Public Policy
Discussion Papers
Federal Reserve Bank of Boston

No. 07-4

Consumer Behavior and Payment Choice: 2006 Conference Summary

Margaret Carten, Dan Littman, Scott Schuh, and Joanna Stavins

Abstract:
This paper summarizes the proceedings of the second *Consumer Behavior and Payment Choice* conference, held at the Federal Reserve Bank of Boston on July 25–27, 2006. These conferences are unique in featuring the collaboration of two groups of payments experts—the private-sector payments industry on the one hand, and the academic, research, and policymaking communities on the other—to stimulate more research and understanding of consumer payment behavior. The central focus of this second conference was learning more about the numerous consumer payments data sources that are available—but which are not well known or easily accessed, often for proprietary reasons—and discovering what further information is needed. Panel sessions on payment card loyalty programs and the transition from cash to electronic payments were informative and stimulated much debate. Research paper presentations provided additional support for the collection and analysis of innovative new data sources to enhance our understanding of the decisions consumers make when choosing payment methods.

JEL Classifications: D11, D12, E21, E41, G28, G11

Margaret Carten is a Payments Industry Specialist in the Emerging Payments Research Group at the Federal Reserve Bank of Boston, Dan Littman is a Payments Research Consultant in the Payments Research Group at the Federal Reserve Bank of Cleveland, and Scott Schuh and Joanna Stavins are each Senior Economist and Policy Advisor in the Research Department at the Federal Reserve Bank of Boston. Their e-mail addresses are margaret.carten@bos.frb.org, daniel.a.littman@clev.frb.org, scott.schuh@bos.frb.org, and joanna.stavins@bos.frb.org, respectively.

The authors acknowledge and thank the remaining members of conference team for organizing and hosting it: Alyson Baldock, Krista Becker, Marianne Crowe, David DeRemer, Nasreen Quibria, Charlie Sprenger, and Caroline Theoharides. The authors also thank Krista Becker, Marianne Crowe, and Nasreen Quibria for their helpful comments on this summary. Elizabeth Murry provided extremely valuable and extensive help with editing the summary.

This paper, which may be revised, is available on the web site of the Federal Reserve Bank of Boston at http://www.bos.frb.org/economic/ppdp/index.htm.

This version: July 16, 2007

Table of Contents

Introduction and Overview

As part of its ongoing efforts to encourage research and raise awareness about payments issues from the consumer perspective, the Emerging Payments Research Group at the Federal Reserve Bank of Boston sponsored a second *Consumer Behavior and Payment Choice* conference on July 25-27, 2006.[1] Designed to be "an unusual conference for unusual times," the event brought together two groups of payments experts—the private-sector payments industry on one hand, and the academic, research, and policymaking communities, on the other—with the goal of fostering a constructive environment for sharing information, forming productive research collaborations, and helping public policymakers.

The motivating idea for the inaugural 2005 conference was that the dearth of data on consumer payments behavior had created a void that was contributing to the lack of applied research on the topic. At an early point in that conference, industry participants informed the non-industry communities that for many years the commercial payments industry had been developing a great deal of data and research on consumer payments behavior. The data just were not readily available to the general public, although in some instances the information could be purchased.[2] As a result of this discovery, we devoted a good deal of the 2006 conference to learning more about the availability of consumer payments data and analyzing its usefulness for research and public policy.

The core data sessions, summarized in Section 1, were dedicated to learning what data are available and why such data are important. The first session was a presentation

---

[1] See http://www.bos.frb.org/economic/eprg/conferences/payments2006/index.htm for the conference agenda, papers, and presentations. The 2006 conference expanded on the contribution of the inaugural 2005 conference of the same title, described in Crowe, Schuh, and Stavins (2006).

[2] Interested readers can learn more about these data sources from the Boston Fed's *Consumer Payments Research Industry Reference Guide*.
See http://www.bos.frb.org/economic/eprg/guide/indrefguide.pdf

by Visa (2006), which maintains a 16-year-old data panel on consumer payment behavior that offers an informative view of payment trends among most U.S. consumers. The first panel session revealed many other existing data sources and interesting facts. The second data panel session presented the views of consumers, businesses, and public policymakers as to why more consumer payments data are needed.

The conference also featured two complementary panel discussions, summarized in Section 2, which centered on consumers' choice of payment cards (ATM, credit, debit, and pre-paid). One panel examined the effects of payment card reward (loyalty) programs on consumers' choice of payment method. The panelists generally agreed that reward programs encourage consumer payment decisions that are the most efficient or profitable to financial institutions and merchants, but the participants were divided over the extent to which these programs are effective and desirable when viewed from a social welfare perspective. The panelists also agreed that generational changes are likely to have a more lasting effect on consumer payment behavior than do loyalty programs.

Another panel examined the consumer perspective on the transition from cash to electronic payment methods, especially for small-value purchases. The panelists generally concurred that the rapid transition is likely to accelerate because younger consumers tend to rely more heavily on electronic payment methods. However, the discussants also expect that cash will remain a viable and important payment method for the foreseeable future because of its attractive characteristics that appeal to both consumers and firms. Although consumer demand for electronic payment methods is important, much of the panel discussion suggested that the supply of electronic payment services is at least as important in fostering the transition from cash to electronic payments. Two examples discussed were the need to redesign vending machines and subway fare machines to take full advantage of current payment technologies.

Another key feature of the 2006 conference was an increase in the number of research papers submitted, many of which were based on new and unique data sources, including:

- The Visa Payment Panel Study of U.S. consumers
- Online grocery deliveries to American households
- A study of how young Finns decide to adopt new payment media
- A special module on debit card use in the Michigan Survey of (American) Consumers
- A daily diary-based survey of French consumer payments
- A survey of U.S. consumers' payments preferences by the American Bankers Association and Dove Consulting
- A Dutch National Bank survey of consumer payment behavior in the Netherlands
- Bank account transactions from a small depository institution located in the midwestern United States

The range, variety, and creativity of these new data sources added much value to the discussion of how to model and test theories of consumer payment choice, as well as how to put the data to better use in the payments industry itself. We briefly describe each paper's relationship to conference themes in Sections 3 (academic workshop) and 4 (main conference).

1. Consumer Payments Data Sessions

Learning that the private payments industry had extensive data on consumer payments behavior was a salient outcome of the 2005 conference. Building on this discovery, for the 2006 conference we designed a group of sessions to explore how industry and non-industry payments researchers and specialists might collaborate productively in furthering our knowledge. To this end, we created a two-part panel session to elicit more details about the availability of consumer payments data and research in order to foster an environment in which members of the two communities

could network and develop joint working opportunities. The first panel session discussed what consumer payments data currently exist. The second panel then explored various reasons for developing more and better consumer payment data sources. To stimulate these two panel discussions, Visa U.S.A. Inc. (Visa) first provided an overview of its Payment Panel Study, an extensive source of private market research data on consumer payment behavior.

1.1 The Visa Payment Panel Study

In the early 1980s, long before the recent accelerating technological transformation in payments behavior, Visa recognized that, unlike industries that produce goods and services for consumers to buy, "the payments industry does not have the infrastructure or the systems necessary to measure consumer behavior comprehensively and reliably" (Visa 2006, page 3). Tracy Hampton (Visa) explained that the company responded to this knowledge gap by initiating an ongoing panel survey of consumer payment behavior. Since the 1990 pilot study, the panel survey has produced 16 years of data on consumer payment choices. Visa and its association members use these data extensively to monitor payment trends and to develop and market their own products.[3]

This impressive data source is known officially as the Visa Payment Panel study (hereinafter shortened to "Visa Panel"). Each quarter, three monthly panels of 1,600 consumers are drawn from a panel of 475,000 households to be demographically representative of the adult U.S. population with at least $10,000 annual household income and at least one payment card (ATM, credit, debit, or prepaid)—criteria that, according to Visa, cover about 80 percent of American consumers. New respondents are asked to participate one month per quarter, and approximately 35 to 40 percent agree to participate. Current respondents are then asked to participate again in the next quarter,

[3] As we explain in the next subsection, Visa is not the only company to conduct ongoing panel surveys of consumer payment behavior. Its panel is a long-running, continuous, and high-frequency (quarterly) survey program with a wide array of high quality data, but similar data panels (although generally less comprehensive) were described by panelists in the first panel on what data exist.

and approximately 85 percent of them agree to do so . Non-responders are eventually dropped from the Visa Panel. Surveys are conducted only in English.

For one entire month in the quarter, each respondent keeps an expenditure diary that tracks all transactions on payment cards and transactions of $5 or more on all other payment methods, including food stamps. Payments excluded are: housing (rent or mortgage), credit card bills, taxes, and loan payments. Because of all of the exclusions, the Visa data are not fully representative. For each transaction, four primary payments data are recorded: the date, the merchant category (100 possible), the amount, and the payment method. An accompanying survey collects information about changes in demographics or card accounts (such as openings and closings); all card-related information, such as revolving balances, also are recorded. To obtain the quarterly data, the monthly transactions data are aggregated across all 4,800 respondents during the three-month period.

Because the structure of the Visa Panel has not changed much since its inception in 1990, it can provide consistent information about consumer payment trends over a long period of time. Hampton's presentation emphasized several trends in consumer payment behavior observed in the Visa Panel:

- Paper (cash and check) is definitely declining, and plastic (payment cards) is increasing. Payments made with plastic have now overtaken payments made with paper.[4]
- Most of this paper-to-plastic transformation is a substitution from checks to debit cards, which are growing strongly, especially among "heavy debit users," defined as people who make 19 or more payments per month.
- Payment cards are finally beginning to gain some traction in replacing checks for general bill payments.

[4] See also Gerdes et al. (2005).

- Rewards are proliferating. General purpose credit cards that offer consumers reward programs, often in connection with routine bill payments, have grown dramatically in recent years.

While some of these broad trends have been identified and publicized by other industry analysts, the breadth, depth, and duration of the Visa Panel trend estimates provide a good example of a useful data source on consumer payments behavior.

One of the most notable trend developments present in the Visa Panel is an indication that the use of paper checks was declining as early as 1996, at least for the sub-sample of point-of-sale consumer checks included in their proprietary data.[5] This change is apparent in shares of checks, as shown in Visa (2006), but also in absolute volume terms, as Hampton reported when answering an audience question. Providers of check-clearing services, such as the Federal Reserve System, did not have conclusive evidence of the decline in aggregate U.S. check use until the Federal Reserve check study was conducted and later reported in 2002.[6] Although Visa's data set only applies to a sub-sample of payments and thus cannot be aggregated to the U.S. level, it offers an example of how high-frequency data might be useful in understanding and predicting consumer payment behavior.[7]

Jonathan Zinman (Dartmouth College) and Ariana-Michele Moore (Celent) served as discussants; both were highly enthusiastic about the data underlying the Visa Panel, applauding Visa's survey efforts and willingness to share the trend information.

Encouraging Visa to go beyond descriptions of interesting payment trends, which constituted the bulk of its paper, and to use the Visa Panel to test economic

---

[5] The data do not include the substantial volume of checks written by businesses or some of the checks written by consumers. As discussed earlier in this section, the Visa data also are not fully representative of U.S. consumers. Furthermore, we cannot verify the statistical integrity of the proprietary Visa data.

[6] See Gerdes and Walton (2002) for more details of the Fed check study. The Federal Reserve was well aware of the trends in its own check-clearing volume, which constituted roughly 40 percent of aggregate U.S. volume in the mid-1990s. See Benton, et al. for discussion on how payment survey data can be helpful in Federal Reserve payment policy.

[7] Of course, the development of any such analysis would have to undergo a complete cost-benefit analysis before any specific recommendations could be made.

hypotheses about consumer behavior and payment choice, Zinman emphasized some ways in which academic-style analyses of industry data could be used to inform pricing strategies. Leveraging his earlier research on consumer choice of debit versus credit (Zinman 2005), he highlighted the increase in debit card use and made some specific suggestions for better understanding the impact of price, self control, and other factors behind this trend. Finally, Zinman also promoted more use of the Visa Panel data at the individual level, rather than at the aggregate level, because he surmised that behavioral hypotheses could be tested better at that lower level of data.

