

# New Person-to-Person Payment Methods: Have Checks Met Their Match?

*By Terri Bradford and William R. Keeton*

**D**uring the last decade, both demand-side and supply-side factors have contributed to a surge in new methods of making person-to-person (P2P) payments. On the demand side, the driving factors have been the emergence of new forums for commerce such as online auctions and the increasing desire by consumers to monitor and control payments. On the supply side, the main factors have been technological advancements such as faster Internet speeds, increased computing power and smartphones. Despite the surge in new P2P payment methods, studies show that consumers in the United States still prefer to make payments to other people with checks and cash. In fact, P2P payments by check are the only type of check payment that is still increasing. If consumers could be induced to use a digital alternative to P2P payments by cash and check, the efficiency and safety of the U.S. payments system might be enhanced.

Three distinct models for P2P payments have emerged. In the nonbank-centric model, an individual instructs a nonbank intermediary such as PayPal to transfer funds to another consumer. In the bank-centric model, the individual interacts directly with a bank to request

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a transfer from the bank account of the individual to the bank account of the recipient. The third P2P model is card-centric, in the sense that the payment is processed entirely over a credit card or debit card network. While these new P2P payment methods have received much attention in the retail payments community, they have not been systematically analyzed and evaluated. This article provides such an analysis, showing how each new P2P model works, the extent to which the model improves on checks in meeting consumers' needs and what needs remain unfilled.

The article concludes that the new P2P methods improve on paper checks in a number of ways but leave important gaps, suggesting a need for further innovation. All the new methods have the advantage that they can be used with mobile devices. Furthermore, compared with checks, some of the new P2P methods provide payers with greater control over account balances, payees with faster access to funds and both with stronger security. Still, none of the new methods enjoys the nearly universal acceptance that checks do for making and receiving P2P payments.

Section I provides a brief history of P2P payments in the United States, focusing on the long-standing dominance of checks and the emergence of new P2P methods in the last decade. Section II introduces the key payments characteristics used in the article to evaluate and compare P2P payment methods—speed, payer control, security and universality. Section III explains and evaluates the three basic models of new P2P payment methods, rating each in terms of key payment characteristics. Section IV summarizes the gaps that remain in P2P payment services and discusses the role the Federal Reserve could play in facilitating innovation in this area.

## **I. A BRIEF HISTORY OF P2P PAYMENTS IN THE UNITED STATES**

P2P payments include payments by individuals to friends and family members and to other individuals for goods and services. The latter group is often referred to as “micro-merchants.” They include gardeners, babysitters, independent repairmen and individuals selling goods through classified ads or online auction markets such as eBay. This section briefly reviews the history of P2P payments in the United States,

describing the early dominance of cash and checks, the emergence of new nonbank-centric methods in the late 1990s and the introduction of bank-centric and card-centric methods more recently.

### *Early dominance of cash and checks*

Before this century, P2P payments were almost entirely by cash and check. Cash was convenient for small, in-person payments between individuals. Except for the risk of counterfeiting, the payee could be confident that funds were good. Furthermore, the only costs of carrying out the transfer were the time and inconvenience cost to the payer of obtaining the cash, the cost to the payee of depositing the cash, and the cost to both parties of safely transporting the cash. But for large payments and payments to individuals in distant locations, cash was not a practical form of payment. For such payments, paper checks were superior because the funds could not be lost or stolen and the check could be sent through the mail.

In commercial transactions between individuals, these benefits of checks over cash came at a cost. A seller who delivered a good or service to a buyer before collecting the check faced the risk that the check would bounce. Conversely, a buyer who sent a check before receiving the promised good or service incurred the risk that the seller would fail to follow through on delivery. A buyer paying by check also faced the risk that the account information on the check could be used to make unauthorized withdrawals. In large transactions, buyers and sellers sometimes avoided these risks of checks by using wire payments, which were costly to the buyer but could be made instantly to any location. Credit cards were not viewed as a viable alternative for commercial P2P payments because credit card processing was either unavailable or too expensive for small sellers.

### *Emergence of new, nonbank-centric payment methods*

In the late 1990s, the spread of the Internet and growth in online auctions gave rise to new nonbank-centric payment methods. In such payment methods, the payer initiates the payment with a nonbank company, and that company acts as a middleman between the payer and the payee. Nonbank-centric P2P payment methods had been offered since the previous century by companies such as Western Union. To make a

payment, however, the payer was required to visit a brick-and-mortar branch of the company. With the spread of the Internet, it became feasible for consumers to make such payments from their personal computers. In addition, the spread of the Internet led to rapid growth in online auctions such as eBay. These online auctions increased the demand for a new P2P payment method that better satisfied the needs of buyers and sellers who did not know each other and lived in different areas.

