visa acquirers account for over three-quarters of their U.S. transaction volume (for the top ten acquirers by transaction volume, see figure 6). The next 15 processors together account for close to 13 percent and the remaining account for a little over ten percent (Credit Card News, 2000).

Initially, charge and credit cards were marketed to merchants as tools to increase their sales and profits. Credit cards also appealed to small merchants that granted credit to their customers directly because they could outsource their finance departments to issuers. However,

large department store chains did not immediately accept third-party credit cards because they preferred to issue their own credit cards.

In 1958, Bank of America established the first general-purpose credit card, Visa's predecessor, and set the merchant discount at six percent. The six-percent merchant discount lasted many years. Merchant discount rates today are bilaterally negotiated between acquirers and merchants and depend on the merchant's business type, monthly card sales volume and average transaction amount.¹⁹ Greater competition in the acquiring business led to decreases in merchant discount rates across the board. Today, merchant discount fees generally range from 1.25 percent to 3 percent.

Merchants have protested against what they consider high merchant discount fees and have been successful in reducing fees. For example, more than 250 Boston restaurants threatened to stop accepting the American Express card during the "Boston Fee Party" in 1991 (Evans and Schmalensee, 1999, ch. 8). Merchants were not convinced that sales volume created through the card's acceptance justified discount rates that averaged more than 3.25 percent versus an average of 2 percent for Visa and MasterCard. Initially, American Express refused to lower its merchant discount rate claiming that its clients were more affluent high-spending ones. However, in the end, American Express began to offer more competitive pricing and reduced fees. By 1992, its worldwide average discount rate was lowered to 3.1 percent; by 1998, it had dropped to 2.74. Thus, merchant pressure was effective in changing pricing policy.

Today, American Express still charges higher discount rates than Visa, MasterCard or Discover although the gap has narrowed considerably (Punch, 1998). Because American

¹⁸ Rochet and Tirole state that MasterCard and Visa prohibit surcharges and discounts in Europe.

¹⁹ In cases where merchant discounts are prohibited, issuers may charge usage fees to their cardholders. For example, American Express charges 2.5 percent for their customers that use their Delta SkyMiles credit card to pay their taxes primarily because the IRS cannot legally pay any processing fees (Washington Post, 2001).

Express is primarily a charge-card issuer, its revenue is primarily composed of merchant discounts and annual fees unlike credit card issuers that also earn revenue from finance charges (see figure 7).²⁰ Given that American Express charges on average a higher merchant discount, why would merchants accept the card? When we asked a large retailer why it recently started to accept American Express cards, it responded that its increase in sales volume and profits more than offset the additional cost of accepting them.

Theoretical models of credit cards usually explicitly or implicitly assume the market for acquirers to be competitive. Anecdotal evidence from large merchants and merchants operating in very competitive industries suggests that merchant discounts are often very close to interchange rates implying relatively little markup. In the next section, we discuss the setting of interchange fees.

VI. The Acquirer-Issuer Relationship

For MasterCard and Visa credit card transactions, acquirers pay issuers interchange fees. As mentioned before, American Express and Discover transactions do not have interchange fees because these systems are three-party systems where the issuer and the acquirer are the same entity.²¹ Interchange fees partially compensate issuers for card marketing costs, cost of funds for the initial grace period, default risk and various card enhancements (for a broader discussion, see Bayer, 1999 and Hisey, 1999).

Interchange fees are determined based on the type of merchant, whether the customer is present, and if the merchant uses an electronic processing system. These fees are set at the

²⁰ Evans and Schmalensee (1999) estimate that 87 percent of American Express charge volume in 1997 occurred on their charge cards.

network level (see figure 8). Standard paper-based transactions have the highest interchange fees at 2.3 percent plus 10 cents for each Visa transaction and 2.65 percent plus 10 cents for each MasterCard transaction. The lowest credit card interchange rate for Visa is for supermarket transactions that are set at 1.2 percent whereas MasterCard has the lowest interchange fee for warehouse clubs set at 1.1 percent (Hisey).

Interchange fees effectively set a price floor for merchant discount fees. In a competitive acquiring market, the merchant discount rates would be expected to be close to interchange fees. Industry experts estimate the interchange fee to account for about 67 percent to close to 100 percent of the merchant discount. Thus, any increase in the interchange fee would most likely lead to an increase in merchant discount.

A higher interchange fee may lead to higher issuers' profits encouraging associations to raise their interchange fees to promote their network's product. Unlike other industries, the card associations face competitive pressures to increase their fees (see Balto, 2000). However, if rates are raised too high, merchants would stop accepting the card and reduce the issuers' revenue. Furthermore, the card associations face competition from other proprietary networks. Discover negotiates directly with merchants and generally offers lower merchant discounts than either MasterCard or Visa. Thus, proprietary networks can provide downward pressure on card association interchange fees.

