could also adopt other means of intervention, such as public education and promotion campaigns.

- There are three ways by which the Fed could introduce differential pricing without creating a significant short-run deficit in fee collections: (1) initially giving overall ACH discounts to institutions that adopt online P2P funds transfer, with the hope that the increase in volume will offset the reduction in fees; (2) raising the fees on other Fed services (such as check clearing), while reducing the fee for ACH transactions; (3) raising the fees on other Fed services (such as check clearing), while leaving the fee for ACH transactions unchanged. The first two methods are somewhat problematic because these may end up diverting transactions from the competing, privately owned EPN network to the Fed ACH network. In this respect, the third method is less problematic because it would maintain competition in the ACH market and in addition it would increase the size of the ACH market by reducing the volume of check clearing.

Implications

In order to determine whether the Federal Reserve should intervene to promote a greater use of P2P in the United States, we need reliable data on cost and demand. Unlike cost variables, which can be estimated, demand data (consumers' willingness to pay as a function of the number of users) are still not available and cannot be estimated until P2P transfers become widely used. At this point, the only available demand data come from a few surveys in which individuals are asked, "How much are you willing to pay to transfer funds from your bank account to another account via online banking or your mobile phone?" This scattered information does not provide a sufficient number of data points to make a meaningful estimate of the demand.

This paper does not address a more fundamental question: why should ACH services be provided by central banks rather than by the private sector or other governmental agencies? Some answers to this question have already been given in Weiner (2008) and Schreft (2007). The arguments they raise for the Fed's involvement include economies of scale and scope, reducing the risk of identity theft and providing safety mechanisms, and correcting market failures that generate underprovision of payment services.

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Mobile Payments in the United States at Retail Point of Sale: Current Market and Future Prospects

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complete text: http://www.bos.frb.org/economic/ppdp/2010/ppdp1002.htm
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Motivation for the Research

Throughout the U.S. banking and mobile carriers industries strong interest exists in the potential for mobile payments, which for this paper the authors define narrowly as the use of a mobile phone to make a contactless payment at a physical retail location, whether or not the phone actually accesses the mobile network to make the payment. This definition excludes person-to-person (P2P) transfers, use of a mobile phone to make an Internet purchase, and mobile banking transactions, which involve accessing bank services through a mobile device—activities that some participants in these industries would include in the definition.

The scope for bundling mobile payments with value-added services is great, and consumers are already conditioned to expect, and have shown a willingness to pay for, an ever-expanding array of innovative applications on their smart phones. Not only could a consumer simply wave a mobile phone

in front of a reader and have his bank or payment card account debited automatically, but using the computing and communication power of a smart phone, the customer could also perform many other activities at the same time. (For instance, in the course of using the mobile phone to make a payment, a consumer could compare prices with prices offered by other local merchants, store the payment record with his financial management software, download a warranty or instructional video on how to use a product, and more.) Merchants could benefit by having the phones interact with reward or other promotional programs. And this technology could greatly increase the efficiency of the U.S. payment system by encouraging the transition to electronic payments for low-value transactions—the one area where cash is still a widely used form of payment in the United States.

A number of countries have already integrated mobile phones, in some form, into their payment systems. While substantial business and consumer interest exists in the United States, adoption has been slower here than in three other countries. This paper examines the experience with mobile payments in three other countries, summarizes the status of mobile payments in the United States, and discusses the prospects for future adoption.

Research Approach

The authors review the technologies involved, discuss adoption patterns and experiences in Japan, South Korea, and Spain, and draw lessons for the U.S. mobile payments business. With respect to technologies, the paper focuses on contactless and near-field communication (NFC) technologies, as these appear to be the most likely candidates to be adopted for retail payments because of their convenience and sophistication.

