

Consumer Payment Choices: Trends and Policy Implications
by
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The Consumer Behavior and Payment Choice Research Conference agenda addresses a broad range of issues related to consumer choice of payments mechanisms and the public policy implications of payments systems and choices. Several of the topics raised by the Conference agenda are central to current policy debate and research on card networks; below are the ones on which we focus in this paper:

- The demand for payment technologies by consumers, including cash, checks, credit cards, debit cards, stored value cards, Internet banking, and ACH transactions;
- The effect of merchant acceptance on consumer payment choice;
- The relationship between the choice of payment technologies and the pricing of goods and services, as well as general issues related to pricing of payment technologies;
- The impact of payment technologies on shopping time and consumer or household behavior.

In particular, our paper focuses on a two-sided network framework for analyzing the relationships between consumer payment choice and merchant costs (and benefits), and the resulting implications for retail pricing, consumer benefits, and public policy toward cost allocation and fee setting in card networks. The proper vantage point, of course, for such analyses is not consideration of the interests of one group of stakeholders taken in isolation but, rather, overall social benefits and costs from the usage of different payments mechanisms.

To set the stage for this analyses, our paper briefly examines the dramatic changes in consumer choice of payments instruments in the U.S. in the last decade and indeed in the past few years, with a particular focus on the expansion of electronic payments (e.g., credit and debit) into new channels such as grocery and smaller valued transactions as well as into Internet sales (as this channel has grown exponentially). The paper documents these trends and related technologies. It also examines the factors affecting shifts in payment choice by consumers from cash and check to newer payment

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technologies such as wands and the development of “aggregators” of merchants as well as large volumes of lower valued transactions such as PayPal. The paper also examines the effects of consumer choice of payment methods, including speed of transactions, for both card-holders (including wand-holders) and on other consumers (e.g., externalities such as gains in check-out times due to improved speed of transactions). These externalities are particularly relevant to the overall assessment of the social gains from changes in payment methodologies from cash and check to electronic forms of payment. In addition to addressing the externalities, we briefly summarize the specific benefits to cardholders and to merchants from the increased use of new forms of payment, or increased use of existing forms of card payment for new forms of commerce (e.g., Internet sales) for both traditional brick and mortar firms as well as Internet-only merchants. Finally we summarize some of the complementary investments in infrastructure, products, and services (such as fraud protection and improved dispute resolution) that have accompanied these payment developments.

Our paper then examines the issues of structure and levels of payments (such as the interchange fees) as well as the “optimal” allocation of such fees between and among issuers, merchants, and consumers for efficiently functioning payments networks. This is an area in which there has been considerable debate about fee structures and levels. While there is a broad-ranging literature in this area,² recent conferences and research have addressed a more narrowly focused issue that has arisen in antitrust litigations as well as in policy arenas, where the concern has been with payments made by just one side of the network – the merchant side. Plaintiffs – and some regulators outside of the U.S. -- claim that interchange fees represent a cost to merchants, which, since consumers’ card usage cannot be “controlled” by merchants, are ultimately passed on to all consumers (including non-card users) in the form of higher retail prices. The claim is that, as a result, interchange fees represent a “tax” on transactions that is paid by all consumers, not just card users. There is, however, no empirical evidence adduced at this point that the interchange fees and the merchant discount fees are somehow too high relative to a socially optimal level or even relative to the level that would arise in a workably competitive environment where various means of payments vie for attention of merchants and consumers. Moreover, as a result of consumers’ multi-homing, merchants have leverage to choose acceptance among multiple card payment options, as well as offering customers payment via direct debits from checking accounts (an option which is marketed aggressively by merchants in recurring billing industries such as telecommunication and cable services).

² While there are many papers, the following provide detailed assessment of these issues: D. Evans and R. Schmalensee, “The Economics of Interchange Fees and Their Regulation: An Overview;” S. Weiner and J. Wright, “Interchange Fees in Various Countries: Developments and Determinants;” and J-C Rochet, and J. Tirole, “An Economic Analysis of the Determination of Interchange Fees in Payment Card Systems,” *Review of Network Economics*, Vol. 2, Issue 2, June 2003; and J-C Rochet, “Regulating Interchange Fees: A Welfare Analysis”, Presentation at Federal Reserve Bank of New York, September 15, 2005.

The outcome of this debate has immediate relevance for consumer choice and payments systems operation, since it has sparked calls for regulation or intervention in fee setting. While the debate is particularly contentious, the academic research and policy assessments in the U.S. have generally supported the conclusion that regulatory intervention is not required and that assessment of issues such as whether fees constitute a “tax” on consumers must be considered within the appropriate two-sided network framework involved in card systems and in the broader context in which electronic payments systems function.³ In fact, much of the confusion and incorrect conclusions stem directly from failure to take into account the fact that payment networks are fundamentally different from traditional one-sided markets and require fee structures, including potentially asymmetric fee structures that impose a higher proportion of fees on one set of participants so as to attract participation by *both* merchants and consumers and to allow for cost recovery of the fixed and variable costs of operating the network.⁴

Our paper attempts to lend clarity about the distinction between one-sided and two-sided markets and its implications for the policy debate over fee structures, by assessing the interrelationship between consumer choice of payment mechanism, interchange fees, and effects on retail pricing in the appropriate two-sided market context and takes preliminary account of broader considerations of the economic effects of the choice of means of payments. In particular, we extend the current literature by incorporating into the traditional two-sided model the reasonable assumption that increased consumer card usage actually *lowers* variable transaction costs – certainly relative to checks and possibly also to cash -- for merchants and we examine the effect of this potential cost reduction on merchant incentives to *lower* retail prices (thereby attracting more sales). Our approach is to model retail prices as being determined in a competitive environment in which merchants may have distinct clienteles that patronize their locations, and compete on the basis of price and service to retain these and attract others. The paper examines the factors that potentially lower (rather than, as is typically assumed, increase) merchant costs, including transaction-specific costs and cost reductions that may occur at some broader level of card usage. Benefits derive from card usage as well as card-related services, including, for example, reduced costs associated with lower fraud, reduced labor or security costs from increased use of cards relative to cash, as well as improved speed of check-out. We also incorporate potential gains to non-users in the form of lower retail prices or improved merchant services (e.g., speedier check-out). As such, our model

³ See, for example, are recent presentation James M. Lyons of the Federal Reserve Bank of Minneapolis: “The Interchange Fee Debate: Issues and Economics” which summarizes the debate and references recent conferences and papers on the topic, and the research cited above.