The setting of uniform interchange fees at the network level has survived antitrust scrutiny by the courts. In 1979, the National Bancard Corporation (NaBanco), one of the first nonbank merchant credit card processor, sued Visa claiming that the interchange fee should be

²¹ Interchange fees are not limited to credit card networks but exist in ATM and debit card networks. Prior to the creation of the Federal Reserve, they also existed for most check transactions. The Federal Reserve by mandate has effectively set the interchange at zero.

zero as was the case for checks.²² The U.S. District Court of the Southern District of Florida ruled in favor of Visa's setting of uniform interchange rates. The Court found that the motive behind universally setting interchange was not to fix prices but to provide credit card services that no single bank could provide on its own. The alternative of bilaterally negotiating interchange fees would be too costly and may not yield universal acceptance if acquirers were not able to negotiate a rate with all issuers.²³

Given today's marketplace, Balto argues that the interchange fee should either be bilaterally negotiated or set to zero. He suggests the following changes in market conditions since the NaBanco case. First, improvements in electronic and telecommunication have significantly lowered processing and fraud costs and laws have been relaxed so issuers can recover a greater proportion of costs from cardholders. Second, the interchange fee is no longer a transfer between banks that serve as both issuers and acquirers. Third, competition from payment alternatives is significantly lower today and merchants stand to lose significant business by refusing to accept them.

However, most economists disagree with Balto's assessment (Baxter, Carlton and Frankel 1995, McAndrews and Stefanadis 1999, Schmalensee, 2000, and Small and Wright, 2000). In a theoretical model, Schmalensee (2000) uses imperfect markets to study the effects of interchange

²² NaBanco was competing to handle credit card transaction processing for Carson Pirie Scott, a large Chicago department store, with First Chicago, an issuer and acquirer at the time. Because many of the department store's customers were also First Chicago's cardholders, NaBanco claimed that First Chicago had an unfair advantage of potentially having many on-us transactions resulting in a cross-subsidy from the issuer side to the acquirer side. Because NaBanco could not cross-subsidize, their processing fees were higher resulting in lost business. For more details on the antitrust case, see Balto and Evans and Schmalensee (1999, ch. 11).

²³ The Court felt that Visa had proper incentives in place to arrive at the appropriate interchange fee. Acquirers and issuers both sat on the Board that determined the fee and raising the fee too high would result in fewer merchants accepting the card and in less value for all members. Additionally, the interchange fee was viewed as a transfer between members that were often both issuers and acquirers. Therefore, members did not want to raise fees that they themselves had to pay. The decision was upheld in the Eleventh Circuit. In 1986, the U.S. Supreme Court declined to hear the case.

fees on credit card network participants.²⁴ His model demonstrates that the socially optimal interchange fee is rarely zero.

Merchants have recently protested Visa and MasterCard interchange fee increases (see Beyer). However, some merchants are negotiating various deals with issuers in terms of co-branded products and with acquirers to negotiate better merchant discount rates. But, given that rates are set at the network level and merchant discounts are already approaching the interchange fee, merchants may not easily find lower fees when interchange fees rise.

VII. The Network

There are two levels of competition in the credit card industry. One level is at the downstream market comprised of issuer-consumer and acquirer-merchant relationships. The other level of competition is at the network and issuer-acquirer level often referred to as the upstream market. As mentioned previously there are four major credit card networks operating in the United States—American Express, Discover, MasterCard, and Visa. However, MasterCard and Visa account for over 75 percent of the market.

While competition among sellers of goods and services generally yields the most efficient outcome, markets with network externalities may benefit from cooperation among providers of the underlying service or good. A network externality exists when the value of a good or service increases as the number of participants using it increases.²⁵ In the case of credit cards, the network externality involves two different sets of participants. The consumer's value from the credit card increases as the number of merchants increases. Similarly, the merchant's value from

²⁴ He assumes merchants and issuers have some level of market power whereas acquirers operate under perfect competition.

²⁵ For more on network externalities, see Economides (1996), Farrell and Soloner (1986), Katz and Shapiro (1985), McAndrews (1997), Osterberg and Thomson (1998), and White (1996).

accepting credit cards increases as the number of credit card consumers increases. Chakravorti and To find that merchants are willing to pay higher discount fees as the number of illiquid consumers increases confirming the existence of network externalities in the credit card market.

We will discuss two antitrust cases currently pending against Visa and MasterCard regarding their alleged anti-competitive business practices. In one of these cases, the U.S. Department of Justice (DOJ) charges the two card associations with anti-competitive practices that harm certain payment system participants and stifle development of new payment instruments.²⁶ There are three main issues.

First, DOJ claims that there is significant overlap between members that serve on one association's Board of Directors while being members of key committees of the other association and such overlap prevents competition between the two networks. While members are not allowed to have representatives on the Board of Directors of both associations simultaneously, they are allowed to have representatives on an association's Board while having members on key committees of the other. By 1996, 19 banks had representatives on both the Board of Directors of one association and a committee of the other (USDOJ, January 15, 1999). DOJ believes that this relationship has resulted in a lack of competitive advertising and customer choice, as well as a delay of new products and services. As a remedy, DOJ suggests that any member with a representative on one association's Board of Directors must commit itself entirely to that brand. Banks without representation on either board could continue to issue both cards.

Visa and MasterCard argue that an overlap in governance leads to better standardization and reduces research duplication. Visa and MasterCard claim that there have been no impediments to new product developments, citing smart cards, debit cards, magnetic stripes, and co-branding as examples. They deny charges of collusion and point to decreasing prices for both

consumers and merchants. The companies believe that this governance structure creates competition across brands and within the brands, as well as the necessary environment to formulate standards. The associations point to the thousands of Visa and MasterCard issuers, as well as Discover and American Express, from which consumers can choose.

