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Consumer Behavior and Payment Choice:

A Conference Summary

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Abstract:
The Emerging Payments Research Group (EPRG) at the Federal Reserve Bank of Boston sponsored a new conference, "Consumer Behavior and Payment Choice: How and Why Do Consumers Choose Their Payment Methods?" on October 27–28, 2005, at the Boston Fed. The conference brought together a diverse set of participants from the academic, private, and public sectors. This paper provides a summary and overview of the conference. Key conclusions are that the consumer's decision-making process concerning payment choice is quite complex, that standard economic models have difficulty incorporating this complexity, that additional research—especially interdisciplinary research—into consumer choice of payment method is needed, and that this conference was an important step in that direction.

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I. Introduction

These are unusual times in the payments industry. A workhorse traditional payment method—paper check-writing—is heading out to pasture. Paper checks are being replaced by a host of new electronic payment methods emerging from the technological revolution in information processing. Most payments experts have a good handle on why the electronic payment methods are efficient, fast, and convenient. But few payments experts have a good handle on why specific individuals choose the particular payment methods they use.

When the tide (finally) turned on paper check-writing in the late 1990s, most everyone was caught off guard. While many experts expected paper check-writing to go the way of the typewriter and some even hoped and worked for that day, no one really knew when it would come. So the payments industry continued to build, innovate, and improve its paper check-clearing capabilities. But when electronic payment methods finally became popular with the consuming public, the retirement of paper checks came to seem inevitable, while remaining stubbornly unpredictable. As the volume of paper checks declined, the capital and labor infrastructure devoted to paper check-clearing—especially in the Federal Reserve System—began to shrink.

Now, the race to replace paper checks has begun in earnest. Payment service providers are striving to offer the next "king of the hill" in the payment arena. To do so, they must satisfy the whims and fancies of the American consumers who use these payment methods. At the same time, these consumers are juggling a widening array of payment choices that offer a myriad of characteristics, and not all of these options are well understood. As a result, some of the consumers' observed payment choices may not be the spending and saving plans that are in their best interests.

Public policymakers, such as the Federal Reserve System, have a responsibility to make sense of this pervasive transformation in payment practices. Payments industry participants, both suppliers and users of payment methods, are seeking legal and institutional arrangements that cultivate the best possible payments system. To achieve this lofty goal, policymakers must create an environment that maximizes the efficiency of the new electronic-based payment

services and the well-being of the ultimate users of payment methods. Payments experts seem to have a much better—although by no means perfect—handle on the proper public policies for creating a low-cost system to providers of payment services than on the policies that would ensure maximum benefits to the end-users of payments (consumers) too.

The Emerging Payments Research Group (EPRG) at the Federal Reserve Bank of Boston recognizes the significant gap in our understanding of the demand side of the payments market. One of EPRG's central goals is to promote fundamental research on consumer payment behavior, in order to inform the development of optimal public policies toward the payments system. As one of its first official acts, EPRG sponsored a conference, "Consumer Behavior and Payment Choice: How and Why Do Consumers Choose Their Payment Methods?" on October 27–28, 2005, at the Boston Fed. This paper provides a summary and overview of the conference, which was designed to stimulate research and discussion about the consumer perspective on payments. The complete program and materials for the conference can be found on the web at http://www.bos.frb.org/news/conf/payments2005/.

II. An Unusual Conference for Unusual Times

Although the niche topic for the conference was relatively easy to select, the conference format was not. Indeed, consumer payment behavior has not received much attention in the academic research literature in any field, economics or other, nor had it received much attention in the trade or business press before the recent surge in electronic payment usage. Some private-sector participants, such as banks and consulting firms, gather data on consumer payment behavior and conduct analyses to benefit their business practices. But these data and analyses are generally proprietary and not open to detailed scrutiny by the research or public-policy community. In short, there is a need for more explicit, publicly available research and data from all areas related to consumer payment behavior.

The academic, private, and public policy communities each have a vested interest in understanding consumer payment behavior, but each has different goals, motivations, and methodologies for studying this behavior. Furthermore, consumer payment behavior involves many disciplines of social and business sciences. Within economics, consumer payment

behavior is related to consumer theory, finance, monetary theory, behavioral economics, and technology adoption, among other areas. Within the broader academic community, consumer payment behavior is related to psychology, sociology, and business administration (especially consumer choice and marketing and advertising). Within the business community, consumer payment behavior is important to the profits of firms in banking, finance, retailing (both "brick and mortar" and internet commerce), and information technology. Within the public policy community, institutions such as the Federal Reserve, the U.S. Congress, the Federal Trade Commission, and others are involved in shaping consumer payment behavior.