The authors identify supply-side and demand-side obstacles to the adoption of mobile payments and consider why the barriers have been difficult to overcome in the United States. They discuss the expected benefits from mobile payments for consumers and merchants, their respective costs, and whether any market failures exist that would warrant policy intervention. On the supply side, the authors discuss issues of coordination, public goods, networks, and standards. In addition, they emphasize the need to be proactive in ensuring that these emerging technologies improve or at least maintain, rather than impair, the security and robustness of the nation's payment system

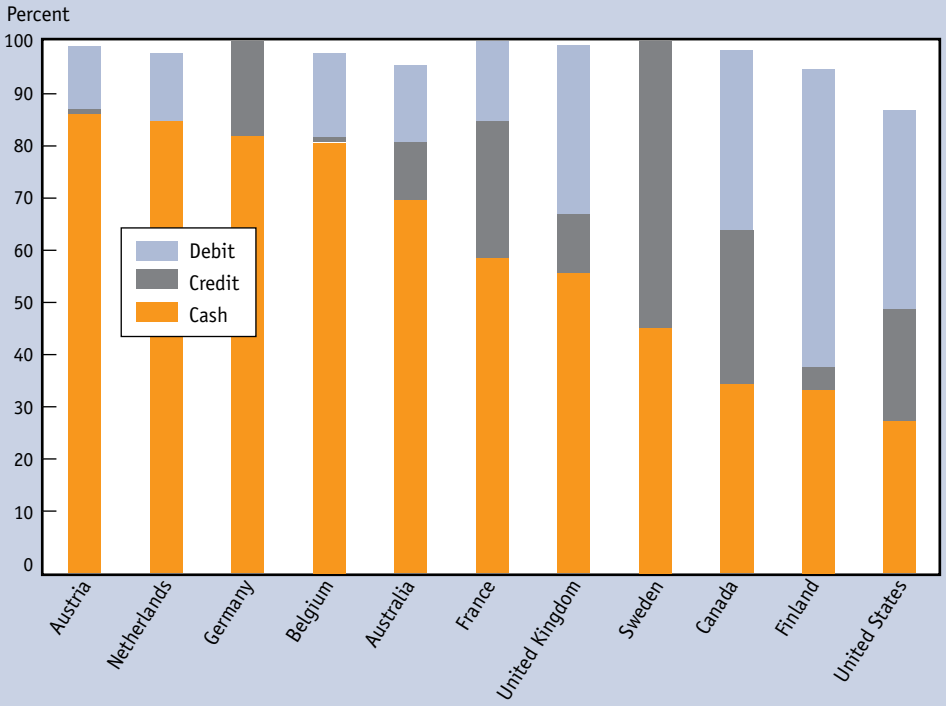
Based on this analysis, the authors consider U.S. prospects for adoption of mobile payments, raise issues concerning standards and oversight, and make policy recommendations for the Federal Reserve. The analysis is based on the existing literature and on discussions with representatives of several mobile carriers, financial institutions, and payments industry consultancies. The authors present their conclusions and recommendations with the caveat that forecasting the adoption of innovations is particularly difficult in any case—and especially so in the case of mobile payments because the market is evolving rapidly and because some developments are hidden behind proprietary veils; therefore, the authors caution that their analysis, conclusions, and recommendations should be understood in this context and may change as more information becomes available.

Key Findings

- Retail mobile payments have been most successful in cash-intensive, technologically advanced countries with highly concentrated banking markets (for example, Japan). In contrast, even though almost everyone in the United States carries a mobile phone, mobile payments have not been widely adopted by U.S. consumers.

- The adoption of mobile payments in the United States is inhibited by constraints on both the demand side and the supply side. On the demand side, in the absence of a compelling value proposition, the expected benefits of mobile payments in the short term are low in this country, since credit and debit cards already provide much of the convenience that mobile payments offer in countries where consumers rely heavily on cash to make payments. Furthermore, the benefits are subject to

Share of Transactions at the Checkout in Selected Countries
(Based on number of transactions)



Source: Adapted from Eugenie Foster, LLC "What Do We Know about Cash Payments?" (presented at the Central Bank Forum on Payment Surveys, Chicago, March 2009). Data source varies by country.

network effects, in that even if consumers saw value in mobile payments, the extent of such value would depend on how many merchants would accept them, which in turn would depend on how many consumers would adopt this payment method. Moreover, the costs of adoption are high. Consumers would have to replace their mobile phones with phones equipped with a designated NFC chip, at a cost estimated to be in the range of $10–$15 per phone. For their part, merchants would have to install NFC readers capable of processing mobile payments at each terminal, at an estimated cost of about $200 per reader, and would have to pay interchange fees for each mobile payment accepted. Network effects come into play here too: mobile carriers are reluctant to invest in the technology until they have confidence that consumers will pay the extra cost, and consumers are unlikely to pay the adoption cost unless mobile payments are widely accepted at retail locations.