Second, the two card associations allow members to issue both MasterCard and Visa cards. Such a policy is often referred to as duality. DOJ argues that duality has stifled competition. It alleges that this structure has created scale economies for the associations and their members which new entrants are unable to compete with. Visa points to the Justice Department's lack of a clear signal when it asked for a "business review letter" in 1974.²⁷ Visa changed By-Law 2.16 requiring both issuers or acquirers of its products to deal exclusively with them. This change resulted from an antitrust case brought by Worthen Bank and Trust, located in Arkansas, that wanted to process both Visa and MasterCard (then Interbank) products while issuing Visa products. Because of DOJ's lack of support for the new exclusivity arrangement and Visa's desire not to have ongoing litigation, Visa ceased to fight against duality.

Third, the two associations do not allow member banks to issue cards from other networks such as American Express and Discover that they deem as a competitive threat. This policy is often referred to as exclusivity. DOJ claims that barring competitors from the primary credit card distribution system—the banking system—prevents competition. DOJ believes that these policies essentially prevent members from considering other networks because they have to give up their profitable MasterCard and Visa portfolios.

²⁶ For an excellent summary of the issues, see McAndrews and Stefanadis.

²⁷ At the time, Visa was known as National BankAmericard, Inc.

The issue of exclusivity was the subject of the *SCFC ILC, Inc. v. Visa U.S.A.*²⁸ Dean Witter (at the time owned by Sears), issuer of Discover cards, sued Visa for violation of Section 1 of the Sherman Act for not allowing Mountain West Savings and Loan, a small Utah thrift, to be a Visa member.²⁹ Visa refused to allow the printing of the cards and Dean Witter sued Visa. Subsequently, Visa passed By-Law 2.06 stating that membership would be denied if:

... any applicant which is issuing, directly or indirectly, Discover Cards or American Express cards, or any other cards deemed competitive by the Board of Directors; an applicant shall be deemed to be issuing such cards if its parent, subsidiary or affiliate issues such cards. (Evans and Schmalensee, 1999, ch 11 quoting Visa U.S.A., Inc, 1992)

Dean Witter argued that the Visa network, classified as a joint venture, had to give access to a competitor because it had a large share of the relevant market (72 percent of the charge volume went over Visa and MasterCard networks at the time). Furthermore, Visa could not show that the exclusion was necessary for the efficient operation and therefore must admit any applicant for membership.

Visa argued that entry by a competitor should only be required if its entry is essential for competition. Visa argued that Discover had successfully entered the credit card market and demonstrated that it did not need to be part of the network. Furthermore, the forced sharing of property with competitors would “reduce long-term incentives for the creation of property through investment and innovation” (Evans and Schmalensee, 1999, 282). Being part of the Visa network allowed Discover to gather intelligence on its competitor internally.

The jury found in favor of Discover. However, in September 1994, the U.S. Tenth Circuit Court overturned the decision. The decision was based on a rule-of-reason analysis in

²⁸ For more details about this antitrust case, see Carlton and Frankel, Carlton and Salop (1996), and Evans and Schmalensee (1999, ch. 11),

²⁹ Dean Witter purchased Mountain West from the Resolution Trust Company. The thrift’s portfolio included a Visa membership and a small credit card portfolio. When Mountain West requested the printing of 1.5 million Prime Option Visa cards, Visa was curious to know why this small thrift wanted so many cards. Upon investigation,

which Dean Witter had the burden of proving that consumers would be harmed by By-Law 2.06. The U.S. Supreme Court declined to hear Dean Witter's appeal.

In addition to competition among credit card networks, other payment networks such as debit card and ACH networks also compete for consumer and merchant usage. While cash and check are the most popular payment instruments, debit cards are the fastest growing payment instrument in the United States. Generally, merchants receive similar benefits from credit and debit cards. Most notably, merchants receive good funds in a relatively short amount of time. However, consumers face different incentives when using their credit or debit cards. Most notably, credit cards offer consumers that pay off their balances every month usually at least 20 days of float along with other benefits such as extended warranties and frequent-use awards.³⁰

An interesting example of such competition is the entry of credit cards into grocery stores. As seen in figure 8, both the card associations have set the lowest or second lowest interchange fees for supermarkets. McAndrews and Stefanadis suggest that the card associations were willing to offer lower than usual interchange fees because Point-Of-Sale networks and Discover had offered substantially lower merchant discounts. However, McAndrews and Stefanadis suggest grocery stores may be a special case because consumers may be reluctant to make purchases on credit.

The other pending antitrust case was filed by a group of retailers against Visa and MasterCard in 1996.³¹ The primary issue is the tying of more than one product. Specifically, the card associations do not allow retailers to decline any product with the association's logo while accepting others. The retailers would like to choose which payment products to accept.

Visa found out that Dean Witter had bought the thrift and wanted launch its Prime Option Visa from the newly acquired institution.

³⁰ Recently, offline debit cards have started to offer frequent-usage awards (ATM & Debit News, 2001).

The retailers object to being forced to accept the offline debit cards offered by Visa and MasterCard because of the relatively high merchant discount fees being charged compared to online debit cards. Research shows that Visa's offline debit cards are three to five times more expensive for merchants to accept than online debit cards.³² Most PIN-based debit card transactions cost merchants about 10 cents to 12 cents to process. However, Visa charges merchants 1.25 percent of the transaction plus 10 cents for their offline debit product. MasterCard charges 1.36 percent plus 10 cents for each transaction. Merchants question the increase in sales associated with accepting offline debit cards, and are unwilling to pay the higher fees. They argue that credit cards and debit cards are different products and therefore should not be included in the card associations' "honor all cards" rules. Because few merchants are willing to stop accepting the credit products, the merchants would like the acceptance of debit cards uncoupled from the acceptance of credit cards.