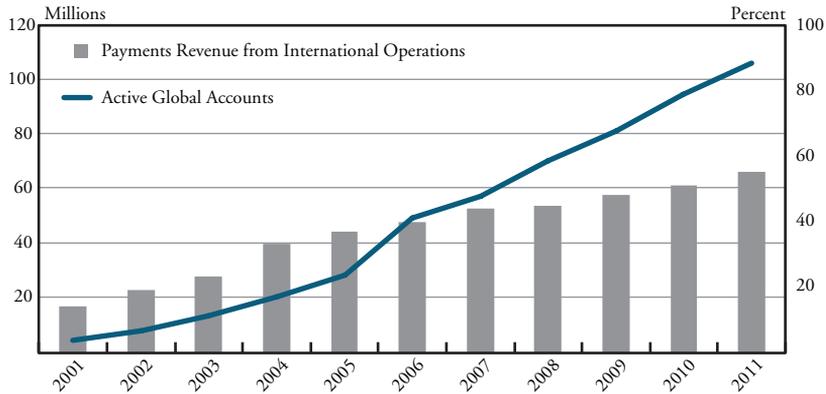
Nonbank companies such as PayPal met the payment needs of buyers and sellers in online auctions by acting as a middleman in the transaction, obtaining funds from the buyer's credit card or bank account and then passing the funds on to the seller (Jackson). Under this approach, buyers had greater flexibility in funding their purchases, sellers received their funds more quickly, and both parties had greater confidence that the transactions would be completed as promised. Another benefit was that buyers did not have to reveal their credit card or bank account information to unknown sellers, because only the intermediary needed that information.

While several nonbank intermediaries competed for the payments business in online auctions, PayPal quickly emerged the clear winner. PayPal's success was due partly to its first-mover advantage and partly to the fact that it offered payment services below cost to build business. Growth in accounts was also facilitated by the fact that recipients had to set up a PayPal account to receive their funds. These factors allowed PayPal to widen its lead over its competitors, helping induce eBay to acquire PayPal in 2002.

While most of PayPal's P2P payments were associated with online auctions, the service could also be used for payments to friends, personal acquaintances, and family members. A number of other P2P services emerged in the early and mid-2000s to meet this need. Like PayPal, the companies offering these services acted as a middlemen between the payer and payee, obtaining funds from the payer and then passing them on to the payee. By the middle of the decade, PayPal and its smaller nonbank competitors were making their P2P payment services available on mobile devices, giving the services an even greater advantage over checks in terms of convenience. One example of such a nonbank-centric mobile P2P service was TextPayMe, introduced in 2005 and acquired shortly thereafter by Amazon (Engleman). Another

Chart 1

## PAYPAL ACTIVE GLOBAL ACCOUNTS AND PAYMENTS REVENUE FROM INTERNATIONAL OPERATIONS



Source: eBay Inc.

example was Obopay, which offered mobile P2P payments in a number of developing countries before launching a similar service in the United States in 2006 (Digital Transactions 2006; Benson 2009b). A final example is Serve, a mobile P2P service owned and operated by American Express and introduced in 2011 (Sposito).

Of the various nonbank-centric P2P services that have emerged since 2000, only PayPal has gained significant traction among consumers. At the end of 2011, PayPal had nearly 110 million active global payment accounts, up from 50 million in 2006 and 5 million in 2001 (Chart 1). PayPal does not report how many of these accounts are in the United States. However, a little less than half of the company's payments revenue still comes from the United States, suggesting that a substantial portion of total accounts are domestic.

### *Introduction of bank-centric and card-centric P2P services*

In the late 2000s, two additional types of P2P payment methods emerged. The first were bank-centric methods in which the payer logged on to her bank's website and instructed the bank to transfer funds from her account to that of another individual at another bank.<sup>1</sup> The introduction of this service was made possible by the rapid growth of Internet banking in the 2000s. The first bank websites on which

customers could conduct banking transactions were launched in 1995. By the end of 2003, 53 percent of commercial banks had such websites, and by the end of 2011, 90 percent had them. Small banks were slower to offer online banking than large banks (Chart 2). By 2011, however, the share of banks under \$25 million in size with transactional websites had passed 40 percent. Many banks also made Internet banking more convenient by introducing applications allowing customers to log on from their mobile phones (First Annapolis 2011a).