To develop a better understanding of consumer behavior, the EPRG designed this conference to bring together representatives of different communities and disciplines on the same stage. To accomplish this somewhat unusual and challenging goal, we adopted a format that balanced the academic and business viewpoints to the greatest extent possible, in three types of sessions.[1] The first session type was a lecture-style overview of consumer payment behavior presented by an industry practitioner and an academic observer. Rich Oliver, Executive Vice President at the Federal Reserve Bank of Atlanta and Product Manager of the Federal Reserve System's Retail Payments Office, provided the industry overview in a keynote address on Thursday evening. He outlined steps that banks should undertake to provide incentives to consumers to make their payment behavior more efficient. Stacey Schreft, Vice President and Economist at the Federal Reserve Bank of Kansas City, provided the academic overview on Friday morning with her paper, "How and Why Do Consumers Choose Their Payment Methods?" Schreft summarized the limited existing research in this area and outlined some possible paths that future research might consider. She stressed that modeling consumer payment behavior is very complex and would require multiple approaches.

The second type of session involved the presentation of a relatively technical paper by an academic researcher selected from an open call for papers and discussions by an academic expert (technical assessment) and a private-sector expert (practical assessment), followed by an

[1] In this first venture into experimenting with this conference format, EPRG believed it was necessary to relegate the issue of public policy prescriptions to later conferences when, presumably, a better understanding of the basic issues on which to base policy conclusions and recommendations will be available.

open floor discussion. The first paper was "Who's Afraid of the Cashless Society? Belgian Survey Evidence," by Ellen Loix, Roland Peppermans, and Leo Van Hove. This paper presents research that develops new surveys of consumer payment behavior and produces new data to study. The second paper, "Credit and Identity Theft," by Charles M. Kahn and William Roberds, applies abstract and mathematical modeling of complicated consumer decisions about choosing payment methods in an imperfect world. The final paper, "Transforming Payment Choices by Doubling Fees on the Illinois Tollway," by Gene Amromin, Carrie Jankowski, and Richard D. Porter, demonstrates the importance of studying actual consumer behavior in well-defined natural experiments of payment choices.

The third type of session involved a panel discussion of a selected aspect of consumer payment behavior by business experts and anchored by an academic paper on the same topic. The first panel session was "Understanding Consumer Behavior at the Point of Sale (POS)," and the anchor paper was "Debit or Credit" by Jonathan Zinman. This panel delved into the reasons why consumers choose the specific payment methods they do, primarily in retail and related environments. The second panel session, "Understanding Consumer Bill Payment Behavior," was anchored by a paper on "The Determinants of Consumers' Adoption of Internet Banking," by Byoung-Min Kim, Richard Widdows, and Tansel Yilmazer. This panel delved into the reasons why consumers choose specific methods to pay their various types of recurring bills.

Additionally, the conference kicked off with a unique and entertaining consumer payment survey on Thursday evening. The survey's questions, developed by David DeRemer and Scott Schuh of the Boston Fed, investigated the central issues raised by the conference's papers.[2] A paper by David DeRemer discussing the survey's benefits and results is forthcoming in the Boston Fed's Public Policy Discussion Paper Series.

In his keynote address, which followed the survey, Rich Oliver remarked that the

[2] The survey inspired the dinner attendees to relate the papers' ideas to their own experiences. Results were distributed for the main conference sessions and were brought up on several occasions throughout conference discussions. Each conference session was introduced using its most relevant survey results. Cited examples include respondents' affinity for holding cash, their willingness to limit credit-card usage given a discount incentive, their experience as identity theft victims, and their all-or-nothing division of attitudes towards Internet bill payment.

conference's consumer payment survey represented the first time in 40 years of work in the payments business that anyone had asked him, as a consumer, what he thought about payments. This comment clearly underscores the need to survey and study actual consumers and their payment behavior in greater detail.

III. Two Perspectives on the Payments Landscape

A. Practitioner/Policymaker

Rich Oliver provided a colorful picture of how payments have changed over the last 30 years and what happens to expectations when the consumer is or is not factored into the business equation. Oliver described several payment-related incidents that occurred over a 10-year span in the 1970s. Each showed how well-intentioned attempts by banks to offer new payment products and influence consumer behavior failed, either because the value to the banks was not necessarily a value to the customers, or because customers had no idea how the new products could benefit them, since no one thought to ask them what they value in a payment method.

Oliver identified four stumbling blocks that the banking industry must address to narrow the gap with consumers and be successful. First, banks must ask consumers what they (consumers) want and do not want from a new product or service. Second, banks must educate consumers so that they (consumers) have enough information to make reasonable choices. If banks do not share all the information on the advantages of new payment methods, they should not expect consumers to make the desirable choices. Third, banks must provide incentives to consumers in a way that supports each bank's strategic direction. Pricing can be used to discourage use of a costly service or to encourage use of a new technology and still allow a bank to be profitable. For example, customers have an array of payment choices at the point of sale (POS). Each method has a different cost to the retailer, but consumers do not face these cost differences. So why would the consumer choose a payment option that is less costly to the retailer and therefore perhaps better from a social standpoint as well? The Federal Reserve followed this strategy when it increased prices for processing paper checks. If banks learn from

history and do a better job of pricing services and providing information, then consumers are likely to make appropriate payment decisions.