Moore also focused her comments on the rise in debit card use reflected in the Visa Panel, and cited a number of other trends and developments that, from the industry perspective, are influencing the shift to debit cards. One key factor is the issue of acceptance. While acknowledging that consumer preferences are important, Moore argued that merchant acceptance of debit card payments, especially at mid-priced and quick-service restaurants, is a very important factor in the growth of debit card use. She also contended that it is important to segment the analysis of trends. Noting that only 41 percent of credit card users are non-revolvers (that is, do not carry over balances between months), Moore explained that only this fraction of credit card users may be in a position to switch to debit cards, which do not permit revolving debt because the payment is immediately debited from a checking or savings account. In addition, she questioned whether the debit card trend would continue in light of the superior consumer benefits offered by credit cards, such as float (the time gap between making a charge and being required to pay it before incurring interest cost), dispute and fraud resolution, and reward programs. Finally, Moore also suggested that the Visa Panel's relative lack of information about cash payments limits a full understanding of debit card use and other payment choices.

In response to these comments, Hampton provided some additional information.[8] She reported that Visa already does a lot of the behavioral modeling and hypothesis testing that Zinman advocated, although Hampton acknowledged that Visa probably only scratches the surface of what can be done. Some of this work was described by Tim Attinger (Visa) in the conference panel on loyalty and consumer choice (see Section 2.1). Hampton also informed the audience that longitudinal studies are hard to do well at the individual level because of the attrition and rotation out of the survey, and the difficulty of attracting and retaining certain demographic groups to participate in the survey. However, the individual-level longitudinal analysis Visa has done thus far shows that the increase in debit card use has primarily replaced the use of cash and checks, and only to a lesser extent the use of credit cards. Visa explicitly does not try to explore in the survey questionnaire why consumers make their choices because doing so can cause the participants to think about and to modify their behavior in ways that could skew the data.

1.2 What Consumer Payments Data Already Exist?

The general story told by the Visa Panel data—a shift from paper to plastic payments—is a tale that, using many other data sources on consumer behavior and the trends in payment choice, is being told throughout the payments industry. Although Visa's proprietary panel survey might be the most comprehensive existing study, its industry competitors have produced and maintained rival data sources that provide a wealth of complementary and additional information on payments behavior. Many of these rival data sources can be made available to the non-industry communities, albeit usually for a price or with caveats on usage and sharing. In addition to these industry sources, some public data sources are available from government and non-profit institutions.

[8] It should be noted that the Visa (2006) paper is a bit of an unusual document for the company. Because of the proprietary nature of their data and research, Visa was limited in the information it could provide in the paper. Hampton explained that her paper presentation at the conference was the first of its kind for her.

To underscore the breadth and depth of consumer payments data that actually is available, we assembled a relatively large panel for conferences of this type. Professor Lucia Dunn (Ohio State University), who has extensive experience using and developing consumer payments data, moderated the panel. To summarize the panel presentations efficiently, we first offer a list of institutional participants and a brief description of the data sources they discussed, followed by a summary of several broad themes raised during the session (details on the data sources can be found in Appendix I):

- *Moderator*–Dunn began by providing an inventory of available data sources with payments data not presented by the panelists.
- *Federal Reserve Board*–Robert Avery provided a whirlwind tour of a variety of consumer payments data available from the Federal Reserve Board.
- *U.S. Postal Service (USPS)*–Ashley Lyons described the USPS Household Diary Study.
- *Bank of America*—Margaret Morgan Weichert described, in very general terms, the "terabytes of data" owned and used by Bank of America.
- *TNS Financial Service Group*–Deborah Patrick provided additional information about the company's Consumer Card Research Program.
- *Global Concept*s–David Stewart described four types of research done by this payments system consulting firm that yield data and information about consumer payment behavior.
- *First Data Corporation*–Lisa Tidwell described the proprietary annual STAR Consumer Payments Usage Study, which is now in its 19th year of operation.
- *American Bankers Association (ABA)*–Jane Yao described the Study of Consumer Payment Preferences, which has been jointly conducted with Dove Consulting on a biennial basis since 1999.

The common themes and issues that emerged during the panel and subsequent audience discussion involved the difficulty of conducting consumer payment surveys and obtaining accurate data, a problem that poses informational challenges for both groups of payment experts

One crucial issue raised was the sampling methodology underlying the consumer payments data bases. Several panelists and audience members stressed that describing data as coming from a "representative sample" may not reflect the data's actual ability to accurately represent American consumers. Many data sources are stratified to match national U.S. Census demographic data after random sampling is implemented. But one panelist argued that "post-stratifying to the Current Population Survey data doesn't make the sample representative," and that telephone surveys are becoming non-random in today's society.

Another panelist cautioned data users to be aware of sample selection bias. The panel presentations included examples of intentional restrictions based on age, payment method adoption, account-holding, geographic location, and the passive exclusion of consumers who choose not to participate in surveys. A by-product of these concerns about sampling methodology centered on data precision. For example, Dunn noted that recent estimates of the average level of credit card debt among U.S. households ranged from $1,900 to $8,000.

Many panelists and conference participants emphasized the difficulty and costliness of conducting "good" surveys of consumer payment behavior. The general agreement on what constitutes a "good" survey includes: 1) truly representative, random sampling; 2) data on a wide range of consumer income, consumption, saving, wealth and other financial characteristics; 3) data on a wide range of payment methods, types, amounts, and locations; 4) data on actual consumer actions rather than self-reported actions (although consumer attitudes and perceptions are important too); and 5) high-frequency data collected over a long period of time on the same consumers (longitudinal panels). From this "wish list" of data characteristics, it is easy to see why there was a consensus that existing data bases fall short of this ideal, and why there was also a consensus on how expensive it would be to conduct such an ideal survey. The Federal Reserve Board's Survey of Consumer Finances (SCF), which Dunn termed "the gold standard," costs approximately $7 million, according to Avery. Yet as good as it is, even the SCF falls short on many of the ideals.

During the audience discussion, several participants inquired about the possibilities of getting access to the proprietary data, such as the individual transactions level data from the Visa Panel or Bank of America. Differences between the owners of propriety data and those who wanted access to this information quickly emerged. The two groups failed to agree on a common set of benefits and to initiate the next collaborative step. One participant noted that in Europe this issue would not arise because patent-like laws protect data bases for 10 years. But another participant wondered if there might be a role for a public institution, like the Federal Reserve, to serve as an intermediary who could bring the parties together.

1.3 What Consumer Payments Data Are Needed?

Extending the discussion on what payments data exist, this panel session attempted to make the case for collecting more data on consumer payments behavior and making the results available to the general public. To describe the potential benefits from having more consumer payments data and research, we invited five panelists who represent distinct perspectives in American society: private business, consumers, the federal government, the financial services industry, and the academic/research community. Moderator Scott Schuh (Federal Reserve Bank of Boston) urged the panelists to make their best case for why they needed these data, and how the benefits of having the data would offset the social costs of collecting this information.

Private Business

The perspective of private business was delivered by Pattie Allouise (Federal Reserve Bank of Boston), who represented the views of Washington Trust, a commercial bank in Rhode Island that sought help from the Boston Fed in managing its consumer demand for cash (paper currency and coins) on Block Island, a popular summer tourist destination, where Washington Trust is the only financial institution.[9] Each summer, Block Island experiences a large influx of tourists from the U.S. mainland who come to

[9] Allouise was part of a leadership development team at the Boston Fed that studied this problem in 2005.

shop and vacation, some bringing cash with them while others create a high demand for cash withdrawals from the island's ATMs. An important concern for the bank is high cash management costs, and achieving a high level of service to the island merchants that are the bank's customers. The daily influx of cash must be managed, and frequently shipped off the island by ferry, because the local Block Island bank branch does not need to carry such large inventories of currency.

The high costs of handling large volumes of cash motivated the bank to seek help in steering the tourists toward less costly payment methods, such as electronic payments, an issue very closely related to those raised in the Cash to Electronic Payments Panel described in Section 2.2. One earlier strategy pursued by Washington Trust, and other owners of ATMs, had been to raise cash withdrawal fees to between $3.50 and $5 per transaction, but this hike did not reduce cash usage sufficiently. Being aware of the Boston Fed's work on developing Eagle Cash, a stored value card for the U.S. military, and considering a similar solution for Block Island, the bank then turned to the Boston Fed for help. Allouise and a team at the Boston Fed surveyed island merchants regarding ways to increase electronic payments. The survey produced many interesting and encouraging preliminary results.

Although a very useful initial step, the merchant survey was far from a comprehensive assessment of the situation and ultimately did not resolve the commercial bank's cash management challenges on Block Island. Thus, from the perspective of a private business (commercial bank), there is a need for data and analytical research on the determinants of consumers' choice between cash and electronic payment methods – at least for purchases made in the kind of semi-closed environment of a vacation island destination. While some private businesses collect payment data for their own purposes (for instance, Visa), the vast majority of firms do not have sufficient resources to do this type of research.

Consumer Advocate

The AARP (formerly American Association of Retired Persons) is a well-known advocacy group for a large segment of consumers aged 50 years and older. Sharon

Hermanson (AARP Senior Policy Advisor) presented the financial management challenges – including payment choice – facing older American consumers. She summarized the situation as follows: "How people make payments is critical to their fiscal independence, both at and through retirement. And yet, we know so very little" about those payment choices. From the AARP's perspective, the choice of payment method is a linchpin in the entire life-cycle process of saving and financial management; thus it is relevant to consumers of all ages.

Hermanson observed that in many respects, today's senior citizens are very different from those of past generations. Emphasizing the impact of the revolution in finance and technology, especially with regard to consumer payment methods, Hermanson explained that these changes in socio-economic factors motivated the AARP to increase its understanding of its constituency's consumer payments behavior. Using a modified version of the Boston Fed's 2004 survey of Federal Reserve employees (Benton et al., 2007), the AARP conducted its survey, with a nationally representative sample of consumers, in the spring of 2006. Although the survey data had not been completely analyzed at the time of this conference, Hermanson reported that preliminary assessments of the results suggested that seniors may not be fully proficient at managing their money, including their payment choices. She hypothesized that consumers in general may have too many complex decisions to make, and this challenge may contribute to paralyzing behavior, or inaction, especially among today's seniors. Consequently, Hermanson called for more research and data to address these challenges.

Federal Government

Each year, the U.S. government makes almost one billion separate payments worth about $1.5 trillion to about 100 million payees. The federal agency primarily responsible for making most of these payments is the Financial Management Service (FMS) of the U.S. Treasury.[10] Ronda Kent (Senior Attorney), who works as a project

[10] FMS does not make military or U.S. Postal Service payments.

manager for the FMS's Electronic Fund Transfer (EFT) Strategy Division, provided the federal government's perspective on consumer payment behavior.

Explaining that the Treasury's main interest in understanding consumer payment behavior centers around cost savings, Kent reported that converting the 225 million payments still made by check to EFT would save $175 million. While the FMS would like to realize this cost saving, Kent said that although current federal law mandates EFT payments, the U.S. Treasury has adopted regulations that allow consumers the choice to opt out of the desired electronic payment alternatives.[11] Consequently, the FMS must resort to consumer education and persuasion to encourage the desired payment behavior.

Like the AARP, the FMS commissioned its own survey to learn what drives consumer payment behavior. Using the results, along with lessons from earlier pilot projects, the FMS began to develop products and campaigns to encourage electronic payments. Campaigns include a low-cost electronic transfer account (ETA) and "Go Direct," which encourages consumers to accept direct deposit. Kent is primarily working on developing a debit card program to facilitate Social Security payments—many of which go to consumers who do not have bank accounts. The FMS needs good data and research on consumer behavior and attitudes toward use of debit cards to develop an effective debit card program, especially with regard to pricing and functionality. But Kent complained that much of the data and information currently available is a few years old, and that this time lag is a serious liability in the rapidly changing world of consumer payments.