⁴ The confusion also stems from failure accurately to assess the benefits attendant in such systems, such as fraud reduction, and the need to recover substantial investments made for network systems. See, M. Guerin-Calvert and J. A. Ordober, “Merchant Benefits and Public Policy towards Interchange: An Economic Assessment” *Review of Network Economics*, Vol. 4, Issue 4, December 2005.

extends the current models, which tend to examine consumer benefits directly related to usage, rather than affecting merchant costs and hence price, and addresses specifically the issue of interchange fees as a “tax” on non-users.

Finally we address the policy implications of our findings for assessment of both regulatory and antitrust enforcement policy.

I. Overview of developments in payments markets in the U.S.

A. Introduction and Overview

Payments markets in the U.S. continue to undergo change and innovation, an increasing proportion of payments are made in the form of electronic payments (e.g., credit, debit, and prepaid cards) with a reduced proportion in checks and cash. This growth comes from a number of sources, including expansion of electronic payments into new channels such as grocery, mass transit (e.g., the New York City MetroCard which can be purchased with credit and debit cards) and smaller valued transactions, where cash or check have been the more traditional means of conducting consumer transactions. Rapid expansion of Internet sales, which are increasingly important components of total transactions in the US economy, also contributed to this growth since the preponderance of Internet transactions are made by electronic means using plastic. The paper documents these changes, focusing specifically on the accompanying innovations and investments that facilitate such changes, and assesses the efficiency and cost implications of these trends.

There are several key trends worth noting at the outset:

- An increasing number of consumers are making use of electronic payments for a wide variety of uses; *thus there no longer appears to be a large and distinguishable class of non-card users*. The data suggest that in the US a vast majority of consumers have debit and/or credit cards and are increasingly using these in a variety of channels while cutting back on both cash and checks.⁵
- There is substantial penetration of electronic payments in a wide variety of sectors, in part enabled by new technologies and investments made by third parties such as PayPal and card networks. These generally require high fixed up-front investments and thus depend on critical mass for their profitability. New merchant fee structures and rapid consumer acceptance stimulated expansion while major chains have come to see substantial gains from increased

⁵ See, for example, G. Gerdes, J. Walton II, M Liu, and D. Parke, “Trends in the Use of Payment Instruments in the United States,” *Federal Reserve Bulletin* Spring 2005, 180-201. (Hereinafter, 2005 Fed Study)

transactions volumes, improved efficiency of transactions times (e.g., speed of check-out) and reduced point-of-sale and back-office costs.⁶

- Internet sales are predominantly accomplished by electronic card payments and have grown rapidly to over 2.3% of retail sales.⁷ Some providers are exclusively Internet-based (e.g., eBay) while others have both Internet and brick and mortar facilities.⁸ Of course, the growth of Internet sales is directly linked to the availability and security of electronic payments systems.
- Additional shifts in payments mechanisms towards debit cards, wands, and merchants actively marketing payment via direct debits to checking accounts cover a broad spectrum of purchases and income groups and are supported by common technologies with other electronic payments. We examine these trends particularly to consider the implications of merchant marketing and choice on the proportion of payments shifted by merchants from cash to other forms and the infrastructure necessary to support such technologies.

B. Major Developments in Payment Technologies

The major development in the payments arena in the U.S. is the virtual ubiquity of consumers who use some form of non-cash electronic payment for at least a portion of their transactions. There no longer appears to be a large and well-defined group of consumers that are solely dependent on cash or checks⁹ for all – or even a majority -- of

⁶ See, citations in section I B.

⁷ As an example of the rapid growth for a specific retailer, Internet sales now exceed catalogue sales at LL Bean; see, http://www.directmag.com/exclusive/specialreports/20050520_especial_report/

⁸ Li, Ward, and Zhang, in a recent working paper “Risk, Convenience, Cost and Online Payment Choice: A Study of eBay Transactions” document payment choices made by those transacting on eBay.

⁹ Summaries of recent statistics include the papers in this conference as well as: R, Borzekowski, E. Kiser, S Ahmed, “Consumers’ Use of Debit Cards: Patterns, Preferences and Price Response” (working paper, April 2006) and articles cited therein, and the 2005 Fed Study. Check-users impose costs on all customers albeit in a somewhat different manner than card users. Thus while a card user imposes a gross impact equal to the interchange fee on the transaction, a check user imposes a hidden but real cost associated with processing checks as well as the costs to the merchant of dealing with bounced checks or fraud issues (including the need to pay for and participate in check guarantee services). Since these costs are not visible – unlike the interchange fee – they tend not to be considered directly in the debate over relative costs of payments and implications of fee structures. For estimates of the relative costs to society from check services, see, Swartz, Daniel, Robert Hahn, and Anne Layne-Farrar, “The Economics of a Cashless Society: An Analysis of the Costs and Benefits of Payment Instruments,” AEI-Brookings Joint

their transactions. Benefits payments, gift cards, debit cards, and credit cards account for substantial sources of electronic payments across a wide variety of purchase types. While consumers vary in their intensity of use – the availability of the option of usage appears to be on the increase. This section documents some of the major developments.

Increased use of electronic payments:

Numerous sources document an accelerating trend toward electronic payments in the U.S. A 2005 study by the Federal Reserve System¹⁰ of the use of “non-cash” forms of payment in the U.S. found that electronic payments exceeded check payments in 2003; this represented the first year in which electronic payments had outpaced check payments in U.S. history. The trend reflected both an *increased* rate of usage of electronic payments over the period 2000-2003, and an average annual rate of *decline* in check usage between 2002 and 2003 of 4.3 percent.¹¹

Between 2000 and 2003, checks declined from 57.7% of non-cash payments to 45.3% (based on number of transactions) with a decline in value from 66.7% of the value of non-cash payments to 59.1 percent.¹² In addition, the 2005 Fed Study finds that the majority of the decline in the value of check transactions was due to reduction in lower valued (less than \$1,000) checks written by individuals to pay businesses or businesses to pay individuals.¹³ The study results confirm an increased reliance by consumers on electronic means of payment for more than 50% of transactions. Debit card transactions, according to the 2005 Fed Study, increased to 15.6 billion in 2003 (almost double the level in 2000) with an average value of \$40 in 2003. The rapid increase in debit usage relative to credit usage, in both transactions volume and total value of all transactions, suggests that consumer preferences for electronic payments is driven by factors other than just rewards for credit card usage.¹⁴ Instead, literature indicates that consumer

Center for Regulatory Studies (2004) and Guerin-Calvert and Ordovery, “Merchant Benefits” op. cit.