Finally, Oliver discussed issues raised by the multiplicity of bill-payment options. A consumer can still write a check and have it processed as an Automated Clearing House (ACH)[3] transaction via a process called Accounts Receivable Check Conversion (ARC).[4] Or, under Check 21[5], the check can be converted to an electronic image after it has been used for payment. The consumer can also go online and pay his bill electronically by either credit or ACH, directly at the biller's website or through his bank's online service. NACHA[6], the electronic payments association, is researching still other alternatives for electronic bill payment. These options, with their different rules and issues of security and identity theft, are examples of why new payment types are creating more confusion for the customer.

Oliver concluded that to address paradoxes in consumer payment behavior, banks must find out what consumers really want. Based on that knowledge, banks can make their investment and product development choices. With that knowledge in hand, they will be able to educate consumers and offer them appropriate incentives and disincentives to facilitate change.

B. Researcher

Stacey Schreft gave a background overview of the economic literature on the consumer side of payment choice. Schreft described what economists have done in this field and what she

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[3] Automated Clearing House (ACH) is a nationwide batch-oriented electronic funds transfer system that provides for the interbank clearing of electronic debits and credits among two or more participating depository financial institutions. The ACH network is supported both by the Federal Reserve and by private or bank-owned companies.

[4] Accounts Receivable Check Conversion (ARC) is the conversion of a paper check, mailed by a consumer to a biller's mailbox, to an ACH payment.

[5] Check 21, the Check Clearing for the 21st Century Act, facilitates check electronification to bring about a more efficient system of check collection processing. Under Check 21, financial institutions can substitute checks using digital images and electronic check information. Check 21 provides the legal framework that legitimizes the creation and use of substitute checks in place of the originals, eliminating the requirement that separate agreements be in place.

[6] NACHA, the National Automated Clearing House Association, establishes standards, rules, and procedures that enable participating depository financial institutions located in the United States to exchange ACH payments.

thinks they should be doing next to understand how and why consumers choose their payment methods. She explained that little is known about consumer payment behavior because few economists have focused on this area so far. The reason for that lack of interest is, in part, an assumption made by monetary and macro economists that payment choice is not relevant to their field.

After describing the existing literature, Schreft explained the complexity of a consumer's decision as to which payment instrument to use, or even as to whether or not to conduct a transaction, depending on which payment methods are accepted by a merchant. The decision of how to pay begins with a choice between current and future consumption, continues through decisions on whether to borrow or use existing funds, which payment instruments to carry and, finally, which to use. The existing research falls short of capturing all the layers of this decision-making process.

Schreft suggested some lines of future research as possible ways to model that intricate decision process. Future research should include modeling the adoption-of-payment-methods decision. Rather than modeling demand for payment methods, researchers should start by thinking about the individual features consumers might want in their payment instruments. This type of analysis follows a hedonic characteristics model, which has at its core the attributes of goods, that is, the goods and services that people buy. The hedonic characteristics model recognizes that goods are bundles of characteristics and derives the demand for goods from the demand for each of the embodied characteristics. This type of model may allow us to analyze consumers' demand for payment vehicles and to understand why certain attributes of payment methods are bundled together. Modeling demand and supply of payment methods is further complicated by the presence of network externalities—merchants do not want to adopt payment methods until consumers use them, and vice versa.

Once demand and supply of payment instruments are understood, research could study the choice of which payment instrument to use at the point of sale. Consumer attributes, such as age, income, and education should be incorporated at that stage of research. Lessons from behavioral economics should also be included. Schreft suggested that future research look at dynamic issues—why adoption of some payment technologies is faster than others, why some

payment methods disappear and others stay, and how the role of certain payment mechanisms evolves over time. The complexity of the decision-making process warrants collaboration by researchers from several different fields.

Schreft concluded by discussing policy implications of the consumer decision-making process on choice of payment method. Although by her own admission she raised more questions than she answered, her presentation emphasized why more research is needed on how and why consumers choose the payment methods they do.

IV. Filling the Gap in Data on Consumer Payment Behavior

One of the main reasons why the literature on the consumer side of payments is so slim is lack of data. We know very little about consumers' payment decisions because we rarely ask them, as the comments by Rich Oliver indicate. Few good surveys of consumer payment habits exist, and thus there is a need for good data.

"Who's Afraid of the Cashless Society? Belgian Survey Evidence" by Loix, Pepermans, and Van Hove helps to fill that data gap by providing a new data set of payment choices made by consumers at the point of sale. The authors used data from a survey of approximately 1,000 Belgian consumers in which respondents were asked, over a number of payment methods, whether they had heard of a payment method surveyed, whether they had adopted it, and, if so, how frequently they used it. Respondents were also asked to score payment instruments according to various criteria.