Financial Services Industry

[11] Later, in response to a question from the audience, Kent referred to the 1996 Debt Collection Improvement Act that mandated direct deposit of government payments. Although this Act was largely successful, some individuals objected to the mandate, in part because they did not have a bank account. The unbanked were exempt from the law from the beginning, and by 1999, in phase two of the law, Treasury made available low-cost accounts to the unbanked. Forcing consumers to receive electronic deposits continued to prompt some negative reactions. Thus, Treasury has allowed exceptions to the Act and turned to consumer education and persuasion. However, no one was ever denied benefits because they did not accept direct deposit.

Jeff Marquardt (Board of Governors of the Federal Reserve) and moderator Schuh offered complementary views from the perspective of the Federal Reserve System on the need for consumer payments data. The Fed plays at least three key roles that pertain to consumer payment behavior: 1) it provides payment services, such as the clearing of paper checks; 2) it regulates depository institutions, which provide payment services and also use payment services provided by the Fed; and 3) it promulgates consumer protection rules in select areas affecting the payments system (such as Regulation E, which covers certain types of electronic payments, and Regulation CC, which covers check payments). In his opening remarks, Schuh provided a diagram illustrating the industry's estimates of check clearing, both for the Fed and for the entire U.S. economy, which indicated a significant decline starting at least as early as 1996 (see the Visa presentation, Section 1.1).

Marquardt's first recommendation for why more data are needed on consumer payment behavior focused on supply-side efficiency. Appealing to Schuh's illustration, Marquardt noted that the decline in check volume provides a clear example of why it is vital for the Federal Reserve to choose the right infrastructure mix, such as the capital and labor associated with check clearing operations, for the prevailing conditions in the payments industry market. Ultimately, if this infrastructure is improperly allocated, the costs of reallocation will be borne by consumers. Hence, Marquardt felt that it is essential to get an accurate estimate and a better understanding of the most basic aggregate payments trends. Arguing that it is important to track innovations in payment services better (which is currently being done to some extent through qualitative information and industry conferences), Marquardt contended that this monitoring needs to be conducted in a more systematic and quantitative manner.

Marquardt also made a pitch for several ways that the demand-side efficiency of consumer payments could be improved with better information. One example he cited was to disaggregate the data to better understand the different types of payment transactions being used. Another example was doing "what if?" studies, meaning experiments that attempt to measure how people would react to changes in their

payments environment, as was done in the Borzekowski, Kiser, and Ahmed paper (Section 4.1). Marquardt said he recognized the difficulties with designing and interpreting such experiments, but felt these were important to sorting out consumer payment choices.

The issues of convenience and privacy were also important. Marquardt surmised that the central issue for consumers is the joint decision of consumption and payment choice because when they shop, convenience and time are critical factors to them. He hypothesized that convenience and time are more important to consumers, at the margin, than the cost of the payment method (which for many is essentially zero at the margin). In Marquardt's view, untangling the various aspects of convenience in a convincing manner remains to be done, so data and research on this issue would be helpful. Likewise, he felt that we do not have a solid understanding of consumers' demand for privacy and how that preference affects the payment choice. The provision of (essentially) zero liability by credit cards is valued by consumers, he observed, but this policy also raises questions about incentive effects and payment system risk that need to be answered with more data and research.

Academic/Research Perspective

Martha Starr (American University) provided a researcher's perspective. Starr has worked with the Survey of Consumer Finances and has published research studies on consumer financial behavior, including payment decisions, as well as in a number of other areas of economics. One of her special focuses has been on consumer decision-making processes.

Echoing the view of Schreft (2006) that traditional academic theories of consumer behavior tend to abstract from the decision to choose a payment method, Starr maintained that in studying human behavior it is important to determine whether consumers make "rational" decisions—meaning decisions that are fully informed and that result from a well-planned optimization of opportunities. If irrational decisions are important to actual behavior, she felt that it is important to distinguish between non-rational ideas that are consistent with the data and those that are not. Furthermore, Starr

suggested that consumers might be better described as having made decisions through learning from experience, education by institutions such as banks, or by emulating other consumers rather than through a carefully calculated, fully informed independent decision process. This sentiment was echoed by Annamaria Lusardi in her comments on Zinman's paper (Section 3.3).

Better information about consumer payment behavior has the potential to offer great benefit to society, according to Starr. She noted that theories of consumer behavior form the underpinnings of monetary, fiscal, and financial policies, so if the theories are wrong so too will be the policies. The nature of consumer behavior may also have economy-wide effects. For example, Starr suggested that if people use a new payment medium, such as debit cards, to control spending, then the acceleration of innovations in payment methods could conceivably affect macroeconomic conditions, such as the personal savings rate.

Starr reiterated the earlier panel's concerns about sample representation, and suggested that combining data collection efforts might produce a superior product. She advocated mixed methods of data collection, such as merging bank records on individual transactions with survey data conducted with the same individuals. One-time, proprietary surveys often provide only point-in-time estimates and do not offer enough information to enhance our understanding of the dynamics of payment behavior and how individual choices change over time. Yet Starr observed that transactions-level data, such as from Bank of America, have their own set of drawbacks. Although these data represent actual (rather than reported) behavior and thus are more accurate, they lack information about individual consumers and their attitudes that is typically found in surveys. In addition, she noted that it is hard to aggregate the data from the account-holder to the economic unit, like a household. For these reasons, Starr believed that mixed methods are critical to collecting the information needed to make fully informed choices and policies about consumer payment methods.

Opening the discussion portion of the session, conference co-organizer Joanna Stavins (Boston Fed) asked Marquardt what he thought were the most important data to

collect. Marquardt reiterated his position that it is most important to get the "simple" things right, like aggregate trends for each payment method used, and to disaggregate the data on payments into amounts, locations, consumer characteristics, and the like. He also suggested that it is important to look more carefully at businesses because their use of paper checks has been much more inert than among consumers. Marquardt advocated for a broader sampling of business checking as the most immediate short-run data need. An audience member corroborated this assessment by noting that estimates of aggregate U.S. check volume in the 1990s and 2000s were correct for consumer volume, but were erroneous on the business-to-business check volume, primarily because the organizations collecting data tend to survey consumers more extensively than businesses. One participant wondered whether it is possible to get complete and accurate counts of U.S. businesses, noting that the range of private estimates varied from low to high by more than 50 percent. Schuh suggested that the most reliable source for businesses is the Standard Statistical Establishment List (SSEL) maintained by the Internal Revenue Service and the Census Bureau.

Another audience member mentioned that the Federal Reserve sponsored a consumer transaction survey about 20 years ago, and asked the non-government panelists whether they thought it should be reinstated. Starr agreed that this would be useful, but cautioned again that the methodology used in such surveys may contain measurement error because, for example, rather than having their behavior observed directly, people are asked to self-report from memory how many checks they wrote. She argued that these crucial kinds of questions are better answered in conjunction with using financial institution records to verify the self-reported responses.

Much discussion was devoted to the need for collecting more and better data to distinguish between incomplete information versus irrational consumer behavior. Both Hermanson and an audience member asked to what extent consumers' decisions are being made based on information that is erroneous or incomplete? For instance, one participant suggested that the household is the best unit for collecting payments data, rather than the individual person, because individual-level data is incomplete without

payments behavior data for the rest of the household. Another participant asked Starr how to test behavioral hypotheses about consumer payment choices and what data are needed to do so. Starr responded that data are needed to distinguish between consumers' lack of information (such as, how much money they have in their checking accounts, or the balances on and the terms of their credit card accounts) versus behavioral explanations like mental accounting and self-control strategies. Participants generally agreed that eliminating these kinds of measurement deficiencies is critical to achieving a better understanding of consumer payments behavior.

Moderator Schuh asked the panelists to conclude the session by identifying the one most important benefit to society from having more and better consumer payments data. Allouise saw greater efficiency in business firms and other organizations. Kent suggested cost savings of public money, and more safety and security for individual finances. Hermanson predicted increased retirement saving and financial independence, especially for seniors. Marquardt pointed to two issues for Fed policy and operations: 1) an incredible decision-making benefit during a transitional time in which "we don't know what we don't know"; and 2) in the midst of a major transformation in the retail payments system—during which firms are making new decisions about how to accept payments—gaining a better understanding of how the payments system is going to evolve, and what is the optimal payment system. Finally, Starr advocated the reduced financial system risks that, in an era where financial innovations and options are proliferating, would result from better projections of how consumers evaluate and make decisions.

2. Panels on Consumer Payment Card Choice

2.1 Rewarding Loyalty and Consumer Choice

Credit and debit card issuers have become more aggressive in offering rewards programs. The number of consumer credit cards with accompanying rewards continues to increase, and the reward offers are getting to be more extensive. Debit card reward programs, while still relatively rare, are also increasing rapidly. As discussed earlier, the

Visa Payment Panel Study showed that consumers' use of reward cards for general bill payments is growing rapidly. A 2005 study by Dove Consulting showed that the number of consumers who had debit cards with reward programs increased by 60 percent over a two-year period, from 8 percent in 2003 to 13 percent in 2005. There are also ongoing developments in merchant-funded and enterprise-wide rewards programs.[12]

This panel session was assembled to gain a better understanding of how consumers respond to payment method incentives and whether loyalty and reward programs are optimal for society. Moderated by Tony Hayes (Dove Consulting), the panel addressed these issues from the perspectives of a payment card institution, represented by Tim Attinger (Visa USA); an economist, represented by Fumiko Hayashi (Federal Reserve Bank of Kansas City); a financial services institution, represented by William Koleszar (Citizens Financial Group); and a rewards program provider offering merchant-funded rewards, represented by Jonathan Silver (Affinity Solutions).

To set the stage for a research presentation by Hayashi and the ensuing panel discussion, Hayes briefly discussed how rewards programs work, noting that the most common rewards program is a card issuer program, where a person earns points every time the card is used and then can redeem the points for rewards. A key metric in rewards programs is the cost per point, which is based on the earn rate (the most common rate being one point earned for each dollar spent) and the redeem rate (for instance, it might take 2,000 points to obtain a $5 gift card).

Hayes noted that in a credit card program the cost per point is typically about one percent (or 100 basis points), while in a debit card program the cost of points is typically about a quarter of one percent (or 25 basis points). For card issuers, the decision whether or not to offer rewards entails a balancing act between the additional costs of offering rewards on all card transactions (those that would have occurred anyway plus new transactions resulting from the rewards program) versus the

[12] An enterprise-wide program provides rewards on a range of banking activities, not just credit or debit card payments, to encourage customers to consolidate all of their banking activity at the institution.

additional revenue gained from the incremental transactions—in other words, calculating how many additional transactions are needed to offset the costs of providing rewards for all the transactions.

Hayashi highlighted the main findings in a paper she co-authored with Andrew Ching, "Payment Card Rewards Programs and Consumer Payment Choice." Ching and Hayashi used consumer survey data from the ABA/Dove 2005–2006 "Study of Consumer Payment Preference" for their research. The sample data of nearly 2,000 observations reflects relatively highly educated, high income consumers, as compared to the U.S. population as a whole. Although not nationally representative, the data contain information about consumer payments, including whether survey participants receive rewards on credit or debit cards, the most frequently used payment method by retail type, and consumers' perceptions of each payment method.

The authors found that 36 percent of the consumers sampled receive rewards from either credit cards, debit cards, or both. The majority receive rewards on credit cards (88 percent), while 37 percent receive rewards on debit cards, and 25 percent receive rewards on both types of cards. After controlling for consumer characteristics and perceptions, the authors found that credit card rewards, signature debit card rewards, and maintaining a credit card balance have a significant effect on consumer payment choice—but PIN debit rewards do not. Some of their key research findings include:

- Reward programs and payment choices are strongly correlated. Credit card rewards and debit card rewards are positively correlated with the respective use of each card category
- The predicted possibility of choosing a certain payment method varies by consumer and by the type of retailer (such as grocery stores, department stores, fast food restaurants, discount stores, drug stores).
- The incentive effect associated with accumulating credit card rewards seems to be greater than the incentives for collecting debit card rewards. Credit card reward programs also influence consumers who carry credit card balances.