- On the supply side, there is a coordination problem. The U.S. banking and mobile carrier industries have very low market concentration compared with other advanced or developing economies, so industry-wide agreements on technology standards and business policies are very difficult to negotiate, whereas bilateral negotiations between a single bank and a single carrier are not very useful for promoting nationwide adoption of mobile payments technology. The coordination issue is exacerbated by the number of parties involved in each transaction: a mobile carrier, a handset manufacturer, a card association (for example, VISA, MasterCard), a mobile software vendor, a bank, a merchant, and a consumer. In addition to the coordination problem, there is a public good issue: because all market participants expect an eventual public standard will be established, any private party investing in the development of the mobile payments standards would help other potential adopters, so the short-term private benefits gained by each party would be much smaller than the private costs each party would have to incur. Furthermore, the uncertainty created by the lack of a clear regulatory oversight authority and by a lack of clarity about the rules and regulations that will govern mobile payments inhibits potential market participants. Provision of mobile payments involves several industries currently supervised by different agencies, and a consumer's use of a mobile device to make payments and purchases falls outside the regulatory boundaries

defied by each agency. Finally, in an issue that spans both the demand side and the supply side, consistent responses from the authors' interviewees indicate that lack of a viable business model that provides incentives to all relevant parties to invest in mobile payments technology and adopt the shared standards is a key barrier to the adoption of mobile payments in the United States.

- Low-value transactions would benefit most from mobile payments, especially in high-volume markets where completion speed is essential. A good example is the public transportation industry, a market that avoids some of the obstacles faced by merchants in other sectors: commuter demand is highly inelastic, and consumer benefits from faster service can be high. Furthermore public transit agencies experience real operational cost savings from replacing cash with electronic payments. In the United States, public transit is where the most successful implementation of contactless technology (albeit with NFC-enabled contactless cards, not mobile phones) has taken place (for example, the MBTA in Boston). In parts of Asia (Hong Kong, Japan, South Korea) contactless mobile transit payments have been implemented successfully.

- Despite the lack of adoption so far, the U.S. payments industry is convinced that mobile payments will inevitably be introduced in this country. The technology to process mobile payments already exists and the number of mobile phones (especially smart phones) has been rising. In addition, the adoption rate of mobile banking has grown, so American consumers seem to be becoming more comfortable with the mobile technology. However, because of the obstacles mentioned above, especially the lack of coordination and absence of a feasible business model, it is not clear when mobile payments will become widely adopted in the United States.

- The authors do not find compelling evidence that mobile payments will experience widespread success in the United States in the near term (defined as 1–3 years), although industry participants are continuing to experiment with pilot programs. Widespread deployment of NFC-enabled mobile phones, along with the requisite merchant readers, is costly, and the immediate benefits to each party appear to be small, given the broad adoption and use of credit and debit cards in the United States. Over the next 3–5 years, as old mobile phones and merchant terminals require replacement or upgrading, they may be replaced by phones and terminals that can process NFC contactless mobile payments, thereby removing some of the merchant barriers that currently exist.

Implications

Based on the findings listed above, the authors believe it is premature to advance any public policy intervention to promote mobile payments. Indeed, their findings indicate that the major reason for the lack of progress in the United States toward broad adoption of mobile payments is the limited prospect for realizing sufficient social net benefits from this technology in the short run (1–3 years), rather than market failure. Nevertheless, they suggest a few areas where the Federal Reserve could get involved to increase social welfare. The Fed could:

1. Conduct quantitative research, including survey and market research, to estimate the potential value of mobile payments in the United States.

2. Help to establish regulatory guidelines for security, privacy, and consumer protection, and to clarify oversight responsibilities. By convening a group of regulatory agencies to start planning potential regulatory changes in anticipation of the eventual widespread adoption of mobile payments and by raising the issue with legislators and the administration (or perhaps forming a council to establish the boundaries of agency oversight), the Federal Reserve could address the ambiguity regarding which agencies would be responsible for regulating mobile payments

3. Facilitate coordination of industry-wide standards that ensure the continued safety, soundness, and efficiency of the payments system by establishing a neutral setting where all the stakeholders can exchange ideas without concerns about collusion.