The paper helps explain why some consumers use a particular payment instrument and others do not. Some of the same socio-demographic characteristics help to explain consumer payment habits in Belgium as in the United States.[7] Age, education, income, and occupation mattered in some, although not all, payment instrument choices. The authors found that consumers' propensity to adopt new technologies helps to explain their point-of-sale payment behavior: Those who adopt new technologies in general are also more likely to adopt new payment methods. The authors investigated whether consumers are affected in their payment

[7] Van Hove cites the following references in his paper: Mester (2003), Hayashi and Klee (2003), and Stavins (2001).

choices by supply-side factors, such as the availability of ATMs, but that part of their analysis did not yield strong results.

Although the paper discusses the results of a survey of Belgian consumers, it provides potentially valuable information for payments researchers and market research firms in the United States, even though the payment options in Belgium differ somewhat from what U.S. consumers are used to. More consumer surveys on payment behavior need to be conducted in the United States, and the Belgian survey gives an example of how that can be done.

The authors tested for the robustness of their results by comparing them with those of previous studies, both U.S. and European. Although the effect of socio-demographic variables was similar to that found elsewhere, this paper introduces some new elements. By controlling for accessibility and proximity to ATMs, the paper attempts to test the importance of supply-side factors on consumers' demand for payment instruments. And, even though this initial step in including supply-side variables did not produce many statistically significant results, the authors intend to find new ways to include such variables in their future revisions.

Discussants:

Elizabeth Klee and Leon Majors provided comments on the paper. Elizabeth Klee compared the Belgian survey results with comparable studies done in the United States, showing that consumer payment behavior is similar regardless of location. She discussed the issues surrounding quota surveys and contrasted them with random surveys. Clearly, more discussion is needed on the topic of surveys as applied to consumer payment choice, and Klee's comments introduced some of the various types of surveys. She talked briefly about her own research, in which she analyzed the actual transaction data at the point of sale. While surveying people about what they do in certain situations is useful, looking at what people actually do may be more convincing.

Leon Majors disputed the claim that no data on the use of payment systems have been collected. Instead, he claimed that private companies have collected and studied a great deal of data on consumer payment behavior. Majors himself has been involved in 400 payment systems

research projects. However, he noted that this research is not well known because almost all the results are proprietary and that, moreover, most of the data studied focus on very small subsets of consumers. Majors discussed a few reasons why payments surveys are difficult to conduct. Consumers do not usually remember their payment behavior, many segments of consumers are hard to reach, and surveys are costly. As a result, surveys conducted by private-sector organizations are often simplified and do not adequately summarize payments behavior of the whole society. Nonprofit organizations and the academic community need to step in and do their own research to fill those gaps.

V. Understanding Consumer Behavior at the Point of Sale

A. Zinman paper

Debit cards have been the fastest growing method of payments at the point of sale. Yet neoclassical economic models would predict that consumers would prefer to use credit cards because of the float and perks that many credit cards offer. The typical credit card user can enjoy a few weeks of free credit before he or she begins to accumulate interest charges, and many credit-card issuers offer their users airline miles or points that can be applied toward future purchases. However, other factors, including self-control and dislike of carrying a balance on a credit card, may play a role in a consumer's decision as to whether to choose debit or credit. Jonathan Zinman discussed the relevance of such behavioral approaches in consumer payment choice and contrasted it with the standard behavioral model. He used data from the *Survey of Consumer Finances* to test which model fits the data better.

"Debit or Credit" fulfills an important role in the payments literature. It looks at actual consumer behavior at the cash register and asks why consumers choose one payment instrument over another. It also combines a well-laid-out model with empirical survey evidence to distinguish between two different approaches to explaining consumer behavior. Can economists continue to rely on traditional neoclassical models or should they turn to the newer behavioral approaches to explain why consumers do what they do?

The paper does not provide definitive answers, but it helps us to narrow down possible explanations. If we want to figure out the motivation behind consumer payment choices, this paper shows us what questions we have to ask in the future. Besides the objective characteristics of payment methods, it is subjective consumer preferences and spending habits that matter in predicting payment choice. One needs to understand consumer preferences before ruling out the neoclassical approach.

The paper provided an effective introduction to the point-of-sale panel. Zinman asked what approach we should use to explain what consumers are telling us in a survey about their behavior. The panelists then addressed similar questions, based on the actual observation of consumer payment choices at the point of sale.

B. Panel Summary

Consumers today face increasing payment options at the point-of-sale (POS). This panel session, moderated by Tony Hayes of Dove Consulting, examined consumer payment behavior from the perspectives of a world-wide retailer, represented by Denis Bouchard of Wal-Mart Stores, Inc.; a regional supermarket chain, represented by Joseph Garbarino of Wegmans Food Markets; a financial services institution, represented by Lorraine Fischer of Wachovia Bank; and a payment card institution, represented by Tim Attinger of VISA USA. The panel addressed such questions as: How do consumers pay? How would you like consumers to pay? And, how can you influence the way consumers pay?