¹⁰ 2005 Fed Study.

¹¹ The 2005 Fed Study also notes on p.181 that recent evidence indicates that the proportion of payments by cash has also declined over this period. Electronic transactions include credit, debit, and ACH as well as electronic benefits transfers.

¹² The 2005 Fed Study translates the dollar value into constant dollars and estimates that this decline represents a 3% annual decline in the value of non-cash transactions done by check. 2005 Fed Study, p.182.

¹³ This includes greater use of electronic payment with electronic banking as well as reduced usage of checks at store locations.

¹⁴ Recent articles have suggested that rewards and other benefits accruing to card holders could lead to inefficient levels of card usage. See, e.g., J. Farrell, “Assessing Australian Interchange Regulation,” *Review of Network Economics*, Vol. 4 Issue 4, December 2005. While, indeed, it is

preference for card usage is driven by a variety of factors, including convenience, flexibility, speed of transaction, dispute resolution mechanisms,¹⁵ and ability to reduce the volume of cash carried.¹⁶

The American Bankers' Association 2005/2006 Study of Consumer Payment Preferences documents similar trends and examines changes over 2001 to 2005. This ABA Study shows a threefold increase in the use of online bill paying between 2001 and 2005 (with 24% of monthly bills paid online as of 2005) and documents comparable trends in debit card usage (with debit cards accounting for one-third of in-store purchases). In addition, the ABA Study highlights the growth of stored value cards, by noting that 32% of consumers surveyed now use gift cards or prepaid cards to make at least one purchase a month.

Increased use of Internet:

A survey by AC Nielsen released in October 2005, indicates that “More than 627 million people have shopped online, including over 325 million within the last month. [. . .] Over 212 million online shoppers mention books as among the last 3 items they purchased

plausible that individual purchaser's choice of the means of payment will respond to the anticipated rewards, such rewards are a form of price reduction on products that can be purchased with reward points. Hence, it is the case that the aggregate economic consequences of consumers' choices regarding the means of payment are properly examined at the macro level rather than at the level of an individual point of sale. Other researchers suggest that where there are substantial fixed costs associated with operation of payments networks, it may be necessary to develop mechanisms to induce greater usage so as to defray costs of network investments as well as to promote innovative technologies. See, for example, citations in footnote 2.

¹⁵ As we noted in our earlier paper, benefits that cards do provide to consumers include “a widely accepted form of payment, rewards, liquidity and an efficient dispute resolution system, which gives consumers confidence to do business with merchants with whom they have not had prior experience and will never meet (such as merchants who do business solely on the internet or via mail or phone sales). Credit cards provide consumers a secure, reliable and convenient means of payment. See, Chakravorti, Sujit and Ted To (July 2003) “A Theory of Credit Cards.” Working paper, Federal Reserve Bank of Chicago at 52. In addition to float, consumers often benefit by receiving extended warranties, rebates on purchases, cash discounts and travel awards. Chakravorti, Sujit (1997) “How Do We Pay?” *Financial Industry Issues*. First Quarter. Federal Reserve Bank of Dallas. Credit cards serve as a payment device in lieu of cash or checks for “millions of routine purchases as well as for many transactions that would otherwise be inconvenient or perhaps impossible...” See, Durkin, Thomas A. (Sept. 2000) “Credit Cards: Use and Consumer Attitudes, 1970-2000,” *Federal Reserve Bulletin*, Credit cards have also become the primary source of unsecured open-ended revolving credit, replacing the installment-purchase plans that were important to the sales volume in many retail stores in times past.” M. Guerin-Calvert and J. A. Ordober, “Merchant Benefits and Public Policy towards Interchange: An Economic Assessment” *Review of Network Economics*, Vol. 4, Issue 4, December 2005.

¹⁶ See, e.g., Swartz, Daniel, Robert Hahn, and Anne Layne-Farrar, “The Economics of a Cashless Society: An Analysis of the Costs and Benefits of Payment Instruments,” AEI-Brookings Joint Center for Regulatory Studies (2004).

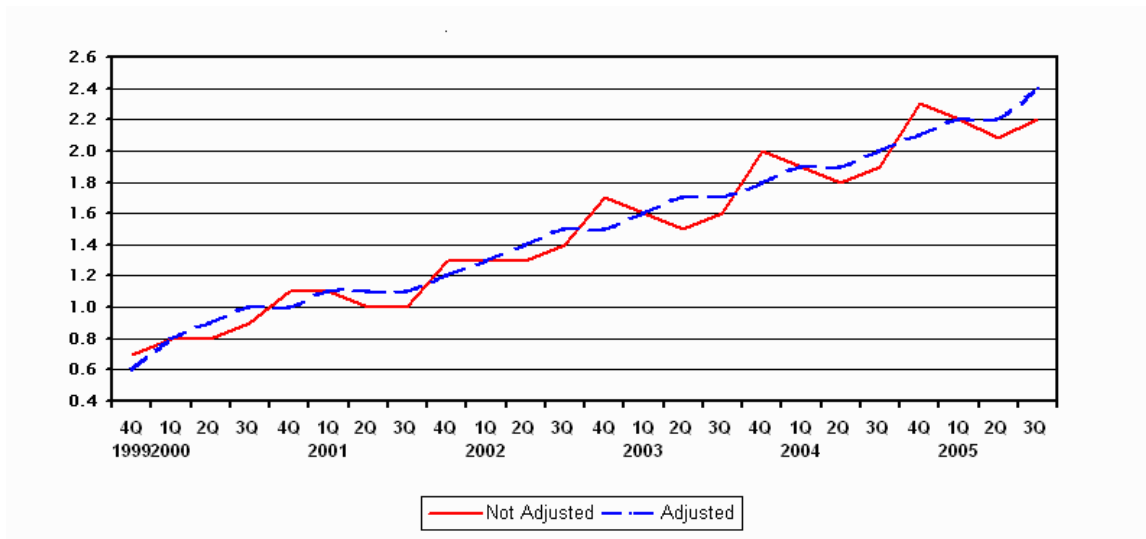
online.” The range of items purchased was quite diverse, according to the survey, cutting across a wide variety of retail and travel industries, including:

- “Over 135 million people purchased DVDs and/or video games;
- Close to 135 million made plane reservations;
- Over 128 million purchased articles of clothing/accessories/shoes;
- Over 112 million paid for music downloads and/or CDs;
- Over 106 million purchased electronic devices (including cameras, etc);
- Close to 98 million bought computer hardware; and
- Over 86 million made hotel and/or tour bookings.”