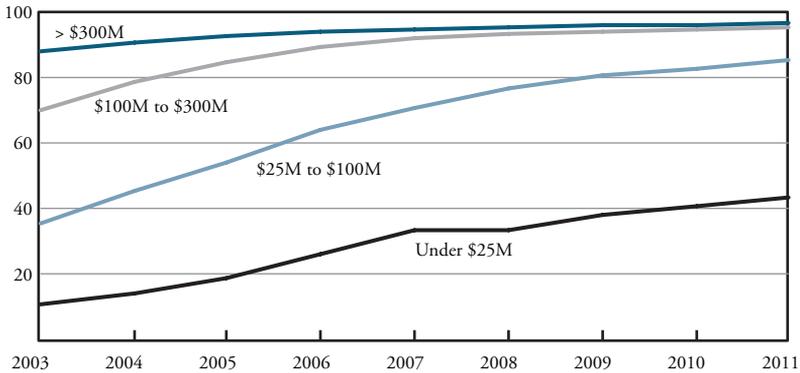
While a few individual banks have offered services enabling their customers to make P2P payments to noncustomers, the more important bank-centric services have been based on multibank networks.<sup>2</sup> Two of the best-known of these services were Popmoney, launched by CashEdge in mid-2009, and ZashPay, introduced by Fiserv in 2010. CashEdge was acquired by Fiserv in 2011, and the two P2P services were combined under the Popmoney name in June 2012 (Digital Transactions 2011b, 2012a). By that time, the total number of participating banks had grown to about 1,250, representing almost 20 percent of total U.S. bank, thrift, and credit union deposits.<sup>3</sup>

In another significant development, Bank of America, Wells Fargo, and J.P. Morgan Chase announced the formation in 2011 of a consortium called clearXchange, allowing their customers to make payments to each other from the banks' websites (Benson 2011; Digital Transactions 2011c; Johnson 2011c; Punch). ClearXchange officials have suggested a willingness to expand their customer base by allowing smaller banks to join or by entering a cooperative arrangement with Popmoney. Even without such expansion, however, the consortium will start with significant reach, since the three banks account for 29 percent of total U.S. bank, thrift, and credit union deposits.

The final development in P2P payments has been the emergence of card-centric methods with payment processed entirely over a debit card or credit card network. An example of such a service is Visa's Money Transfer (VMT), which has been available outside the United States since the early 2000s. VMT allows a consumer to send funds from her own Visa credit card or signature debit card to the Visa credit card or signature debit card account of the payee. Visa entered a pilot project with U.S. Bank to offer the service in 2008 (Visa 2008) and

Chart 2

## PERCENT OF COMMERCIAL BANKS WITH TRANSACTIONAL WEBSITES

*End of Year*

Source: Federal Financial Institutions Examination Council.

announced a joint venture with Popmoney for the service in 2011 (Johnson 2011b). Despite such initiatives, however, U.S. Bank appears to be the only bank currently offering VMT.

Other new card-centric P2P payment methods are based on PIN debit cards.<sup>4</sup> Early examples were the P2P services offered by PIN debit card networks STAR and NYCE in the early 2000s (First Data; Business Wire). These services required both the payer and the payee to have cards issued by banks belonging to the network. Because the services failed to gain traction on a stand-alone basis, Star and NYCE recently decided to offer them jointly with other payment providers—STAR with Obopay and NYCE with Popmoney (Wolfe; Johnson 2011a; Quittner). Continuing this trend, Accel/Exchange announced it would team with ZashPay (now Popmoney), and Pulse entered into an agreement with Obopay (Roberts; Quittner).

*Current state of P2P payment methods*

While many new P2P payment methods have been introduced over the last decade, cash and checks remain the primary methods for making such payments, with checks occupying an especially important role. In other types of consumer payments, such as bill payments and purchases from stores, the number of payments made by check has

declined sharply as electronic payment methods have become more popular. In the case of P2P payments, however, the number of payments by check has continued to grow moderately. For example, the most recent triennial payment study by the Federal Reserve found that from 2006 to 2009, the number of checks written for P2P payments increased 4 percent, while the number written for consumer-to-business (C2B) payments fell 10 percent (Federal Reserve System, p. 12).