In addition to discussing their observations of consumer payment choices, the panelists further examined the reasoning behind those decisions. The retailers agreed that their customers are most concerned with a speedy checkout process. Therefore, consumers tend to use whatever means they have to get out of the store as quickly as possible. PIN debit, which accounts for 22 percent of Wal-Mart's sales, lends itself to the fastest checkout process because there is no signature requirement. Most of Wegmans's transactions are paid with cash, though credit transactions account for the highest dollar volume.

Attinger of VISA notes that cash and check payments account for more than 60 percent of all consumer transactions, with debit transactions rising at a faster pace than credit. So although the "pay now or pay later" mentality may influence consumer payment choices, Attinger contends that the average U.S. consumer household is fairly fiscally conservative, despite what is heard about bankruptcies and rising debt levels.

One consistent driver behind payment choices observed by the panelists is generational influence: Consumers tend to choose the payment method they grew up with. It is common to see the older generation pay with check, the baby boomer generation pay with credit, and the younger generation pay with debit. In addition, Fischer of Wachovia notes that members of the older generation are more likely to be "single-user" customers, while members of the younger generation are more likely to use multiple payment types.

When asked about their POS payment preferences, the panelists' responses varied. Bouchard of Wal-Mart favors PIN debit, not only because of the resulting speed at checkout, but because of the lower merchant transaction costs compared with credit or signature debit. Garbarino of Wegmans, on the other hand, prefers an ACH payment product that is paid through Wegmans's loyalty card program, though it has yet to gain the customer acceptance they had hoped for. Fischer suggested that risk aversion may be one cause of the lack of ACH adoption and cautioned that the ACH infrastructure is not as secure as the check infrastructure for fraud and risk mitigation. According to Garbarino, the credit card is the least preferred method of payment, because its use is actually more costly to Wegmans than accepting a paper check.

The financial institution, Wachovia, also selected debit card as the preferred method of payment, although checks still account for approximately half of the firm's primary customer account transactions. Attinger said VISA does not favor one particular payment method. Their priority is to enable as many options as possible so that consumers can choose freely among a robust choice of products. An example is VISA's card-swipe product with no signature requirements, which is quickly being adopted by consumers as an alternative to cash in quick-serve restaurant (QSR) environments.

The respondents' opinions on how consumers' payment choices can be influenced at POS were mixed. Bouchard and Garbarino agreed that their options are limited, while Attinger maintains that retailers have a number of possible alternatives. Since they cannot surcharge customers, the retailers believe their most effective option to influence the consumer is to prompt for the consumer's PIN—a method currently used by Wal-Mart. However, because of Wegmans's strong customer focus, they choose not to use PIN prompting for two reasons: 1) to avoid confusing the customer at the POS, and 2) to avoid being blamed by the customers for PIN debit charges from the customer's financial institution. Attinger contended that store loyalty cards are an effective option for retailers—approximately 15 to 20 percent of U.S. households participate in such programs. Other methods suggested by Attinger include "Debitman," "Safeway Smart Check," and other ACH-based cards.

According to Attinger, educating consumers about each payment method, including the risks, costs, and benefits associated with each, is the most effective way to influence consumer decisions. In addition to education, Wachovia believes rewards can influence choice. The recent launch of their VISA signature-based debit awards program resulted in increased debit spending and activation. Today, close to 85 percent of U.S. households participate in rewards programs of some kind.

Sometimes incentives have nothing to do with how consumers make their payment choices. Fischer mentioned another factor. Consumers have the ability to recognize the need for new payment alternatives and the power to put them to use. She cited PayPal[8] as an example. Of the online payments in the United States, 64 percent are paid by credit, 31 percent by debit, and 26[9] percent by PayPal—a non-bank electronic payment method that did not exist eight years ago, yet is being adopted rapidly by consumers, driven by consumers' own needs.

In summary, this panel session provided a unique look into the observations,

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[8] Founded in 1998, PayPal, an eBay Company, enables any individual or business with an email address to send and receive payments online. PayPal's service builds on the existing financial infrastructure of bank accounts and credit cards and utilizes a proprietary fraud prevention system to create a secure real-time payment solution.
[9] The percent attributed to PayPal (26 percent) includes PayPay payments made by credit card, which may also be counted in the overall credit-card percentage.

preferences, and influences related to consumer payment choices. It is evident that each of these industries—retail, financial, and credit card—is intertwined with the others, and that each faces its own challenges. While the means to influence choices may seem limited, the significance of consumers' needs, knowledge, and acceptance of old and new payment methods must not be overlooked.

VI. Filling the Need for Theory

The few research papers that exist on the demand side of payment choice are almost exclusively empirical. So, in addition to the lack of data, there is an even greater shortage of theoretical papers. Clearly, we have to collect more and better data to allow us to answer the question: "What do consumers do?" But to address the question: "Why do consumers do it?" we must develop sound theoretical foundations for their decisions to use in evaluating their observed payment behavior.