Among those who maintain a credit card balance, consumers with a credit card tied to a reward program more credit cards more often than those consumers without a reward-based card.

- Reward card transactions replace paper-based transactions in addition to other non-reward card transactions.

While it is accepted that financial institutions and merchants are using relationship-based rewards to encourage customers to move towards more electronic payments, there was some disagreement among the panelists regarding the extent to which reward programs have provided strong incentives for electronic payments adoption.

The panelists representing the card issuer and the bank felt strongly that rewards are very important in influencing consumer behavior. Attinger believes that rewards have provided a strong incentive for merchants and financial institutions to partner and give consumers benefits for using payment options that ultimately benefit them both. Koleszar agreed that reward programs can, to some degree, influence consumers' transaction choice, and noted that banks will be focusing even more on encouraging consumers to use electronic payments. Citizens Bank has been providing two points instead of one point for every dollar spent on contactless[13] debit card payments to encourage customers to become familiar with and adopt the technology. Citizens Bank earns about four times as much from interchange fees on signature card transactions than it does on PIN debit transactions, so there is an economic incentive for the bank to induce customers to pay with signature debit cards.

Silver believes that rewards are less important in driving people to change payment methods, and noted that consumers' decisions may be more about choosing one institution over another than about moving from one payment method to another.

[13] A contactless card is a credit card or debit card with an RFID (radio frequency identification device) chip embedded in it, also known as Near Field Communication (NFC) technology. The card involves the use of radio waves to transmit the transaction information, and eliminates the need for physical contact between the card and the card reader. The card needs to be within close proximity (10 cm.) to the reader for the transaction to register. This payment method is used for small dollar transactions, usually $25 or less.

Hayashi questioned whether reward programs increase the consumer's use of credit or debit card payments, or if it is the other way around. The panelists generally agreed that generational differences among consumers will play a much bigger role than reward programs in fostering the migration away from checks and credit cards to debit card payments.

Silver suggested that there are three main reward categories associated with credit and debit cards that influence consumer behavior: cash, points, and miles. The panelists discussed ways to engage consumers in rewards programs, and how the rate and speed at which consumers acquire points and redemption times might affect consumer behavior. Citizens Bank tries to get people a debit card reward about every twelve months, noting that if customers can earn a $75 benefit in a twelve-to-sixteen month period, it engages them enough to influence behavior. Citizens has also started to provide more substantial rewards, such as allowing rewards customers to accumulate and redeem points to get additional interest on a certificate of deposit. To help them achieve redemption status sooner, some financial institutions provide extra points when customers accept a debit card or use it for the first time.

The panelists identified key metrics associated with offering rewards programs. For example, the Citizens' reward programs measure: 1) the penetration rate, meaning what percentage of customers with checking accounts have a debit card; 2) the activation rate, meaning what percentage of customers will use the cards they already have; and 3) the number of transactions, meaning how much do customers increase their transactions as a result of the rewards program. Silver discussed branding attributes as another metric associated with rewards programs, noting that there is some question of whether points are really changing behavior beyond that segment of people who always engage in points (in other words, would someone choose Bank A over Bank B for a quarter of a percent difference, or about 15 to 20 dollars?). Citibank's "Thank You" program is an example of the branding attributes of rewards programs, as this program is now embedded in and part of the Citibank brand. Rather than providing rewards just on credit or debit card payments, Citibank's "Thank You" program takes an enterprise-

wide approach to rewards to help the bank develop a fuller and "stickier" relationship with the customer.

The panel discussed the network effect merchants and financial institutions obtain through rewards programs. For example, the positive externality of a financial institution having multiple accounts with a consumer, and rewarding those multiple accounts, allows the institution to segment the customer into a behavioral profile that can be used to motivate him/her in a way that makes money for the institution.[14] Similarly, almost all American households receive rewards from merchants through the use of store discount cards.

As an example, Attinger described the Visa Incentive Network, which has 60 million or so rewards credit accounts, a database of those consumers, their contact information, and some behavioral characteristics provided by financial institutions to enable them to profile consumers. Because Visa has this consumer information and tracks the transaction data off the consumers' rewards programs, they can compile a program that allows a merchant to do targeted direct marketing campaigns to different consumer segments, rather than simply using a mass marketing approach. Attinger noted that in these targeted programs they see average response rates of three to ten percent.

The panel also discussed bank loyalty programs involving merchant-funded rewards. While merchants like rewards programs and believe these can increase incremental visits to retail outlets, some merchants are concerned that through higher exchange fees they are funding a rewards program that may build loyalty to the bank rather than to the merchant. The panel generally agreed that the question for merchants is whether they are getting sufficiently more customers and more transactions than they otherwise would have to justify the additional cost for sponsoring rewards transactions.

On the questions of 1) customer loyalty to rewards programs, and 2) whether increased competition could result in a lot of switching between programs, the panelists

[14] See earlier discussion of this concept by Hampton and Zinman in the conference session on the Visa Payment Panel Survey.

seemed to agree that while rewards participants may have multiple cards, they are likely to have a predominant loyalty towards a program for which they accumulate the majority of their reward points. Many rewards programs are designed specifically to encourage the consumer to consolidate activity by providing incremental benefits the more the program is used.

Noting the complexity and breadth of payment choices, an audience member speculated whether consumers are truly able to make good decisions when confronted with so many choices. The results of an informal survey[15] of the audience's payment decisions suggested that many consumers do not know the actual cost of the payment choices they are making. This lack of awareness may be because the costs are directly incurred by the merchant rather than by the consumer. Also, a majority of respondents indicated that when choosing a reward program, the type of reward, rather than the cost of incurring the reward, was most important. However, when asked what they would do if they had to pay a one-percent fee on every debit card transaction, 75 percent of respondents indicated that they would either totally eliminate debit use or they would reduce it by a significant amount. The responses to the debit card question suggest a very large elasticity of demand, and that if consumers faced the true price of their payment methods at the point-of-purchase, they might make very different choices.

In conclusion, the panel indicated that in rewards programs, the current trend of moving from "spend and get" transactional approaches to more relationship-based programs, focused on customer segments and network effects, is going to continue. This trend may promote a deeper engagement in rewards programs by consumers as well as by program providers, who use loyalty programs to solve the business problems of acquiring and retaining customers, and motivating the consumer behavior that is most profitable for the organization. Ultimately, merchants and financial institutions are involved in rewards programs to make money. The panelists predict ongoing changes in

[15] During the conference, attendees participated in an interactive survey, developed by the Boston Fed, that included questions related to the central issues raised by the conference's papers regarding consumer payment behaviors.

loyalty and rewards programs, increased use of lower-cost electronic transaction vehicles, and a lot more innovation around cross-product or cross-segment rewards.

2.2 Cash to Electronic Payments

The final conference panel featured experts who discussed the potential substitution of electronic payments, particularly debit and credit card payments, for cash transactions in the United States. The panel was moderated by Michael Kasavana (Michigan State University) and included Mark Friedman (Peppercoin), Gregory Garback (Washington DC Metropolitan Area Transit Authority, WMATA), Tim Hammonds (Food Marketing Institute, FMI), and Anne Layne-Farrar (LECG Corporation).

While there was lively debate during the panel discussion, a consensus emerged: payment cards, especially debit cards, are displacing cash in low-value transactions in the United States. This rate of displacement is expected to accelerate with dynamic factors which influence payments behavior: these factors include demographic shifts (for example, the aging of Generations X and Y) and technological advances (such as the broader use of contactless payment cards). The panelists predicted that the substitution of payment cards for cash would be uneven, penetrating industry segments and population groups at varying rates. One potential barrier to the growing acceptance of electronic payments cards proved to be a charged topic: the current regime of payment card fees and the burden these fees impose on merchants. Panelists urged that without significant change, the desirable move from paper-based payments to electronic ones may be hindered, and concluded that cash will remain a mainstream payments instrument for the foreseeable future.

Kasavana began the session by reviewing the payments landscape of recent years: there has been rapid and sustained growth in debit card usage for a decade; continued growth of credit card transactions, albeit at a much slower pace than debit; the emergence of stored-value cards and online bill payments as important alternatives in specific domains; and steady declines in the use of checks by consumers and

businesses. Kasavana noted a key difference in the quality and quantity of data available on consumer payments behavior: data for cards and checks are more readily accessible, as each card and check transaction flows through the financial payments system to move from the merchant to the consumer's bank. In the case of cash, a single banknote or coin can be used multiple times without moving into the banking system.

The lack of solid data on cash transactions suggests that no one is certain how many consumer payments are made using cash, the amount of those payments, or the relative importance of cash in consumers' wallets. However, according to Kasavana and Friedman, cash remains the nation's dominant payment instrument in transaction terms. Indeed, studies by Mastercard, Ipsos, Dove, and Mercator indicate that from the perspective of consumers, cash possesses unique advantages: they view it as a payment method that is easy-to-use, fast, fee-free, anonymous, appropriate for small purchases, and a useful budgeting tool. For transactions of $5 or less (also known as micro- or small-value payments), it is estimated that there are $1.3 trillion in cash transactions per year—a significant market potential for card or electronic substitution.

Several consumer-oriented studies already suggest a diminishing use of cash in recent years. One-half of consumers indicate they are carrying less cash than in the past. Two-thirds say they ordinarily carry no more than $20 at any one time, and are using cash less than they did five years ago. The shift of substantial volumes of consumer purchases to the Internet is also indicative of a shift from paper instruments (cash and checks) to card payments.

To understand changing U.S. consumer payment practices and preferences, an annual study[16] conducted by Peppercoin, in collaboration with market research firm Ipsos-Insight, focuses on small value payments and the substitution of cards for cash purchases. The research indicates that American consumers—across all age brackets, income levels, and educational backgrounds—are showing an increasing willingness to use payment cards for small-value transactions, both on the Internet and at brick-and-mortar stores. To illustrate this growing shift, in 2003 the initial survey asked whether

[16] This research program has involved five telephone surveys over the last four years.

respondents had ever used a card for an online transaction of $2 or less, and two percent of the sample responded in the affirmative. When that question was repeated in the 2005 survey, 10 percent of the sample said yes. The individual surveys showed similar findings for low-value purchases at physical stores.

Kasavana noted that for electronic payments to supplant cash transactions, consumers and merchants alike must be convinced that cards are superior to cash. In the absence of securing safety and a critical mass of users, bankers and merchants are reluctant to invest in these new technologies (such as contactless cards, card payment aggregation methods, and cell phone based payments). In contrast, consumers are not willing to adopt new payment mechanisms without obvious user benefits. For electronic payment methods to succeed, all of the participants–consumers, merchants and financial intermediaries–must be confident that the newer payment instruments are safe, reliable and secure.

The trends in and challenges of migrating to electronic payment methods were supported by three different industry examples: the vending machine sector, grocery stores, and mass transit. The panel discussion suggested that substituting cards for cash will be uneven by industry segment and population group. In the grocery industry, where the average sale is above $25, a significant shift away from cash has already occurred, except for low-value sales. In the vending industry and in parts of the mass transit industry (meaning buses and subways, as opposed to light rail), sectors where the average sale is well below $25, Kasavana and Garback indicated that cash continues to play a dominant role. Friedman said that joint studies undertaken by Peppercoin and Ipsos-Insight show that younger generations are much more likely than older ones to substitute cards for cash, which suggests a more lasting migration away from cash is likely in the future as those generations age.

The U.S. vending machine industry has received little focused attention from social scientists and market researchers studying consumer payments. Kasavana posited that the vending machine sector may have been neglected by researchers because it is dominated by low-value payments, almost entirely comprised of

transactions less than $5, and where virtually 100 percent of payments are traditionally made via currency and coin. But with gross annual revenues of $20 billion in the United States, vending sales may comprise the single largest cash-intensive sector in the American economy. For this reason, Kasavana argued that we ought to know more about the vending industry and its prospects for cash-to-card substitution.