The continued dominance of checks in P2P payments is also evident in a recent study of U.S. payment trends by McKinsey & Co. This report estimated that \$1.4 trillion in P2P payments were made in the United States in 2009, representing 5 percent of the total value of consumer payments (McKinsey & Co.). Of these P2P payments, 84 percent of the dollar value was made by check and 11 percent by cash. Only 5 percent was made by other methods such as the new ones introduced over the last decade. The fact that new payment methods still account for such a low share of P2P payments suggests the need for a careful assessment of the pros and cons of these methods relative to checks.

## II. KEY CHARACTERISTICS OF P2P PAYMENT METHODS

To determine whether a P2P method meets the needs of consumers, it is useful to evaluate the method in terms of the characteristics important to payers and payees. Among these characteristics, two of the most important have always been cost and convenience. For many consumers, and especially younger ones, electronic payment methods are more convenient than paper-based methods such as cash and checks (Hough and others; Simotas). In addition, empirical studies have shown that electronic payment methods tend to use significantly fewer resources than paper-based methods (Humphrey and others). Thus, to understand why the new P2P payment methods have gained little ground over cash and checks the last decade, it is necessary to look at other characteristics of payment methods. Four especially relevant characteristics are speed, payer control, security, and universality. This section briefly describes each characteristic and explains why it is important to payers and/or payees. The section also evaluates the two traditional payment methods, cash and checks, in terms of each characteristic.<sup>5</sup>

### *Speed*

Speed refers to the time between the initiation of payment by the payer and the completion of the transfer of funds to the payee. Initiation could take various forms, including handing over cash, mailing a check, or submitting a payment order on a bank or payment provider website. The transfer of funds is assumed to be complete when the funds used to make the payment are unavailable to the payer (for example, when her bank account has been debited) and available to the payee (for example, when his bank account has been credited). Some payments experts argue that a payment is not complete until it is also final, in the sense that the transfer cannot be revoked except in unusual circumstances such as undisputed fraud.<sup>6</sup>

Payment speed differs significantly between the two traditional P2P methods, cash and checks (Table 1). Cash payments can be viewed as immediate—the payer loses access to the funds and the payee gains access as soon as the cash is delivered. Payment speed is more variable for checks, depending on how long it takes the check to reach the payee through the mail, how long it takes the payee to cash or deposit the check, and how long it takes the check to be processed after deposit. Check payments can be completed in a matter of hours if the payer delivers the check to the payee in person and if the payee cashes the check at a branch of the payer's bank. Also, check payments can be completed within a day or two if the payer hands the check to the payee and the payee deposits the check in his bank account.<sup>7</sup> However, if the payer has to mail the check to the payee, payment can take as long as a week to be completed. For this reason, the payment speed of checks is rated low-to-medium.

Rapid payment in P2P transactions can significantly benefit participants by allowing them to more easily monitor their financial positions and track their spending. With rapid payment, payers can be more certain when funds will be transferred out of their accounts and how their balances will be affected. As a result, they will be less likely to incur accidental overdrafts or have payments denied because they have exhausted account balances or exceeded credit limits. Rapid payment has similar benefits for consumers receiving P2P payments, by providing them greater certainty about the timing of inflows to their accounts.<sup>8</sup>

Table 1  
KEY CHARACTERISTICS OF TRADITIONAL AND NEW P2P PAYMENT METHODS

P2P payment method	Examples	Speed	Payer control	Security	Universality
Traditional P2P methods					
Cash		High	High	Low	High
Checks		Low-to-Medium	Low	Low	High
New P2P methods					
<i>1. Nonbank-centric (initiated by payer at nonbank intermediary)</i>					
a. Book transfer between payer's and payee's intermediary accounts	Amazon Webpay, Obopay, PayPal, Serve	High	High	High	Low
b. ACH credit to payee's bank account funded by ACH debit on payer's bank account	Amazon Webpay, Obopay, PayPal, Serve	Low-to-Medium	Medium	Medium	Low
c. ACH credit to payee's bank account funded by payer's payment card (debit, credit, or prepaid card)	Amazon Webpay, Obopay, PayPal, PayPal/Discover	Medium	Medium-to-High	Medium-to-High	Low
<i>2. Bank-centric (initiated by payer at her bank)</i>					
a. ACH credit to payee's bank account funded by ACH debit on payer's bank account (split payment)	Popmoney	Medium	High	High	Medium
b. ACH credit to payee's bank account from payer's bank (single payment)	Chase QuickPay, ING Person2Person, clearXchange	Medium-to-High	High	High	Low (individual bank) Medium (consortium)
<i>3. Card-centric (processed entirely over card network)</i>					
a. Processed over a signature debit or credit card network (Visa or MC)	Visa Money Transfer	High (discretion of payee bank)	High	High	Medium
b. Processed over a PIN debit card network	Obopay/Star, Popmoney/ NYCE, ZashPay/Accel	High (discretion of payee bank)	High	High	Medium