The card associations argue that they should be compensated for the use of their network. The offline debit cards are accepted by merchants that accept credit cards allowing use at a greater number of merchant locations than online debit cards. They contend that customers should not have to disclose how they choose to settle the monetary obligation. The associations contend that debit cards are part of the same bundled product offered to consumers, therefore they view their honor-all-cards rule as appropriate and lawful (Fickenscher and Keenan, 1998).

Antitrust issues are not new to the credit card industry, but improvements in technology have led to new antitrust challenges as evidenced by the retailers antitrust suit. The debit card offers similar features as credit cards to merchants in terms of electronic delivery of funds with

³¹ Wal-Mart, The Limited, National Retail Federation, and the International Mass Retail Association led the group of retailers, and were joined by Sears and Burlington Coat Factory a year later.

limited default risk. However, the underlying incentives for each participant differ between credit and debit card networks. These incentives may lead to overuse of credit cards by convenience users than is socially desirable. While general equilibrium analysis is extremely difficult given the number of participants, payment system regulators and the courts should study the effects on each participant in the credit card network and participants in other competing payment networks before imposing regulatory changes.

VIII. Conclusion

This article has explored the interrelated bilateral relationships that underlie credit card transactions. The pricing decisions between any two credit card participants have effects on other bilateral relationships downstream and upstream. The decisions by networks to impose the no surcharge rule and by issuers to offer certain consumers underpriced services may affect incentives for usage of other payment instruments. As evidenced by the various theoretical models discussed, the effects of pricing decisions on overall welfare depend on the underlying assumptions.

An important assumption made by most of this literature is that cash is the primary substitute for credit cards. However, regardless of whether participants earn rents, welfare may be improved if a close substitute for credit cards in every respect except the extension of credit is used by convenience users. Therefore, online debit cards may improve welfare by lowering the convenience use of credit cards if incentives are properly aligned. Online debit cards offer merchants the same benefits as credit cards in terms of the delivery of good funds via an electronic network. If credit and debit cards offer similar benefits to liquid consumers and

³² Another difference is that online debit cards immediately debit a consumer's account whereas offline accounts debit the consumer's account a day or two after the transaction but often issuers may memo post the account immediately.

merchants, the use of credit cards may not lead to the most efficient outcome given their higher processing costs. Unlike the United States, debit card transactions outnumber credit card transactions in most European countries partly due to greater acceptance of debit cards in Europe generally.

To investigate such issues, models should incorporate the view that credit cards extend short-term loans to convenience users. In the case of convenience users, the cost associated with the loan is mostly paid by other participants. Chakravorti and Emmons suggest that revolvers may be willing to pay this fee. Others have suggested that merchants pay for this fee. Alternatively, issuers may be willing to absorb this cost for future revenue from convenience users that revolve at a later date.

While the outcomes of the two antitrust cases are not known, the cases themselves have influenced the behavior of some market participants and exposed a very fertile ground for academic research. Further research into credit card networks is clearly warranted to better understand the underlying incentives to each participant. So far, the literature has been primarily theoretical. Empirical investigations are required to observe what market structures exist for merchants, issuers, acquirers, and credit card networks and which participant, if any, earn rents.

References

- American Express (1999), *Annual Report 1999* (New York, NY: American Express Company).
- ATM & Debit News (2001), "U.S. Bank Adds Its Debit Cardholders to a Northwest Frequent-Flier Program," April 5, 1 and 4.
- Ausbel, Lawrence M. (1991), "The Failure of Competition in the Credit Card Market," *American Economic Review* 81 (1), 50-81
- Balto, David A. (2000), "The Problem of Interchange Fees: Costs Without Benefits," *European Competition Law Review* 21(4), 215-224.
- Barron, John M., Michael E. Staten and John Umbeck (1992), "Discounts for Cash in Retail Gasoline Marketing," *Contemporary Policy Issues* 10, October, 89-102.
- Baxter, William F. (1983), "Bank Interchange of Transactional Paper: Legal and Economic Perspectives," *Journal of Law & Economics* 24, October, 541-88.
- Beyer, Leslie (1999), "Why Merchants Are Up in Arms," *Credit Card Management*, July, 61-70.
- Board of Governors of the Federal Reserve System (1983), "Credit Cards in the U.S. Economy," July 27.
- Board of Governors of the Federal Reserve System (2000), *Semiannual Survey of Credit Card Plans*, January 31, found at <http://www.bog.frb.fed.us/pubs/shop/tablwb.pdf> .
- Brito, Dagobert L., and Peter R. Hartley (1995), "Consumer Rationality and Credit Cards," *Journal of Political Economy* 103(2), 400-33.
- Calem, Paul S., and Loretta J. Mester (1995), "Consumer Behavior and the Stickiness of Credit-Card Interest Rates," *American Economic Review* 85 (5), December, 1327-36.
- Carlton, Dennis W. and Alan S. Frankel (1995), "The Antitrust Economics of Credit Card Networks," *Antitrust Law Journal* 63(2), Winter, 643-68.
- Carlton, Dennis W. and Steven C. Salop (1996), "You Keep on Knocking but You Can't Come In: Evaluating Restrictions on Access to Input Joint Ventures," *Harvard Journal of Law & Technology* 9 (2), Summer, 319-52.
- Chakravorti, Sujit (1997), "How Do We Pay?" Federal Reserve Bank of Dallas *Financial Industry Issues*, first quarter.
- _____ (2000), "Why Has Stored Value Not Caught On?" Federal Reserve Bank of Chicago Emerging Issues Series, S&R-2000-6, May.