The survey, covering a large population of consumers across North America, found credit cards were used by 69% of respondents as means of payment, followed by PayPal (39%) and debit cards (22%).¹⁷

According to the Census Bureau of the Department of Commerce, retail “e-commerce” sales accounted for about 2.3% of total sales and reached \$22.3 billion as of second quarter 2005. As shown in the graph below, e-commerce sales as a percent of retail sales have been steadily increasing since data have been collected.

Estimated Quarterly U.S. Retail E-commerce Sales as a Percent of Total Quarterly Retail Sales: 4th Quarter 1999– 2nd Quarter 2005



The growth in Internet sales has been supported by major investments in fraud reduction technologies and applications. Examples include both password-based systems as well as

¹⁷ “The twice-yearly global ACNielsen Online Consumer Opinion Survey, the largest of its kind, polled over 21,100 respondents in 38 markets from Europe, Asia Pacific, North America, Latin America and South Africa.”

additional verification systems.¹⁸ The increased acceptance of card payment methods by “bricks and mortar” merchants, as well as the dramatic increase in Internet commerce are both dependent on the availability of secure payments systems. Sales to unknown customers whose cards cannot be physically inspected require novel and enhanced security precautions, including authorization, authentication, etc. As these systems have developed, e-commerce has expanded.¹⁹ Sales on the Internet are projected to increase to as much as 10-15% of total retail sales by 2010.²⁰ The security breach last year at a card

¹⁸ See, M. Guerin-Calvert and J. A. Ordober, “Merchant Benefits and Public Policy towards Interchange: An Economic Assessment” *Review of Network Economics*, Vol 4, Issue 4, December 2005. As we noted therein: Card networks have developed password-based processes for Internet or card-not-present transactions that facilitate efficient shifting of liability to issuers and away from merchants. See, for example, Kucan (Apr. 17, 2003). MasterCard’s SecureCode program offers reduced interchange fees for debit and credit card transactions to complying merchants, who may also be guaranteed payments for online transactions. See, “What does MasterCard Interchange Incentive Mean to Merchants?” *Cardinal News*, Mar. 2005. Merchants are offered incentives to participate more actively in card network services as the fundamental means to reduce losses and to achieve enhanced payment guarantee services. A recent survey on card practices by merchants showed that “The survey listed 11 fraud prevention tools, and asked merchants whether they used them and which they rated as most effective at reducing online fraud. The four most popular tools were address verification systems (about 70 percent say they use them), customer follow-up and real-time authorization tools (both 54 percent), and post-process fraud management tools (43 percent). Interestingly, 54 percent of respondents listed customer follow-up as a tool they use to combat fraud, but only 38 percent viewed it as most effective”. <http://zones.advisor.com/doc/08087>. A listing of fraud protection and dispute resolution mechanisms for consumers are provided, for example, at “Fraud Protection Center” https://www.124.americanexpress.com/cards/loyalty.do?page=FraudCenter&CCNR=Identity_Theft. “Fifty-three percent of merchants report using 5 or more tools to combat online fraud.” See pgs.8-10 of: “6th Annual Online Fraud Report: Online Payment Fraud Trends and Merchants’ Response,” (2005 Edition) Sponsored by CyberSource Corporation, Conducted by Mindwave Research. Power of Payment Series. http://www.cybersource.com/resources/collateral/Resource_Center/white_papers_and_reports/CYBS_2005_Fraud_Report.pdf. See also, “Interview: Largest German Credit Card Issuer on Massive Reduction of Charge Backs Ulrich Riehm (ulrich.riehm@itas.fzk.de) and Arnd Weber (arnd.weber@itas.fzk.de), ITAS, Karlsruhe, Germany, talk to Tilo Schürer (tilo.schuerer@bankgesellschaft.de), Bankgesellschaft Berlin, Germany” which notes that substantial reductions in merchant chargebacks were achieved by the implementation of authorization and compliance programs with card systems.

¹⁹ See, for example “Digital economy and structural change,” *Deutsche Bank Research*, May 6, 2004, No. 44. This article notes that sellers are unlikely to invest in electronic payments infrastructure in a network that had only a few consumers and notes specifically the network advantages to card systems with broader cardholder acceptance.

²⁰ A recent survey of retailers showed that most believe Internet sales will increase possibly to as much as 10-15% of total sales. See, “Survey: Retailers Look to the Future,” *Internet Retailer*, June 2005 at www.Internetretailer.com. See, <http://www.census.gov/mrts/www/data/html/04Q4.html>. “The Census Bureau of the Department of Commerce announced today that the estimate of U.S. retail e-commerce sales for the first quarter of 2005, adjusted for seasonal variation and holiday trading-day differences, but not for price changes, was \$19.8 billion, an

processor, Card Systems Solutions, has brought increased focus by Congress, state legislatures, and regulators on the security of electronic payment systems and the necessity of reducing their vulnerability to hacking will likely require further significant investment by the card payments industry in technological developments to manage this risk.

New Technologies: “Contactless” cards/wands and “aggregators”

While a number of retail sectors, including grocery and retail gasoline, have experienced dramatic increases in electronic payments, the quick service restaurant sector has witnessed both increased usage of electronic payments and increased innovation in technology with the advent of both RFID (wand) and “contactless card” technologies. CardWeb reported that the volume of fast food charged to credit cards rose from \$6.1 billion in 2002 to \$22.5 billion in 2004.²¹ In part, the increased usage has been spurred by reduced telecommunications time and connectivity issues and the schedules of merchant fees applicable to fast food transactions. For the merchants who are accepting “plastic” for fast food purchases, there is also a benefit of increased expenditure per transaction. For example, McDonald’s found that using credit cards tended to increase the average size of transaction from \$5 to \$7.²² As of 2003, about 25 percent of restaurants

increase of 6.4 percent ($\pm 2.1\%$) from the fourth quarter of 2004.” <http://www.census.gov/mrts/www/data/pdf/05Q1.pdf> “According to the latest figures from Scarborough Research, 47 percent of America’s online population shops online” http://www.nua.com/surveys/index.cgi?f=VS&art_id=905356210&re_l=true April 24, 2001. “The eCommercePulse online survey of 39,000 Web users found that 100.2 million U.S. adults, or 48.2 percent of the U.S. adult population age 18 and over, have purchased online. More than 81.2 percent of all adults with Web access have made a purchase online since they started using the Internet.” http://www.clickz.com/stats/sectors/retailing/article.php/6061_751021