As an example, Kasavana put forth one study conducted by the vendor, USA Technologies. [17] The study illustrates that consumers are very willing to use cards to make purchases at vending machines –transactions proven to produce an additional lift in sales (that is, consumers are willing to spend more at the vending machine when they can use a card than when they are confined to using the cash they have on hand).[18] However, one barrier to cashless vending is the capital investment needed to upgrade the current low-technology fleet of vending machines across the country. So the immediate to medium-term prospects for a wide implementation of cashless transactions in the vending industry are uncertain.

Gregory Garback (WMATA) discussed the rapidly changing payments landscape in the mass transit industry. This industry has moved from payment systems that 20 years ago exclusively took cash or tokens, to accepting credit and debit cards (most often at ticket machines in stations) for the vast majority of rides, in tandem with the implementation of *closed-loop* card systems. Closed-loop systems use proprietary cards which, as a general rule, can only be used within one enterprise, such as a particular public transit system. With the wider availability of contactless debit and credit instruments, mass transit may be reaching a crossroads at which the merger of closed-loop systems with the ordinary card payment networks bring associated benefits for the transit operators and consumers.

Handling cash payments is very costly for the mass transit industry, where cash is the largest single tender type. Garback commented that New York City's transit

[17] This study uses individual transaction data from 500 vending machines equipped with USA Technologies' e-Port automation product, and encompasses 600,000 purchases worth $1.2 million

[18] Depending on the type of site where a card-equipped vending machine is located, the lift varies from about 20 percent to over 100 percent in sales.

system (which alone represents 25 percent of all daily rides in the country) collects $2.1 billion in cash each year, compared to $750 million from cards. The equipment, controls and procedures, staff training and operations necessary to process this cash, in the New York City system and elsewhere, is enormous.[19] For example, the secure four-car money trains that WMATA runs around the network several times per day to collect cash cost about $2 million each, and WMATA employs 100 people to count cash. In the mass transit industry, accepting and processing cash involves substantial incremental costs that may not be present in other business models. Garback believes that in mass transit, substituting incremental cash processing costs for card fees has a positive impact on the bottom line because the incremental cost of taking cards may be lower than the incremental cost of taking cash.

Garback noted that when card acceptance was deployed in WMATA, card usage grew rapidly, but early users were content to buy fares $5 at a time. As riders became comfortable with the technology, they were increasingly willing to recharge their fare cards at the rate of $50 to $100 at a time. This increase served to reduce the per-dollar fee load charged by the card associations, and to generate positive income-earning bank balances for the transit system. Garback also commented that the fare cards are widely used across neighborhoods and income classes in Washington, DC.

For the retail grocery sector, Hammonds (FMI) argued that the current structure of interchange fees is an obstacle to wider merchant acceptance of electronic payments. FMI studies of the grocery industry show that today, the relative cost of accepting a cash payment versus a card payment favors cash. He noted that merchants pay bulk deposit fees to their banks for the cost of processing cash deposits. Because these fees have no relationship to the number of cash tenders the merchant receives in a day, these bulk deposit fees represent a fixed cost and impose no marginal cost. In contrast, Hammonds said, individual fees are imposed on each credit or debit card transaction, imparting a

[19] In the Washington, DC transit system, each ticket vending machine costs $80,000 to $100,000. Its central cash processing operation employs 100 staff.

marginal cost to the merchant. Thus, abstracting from other costs, card fees pose a higher marginal cost to merchants for each transaction. [20]

Although the card associations have created new fee structures for low-dollar transactions, Hammonds said these fees have not been sufficient to make accepting a card attractive for a very low-value transaction. He attributed the occasional violation of card association rules at small businesses—which sometimes post notices that they will not accept card payments for purchases less than a specified amount like $5 or $10— to the card association fee structure. However, Hammonds said that consumers do not face the same economic incentives to use payment instruments that are attractive to merchants because the card association rules prohibit merchants from charging different prices–if a merchant accepts cards, it must take these for any transaction, regardless of size. Larger retail enterprises, like grocery store chains, have been unwilling to violate this rule, and are therefore faced with narrowing their already low margins by taking cards for sales of an individual candy bar or water bottle. Hammonds believes that for each transaction, card association fees result in losses for supermarkets.

To remain competitive and satisfy their own customers, Hammonds predicted that grocers will continue to offer the full array of payment options: cash, check and cards. As a consequence, the grocery industry will share in the shifts away from cash and checks, and toward cards. But to mitigate the impact these trends will have on their payment processing costs and, therefore, on their profit margins, the grocery industry will continue to lobby for a more even-handed approach to fees and rules associated with accepting payment cards.

Anne Layne-Farrar commented that the cost picture for accepting different payment tender types may not be the same for the economy as a whole as it is for an individual merchant. From a societal standpoint, it may be less costly to promote the use of cards over cash, even if the current fee structure results in a higher cost for some merchants. The audience and the panelists pointed out that ongoing litigation between

[20] Of course, merchants face variable labor or other costs of handling payments, and those associated with cash may differ from those associated with payment cards.

merchants and the card associations, and the moves by MasterCard and Visa to become publicly-traded companies, may result in improvements in the balance of market power.

Garback added that the major mass transit operators and their trade group, the American Public Transit Association, are concerned about card fees as well. [21] They have closely followed antitrust litigation involving the card associations, but have not joined the plaintiffs. Nevertheless, mass transit operators hope to benefit from any change in the fee structure that might result from the litigation. The mass transit operators have engaged in direct discussions with the card associations, with a particular focus on lowering fees for the kind of very small value transactions that characterize the fare structure of most transit systems.

In response to the vigorous discussion on merchant fees, Friedman (Peppercoin) cited the solution his company has developed to help merchants take cards for small-value payments in a consistently profitable manner. Peppercoin has developed an aggregation technology that, by allowing merchants to hold and then combine card transactions transmitted via the card networks, lowers transaction fees. The company also offers loyalty programs that help merchants generate repeat business and encourage higher spending on each visit. Friedman commented that not all population groups are the same in their willingness to use cards, and to use them repeatedly for small-value transactions. There is anecdotal and survey evidence to show, for instance, that teenagers and college students do not carry checkbooks and only carry small amounts of cash, potentially using their cards several times per day at ATMs, convenience stores, and the cafeteria. This young sub-population has substituted their cards for cash, and they may, in the future, rarely use cash and never write a check. Friedman argued that loyalty and aggregation solutions turn out to be ideal for addressing the needs of merchants serving this population segment, and, in general, those merchants that accept small value payments.

[20] He estimated that the top 10 mass transit systems represent 55 percent of daily rides in the United States.

The subsequent discussion period generated many interesting comments on the technological innovations in payment cards, such as contactless cards, biometric cards, and multi-use cards (for example, identity and payment cards). Several audience members suggested that although many of these new technologies are growing rapidly, they are so new and unfamiliar to consumers that it is difficult to determine their future market success with great accuracy or confidence. Research cited suggests that consumers may not be fully aware of the functionality and capability of these innovative new cards. Another person countered that with increased knowledge of new payment methods, consumers also become concerned about privacy issues associated with these cards. Thus, the pace and adoption of emerging payment options remain uncertain in the short run and medium run, but the outlook for the long run is optimistic.

3. Academic Workshop Research Papers

The first day of the conference was an academic workshop with five research paper presentations. The full text of these papers is available on the conference website.

While the papers, some empirical and some theoretical, cover a variety of payments-related topics, all reflect the common theme of consumer payments behavior. Some papers were selected because of the innovative data used, such as a survey of how Finnish consumers choose payment methods, and others because of the models that could be tested with the help of high-quality data that hopefully will be collected in the near future. Three of the five papers presented on the first day studied credit card usage by consumers, a topic with many issues that continue to puzzle researchers. Why do consumers borrow on their credit cards while keeping money in a checking account that pays much less than the interest rate charged on their debt? Why do consumers believe that they will repay their balance in full but end up not doing so? These and other questions were addressed in the papers summarized below.

3.1 "Credit Card Competition and Naïve Hyperbolic Consumers" by Elif Incekara

Incekara (Pennsylvania State University) provided a theoretical model of naïve quasi-hyperbolic consumers and credit card companies. Consumers are normally considered to be relatively patient in the future, but impatient when the future becomes the present. Dynamically inconsistent time preferences allow consumers to apply different discount factors between today and tomorrow and between tomorrow and the next day. This time-inconsistency has interesting implications for the credit card market.

Formalizing previous claims by Ausubel (1991), Incekara showed that credit card companies earn supranormal profits by exploiting consumers' naïveté. She modeled naïve consumers as people who do not realize that they will become impatient when the future becomes the present. Incekara shows that the time inconsistency problem, in tandem with a grace period for deferred credit card payments, leads consumers to underestimate the amount of their future borrowing costs. At the time when the initial borrowing occurs, consumers value their current consumption much more highly than future consumption, and believe that they will happily forego spending money later in order to pay back the money they borrowed today. This miscalculation has serious effects—consumers believe that they will be convenience users, meaning they will pay the credit card balance in full, but they end up with revolving credit card debt (that is, carrying debt beyond the end of the monthly pay cycle). Incekara goes on to show that in this setting, consumers are indifferent to the interest rates offered on credit cards. This indifference takes competitive pressure away from credit card interest rates (the price associated with credit-card borrowing costs), and allows credit card companies to earn positive profits.

The model presented in the paper is theoretical, but it could be tested with good survey information. Credit card holders could be asked what type of credit card plan they selected and whether they carry a balance on their card. This information would enable addressing the question of whether consumers act according to their prior beliefs. Incekara finds a behavioral justification for consumers' seemingly irrational behavior. In contrast, Zinman (see 3.3 below) shows that credit card borrowing puzzles can be explained with standard "rational" explanations. In Fusaro (see 4.5), consumers have

self-control problems, a result that is consistent with Incekara's model, although Fusaro's paper finds cost-based justification for consumers' actions and not the behavioral justification shown here. With good survey data, each of those theoretical hypotheses could be tested in order to gauge actual consumer payments behavior.

3.2 "Determinants of Borrowing Limits on Credit Cards" by Shubhasis Dey and Gene Mumy

Incekara explained how it may be possible for the credit card industry to earn supranormal profits, an outcome that typically does not occur in a perfectly competitive market. Alternatively, Dey (Bank of Canada) and Mumy (Ohio State University) suggest that the credit card market could be imperfect because information asymmetries can lead to misallocations of credit. In the authors' framework, consumers differ in their levels of risk and wealth. Banks offer credit contracts based on both consumer risk and wealth, as both attributes affect borrowing and repayment abilities. However, individuals' wealth is not observed by banks. Credit contracts are, therefore, offered based on individual risk and an estimate of individual wealth.

Banks evaluate how risky their loan applicants are, and then offer higher levels of credit and better credit terms to lower-risk individuals. However, banks do not ask about their applicants' overall wealth. Wealthier individuals could potentially produce more profitable credit contracts, even though, based on the information collected by the banks, they might appear to be more risky and therefore get offered lower levels of credit. Thus the presence of asymmetric wealth information leads to misallocations—credit is not always allocated where it would be most profitable or efficient.

Using the data from the Survey of Consumer Finances (SCF), the authors test whether individual wealth is an important determinant of borrowing behavior as evinced by the borrowing limits offered on credit cards. They find that lower borrower quality (as measured by banks) is associated with higher levels of borrowing, and higher wealth is associated with lower levels of borrowing. These empirical findings support

their initial assumption that broader measures of wealth should be taken into account when setting loan limits.

The paper was discussed by Paul Willen (economist, Federal Reserve Bank of Boston). Willen remarked that although the paper mentions information asymmetry between the bank and the borrower, it is not at all clear what type of asymmetry the authors have in mind. The asymmetry could be caused by adverse selection, by moral hazard, or by both. Although the paper presents some arguments in support of adverse selection, its conclusions are not consistent with that assumption. Willen also pointed out that although more detailed wealth data could potentially help prevent the type of adverse selection problem described in the paper, the SCF data are publicly available, and thus if the banks found that the additional information from the SCF raises their profits, they would use this source.