_____ and William R. Emmons (2001), "Who Pays for Credit Cards?" Federal Reserve Bank of Chicago Public Policy Series, EPS-2001-1.

_____ and Ted To (1999), "A Theory of Merchant Credit Card Acceptance," Federal Reserve Bank of Chicago *Working Paper Series*, WP-99-16, November.

Credit Card Management (2001), *Card Industry Directory*, (New York, NY: Faulkner & Gray, Inc.).

Credit Card News (1997), "Issuers Are Putting the Squeeze on Non-Revolvers," October 15, 1.

Credit Card News (1999), "Double Whammy: Associations Raise Interchange Again," February 1, 1.

Credit Card News (1999), "Issuers Scale Back 9.9% Offers," February 15, 4.

Credit Card News (1999), "High Fees, Shorter Grace Periods: What's Next?" February 1, 1.

Credit Card News (2000), *Credit Card Issuers' Guide 2001 Edition*, Thomson Financial.

Credit Card News (2000), "Frequent Fliers May Not Be as Loyal as the Card Industry Assumes," March 15, 3,7.

Crenshaw, Albert B. (1997), "On Balance, A Credit Card Squeeze." *The Washington Post*, October 10, G1.

Daly, James J. (1999), "A Balancing Act for Profits," *Credit Card Management*, May, 52.

Economides, Nicholas (1996), "The Economics of Networks," *International Journal of Industrial Organization* 14(2), 673-99.

Ernst & Young (1996), "Survey of Retail Payment Systems," *Chain Store Age*, January.

Evans, David S., and Richard L. Schmalensee (1993), *The Economics of the Payment Card Industry* (Cambridge, MA: National Economic Research Associates, Inc.).

_____ (1999), *Paying with Plastic: The Digital Revolution in Buying and Borrowing*, (Cambridge, MA: MIT Press).

Farrell, Joseph, and Garth Saloner (1986), "Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation," *American Economic Review* 76, 940-55.

Fickenscher, Lisa and Charles Keenan (1998), "MasterCard, Visa Face FTC Probe on Debit Rules," *American Banker* 163, July 1, 1.

- Food Marketing Institute (1998), *A Retailer's Guide to Electronic Payment Systems Costs* (Washington, D.C.: Food Marketing Institute).
- Hisey, Pete (1999), "How High Can You Go?" *Credit Card Management*, April, 105-11.
- Katz, Michael L. and Carl Shapiro (1985), "Network Externalities, Competition and Compatibility," *American Economic Review* 75 (3), 424-44.
- Kitch, Edmund W. (1990), "The Framing Hypothesis: Is It Supported by Credit Card Issuer Opposition to a Surcharge on a Cash Price," *Journal of Law, Economics, and Organization* 6 (1), Spring, 217-33.
- Lobell, Carl D., and Joseph W. Gelb (1981), "The Cash Discount Act," *New York Law Journal*, December, 1-4.
- Mandell, Lewis (1990), *The Credit Card Industry: A History* (Boston, Mass.: Twayne Publishers).
- McAndrews, James J. (1997), "Network Issues and Payment Systems," Federal Reserve Bank of Philadelphia *Business Review*, November/December, 15-25.
- McAndrews, James J. and Chris Stefanadis (1999), "The Issues of Exclusivity and Overlapping Governance in the Visa and MasterCard Antitrust Case," Mimeo, Federal Reserve Bank of New York.
- Murphy, Michael M., and Mack Ott (1977), "Retail Credit, Credit Cards and Price Discrimination," *Southern Economic Journal*, 1303-12.
- The Nilson Report (1999), Issue 705, December.
- Nocera, Joseph (1994), *A Piece of the Action: How the Middle Class Joined the Money Class* (New York, N.Y.: Simon & Schuster).
- Osterberg, William P. and James B. Thomson (1998), "Network Externalities: The Catch-22 of Retail Payments Innovations," Federal Reserve Bank of Cleveland *Economic Commentary*, February 15.
- Punch, Linda (1998), "Behind AmEx's Merchant Push," *Credit Card Management*, August.
- Rochet, Jean-Charles and Jean Tirole (2000), "Cooperation among Competitors: The Economics of Payment Card Associations," mimeo, Institut D'Economie Industrielle.
- Schmalensee, R. (2000), "Payment Systems and Interchange Fees," Unpublished manuscript, December.

Schwartz, Marius and Daniel R. Vincent (2000), "Spreading the Pain Can Aggravate the Injury: Uniform Pricing Constraints in Electronic Payments Networks," unpublished manuscript, University of Maryland.

Small, John and Julian Wright (2000), "Decentralised Interchange Fees in Open Payment Networks: An Economic Analysis," Mimeo, NECG and University of Aukland.

Toloken, Lisa (1999), "The Fee Decade," *Credit Card Management*, May, 80.

U.S. Congress (1981), Public Law 97-25 [H.R. 31]: Cash Discount Act. July 27.

U.S. Department of Justice (visited 1/15/99), "Complaint for Equitable Relief for Violations of Sherman Antitrust Act," found at <http://www.usdoj.gov/atr/cases/f1900/1973.html>.

U.S. Senate Banking, Housing and Urban Affairs Committee (1981), S. Report No. 97-23, 97th Congress First Session, reprinted in U.S. Code Congressional & Admin. News 97th Congress first session vol. 2, 80.

Visa U.S.A., Inc., *By-Laws/Operating Regulations*, May 1.