²¹ “Paying with a Wave, Tap and 'blink': Contactless Payments in the U.S.,” *Smart Card Talk*, August 2005. Volume 10 No 8 reports that: “Both nationwide retail chains and regional businesses are upgrading their POS systems to accept the new contactless payment devices.” The following excerpts a list of some of the merchants and their technologies from the article: 7-Eleven, Inc.: American Express ExpressPay; Chase blink (Denver). 7-Eleven reports that it is installing contactless readers in all of its stores nationwide by 2006; Boater’s World Marine Centers®: MasterCard *PayPass*; CVS/pharmacy®: American Express ExpressPay; Chase blink (Atlanta); MasterCard *PayPass*; Visa Contactless; Regal Entertainment Group theaters: Chase blink (Atlanta, Denver); MasterCard *PayPas*; Visa Contactless. Regal is completing rollout of contactless terminals in summer of 2005; Ritz Camera Centers: American Express ExpressPay; MasterCard *PayPas*; Visa Contactless; Sheetz: American Express ExpressPay, Chase blink, MasterCard *PayPass*, Visa Contactless; Walgreens: Chase blink (Atlanta, Denver). The article also references the benefits of the new systems as reduced time at check out, citing a Chase study of time savings of 30-340%, and increased transactions value relative to cash. Reduced cash needs are regarded as an additional benefit for consumers. The Chase study referenced is at Chase Credit Cards with blink - Fact Sheet, http://www.chaseblink.com/blink_flash.asp

²² In “E-commerce, Small is the New Big,” *CIO Insight*, January 6, 2006 at http://www.cioinsight.com/print_article2/0,1217,a=169693,00.asp

surveyed by QSR Magazine accepted some form of electronic payment, including both traditional card payment and some form of a wand technology.²³

Among the products tested by retailers were the MasterCard PayPass and American Express ExpressPay (Wired News, Dec 14, 2003).²⁴ These and contactless cards -- such as the Chase "blink" card -- do not require consumer signature at point of purchase. It is clear that these new technologies result in reduced checkout times: for example, among the chains that have implemented the technologies are 7-Eleven, where internal estimates find that 10-15 seconds are saved on each transaction using the technology.²⁵ It is anticipated that there could be comparable savings on drive-thru purchases, which account for 70% of fast food transactions.²⁶

The introduction of these new technologies and the increased use of cards at point of sale (POS) for smaller valued transactions have led to a dramatic increase in the number of consumers using non-cash means for both in-person and online transactions.²⁷ In turn,

²³ "Paying with a Wave, Tap and 'blink': Contactless Payments in the U.S.," *Smart Card Talk*, August 2005, Volume 10 No 8. http://www.smartcardalliance.org/newsletter/august_2005/feature_0805.html

²⁴ One of the various factors that promote the ability of merchants to use the technology is the ability of a common reader to "read" the card off of more than one network.

²⁵ Rueter, Thad. "Payment on the Go: A New Era for Contactless Payment," *Card Technology*, September 2005. <http://www.cardtechnology.com/article.html?id=2005102556H3UMJV>.

²⁶ National Restaurant Association cited in *Card Technology*. A recent study in the Chicago area documented the substantial gains that can occur to customers with the implementation as a result of increased usage of electronic payments. The study examined the implementation of "speedpass," which uses RFID technology to link the payment to a credit card or a bank account. The study showed that increased usage of speedpass benefited users as well as non-users by reducing congestion at toll booths and also reduced toll booth operation costs for coin handling and staffing. In addition, the study demonstrated the need to invest high fixed costs and the need for critical mass of users in order to gain the efficiencies. See, Rueter, Thad. "Payment on the Go: A New Era for Contactless Payment," *Card Technology*, September 2005. <http://www.cardtechnology.com/article.html?id=2005102556H3UMJV>.

²⁷ "In Dec. 2005, the third annual Micro and Small Payments Conference was held in New York City. A quantitative survey, conducted by research firm Ipsos Insight and payments technology company Peppercoin, was released at the conference. Among the survey's findings:

- Approximately 45 million Americans are willing to use plastic for purchases of \$5 or less, an increase of 23 percent from the previous year.
- Almost 20 million Americans above the age of 12 have made an online purchase of less than \$2 in the past year, up 29 percent from 2004 and 350 percent from 2003.

this appears to have precipitated some changes in fee structures by some networks and the rapid expansion of “aggregators” or companies such as PayPal that aggregate large volumes of transactions from smaller merchants and process them as a single merchant.²⁸ The result is lower per transaction costs for the merchant. Among the companies engaged in aggregator services are PayPal, Worldpay and Bibit (both owned by RBS/Streamline), Netbanx, GlobalCollect, and Metacharge. Companies such as PayPal are also expanding the scope of services offered to become more attractive to both online and “brick and mortar” facilities.²⁹

This growth in the usage of electronic payments for even small transactions evidences the value that consumers ascribe to the usage of such means of payment relative to the alternatives (inasmuch as it is likely that customers have enough cash on hand to pay for small items).

II. Expanding Analyses of Payment Networks to Account Expressly for Cost Reductions and Externalities

A spate of recent papers has substantially advanced our understanding and the economic analysis of payments networks – including credit card networks -- and the modeling of

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- More than half of the respondents to the survey said they would use plastic at c-stores if they could. Other top responses for desired usages included quick-service restaurants, transportation, coffee and parking fees.
 - When asked which purchases they had made with cash at least six times in the past 30 days, 43 percent responded coffee, 35 percent QSR and restaurant food, and 18 percent products and services from vending machines and kiosks.”

J. Bickers, “Card use increases for small purchases” at QSR Web <http://www.qsrweb.com/article.php?id=642>

²⁸ See Morgan Stanley, “28 January: eBay – The PayPal Opportunity,” which included estimates that PayPal could account for up to 17% of U.S. consumer e-commerce by 2010 and offers consumers a choice of funding options. Aggregators, as the name implies, aggregate transactions for a given seller or number of sellers and then forwards the transactions to an acquirer for processing on behalf of the seller(s). The fees involved include the charges from the acquirer plus fees charged by the aggregator.