"Credit and Identity Theft" by Kahn and Roberds, a theoretical assessment of a rapidly expanding social ill—identity theft—that is indirectly affecting consumer payment choice, provides a nice starting point. The implications of identity theft for real payment behavior are not immediately obvious. But the paper provides a careful and thorough definition of the role of information in allocating credit and thus shows us the trade-offs between providing information needed to ensure efficiency of credit allocation and restricting information to guard against the potential exposure of personal financial data to theft.

Identity theft is an illegal use of personal identifying data—in this case, for credit transactions. On the one hand, consumers want to maintain their privacy and avoid giving out their personal information, while credit providers find monitoring consumers to be costly. On the other hand, fraudulent transactions cannot be prevented without collecting personal financial information. These conflicting objectives generate a trade-off between having and preserving privacy, and this trade-off influences consumer payment decisions. Moreover, the results of the model suggest that technological advances will not eliminate this discomfiting trade-off. On the contrary, the cheaper the technology, the

easier it will be to share the information on consumers' identities, and both the positive and the negative effects of this sharing will persist.

Because obtaining information and credit is costly to both consumers and issuers, in the model people form an association similar to a credit-card association like MasterCard or Visa. The authors call that association a credit club. The credit club has both costs and benefits. One cost—a cost that is primarily, but not entirely, borne by the issuer— is the cost of collecting information when membership decisions are made. On the benefits side, the clubs benefit their participants—both consumers and issuers—by protecting them from identity theft. The more intensive is the screening, the higher the probability of detecting the identity theft, but the higher the cost.

This paper provides an important contribution to the payments literature. It helps to fill a void in the literature by modeling consumer decisions pertaining to electronic transactions. It also introduces an important question: Is it possible that the ongoing trend of substituting electronic payments for cash and checks might be reversed? The growing threat of identity theft may prevent consumers from using electronic payments, as this payment method can easily allow transfer of personal information onto the Internet, making this information widely accessible. Although the authors do not give any definitive answers, this well-grounded theoretical model gives us a new framework for understanding consumer decisions about which payment methods to use.

Discussants:

Nobuhiro Kiyotaki and Seth Berman discussed the paper. While Kiyotaki focused on the assumptions and structure of the mathematical model, Berman talked about his experiences as a federal prosecutor in charge of computer and Internet crimes.

Kiyotaki affirmed the importance of understanding identity theft and developing sound policies to mitigate it, and he praised the paper for addressing the issue. However, he felt that the paper contained too many versions of its basic model and that these were each too complicated and disconnected. Instead, he proposed a simpler alternative model that boiled

down the essential elements of the paper into four equations. In addition, Kiyotaki argued that the credit club developed in the paper acted more like a gift-exchange club than like a lending institution because debtors never repay their debts to their creditors. He also raised questions about the arbitrariness of some of the restrictions imposed on information flows and credit club behavior in the modeling framework.

Berman said his experiences suggest that although entering identity information on the Internet does not seem to increase one's risk of identity theft, there is almost nothing a person can do to prevent that risk. Instead, he suggested that institutions that can do something to raise Internet security—banks, traders, and credit rating agencies—be made responsible for what they can prevent, so that they incorporate the cost of potential security breach into their decision-making. Otherwise, the costs are not borne by the parties that make decisions, leading to inefficient outcomes.

VII. Consumer Bill-Payment Behavior

A. Kim, Widdows, and Yilmazer

Tansel Yilmazer opened the bill-payment panel session with her paper, "The Determinants of Consumers' Adoption of Internet Banking." We selected this paper because it addresses a question often neglected by empirical researchers: How do consumers choose to pay their bills? Despite some information about the evolution of electronic payment technology and statistics about the increasing volume of Internet transactions, little is understood about which consumers choose electronic payment methods to pay their bills and which prefer to use traditional methods.

Kim, Widdows, and Yilmazer used the *Survey of Consumer Finances* (SCF) to test which factors affect consumers' adoption of Internet banking. Based on data from the 2001 SCF, the authors found that consumers who were younger, more affluent, and better educated were more likely to adopt Internet banking. Although socio-demographic factors increased the likelihood of such adoption, the authors also found that other characteristics, such as previous experience with computers or adoption of other banking technologies, increased the probability

of Internet banking adoption. The authors grouped households according to the banking technologies they use, showing the differences among the various groups.

This paper shows that it could be relatively easy for financial institutions or marketing companies to target specific groups of consumers according to their needs. Younger, more affluent households with substantial computer experience are more likely to adopt new technologies than older households who use fewer computer technologies. However, this study also underlines the need for academic researchers to gather more objective data on the adoption and use of different bill-payment technologies. We have to learn more about what determines how consumers pay bills and to understand why they make the choices they do.

B. Panel Summary

Panelists in this session represented a wide array of businesses and viewpoints on the topic of understanding consumer bill-payment behavior. The panel, moderated by Steve Ledford of Global Concepts, included Bob Pedersen of the U.S. Postal Service (USPS), Patty Thorell of Comcast Cable Communications, Bob Wilson of JPMorgan Chase, and Jamie Armistead of Bank of America.