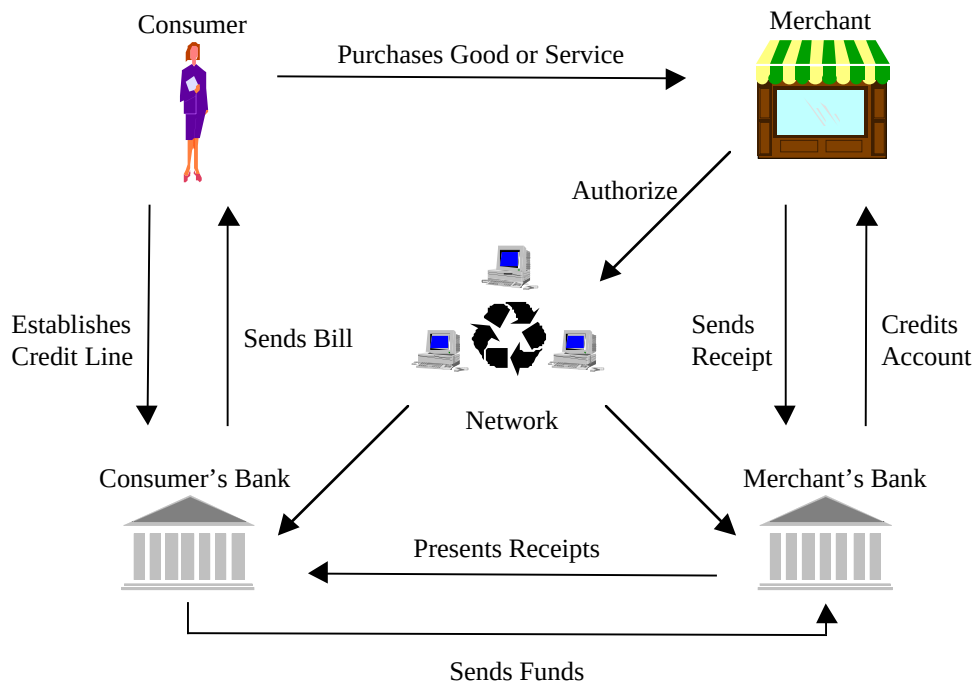
Visa (visited 8/3/99), "The Antitrust Question - Competition and Choice," found at <http://www.visa.com/av/doj/competition/main.html>.

Washington Post (2001), April 11, E01.

White, Lawrence J. (1996), "U.S. Public Policy Toward Network Industries," Mimeo, New York University, March 7 draft.

Wright, Julian (2000), "An Economic Analysis of a Card Payment Network," Mimeo, NECG and University of Aukland.

Figure 1: A Credit Card Transaction



Adapted from Evans and Schmalensee, 1993.

Figure 2: Transaction Costs

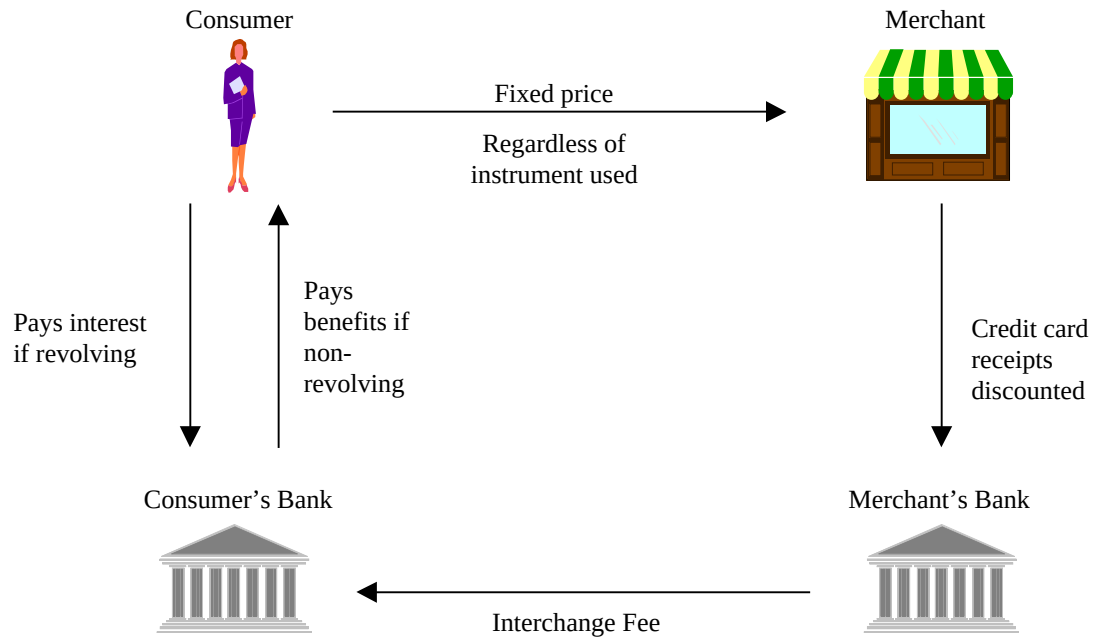


Figure 3: Ten Largest Issuers

By Outstanding Balances, 1999 (in millions)

1. Citibank	\$ 73,300
2. Bank One Corp./First USA Bank	\$ 69,365
3. MBNA America	\$ 65,170
4. Morgan Stanley Dean Witter	\$ 37,975
5. The Chase Manhattan Corp.	\$ 33,572
6. American Express Centurion Bank	\$ 25,196
7. Bank of America	\$ 21,483
8. Providian Financial Corp.	\$ 19,049
9. Capital One Financial Corp.	\$ 18,344
10. FleetBoston Financial Corp.	\$ 14,589