²⁹ “That’s where the third-party micropayment processors such as eBay Inc.’s PayPal, BitPass Inc. and Peppercoin Inc. fit in. These firms have come up with several creative work-arounds that make small payments profitable. First is the aggregation model, whereby small charges are accumulated over a set period of time—say a month—and then sent to be processed by the credit card company as one large transaction. The aggregation model is particularly well suited for merchants that have frequently returning customers who buy small-ticket items, such as Apple Computer Inc.’s iTunes Music Store. MasterCard announced a marketing partnership with Peppercoin in December to accelerate the use of aggregation among merchants.” “E-commerce, Small is the New Big,” *CIO Insight*, January 6, 2006 at http://www.cioinsight.com/print_article/2/0,1217,a=169693,00.asp

multi-sided markets and attendant externalities. However, most of these papers model interchange as a *cost* that is defrayed either by merchants and/or by customers who shop at the merchant. Some, particularly merchants, claim that interchange fees are essentially a tax on all consumers – especially on those who do not use cards -- in the form of higher retail prices which reflect merchants’ pass-through of interchange costs into prices at POS. These analyses fail to capture important benefits that accrue directly from network services (such as fraud protection and dispute resolution), and the fact that one would therefore expect that some proportion of interchange fees appropriately should be allocated to cover the cost of such services.³⁰

Much of the debate over interchange has primarily focused on the *structure* of fees between merchants and cardholders, and in particular a view that more of the cost recovery for credit card network fixed and variable costs is placed on merchants than on consumers. However, this focus misses the essential role that the interchange plays in enabling the functioning of payments systems. Unlike a one-sided market, in two-sided markets the allocation of price between the two sides of the market reflects the need for participation by both sides of the network and the volume of transactions, i.e. to stimulate demand from both sides by charging a price that reflects what each side is prepared to pay for being part of the network and the benefit that each side’s participation generates for the other side. The literature on two-sided markets is robust in its theoretical predictions and also in empirical evidence that recovery of the costs of operating the system can lead to pricing structures that appear to be “unbalanced” in a sense that one side of the market “pays” very little while the other “pays” an a greater share of the overall costs.³¹

³⁰ As we described in our earlier paper: “In our view, the benefits to merchants from card acceptance cannot fairly be analyzed solely on the basis of savings in per transaction costs. Benefits that extend beyond pure transactional or processing efficiencies from card acceptance include broader operating efficiencies, payment guarantees, reduced risks of theft of cash, elimination of the risk of uncollectible checks, the gains from efficient resolution of customer disputes through the credit card network chargeback processes, access to (and benefits from) network marketing programs, and improvements in merchants’ cash flow. For example, in a credit card transaction, the merchant will be paid well before the card issuer receives payment from the card holder, which reduces operating cash balances that a merchant needs to have on hand. If, instead of accepting a credit card, the merchant were to extend credit to the customer, the merchant would have to incur the cost of a credit check, wait for payment and bear the risk that the customer might not pay. By accepting the credit card, the merchant gets the benefit of prompt payment, while the card issuer bears the cardholder credit and fraud risk.” M. Guerin-Calvert and J. A. Ordovery, “Merchant Benefits and Public Policy towards Interchange: An Economic Assessment” *Review of Network Economics*, Vol. 4, Issue 4, December 2005.

³¹ Differentially balanced pricing is a feature in many markets. For example, in the U.S., home buyers do not pay brokerage fee: the sellers do. Of course, this vantage point misses the obvious fact that any home buyer will ultimately be also a seller *and* that in the long-run the recovery of costs from brokerage services affects the pricing of housing stock. This viewpoint is important because it draws a clear distinction between competitive concerns that would arise if brokerage fees were set at supra-competitive level versus the distributional concerns that arise from the

Implicit in the public debate over the interchange fee is a view that card systems – as opposed to other types of payment systems -- uniquely impose cost or cost allocation burdens on merchants. However, other payment systems, such as checks, also impose costs directly and in greater proportion on merchants inasmuch as merchants do not charge fees for check acceptance. Our review and assessment of studies of merchant costs and fees presented in our earlier paper, showed that these other systems do have costs associated with them, and that the relative costs of providing services outside a network context are substantially higher than those within a network context.³² The available evidence shows that merchants have direct costs in the form of fees for check guarantee services and back-office costs associated with processing and depositing checks with banks, and awaiting payment and indirect costs in the form of time at the counter. These costs are not borne directly by consumers but, rather, are folded into the overall costs of operating a business, be it a supermarket, telephone company, or a doctor's office. It is therefore appropriate to view credit card acceptance costs in the same vein—as a cost of doing business.³³

Markets are two-sided where the level of demand for the network services comes from interactions between buyers and sellers (cardholders and merchants), and the total volume of demand for the services of the network depends not only on the level of the total price, but also, and most importantly, on the allocation of the price between these two sides, that is on the *structure of prices*.³⁴ In a two-sided market, such as a payment card network, the interchange fee has two key roles to play.

First, the interchange fee is a means for defraying some of the costs of operating the network. In particular, assuming that the network is already in place, per transaction costs of operating the network have to be recovered in some proportion from the two sides of the market. Given the two-sided nature of card networks, the relative cost recovery should reflect the intrinsic membership and usage externalities that the two sides impose on each other. However, it is important to note that, because there are substantial fixed

allocation of responsibility for recovery of (competitively set) costs associated with the provision of brokerage services. Similarly sometimes getting cash and sometimes card.

³² As we noted in our earlier paper, many of the cost estimates focus only on the direct costs and do not estimate any offsetting benefits. See, for example, Swartz, Daniel, Robert Hahn, and Anne Layne-Farrar, “The Economics of a Cashless Society: An Analysis of the Costs and Benefits of Payment Instruments,” AEI-Brookings Joint Center for Regulatory Studies (2004) and Guerin-Calvert and Ordovery, “Merchant Benefits” op. cit.

³³ Others have compared the benefits of electronic payments systems and the incidence of costs to shopping malls, where the addition of new stores has benefits to existing stores in the form of additional foot traffic. See, Lyon op cit.

³⁴ When the level of demand is affected only by the total level of fees, the market is said to be a (traditional) one-sided market and traditional forms of intervention can, if needed, be deployed if there is a concern that the level of price is excessive, that market forces cannot remedy persistent exercise of monopoly power, *and* the regulatory solution will actually improve social welfare rather than further harm it. In the latter instance, it is particularly important to evaluate and not ignore costs of regulatory intervention.

costs in operating the payment system, the users of the system – merchants and cardholders – will have to make aggregate contributions in excess of direct per transaction costs in order to contribute to the recovery of these total costs. Of course, besides per transaction fees, the two sides may be required to pay non-usage sensitive fees (such as membership fees). The key issue is how such costs and contributions should be allocated between the parties, and in particular, how to set prices so as to attract participation and volumes from both sides of network.