Industry research shows that most bills are still paid by check in the United States, although Armistead contends that he is seeing the rate of growth for ACH and online payments growing, while check volume is declining. Why does online bill payment still represent only a small percentage of overall bill payments? One theory is that bill payment by check has lower costs, controlled timing, and limited fraud. Because check works well, consumers have been slow to change to electronic bill payment.

Pedersen discussed the Postal Service’s household diary study that surveyed consumers’ use of the mail system to pay bills. The survey indicated that electronic bill payment as a percentage of total bills paid increased from 10 percent in 2000 to 23 percent in 2004, mostly at the expense of physical mail. While online bill payment has grown, 95 percent of households surveyed by the USPS still paid at least one bill per month with a paper check. Pedersen

observed that while consumers like to have options, they do not like to pay for them, and they are not aware of what the different options cost.

The panelists offered different points of view on the costs and benefits of allowing customers to pay online using a credit or debit card. Thorell indicated that Comcast allows payment by credit card because of customer demand, even though the costs are higher than for other payment options. Armistead of Bank of America also saw the benefit, but he noted an indirect cost related to the difficulty in implementing online credit-card payments, because billers must adopt a separate mechanism to integrate the process for their customers. Wilson of JPMorgan Chase noticed a large number of debit-card payments for recurring bills.

Another topic discussed was the use of incentives and disincentives to move consumers to online bill payment. Comcast provided opportunity incentives to encourage one type of payment behavior over another. They also charged a small fee to discourage consumers from calling the interactive voice response system (IVR) or a live customer-service representative. Bank of America employed the tactic of co-marketing with billers to drive customers to the cheaper e-bill payment channel. While successful, Armistead cautioned that one should understand the costs and objectives of marketing programs developed to change consumer payment behavior, because some consumers will adopt a service anyway and don't need incentives. Otherwise, one risks "paying the freight on everybody." JPMorgan Chase took an approach similar to that taken by Comcast. In one example, they allowed consumers making mortgage payments right before the due date to pay via phone instead of FedExing the payment. Chase charged a slightly lower fee than FedEx, which benefited the consumer (who avoided late fees), and also benefited Chase by reducing the number of overnight FedEx payments received all at once for processing. In a second example, after Chase began offering touch-tone and web services for credit-card payments, they raised the fees for talking to a person. Even though Chase quadrupled the fees over time, they continue to have a fair percentage of people willing to pay to talk to someone on the phone. To summarize, the panelists agreed that the use of fees and incentives was an attempt to drive consumers to the most efficient payment channel and not an attempt to steer customers away from the bank, but,

despite their efforts, there are still consumers who want to make non-electronic payments and are prepared to pay for the service if necessary.

One interesting phenomenon was the growing use of online bill payment for what the panelists called "nuisance payments" now that the online bill payment service is free. Nuisance payments are non-recurring payments—for example, doctor co-payments. Because they are not electronic throughout, they are more costly for the banks to process. However, Armistead pointed out that while the bank may bear the cost of online banking in general, this cost is offset by a better relationship with customers, increased deposit balances, and lower attrition.

A second phenomenon created from the online bill-payment service is the opportunity consumers now have to make multiple payments via different channels for recurring bills. Wilson noted that some consumers make multiple payments online during one statement cycle, while others make one payment online and a second payment, tied to the billing statement cycle, via paper check. This increase in the velocity of payments has actually increased the cost of processing.

Finally, the USPS noted that sometimes a shock to the payments system can cause people to behave differently from their usual practice, as they did, for example, after 9/11 and the anthrax scare. Both incidents led to an upsurge in electronic bill payments, initially primarily via automatic deductions (ACH), but then over the next two years trending away from ACH toward more online bill payments.

The panelists predict an eventual flattening of online bill-payment growth. The number of people paying online cannot exceed the number of people who are already using the Internet for other reasons, so it is a subset of that population. As the number of Internet users plateaus, so will the number of users of online bill payment. However, from the USPS's perspective, the gradual erosion of paper payments and concomitant growth in electronic payments to reach

that plateau is a painful process[10] because a slow decline in volume is more difficult to deal with than a quick reduction in volume, owing to the need to slowly manage the downturn and gradually move or reduce staff and hours. The USPS is keeping a close watch on volumes through research and surveys.

Overall, the panelists agreed that the online bill-payment process works but that there is still room for growth. And while the banks and businesses involved have a good understanding of what features consumers want with online bill payment, they still do not have a good grasp of why consumers choose to use or not to use online bill payment. The panel discussion suggested several indicators of Internet use that can be monitored to help predict consumer use of online bill payment, such as: (1) pure Internet adoption; (2) broadband adoption; (3) online retail purchase behavior, and (4) online travel reservations. Once a consumer has overcome his/her aversion to providing personal information online for these types of purchases, the next logical progression is to online banking and bill payment. However, more research is still needed on what influences individual consumers to use online bill-payment services and why.