3.3 "Piecing Together a Portfolio Puzzle: Accounting for Why Households Borrow High and Lend Low" by Jonathan Zinman

In this study Zinman (Dartmouth College) addresses yet another puzzle related to credit card borrowing. Many consumers seem to be borrowing at a high interest rate on their credit cards while simultaneously holding low yield liquid assets such as checking or savings accounts. This behavioral phenomenon, sometimes referred to as "Borrow High–Lend Low" (BHLL), implies that consumers make mistakes, foregoing arbitrage that could reach $100 per year per household. In the past, self-control models have been used to explain this apparently inconsistent behavior. In such models, consumers do not intend to borrow on their credit cards, but lack self-control to stop themselves from doing so. Taking a different approach, Zinman suggests that a more careful and comprehensive evaluation of the gap between a household's cost of borrowing and lending reduces the estimated foregone arbitrage and mitigates the apparent BHLL puzzle.

Zinman shows that households can make only a subset of their required purchases with credit cards, so there is a transaction demand associated with holding

low-yield liquid assets. Households also hold liquid assets as a precaution in case of sudden expenses, which reflects a deliberate portfolio choice. These liquidity and precautionary motives increase the consumer's value gained from lending low, thus reducing the costs associated with BHLL losses. Finally, the potential gap between borrowing high and lending low is reduced for households that are planning to default on their credit card debt. Those households have no intention of paying their credit card debt, so their credit card borrowing is not a true reflection of their actual liability. By accounting for liquidity, precautionary portfolio choices, and strategic default motives, Zinman shows that only 2 percent of credit card holders actually forego more than $10 per month. In Zinman's view, BHLL is not a puzzle, but rather is a rational choice consistent with standard theories of intertemporal choice.

Like Dey and Mumy, Zinman uses data from the Survey of Consumer Finances (SCF). While generally recognized as a well-designed representative survey of consumers, the SCF asks only a limited number of questions pertaining to payment behavior. Zinman's paper poses an important question about consumer payment behavior that would be best addressed with more detailed survey data. Instead of guessing why consumers borrow on credit cards while holding low-yield assets, a survey could ask consumers that question directly. More detailed questions about consumer behavior would allow researchers to solve some of the puzzles related to consumer payment behavior, such as this one.

Zinman's paper was discussed by Annamaria Lusardi (Dartmouth College). She pointed out that the SCF does not accurately report credit card balances (a point that was previously made by Gross and Souleles 2002). She noted that the average consumer has six credit cards, and the SCF does not report data on all of them (a similar comment was made by Paul Willen in his discussant's comments, see the section above). This paper confirms that better consumer payments behavior data are badly needed—there is no shortage of high-quality papers with interesting testable hypotheses, only a shortage of good useable data to test them. Lusardi also pointed out that the rate of financial illiteracy in the United States remains high, and that consumers are probably not making

these financial calculations as depicted in the paper, but rather make suboptimal financial decisions because of their lack of financial education. A similar point was raised by Martha Starr in her comments during the second part of the data panel.

3.4 "Multihoming in the Market for Payment Media: Evidence from Young Finnish Consumers" by Ari Hyytinen and Tuomas Takalo

Hyytinen (The Research Institute of the Finnish Economy) and Takalo (Bank of Finland) explore payment adoption in an environment with multihoming, a term which means using more than one payment instrument. The authors find that being informed about new payment options increases the likelihood of adopting those payment instruments. As a result, consumers use different payment methods not only to minimize their transactions costs, but also for non-monetary reasons, such as search and information costs. The authors argue that consumer awareness about a particular payment method reduces such non-monetary considerations.

Although the idea has been discussed previously in the literature, this paper uses a new data set to test it: survey data on approximately 1,000 Finnish consumers. Hyytinen and Takalo show that the number of payment instruments used is positively correlated with an indication of consumer awareness. Because consumer awareness reduces non-monetary costs, this is taken as evidence that non-monetary costs are important for multihoming. The policy implication is that providing better information will lead to the use of more varied payment instruments. The paper shows how a survey on consumer payment behavior could help address payment policy questions.

The paper was discussed by Oz Shy (University of Haifa), who explained that payment adoption decisions are more complex than the authors depict. In particular, payment methods can be classified by how these relate to consumers' bank accounts (linked, as are debit cards, or not linked, as are e-cards), by their real cost to consumers or to merchants (in terms of time, degree of acceptability, and vulnerability to theft), and by paper versus electronic methods. Consumers use these criteria in their decision of

whether or not to adopt a new payment instrument. Using the example of e-cash, Shy showed how a new payment method may fail, despite its apparent advantages, because of the multiple factors involved in the consumers' decision-making process. He showed how the adoption decision can be modeled by taking into account the various costs associated with different payment methods. In Shy's model, consumer awareness of a particular payment method does not directly increase the likelihood of adoption, but instead merely reduces the consumers' time cost, which is severely discounted. The discussant suggested that in the paper, the causality between consumer awareness and the adoption of multiple payment methods is not clear.

3.5 "Price Discrimination with Experience Goods: Sorting Induced Biases and Illusive Surplus" by Ronald Goettler and Karen Clay

Goettler (Carnegie Mellon University) and Clay (Carnegie Mellon University) consider how payment instruments might be considered experience goods, meaning that the quality of a given service or product is difficult to observe in advance, but this uncertainty is resolved through the experience of consuming it. An individual's beliefs about an experience good are updated through successive consumption experiences.

In the paper, individuals subscribe to grocery delivery services through a flat monthly fee, a per use basis, or a combination of the two. A significant portion of consumers choose one of the monthly fee subscription plans, but end up using the product less frequently than would be optimal given the monthly fee. These individuals behave optimally from an ex-ante perspective, though for many of the consumers their tariff choices end up being ex-post mistakes, in that they would have paid less than the monthly fee had they been on the per-use plan. For an experience good, it is not unusual for individuals to be optimistic in their initial beliefs about products, yet revise these preliminary beliefs based upon actual experience. Over time, these individuals should either cancel their subscriptions or switch plans. Interestingly, relatively few individuals responded to their experience by canceling their subscription or switching plans. The authors suggest that switching costs may play a role in this inertia, and that negative

encounters with experience goods might not lead to cancellations or subscription changes.[22]

Goettler and Clay's paper is potentially relevant to payments. For example, consumers get a credit card that carries a high interest rate, but believe that they will not borrow money on the card. Experience may suggest otherwise, but high switching costs may prevent them from switching to another credit card plan. Although in this example consumers end up using the product *more* than they initially anticipated instead of *less*, it shows that if individuals do not revise their beliefs as a result of their actual experiences, the market response to the attributes of a given payment method may be inefficient. This example suggests that "good" payment instruments might not catch on, while "bad" payment instruments might persist long after their useful life.

4. Main Conference Research Papers

Jeffrey Fuhrer (Executive Vice President and Director of Research at the Federal Reserve Bank of Boston) offered some comments to open the morning session on Day 2. With more academic research on consumer payment issues, he suggested, the academic community and the Federal Reserve System might have been better positioned to foresee and cope with recent dramatic declines in check volume. Increased academic research is a function of data availability, and this conference aims to further the resources available to researchers. Fuhrer outlined some of the novel data that would be presented at the conference, expressing the wish that one of the primary outcomes of the conference would be increased interaction and possible data sharing between academic researchers and the private sector.

4.1 "Consumers' Use of Debit Cards: Patterns, Preferences and Price Response" by Ron Borzekowski, Elizabeth Kiser, and Shaista Ahmed

[22] That is, costs associated with switching to another product. These costs may include monetary costs, such as a fixed sign-up fee, but also the time costs of contacting financial institutions, filling out forms, etc.

Elizabeth Kiser (Federal Reserve Board) presented this paper on debit card penetration using a new, nationally representative survey. Co-authored with Ron Borzekowski (Federal Reserve Board) and Shaista Ahmed (Princeton University), the paper provided evidence that in the United States, debit card use at the point of sale has grown dramatically in recent years, information repeated in several presentations at this conference, including that by Visa. However, many questions remain regarding patterns of debit card use, consumer preferences when using debit cards, and how consumers might respond to explicit pricing of debit card transactions.

Using nationally representative survey data collected from the 2004 Michigan Survey of Consumers, the authors analyze the effect of socio-demographics, expectations, and perceptions on using debit cards and on the substitution among payment instruments. While their findings on the use of debit cards by various socio-demographic groups show similar patterns to the ones previously found in the literature, their main contribution is in estimating the price sensitivity of debit card use with respect to fees. The authors' main findings are as follows:

- Fees imposed on PIN debit make consumers less likely to use debit cards overall.
- If a fee is charged for PIN debit use, consumers are more likely to use only signature debit, so steering customers to signature debit (a more profitable options for issuers) is effective.
- They estimate that issuer fees imposed on debit transactions would result in a decrease in the likelihood of using the card.
- Consumers might switch to paper payment instruments as a result of debit surcharges, arguably a less efficient outcome.

They also evaluate substitution among payment methods based on the answers to several open-ended survey questions, addressed to both users and non-users of debit cards. The authors found that debit is mainly a substitute for cash and checks, while consumers who do not use debit cards most often choose to use credit cards. Convenience was the reason most cited for using debit cards.

This paper is an interesting extension of the existing payments literature. Building on previous research that shows the importance of socio-demographic variables in payment choice, Borzekowski, Kiser, and Ahmed further explain payment choice by constructing consumer perceptions from responses to open-ended survey questions. This is one of very few studies calculating price sensitivity for point of sale card payments. Thanks to their design of a detailed consumer survey, the authors were able to estimate price elasticities of demand for payment instruments. This survey exemplifies how a questionnaire can shed light on the complex process consumers use to select payment methods.

Robert Hunt (Federal Reserve Bank of Philadelphia) and Genie Driskill (Synergistics Research Corporation) discussed the paper. Hunt praised the data and the methodology used in the paper, but suggested a few interpretive caveats. He observed that the estimated response to a change in the price of debit card transactions (that is, price elasticity) is likely underestimated, because consumers do not observe the fees incurred at the point-of-sale and because consumers rarely switch banks. Hunt noted that even though banks may try to steer consumers towards signature debit cards by using PIN debit fees, banks care about their overall profit margins. Even if, as a result of debit fees, consumers switch completely from using debit cards to using credit cards, banks may still benefit. In reality, few banks impose fees on debit transactions, which suggests that this is not a profitable strategy for them, possibly because the true price elasticity of demand is much higher than the paper suggests, and banks do not want to risk losing customers. Hunt also suggested that the authors should consider whether a potential selection bias is present in the data, as only a small fraction of consumers face debit fees, and it is not clear who these people are. For example, banks may engage in price discrimination among their customers.

In her response, Driskill presented industry data collected by Synergistics Corporation on debit card use that confirm the trends found in the Borzekowski, Kiser, and Ahmed paper: debit card use has grown at a high rate. In the Synergistics debit card data, debit card penetration increased from 2 percent of consumers surveyed in the

early 1980s to over 70 percent in 2005. By comparison, the Michigan Survey of Consumers data reported in the paper show that 60 percent of respondents had a debit card in 2004. In the Visa survey (see Section 1.1), 78 percent of surveyed consumers owned a debit card, but only 66 percent reported using one in 2005. The profile of debit users found in the Synergistics data is similar to that found by Borzekowski, Kiser, and Ahmed—namely, that debit card use decreases with age, and is highest for the middle-income categories, then decreases slightly for the highest-income cohorts. Driskill showed the results of a Syngergistics survey on consumers' preferred debit features. As in the Survey of Consumers, the Synergistics results show that consumers predominantly select speed and convenience as the most important features of debit cards.

When surveying the conference participants on *their* potential response to a fee on debit card use, that elasticity was very large. When asked how their use of debit would change in response to a one-percent fee on each debit card transaction, 55 percent of the conference participants stated that they would stop using debit completely, and another 34 percent would decrease their use of debit somewhat. That is a much higher elasticity than the authors find in their paper.