Second, the interchange fee is a mechanism for reallocating all the pertinent costs of operating the payment scheme between issuers (and their cardholder customers) and acquirers (and their merchant customers) in a manner that (i) optimizes the objectives of the owner/operator of the scheme, (ii) reflects the interdependence between the demands on each side, and (iii) considers all the competitive constraints operating on the owner/operator of the scheme, such as competition among payment schemes and multi-homing by cardholders and merchants.³⁵ The structure of the relative prices to each side will reflect all the pertinent costs and account for the *usage* and *membership* externalities that each side imposes on the other. Because demands for the network services on each side are intrinsically linked, the interchange acts to balance demand on both sides by ensuring that the contributions from each side optimize the total demand for network services which is affected by participation and utilization from both sides of the market. Thus, the operator/owner of the payment scheme must create appropriate incentives for usage of its card(s). In this setting, contributions from each side are not necessarily likely to be equal, even where total contributions are no more than are required to cover the costs of operating the network.³⁶ This is not dissimilar to other payments systems such as checks where there are related services and costs to be covered.

Failure to take into account fully the ramifications of the two-sided nature of the payment card industry leads to important misconceptions about the desirability and implications of intervention, including cost-based regulation in two-sided markets, the effects of which are different than in one-sided markets. Any adjustment in fees on one side will inexorably have various (possibly) unintended consequences (even if the total level of contributions were unchanged):

- Any regulatory intervention designed to limit the contribution on one side of the market would inevitably cause the need for contributions to be increased on the other side.

³⁵ A cardholder multi-homes when it has credit cards issued by more than one network. In fact a credit card holder likely will also have a debit card. Most merchants multi-home insofar as they accept payments from many payments schemes; multiple cards, and ACH which is aggressively marketed by phone companies and others that have monthly payments.

³⁶ This has been shown in many theoretical models of the card system developed in the literature, as well as by many other theoretical and empirical examinations of various two-sided markets. Rochet and Tirole, “Two-Sided Markets: A Progress Report” (IDEI Working Paper, November 2005).

- Were this re-balancing to result in higher cardholder fees (per transaction fees and fixed fees), cardholder multi-homing would be impeded. Given that multi-homing (by cardholders and merchants) enhances competition, regulatory policies ought to encourage multi-homing rather than impose price regulations or other forms of intervention that would impede it.³⁷
- Reductions in fees on one side of the market are not a solution if the perceived problem is that the aggregate level of fees is “excessive.” The most direct solution to excessive level of fees is competition and not regulation.

III. The Effect on Consumers

Two-sided models generally do not account directly for the fact that card acceptance lowers *variable transactions costs* to merchants and also imparts *positive externalities on non-users* from card usage (e.g., faster checkout, less wait time).³⁸ Our model adapts the traditional two-sided model to take into account the feedback effects of increased choice by consumers of cards as the payment mechanism of choice on the variable costs of merchants. We model the consumer side in the conventional way, assuming that consumers derive benefits³⁹ from card usage and using conventional allocation of fees

³⁷ A merchant’s incentive to accept a credit card depends on the direct benefits of acceptance (such as savings on transactions costs) and on the expected gain in profits from acceptance relative to what the merchant would earn absent acceptance. The latter effect is likely to be less if a high proportion of the merchant’s potential clientele multi-homes, because such customers are able to make a purchase with other credit cards and so may be indifferent as to which card is accepted. Consumer use of multi-homing thus enhances inter-network competition, resulting in increased competition in areas in addition to price and competitive pressure on the level of merchant services charges and interchange. Multi-homing is more likely to occur when issuers have sufficient pricing flexibility to use transaction-based income to defray costs and balance the two sides of the market, thereby keeping fixed membership fees low and encouraging multi-homing by cardholders. Multi-homing is becoming increasingly common. In particular, by increasing network competition, multi-homing increases incentives for issuers to pressure acquirers to reduce merchant service charges or offer unbundled rates, thus increasing competition at the acquirer level.

³⁸ Cost reductions are evaluated as being passed through due to competition among merchants in the form of lower prices. Many papers tend to limit the focus of inquiry to transactional services (e.g., card authorization, transactions processing) and exclude consideration of services such as fraud detection and payment guarantee, bill collection type services and facilitation of particular types of sales such as Internet sales. As such, these papers also tend to find a larger “gap” between the value of these services and their “price” (e.g., interchange fee) and may be biased toward finding that fees are too high relative to some measure of value of service offered, even in circumstances where there is sufficient inter-network competition.

³⁹ The word “benefits” for consumers is used here to include more than the explicit “rewards” that can accompany card usage. See, above, for a listing of such benefits.

across the two sides of the market by means of the interchange fee. We expressly model the variable costs of merchants as including both allocated interchange fees and the variable costs to the merchants of providing the merchants' "product."

In the typical setting, the merchant receives a benefit which could be a lower per transaction cost relative to accepting cash (or check) for example. If a merchant receives such a saving, the effect on pricing at the POS will depend significantly on whether (i) the payment by the merchant to the merchant acquirer on a per transaction basis exceeds the benefit or not; and (ii) how competitive is the market in which the merchant operates. If the interchange does not extract all of the benefit from the merchant (on a per transaction basis) then the variable cost falls and the merchant can (in principle) lower the price for the product it sells and thus stimulate volume. That is, if the merchant faces a regular downward-sloping demand curve at its POS, then a reduction in variable transaction costs will compel a price reduction. There is, however, a countervailing view, namely that since card-holders derive a benefit from using a card, in the form of points or actual cash rebates, the merchant may find it desirable to raise the price since it now faces a clientele that has somewhat less elastic demand (as compared to that clientele's demand if the merchant did not accept credit but only cash or check, for example). However, this point of view again misses the proper perspective since it ignores the fact that most cash customers are also credit card holders and their economic welfare should be assessed over the "shopping cycle" across all of their activities. This is because the number of merchants that accept cards is (as we have seen) dependent on the number of card holders who *actually* use cards. Hence, the availability and ubiquity of card-accepting points of sale depends on the overall usage. Thus, the fact that a customer can use a card at a restaurant and thereby obtains a usage benefit is linked to the fact that many customers use cards for many other purposes which, in turn, induces a restaurant (such as McDonald's) to accept cards in the first place.

The second reason why this point of view is too narrow is that some or many current non-users likely will be future users. As such, these customers will benefit from the existing card networks that were in part developed to deliver merchant and customer benefits. Put another way, the existing networks deliver a valuable option value to the non-users and (to some extent) that option value may be paid for in the form of a (marginally) higher price at POS.