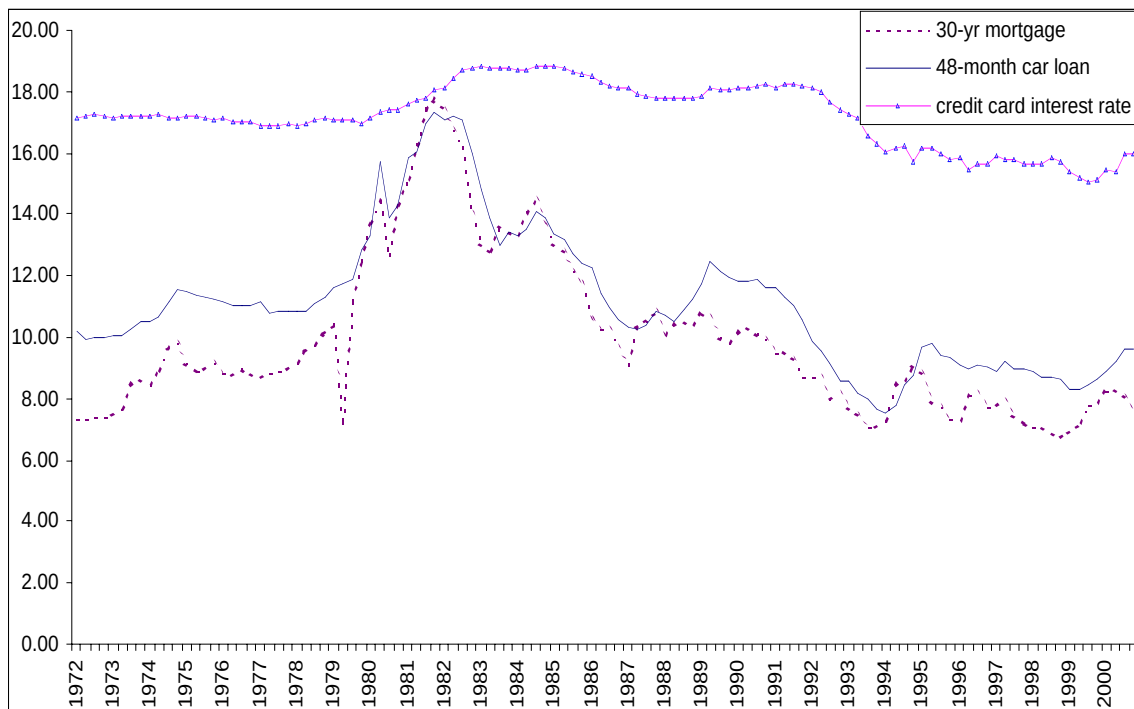
Source: Credit Card News (2000), 7.

By Accounts, 1999 (in thousands)

1. Bank One Corp./First USA	64,191
2. Citibank	40,600
3. Morgan Stanley Dean Witter	38,500
4. Capital One Financial Corp.	23,705
5. The Chase Manhattan Corp.	15,592
6. Households Credit Services Inc.	15,030
7. Providian Financial Corp.	12,400
8. Bank of America	12,000
9. Associates National Bank	8,764
10. FleetBoston Financial Corp.	7,237

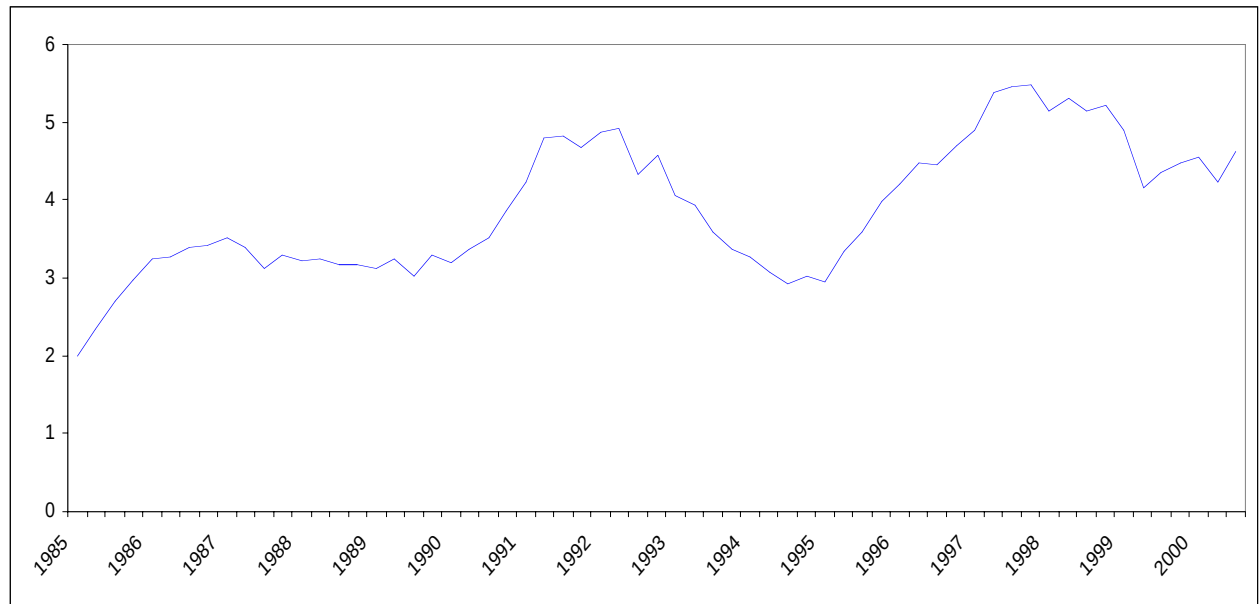
Source: Credit Card News (2000), 7.