VIII. The Price of Payments: a Natural Experiment

Although a retailer's costs of processing a transaction vary depending on the payment method used, consumers do not usually face those cost differences explicitly. Therefore, it is difficult to test empirically whether consumers respond to price differences in their payment choices. In "Transforming Payment Choices by Doubling Fees on the Illinois Tollway," Amromin, Jankowski, and Porter used a change in the fees for cash versus electronic toll payment on the Illinois Tollway to estimate consumers' response to price differentials across payment methods.

[10] The USPS Household Diary Study indicated that use of the U.S. Mail as a payment method by all households decreased from 8.7 pieces per household per month to 8.3 pieces per month between 2000 and 2004, while use of electronic/Internet channels to make payments more than doubled from 1.1 pieces per household per month to 2.9 pieces per month. Even more telling is that among households whose head was younger than 35 years old, use of electronic/Internet channels increased from 1.1 pieces per household per month to 3.4 pieces per month between 2001 and 2004.

On January 1, 2005, Illinois doubled the highway toll for travelers paying with cash but kept the price unchanged for those paying electronically using a payment option called I-PASS. Amronin, Jankowski, and Porter combine a theoretical model of payment choice with empirical analysis based on this rare natural experiment of differential pricing depending on the method of payment. An actual response to a price change allowed the authors to estimate the sensitivity of consumer payment demand to prices.

The paper shows that as soon as the price differential was introduced, consumers responded by increasing their use of the electronic payment option from 45 percent of all toll payments to 70 percent, as drivers who had previously paid by cash switched to I-PASS. The authors analyzed traffic patterns of Chicago-area drivers by zip code and by time of day, allowing them to differentiate between elasticities of demand by income group (as proxied by zip code) as well as between commuters (rush-hour drivers) and non-commuters. Across all income groups, elasticities of demand for payment method were substantial, as demonstrated by a sizable increase in the percentage of drivers who used I-PASS.

One potential implication of a price increase is, of course, a drop in demand. In the case of the Illinois Tollway, the loss in demand was very small with the exception of truck drivers, who changed their driving routes to avoid the Tollway, having faced a much greater increase in price differential than did the drivers of passenger vehicles.

In a sense, this paper represents a combination of the approaches in the other two featured papers: It combines theory with empirical evidence. It presents a theoretical model of payment choice and then tests it using a natural experiment of price differentiation based on the method of payment. Unfortunately, such natural experiments in differentiated prices are rare. Until the marketplace offers more situations where the price of payment methods varies, we have to continue conducting surveys and asking consumers hypothetical questions about what their responses to differentiated prices would be.

Discussants:

Marc Rysman and Michael Swanson discussed the paper. Rysman commented that the paper would benefit from additional information, such as how many times drivers have to stop

to pay tolls, to take into account the effect of time on a driver's decision whether or not to buy I-PASS. Swanson, the chief of operations for the Massachusetts Turnpike Authority, talked about the challenge of raising revenues from the Massachusetts Turnpike tolls without raising the tolls so high that drivers will avoid the tollway. Although Massachusetts has not introduced a price differential between cash and electronic tolls, it has tried to provide various incentives to alleviate congestion.

IX. Conclusions

A. Stango

Professor Victor Stango from Dartmouth College summarized the conference. He observed that the conference emphasized the complexity of a consumer's decision how to pay. For economists, explaining these decisions can be difficult, especially since many consumers seem, according to standard economic models, irrational in their behavior. Consumers base their decisions on many different attributes, and many of these attributes are not easily quantifiable. Taking consumers' preferences into account is important not only for research: Understanding how people make payment or financial decisions is also important for policy. Based on the conference panel discussions, Stango concluded that private industry has done a much better job figuring out how consumers make decisions than have economic researchers. One of the reasons why such decision making is difficult for economists to understand is that consumers make choices based on qualitative characteristics of payments, such as convenience or time, rather than on more easily quantifiable attributes, such as price. However, the conference encouraged Stango to be optimistic that excellent research—some of which was presented at this conference—is taking place and will continue in the future.

B. Emerging Payments Research Group

The EPRG also drew several conclusions from the conference based on an evaluation by participants as well as a critical self-assessment. First, the EPRG was pleased to learn that most participants rated the unique interaction among the academic, industry, and policy

communities as favorable and productive. Perhaps not surprisingly, the interaction was not viewed as totally seamless. Some participants wrestled with the technical details of some of the research papers, and other participants felt the panelists should have incorporated the research papers into the discussions better. Nevertheless, all of the sessions were rated favorably overall. Second, many participants expressed interest in joint ventures that would involve sharing proprietary industry data with researchers in the academic and public sectors. Third, the conference survey was the most highly rated session, which underscored the need and value of collecting consumer payment data. Finally, most participants suggested that the conference should be longer. To address that suggestion, the EPRG has scheduled its 2006 conference on consumer payment behavior for two full days, July 26–27.

(See http://www.bos.frb.org/news/conf/payments2005).

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