Finally, this view takes the benefits of the networks as being totally static – so that the "distribution" of benefits to merchants and to cardholders is fixed and independent of the overall profitability of the network (to the stake-holders). Consequently, non-users (or current non-users) contribute nothing to the desirable investments that networks make in enhancing the value of the networks and the services which they provide. From this perspective, non-users benefit if, for example, networks improve fraud protection features or back-office features because this lowers the acceptance costs and raises the acceptance value to merchants.

Our model examines two mechanisms by which card usage could reduce merchant variable costs – as directly related to the incidence of card usage (e.g., each transaction generates some small reduction in costs) and as a threshold level – where the overall volume of card usage may result in some cost reduction in staffing or other resources that are variable over larger volumes. We examine the effects of these cost reductions on merchant incentives to change (reduce) retail prices so as to attract additional sales via card transactions – this represents a significant extension of current papers, which do not account for such incentives and the effect on retail prices.⁴⁰ Our model is built on cost reduction coming from many sources, including reduced debt collection costs (due to reduced fraud and payment guarantee), reduced staffing costs (due to reduced need for billing and collections), and improved efficiency of transactions – thereby, generating the same level of output at lower cost.⁴¹ In addition, there can be increased profitability due to such lower costs.⁴² We model the retail environment as competitive. These reduced variable costs, in turn, in a competitive retail environment, are shown to increase the incentive of merchants to lower retail prices so as to attract more sales. The incentive to reduce retail prices so as to attract additional sales is then examined for its effects on consumers (both card holders and non-users). The modeling exercise demonstrates that directly incorporating cost-reduction in the two-sided model shows that the gains from increased card usage can translate into lower – not higher -- retail prices, particularly where the cost-reductions are substantial.⁴³

⁴⁰ We note that this approach is consistent with the research on the net benefits of electronic payments to countries, which expressly model the cost-reducing benefits of increasing the proportion of transactions that are made electronically (e.g., ATM, credit or debit) as compared to paper (including cash and check). The gains estimated in these papers are related directly to lower transactions costs associated with card and electronic payments, as well as efficiency, reduced labor costs, and reduced risk of theft. The gains from these shifts are substantial, estimated between 1-3% of a nation's GDP.

⁴¹ We examine stylized examples of merchants and estimate the percentage cost savings relative to revenue (e.g., from reduced bill collection, percentage reduction in fraud, float, and reduced labor and operating expense) that accrues from card usage. We consider cost reductions as accruing in direct proportion to card transactions (but cost savings accruing across all customers). Estimates of cost savings are derived from the literature and work following on Guerin-Calvert and Ordober, op. cit. in *Review of Network Economics*, Vol. 4, Issue 4, December 2005. Additional benefits are derived when card usage facilitates expanded sales from Internet and those increased sales occur at lower overhead for the merchant than brick and mortar sales.

⁴² 51 percent of small business owners report that the Internet has improved their profitability, 58 percent said the medium has helped their businesses grow or expand. Fully one-third of the survey participants, which included merchants who have used eBay, sell goods and services online, and 15 percent said the Internet is essential to their survival.[eBay/ACNielsen, 03/2004, http://www.shop.org/learn/stats_ebizz_fulfillment.asp]

⁴³ It can be demonstrated that there is a relationship between merchant resistance to fees and the reasons analysts adduce for why stores are either unwilling to surcharge or drop cards. Of the many various explanations, we want to focus on the clientele effect as the reason for not

In the context of our model it is possible also to reflect on the role of interchange fee and cards in opening up a new POS – such as on the Internet. Setting up an e-store is equivalent to opening up a POS such that no customer has a direct cost (other than a cost of the call or computer-initiated purchase) of visiting the store. In this situation, if customers are siphoned-off to the Internet, brick-and-mortar stores may lose customers.

There are a number of common principles that arise from our review:

- The presence of shared or common costs between credit, debit, and other forms of electronic payment implies benefits for consumers who use only one of the technologies. The incremental costs associated with new technologies including those potentially widely used may be lower as a result of investments in prior technologies.
- Increased use of technologies and electronic payments has clear positive externalities for consumers and merchants that are quality-enhancing (such as reduced congestion) or cost-reducing; efforts should be focused on increasing not reducing such technologies.
- Additional positive externalities are present in the form of reduced costs from reduced usage of checks with attendant check processing fees.
- There is more widespread adoption of technologies by merchants to improve quality of service – supporting a conclusion that it is not solely a consumer driven or bank induced movement.
- Competition between and among networks, issuers, and acquirers and new fee and other structures can support innovation and advancement of benefits.
- Network technologies have high fixed cost and such costs must be accounted for in modeling socially efficient and profit-maximizing pricing of network services.

III. Policy Implications

Examination of interchange fees and the incidence or structure of these fees in the context of the appropriate two-sided market context rather than traditional one-sided markets

surcharging or not accepting cards. In particular, some point to the alleged fact that a store that surcharges or refuses to accept will lose some share of its customers. The converse of that proposition has to be that if the store drops acceptance *and* lowers retail price as a consequence (since the interchange fee is an alleged “tax”) then it should be able to attract many non-card customers. Of course, the implicit assumption is that there are few merchants at the POS that would be willing to accept cards (were it not for the clientele effect). On the other hand, if there are fewer cash and check users than there are card users then the overall social cost (total transfer from merchants to banks) is likely to be small. This is because if the only effect of the interchange fee is to shift surplus around from merchants to banks, there is no social cost. The social cost has to be linked to excessive card usage (so that the merchant actually has higher physical transaction costs if it accepts the card as opposed to if it does not – at least on average) or to higher retail prices (for an assumed “too-high” interchange fee). The correct perspective is the overall social welfare effect. One needs to take into account the socially optimal level of services and costs, and not just the private benefits to any one group.

highlights the balancing required to maintain active participation by both sides and achieving relevant economies of scale and scope, as well as sufficient cost recovery for need infrastructure and innovations in services. Taking account of both positive externalities and the effect of payment choice (e.g., cards) on merchant costs (e.g., cost reduction), leads us to conclude that incentives exist for merchants that can *reduce* rather than increase retail prices to consumers. This refutes simplified theories that plastic-based payments systems with their choice of fee structures systematically impose costs on cash-paying customers by causing merchants to raise prices – and thereby “tax” cash- or check-paying customers. We find that policies seeking regulatory constraints or outright regulation of fees or fee allocations in payment structures based on such theories could have substantial unintended and negative consequences, and that reliance on more standard “tools” of competition policy is a preferred approach.