4.2 "Cash, Check, or Bank Card? The Effects of Transaction Characteristics on the Use of Payment Instruments" by David Bounie and Abel François

David Bounie (Telecom Paris) presented joint work with Abel François on transaction characteristics and their effect on payment use. Using a diary-type data set of 11,945 payments made in France during three months in 2005, the authors seek to identify what determines a consumer's decision to pay by cash, check, or bank card. Household diary-type surveys were also used by Visa and by the USPS (see Sections 1.1 and 1.2). The use of paper checks is more common in France than in most other European countries, but is less frequent than in the United States. In this survey, 62 percent of transactions were paid using cash, 21 percent using payment cards, and 14 percent using checks.

The authors find that the size of the transaction is the most important determinant of the payment method used: the highest-value transactions are made primarily with paper check, mid-range value transactions are made with cash and bank card, and the lowest-value transactions are made predominantly with cash. The payment choice is also affected by the type of goods or services purchased and the type of retail outlet: cash is the primary payment method at small stores and when purchasing food or beverages. In this study, income and education were much less important in determining payment choice when transaction characteristics were accounted for. The Bounie and Abel paper shows that transaction characteristics help determine payment choice, even when individual demographic characteristics are taken into account. Until recently, that finding has gathered relatively little support in the literature, because of a lack of data sets that include detailed information on individual transactions, such as the value of sale and the type of good and establishment.

Elizabeth Klee (Board of Governors of the Federal Reserve System) and Aaron McPherson (Financial Insights/IDC) discussed the paper. Comparing the French payment landscape to that of the United States, Klee found similarities in the ratio of card transactions to check transactions, but noted that, in overall payments, France has a higher fraction of ACH transactions—37 percent in France compared to 13 percent in the United States in terms of the number of transactions. The difference in the value of transactions is even greater—97 percent in France compared to 39 in the United States. Klee suggested that to evaluate whether the survey is representative , the authors should compare their survey results to the French population. She suggested that the authors should use a different estimation method—a nested logit model to allow for sequential decisions instead of the multinomial logit model they are currently using. McPherson mentioned that transaction costs were not fully addressed in the paper. He hypothesized that transaction costs could be leading merchants to steer consumers to different payment methods for different transactions in different locations. McPherson argued that the data does not reflect consumer preferences, but rather it reflects different merchant transaction costs for different goods.

When asked whether payment preferences in urban areas differed from those in rural areas, Bounie responded that no differences in payment preferences between urban and rural consumers were found. Participants also urged Bounie to explore timing issues: a consumer's payment preferences may change with the time elapsed since his or her most recent pay day.

4.3 "Consumer Payment Choice" by Janusz Ordover and Margaret Guerin-Calvert

Guerin-Calvert (Competition Policy Associates) presented research, conducted jointly with Janusz Ordover (New York University and Competition Policy Associates), which analyzes the supply-side factors of the U.S. payments market, and the effect of supply on consumer demand, with a specific focus on positive externalities associated with the expanded use of electronic payment methods. While the common assessment of interchange fees views these as imposing cost to merchants and consumers, Guerin-Calvert presented a different framework for understanding payment use in a two-sided network environment. By suggesting that there are several positive externalities arising from the use of electronic payments that have, thus far, been ignored in the literature, she argues that a range of benefits arise from using electronic payments: the literature has ignored what should be considered positive externalties, but accounting for these yields greater insights into the benefits gained from using electronic payments. For instance, because of substantial fixed costs associated with card networks and processing, the increased use of credit and debit cards lowers the variable transactions costs that accrue to merchants which, in a competitive market, reduces merchant fees. The consumer price level also will reflect the myriad cost-reducing benefits that in a monopolistically competitive environment (like the retail industry) are passed on to consumers. Based on this analysis, Ordover and Guerin-Calvert believe that policies seeking interchange fee regulation could have substantial negative and unintended consequences.

Sujit Chakravorti (Federal Reserve Bank of Chicago) and Steve Mott (Betterbuy Design) discussed the paper. Chakravorti questioned the underlying assumptions of the

Ordover and Guerin-Calvert framework. He noted that two-sided network models with perfect competition among merchants very frequently generate results where nobody is worse off, because any cost reduction is passed directly to consumers. They are made better off while extra firm profits remain constant at zero. Although Chakravorti accepted that there may be occasional positive externalities, it is not clear that these generally exist. He argued that the paper does not give concrete verification of positive externalities, and that the conclusion is markedly different from the accepted understanding that cash users subsidize electronic payment users, not vice versa.

Mott noted that participants in the payments industry, like in any other industry, try to recover their costs. Those costs include not only the marginal cost of individual transactions, but also fixed infrastructure costs, the costs of deploying electronic payments products, and, in the case of credit card companies, the charge-off costs of bad loans. Along with interest rates and late fees, merchant fees are one way that the electronic payment industry can defray some of these operating costs. Echoing Chakravorti's comments on cash users subsidizing electronic payment users at the point- of-sale, Mott noted that there are also cross-subsidies among electronic payment consumers. Specifically, he argued that non-revolving credit card users who have rewards programs are subsidized by revolving users without rewards programs. Mott concluded by highlighting the possibility that innovations in payments may make the discussion moot—as new payments arise with lower transaction costs, such as point-of-sale ACH, merchant fees and subsidies may disappear.

Although including the supply side factors in the analysis of consumer payment behavior can potentially be important, the authors do not quantify any of the externalities they discuss. Based on this paper, it is difficult to assess whether any additional costs imposed by the card system are outweighed by potential benefits to the merchants or consumers.Following the presentation and comments, there was a brief audience discussion on how payments are related to social well-being. One audience member remarked that in academic models, welfare functions used to justify merchant fees were mis-specified because these do not account for subsidies of card users by cash

users. Guerin-Calvert remarked that different opinion exist on this point, and her paper's contribution was an attempt to evaluate the costs and the benefits of electronic payments to cash users.

4.4 "Payment Instruments as Perceived by Consumers – A Public Survey" by Nicole Jonker

Jonker (De Nederlandsche Bank) presented her research on how perceptions of different payment instruments influence the payment behavior of Dutch consumers. Using survey data on more than 2,000 Dutch individuals, Jonker showed that Dutch consumers are satisfied with cash, debit card, e-purse[23] and credit card in terms of these methods' safety, transaction speed, cost, and ease of use. They are especially satisfied with debit cards, followed by cash and e-purse, and are least satisfied with credit cards. Cash is generally believed to be a cheap payment instrument, whereas debit cards and e-purse are perceived as relatively expensive, even though the true cost of using debit is lower than the cost of using cash for larger-value transactions.

Jonker recommends making the actual cost of payment methods more transparent to consumers. However, consumers already use cash for lower-value transactions (such as vending machines, parking, cafes and restaurants), and use debit cards for higher-value transactions (such as supermarkets, gasoline stations, and non-food shops), so they already choose cost-effective ways to pay, even if they do not always understand the relative social welfare costs of the various payment methods. Because transaction speed is important to consumers, Jonker recommends that the public be made aware of the low transaction time of e-purse, which is the fastest payment method, yet continues to be barely used. This paper shows that consumers' perceptions of payment methods, which may not always be accurate, can be important in understanding their payment behavior. Yet very few payment surveys ask consumers about their perceptions, and such information is needed.

[23] An e-purse is a small portable device which contains electronic money. It is sometimes called the electronic wallet or the stored value card.

Jeff Dominitz (RAND Corporation and Carnegie Mellon University) and Jed Kolko (Public Policy Institute of California) discussed this paper. Commenting on the survey methodology used in the study, Dominitz compared the Dutch household survey to RAND's American Life Panel survey and suggested ways in which the Dutch survey design could be improved. In particular, survey questions should include hypothetical choices as well as open-ended questions about the reasons for making those choices. He recommended 7-point scales for each characteristic (for example, safety, speed, cost, ease of use), and offering alternatives for the payment methods selected by the respondents in order to figure out conditional probabilities and relative ranks. Dominitz also observed that welfare costs are very difficult to measure, and that it is possible that the cost numbers are not reliable.

Kolko focused his comments on potential biases in Jonker's results and policy prescriptions. He questioned the sample selection, opining that individuals willing to participate in an online survey are likely to be more technologically savvy than others, and hence more likely to use electronic payment methods. Kolko also noted that the recommendation to increase the number of acceptance points for electronic payments entails additional merchant costs. If the merchant costs are high, then there is policy rationale to help coordinate payment use, and thus limit the fees faced by merchants and consumers stemming from having many costly payment mechanisms.

4.5 "Debit vs. Credit: A Study of Self-Control in Shopping Behavior, Theory and Evidence" by Marc Fusaro

Fusaro (East Carolina University) elaborated on the growing use of consumer debit cards, a trend recognized in other conference presentations (see Visa and Borzekowski, Kiser, and Ahmed). He noted that, despite being more expensive than credit cards in terms of foregone rewards and float, debit cards are the fastest growing consumer payment method. Fusaro provided evidence that debit card use could be associated with consumers' desire to control their spending. Using data from a sample of more than 2,000 consumer bank accounts, he found that debit card users, when making credit card payments, are more likely to be paying off a large balance. Debit

users also make more frequent ATM visits than non-debit users, suggesting that debit users withdraw small amounts of cash more frequently to avoid overspending. Although self-control is associated with the behavioral approach, Fusaro's paper provides a framework for understanding self-control from a cost-based perspective: people who are credit-constrained and have revolving balances, respond to price incentives.

Stephan Meier (Federal Reserve Bank of Boston, Center for Behavioral Economics and Decision-Making) and Bruce Cundiff (Javelin Strategy and Research) discussed the paper. Meier observed that testing whether individuals face self-control problems is very difficult in practice, because there may be other explanations for the same behavior. He suggested that in this paper, the reasons for the observed actions could be behavioral, but found the evidence offered for self-control motivations only partially convincing. For example, he argued that repeated ATM visits might not imply spending control, as the paper suggests, but rather that individuals might be withdrawing cash to spend immediately on an impulse purchase. Meier also suggested that larger credit card payments on a single card might not reflect consumers' efforts to keep debt in check, because most individuals carry more than one card.

Cundiff noted that the consumer decision regarding which payment method to use is more complex than the credit versus debit decision Fusaro describes in his paper. For example, some people are "habitual check writers," and will choose to use checks despite the fact that other options may be cheaper. According to Cundiff, consumer payment behavior is very difficult to influence. He recommended that better data should be collected in order to understand how consumers make such decisions. When modeling consumers' choices, other payment methods should be included besides debit and credit. For example, consumers may decide between using checks and debit, rather than debit and credit. That view is consistent with the Borzekowski, Kiser and Ahmed findings based on the Michigan Survey of Consumers—consumers view checks as a substitute for debit if debit is not available, and debit as a substitute for credit if credit is not available. Those results confirm Cundiff's belief that consumers' payment decisions

are much more complex than as portrayed in Fusaro's model. Better data are clearly needed to address these issues.

Audience comments focused on the empirical evidence Fusaro provided for conscious self-control, and how self-control and payment behavior may not be correlated. Some individuals may not realize that they have a self-control problem, so these people would not adopt debit cards as a deliberate means of controlling their spending.

In the survey of conference participants, 22 percent stated that they use debit cards to prevent overspending, and 27 percent responded that they borrow on their credit cards. Debit card users were much less likely to keep a record of their bills. That indicates that consumers' recordkeeping habits vary across payment methods. Their self-control issues may vary as well, but again, better survey data would be needed to answer that question.

5. Conference Summary and Conclusions

This conference confirmed that there are many individual data sources available on consumer payments behavior. However, because many of the existing sources are proprietary, much of this information is not well known or easily available to people outside of the particular firm that compiled it. Visa's acknowledgment that by 1996 it possessed evidence that consumer use of paper checks was declining in the United States dramatically underscores the need for assembling better information,—especially for public policymakers. It is important to note, however, that Visa's data concentrated on consumer check volume at a point-of-sale only, and as such cannot be used to make conclusive evidence about the aggregate number of checks written in the United States One strong recommendation made during this conference was the immediate need to assemble data on the use of business checks, which has changed more sluggishly than the number of consumer checks. Indeed, aggregate estimates of business-to-business check volume in the 1990s and 2000s have been erroneous because of an over-concentration in most surveys on consumer check use.