Figure 4: Quarterly Credit Card Rates and Other Consumer Loan Rates



Sources: Board of Governors of Federal Reserve System and Federal Reserve Bank of St. Louis

Figure 5: Quarterly Credit Card Chargeoff Rates



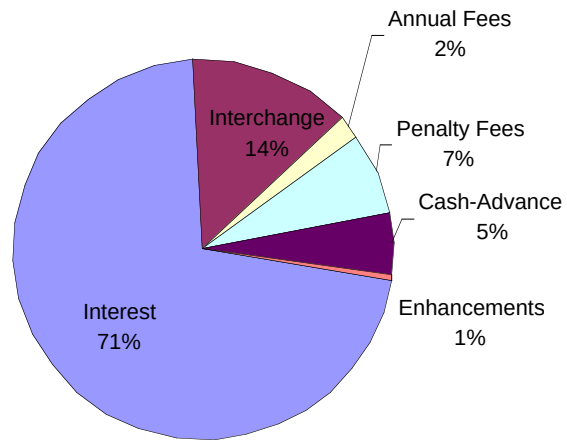
Source: Board of Governors of the Federal Reserve System.

Figure 6: Top 10 Merchant Acquirers By Dollar Volume, 1999 (in millions)

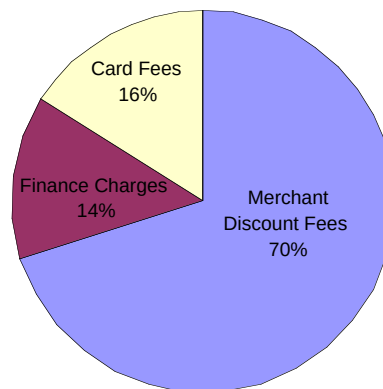
1.	Chase Manhattan Services	<i>\$ 150,597</i>
2.	National Processing Company	<i>\$ 115,908</i>
3.	Paymentech	<i>\$ 93,308</i>
4.	Nova Information Systems Inc.	<i>\$ 60,000</i>
5.	BA Merchant Services Inc.	<i>\$ 50,719</i>
6.	Fifth Third Bank	<i>\$ 44,649</i>
7.	Concord EFS/EFS National Bank	<i>\$ 37,200</i>
8.	Unified Merchant Services	<i>\$ 31,600</i>
9.	Wells Fargo Bank	<i>\$ 31,418</i>
10.	U.S. Bancorp	<i>\$ 27,609</i>

Source: Credit Card News (2000), 17.

Figure 7: MasterCard and Visa Issuers' Revenues and American Express Revenues in 1999



Source: Credit Card Management (2001), 11.



Source: American Express (1999).

Figure 8: April 1999 Interchange Rates for Consumer Transactions

Visa Interchange Fees	
Credit Cards	
CPS/Retail-Credit	1.38% + \$.05
CPS/Retail 2-Credit (Emerging Markets)	1.43% + \$.05
CPS/Hotel and Car Rental	1.58% + \$.10
CPS/Card Not Present	1.80% + \$.10
CPS/Automated Fuel Dispenser	1.50% + \$.05
CPS/Supermarket-Credit	1.20%
CPS/Passenger Transport	1.70% + \$.05
Express Payment Service	2.00% + \$.02
Electronic Interchange Rate (EIRF)	2.00% + \$.10
Retail Key Entry	1.80% + \$.10
Standard (paper)	2.30% + \$.10
Debit Cards	
CPS/Retail-Check Card (signature-based)	1.25% + \$.10
CPS/Supermarket-Check Card (signature-based)	\$.40
New Check Card-Retail (PIN-based)	0.55% + \$.10
New Check Card-Supermarket (PIN-based)	\$.25
Interlink/Supermarket	\$.15
Interlink/Non-Supermarket	0.45% + \$.03

Source: Hisey (1999), 106.

MasterCard Interchange Fees	
Credit Cards	
Merit III	1.36% + \$.10
Merit I	1.85% + \$.10
Travel Premier	1.58% + \$.10
Cardholder Activated	1.50% + \$.05
Supermarket	1.15%
Warehouse Club	1.10%
Service Industries	1.15% + \$.05
World MasterCard T&E	2.20% + \$.10
Key-Entered	1.80% + \$.10
Standard (paper)	2.65% + \$.10

Source: Hisey (1999), 110.

Emerging Payments Occasional Paper Series

Why Don't Consumers Use Electronic Banking Products? Towards a Theory of Obstacles, Incentives, and Opportunities. <i>(Brian Mantel)</i>	EPS-2000-1
Legal Analysis of a Banking Industry Online Identify and Attribute Authentication Service for Consumers and Merchants: The Financial Services Technology Consortium's FAST Initiative. <i>(William Gram)</i>	EPS-2000-2
Who Pays for Credit Cards? <i>(Sujit Chakravorti and William R. Emmons)</i>	EPS-2001-1
A Study of the Interrelated Bilateral Transactions In Credit Card Networks? <i>(Sujit Chakravorti and Alpa Shah)</i>	EPS-2001-2