Yet despite the myriad sources of payments data on consumer behavior, the most important revelation from this conference is that this collective body of information, even if readily accessible, still leaves much to be desired in terms of accuracy and thoroughness. Clearly, it is difficult to conduct surveys on consumer payments behavior—the ideal survey is complex, comprehensive, and costly. But the existing data sources are often redundant and do not offer a wholly representative sample of consumers—this was true for data presented on American, Dutch, and French consumers. The Visa panel survey, for example, excludes non-English speakers. Yet given the sizeable Spanish-speaking population in the United States, this practice omits a significant portion of consumers. The first conference panel session identified many other examples of exclusion from samples, including age, payment method, and geographic location. Even the Federal Reserve's Survey of Consumer Finances, considered the "gold standard," falls well short of the data characteristics "wish list" recommendations that came out of this panel. Thus, there is a need to be careful about using the data that currently exist, and an urgent need for new and better data sources. The public interest in having this information—and the coordination problem of assembling it—indicates that there may be a role for a public or a non-profit institution such as the Boston Fed to play in amassing and disseminating this information, and in serving as a broker between the proprietary interests of private firms in the payments industry and the broader needs of the public. A similar suggestion was articulated by Jeff Fuhrer, the Director of Research at the Boston Fed, during his opening remarks.

The decline in paper check usage has a parallel today in the sense that electronic forms of payment are supplanting the use of cash in the United States. Yet there is no solid evidence to support the perceived migration away from coin and paper currency—since most of the existing information is anecdotal and fragmented, The collective judgment of the panel on cash to electronic payments was the sense that cash, if not quite king, still retains a strong presence in the American payments landscape, and is likely to do so for the foreseeable future. One advantage cash has over other payment

forms is its high degree of privacy and anonymity, qualities which, in the intrusive information age, are increasingly valued.

Of all the electronic payment forms available, debit cards were a common denominator throughout the conference. Data sessions identified this method as being the fastest growing electronic payment method, as for many consumers, a debit card is the best substitute for using cash or paper checks. The use of debit cards seems to have a generational bias, as younger adults favor debit cards, while older people lean more towards credit cards. Yet the panel on loyalty raised the issue that consumer rewards for using credit cards are typically much better than rewards programs (if any) tied to debit cards. Some consumers favor debit cards for helping control their expenses, while others favor payment methods that offer some float between incurring the expense and settling the payment. Credit cards offer float, and also offer better purchase protection for consumers than do debit cards.

One important element in tracing the move from cash to electronic payments was the issue of interchange fees. While as a payment method cash may be less efficient than electronic methods, the more efficient electronic methods are more costly. The United States has the highest interchange rates among the industrialized economies, and is the only country where these costs are increasing. Banks and credit cards companies have an incentive to raise these fees, but it was noted that in mid-2006 the European Union deemed this practice to be an antitrust violation. While the move from cash to electronic payments may, in the long run, be better for social welfare, the current situation seems to be one in which the efficient method may be more inequitable than the inefficient method.

For consumers to make rational payment choices, full information must be available to them. It is unclear whether consumers are making sound and informed choices, or if they are making economically important mistakes due to a lack of complete information, or a complete understanding of this available information. The same situation applies for policy makers, and underscores the need to assemble better information about how and why consumers make their payment decisions. How do

consumers balance the desire for convenient and secure payment methods with the desire for maintaining their privacy?[24] How do consumers decide to substitute between debit cards, credit cards, and other payment methods? What role might rewards programs and other incentives play in these decisions?

It is clear that in order to answer these questions, there is an urgent need to combine data on what consumers do—this information could be obtained from bank records—and what consumers think and say they do based on survey data. The Visa Panel pointedly avoids questioning why consumers make various choices, but having this information is vital to distinguishing between decisions made based on incomplete information versus decisions predicated on irrational consumer behavior. There is a conspicuous lack of empirical data to test theoretical hypotheses of consumer payments behavior. The differences among various consumers and their payment choices mean that it is important to disaggregate the trends in payment methods according to demographic characteristics. While the details driving these choices remain unclear in the absence of supporting data, we expect that once assembled, the evidence will be complex, and perhaps even appear to be irrational or contradictory. Thus, there may be a role for behavioral economics in untangling the decisions behind consumer payment choices, and using these insights to shape public policies that give proper incentives to increase social welfare.

[24] One risk that has to be taken into account is the risk of security violation. For example, in January 2007, TJX, a large retailer, reported a large computer data breach where credit and debit card data were stolen ("Retailer TJX reports massive data breach," Paul F. Roberts, InfoWorld, January 17, 2007).

Appendix I

Payments Data Panel: What Consumer Payments Data Exist?

Lucia Dunn (Ohio State University):

- The Panel Survey of Income Dynamics (PSID) has one question on payments and information about credit cards.
- The latest round of the National Longitudinal Survey (NLS) had an extensive but one-time module on consumer finance.
- The biennial Health and Retirement Survey (HRS) has good consumer finance information for older consumers.
- Miscellaneous, irregular surveys. She focused primarily on an Ohio-based survey similar to the Survey of Consumer Finances that provides information about credit card debt and payoff behavior, data that she has used in her research. Dunn showed that debt and default generally have been rising for age cohorts over time, putting consumers increasingly at financial risk.

Robert Avery (Federal Reserve Board):

- Survey of Consumer Finances (SCF), contains some limited information about consumer payments. The SCF includes about 4,500 U.S. families and has been conducted every three years since 1983.[25]
- The 2003 Survey of Small Business Finances (SSBF) has new and improved data on credit card and debit card (PIN and signature) use at more than 4,000 small businesses.[26]
- Four unpublished surveys of consumer transaction account usage (individual-level financial transactions) were conducted – two in the 1980s, two in the 1990s – but the data were not made available to the public.
- The Federal Reserve commissioned surveys of depository institutions to calculate the total number of consumer payments, especially paper check use, in 2001 and 2004, with results published in the *Federal Reserve Bulletin*.[27]

[25] For more information, see http://www.federalreserve.gov/pubs/oss/oss2/scfindex.html
[26] For more information, see http://www.federalreserve.gov/pubs/oss/oss3/nssbftoc.htm

- Special survey of checks issued by the Social Security Administration (SSA) to estimate the length of float and resolve a disagreement between SSA and the U.S. Treasury.
- The Board has been purchasing credit bureau data since 1997 and is compiling a longitudinal database of detailed financial transactions for about 300,000 consumers. These data can be purchased and assembled into a panel by the general public as well.

Ashley Lyons (U.S. Postal Service):

- The USPS Household Diary Study, which has been conducted annually since 1987 and is similar to the Visa Payment Panel Study. The USPS HDS features a weekly diary of the mail, payment, and other activities of about 5,200 households. Much of the study aims to understand bill payment trends by mail versus Internet, and also online shopping. The data and reports are available to the public for free.[28]

Margaret Weichert (Bank of America):

- Bank of America's database on about 50 million households and 2-3 million small businesses. Weichert explained that the data include financial transactions involving virtually every payment method and can be classified at the account level or household level of detail. Bank of America's data resources also include credit information. Only a relatively short history – in some cases, three months, in other cases, somewhat longer – of data are kept in electronic format, and the rest is discarded. Bank of America uses these data to research and model consumer payment behavior, just as Zinman suggested to Visa, and to develop new products that help it to compete (such as free online Internet banking and the "Keep the Change" program). Because of the associated costs and the need to sustain its competitive advantage, among other things, Weichert explained that Bank of America

[27] For more information, see Gerdes and Walton (2002) and Gerdes et al. (2005).
[28] For more information, see http://www.nustats.com/uspsstudy.htm

generally cannot make its data freely available to the public or research community. A possible exception, she said, might be when sharing the data might improve the safety and soundness of the payment system.

Deborah Patrick (TNS Financial Service Group):

- TNS's Consumer Card Research Program, which has produced the longitudinal panel of consumer payments data underlying the Visa Panel Study described earlier. Patrick also briefly described a second data source, stemming from the company's Affluent Market Research Program, that covers consumers with $500,000 or more in annual income or net worth (excluding residence). TNS, which works with and for many financial institutions like Visa and Bank of America, also has an enormous amount of proprietary data that it does not share with the general public.

David Stewart (Global Concepts):

- Operations benchmarking at commercial banks, such as measuring the costs associated with processing checks, ACH, and other payment methods.
- Industry surveys done primarily for descriptive (not operational) purposes, such as the Federal Reserve studies of check volumes.
- Proprietary industry research, such as surveys of financial institutions about their payment transactions volume (check, ATM, debit, etc.).
- Market surveys of business, government, and consumers. In particular, Global Concepts conducts two annual, nationally representative surveys of consumers (by phone), one covering individuals' payment behavior at the point of sale and one covering households' bill-payment behavior. These surveys are not used to project national payments volumes because the methodology is not well suited to do so, but they are used to define and analyze consumer payment market segments.

Lisa Tidwell (Director of Market Intelligence, First Data Debit Services, First Data Corporation):

- Annual STAR Consumer Payments Usage Study, now in its 19th year of operation. The main purpose of STAR is to generate information about consumer payment trends and changes. It currently contains data on nearly 14,000 consumers who are at least 18 years old and have a checking or savings account, and thus a debit card (the company's focus). However, it does not include consumers from all states in the nation because it has been developed from a historical objective to measure attitude and awareness of the STAR brand wherever it was marketed. Making the survey geographically representative is a goal of the company. Although the STAR data are proprietary, Tidwell said the company is looking for ways to make the data more accessible to the academic community, and noted that much of the data remains underutilized in terms of research use.

Jane Yao (Managing Director, Benchmarking and Survey Research, American Bankers Association (ABA)):

- Study of Consumer Payment Preferences, which has been conducted jointly with Dove Consulting biennially since 1999. The ABA makes results of the study available to the general public (for a fee), but not the underlying data. This survey of approximately 3,000 consumers is conducted via paper and the Internet. It includes a core set of questions developed by the ABA and Dove on all kinds of payment methods and decisions, as well as additional questions contributed by the survey sponsors who help offset some of the survey costs. The survey data suggest that consumers' payment choices are heavily influenced by their comfort with the method and its speed in facilitating transactions. Yao said that from the perspective of the ABA's membership (financial institutions), risk management of new payment technologies is of central importance.

References

Ausubel, Lawrence M. (1991). "The Failure of Competition in the Credit Card Market." *American Economic Review* 81 (1) :50-81.

Benton, Marques, Krista Blair, Marianne Crowe, and Scott Schuh (2007). "The Boston Fed Survey of Consumer Behavior and Payment Choice," Federal Reserve Bank of Boston Public Policy Discussion Paper 07-1.

Crowe, Marianne, Joanna Stavins, and Scott Schuh (2006). "Consumer Behavior and Payment Choice: A Conference Summary." Federal Reserve Bank of Boston Public Policy Discussion Paper 06-1.

Gerdes, Geoffrey R. and Jack K. Walton II (2002). "The Use of Checks and Other Noncash Payment Instruments in the United States." *Federal Reserve Bulletin* 88 (August): 360-374.

Gerdes, Geoffrey R., May X. Liu, Darrel W. Parke, and Jack K. Walton (2005), "Trends in the Use of Payment Instruments in the United States." *Federal Reserve Bulletin* 91 (Spring): 180-201.

Schreft, Stacey L. (2006), "How and Why Do Consumers Choose Their Payment Methods?" Federal Reserve Bank of Kansas City Working Paper 06-04.

Visa (2006). "Visa Payment Panel Study: 2006 Payment Trends Summary." Visa USA Research Services, Visa U.S.A. Inc.

Zinman, Jonathan (2006). "Debit or Credit?" Dartmouth College, unpublished paper, August.