*Payer control*

Payer control refers to the payer's ability to choose the most advantageous terms for the transfer of funds to the payee. As used in this article, the term refers to two distinct aspects of payer control. First is the payer's influence over the timing of the funds transfer—specifically, her ability to determine when the funds will become unavailable to her for other spending. The second aspect of payer control comes into play when payment is from an account with a bank or nonbank intermediary. This aspect is the payer's ability to observe information about the status of the account—such as the current balance and pending payments—that could help her decide whether to proceed with the payment and, if so, when to have the transfer occur.

Among the two traditional payment methods, payer control over the transfer of funds is very high with cash but low with checks (Table 1). In a cash payment, the payer has complete control over the timing of the transfer—the payer loses access to her funds at the moment she hands the cash to the payee. Furthermore, the payer has no need to verify her account balance to make sure she has sufficient funds to cover the payment.

In the case of checks, payer control over the transfer of funds is low in both respects mentioned above.<sup>9</sup> As noted earlier, an individual paying by check cannot be sure when the payee will receive the check, when he will deposit the check in his bank, and when his bank will present the check to the payer's bank. As a result, the payer has little control over the timing of the funds transfer. With some effort, she may be able to ascertain her current balance at the time she writes the check. However, because she cannot be sure when the check will be presented for payment, she may have no way of knowing whether there will be enough funds in her account when the check is presented for payment. Thus, check payments also rank low in terms of the payer's ability to observe information about her account status that could help decide whether to go ahead with the transfer and when to arrange it.

Strong payer control over the transfer of funds benefits consumers by helping them manage their finances and control their spending. Specifically, greater certainty about the timing of transfers and increased access to information about account status helps payers avoid overdrafts and manage their account balances.

### *Security*

A P2P payment method is secure if there is little risk that consumers' use of the method will lead to unauthorized transfers of funds. One aspect of security is the extent to which sensitive account information is prevented from falling into the hands of fraudsters. In the case of a bank account, this information includes the consumer's account number and the bank's routing number. Most payment methods funded from bank accounts or paid into such accounts require one of the parties to reveal this information to the other party or to a third party. The methods may differ, however, in how carefully this information is protected. A second aspect of security is the strength of the authentication procedure used to verify that a transfer of funds has been authorized by the payer. If such authentication were foolproof, a fraudster in possession of a consumer's account information would be unable to impersonate the consumer and use the stolen information to make an unauthorized withdrawal from the consumer's account.

With respect to traditional P2P payment methods, security is low for both cash and checks. In the case of cash, the payer may be subject to theft before the payment and the payee subject to theft after the payment. With check payments, the payer must reveal her bank account number and bank routing number to the payee because this information is printed on the check. Thus, protection of sensitive account information is low. In addition, banks do not have highly reliable means for verifying that the payer has authorized the withdrawal from her account. In principle, the payer's bank could compare the signature on the check with a signature on file before honoring the check. However, banks do not verify signatures on most checks, and signatures can be forged. Furthermore, account information taken from a consumer's check could be used to withdraw funds even without forging the consumer's signature. For example, a fraudster could use the information to pull funds from the individual's account through the automated clearinghouse (ACH), claiming that the individual had authorized the payment over the telephone or Internet.<sup>10</sup> Thus, check payments rank low not only in protection of account information but also in authentication of the payer.

Security in P2P payments is important to consumers. Consumer protection regulations and payments providers' voluntary fraud

protection policies may shift the losses from unauthorized withdrawals from the consumer to the bank or nonbank intermediary holding the consumer's account. However, unauthorized transfers can be costly to consumers in other ways. For example, closing a compromised account may be inconvenient and time-consuming, and fraud protections may be contingent on prompt notification or elaborate documentation.

### *Universality*

The last characteristic useful in comparing P2P payment methods is their potential for universality—their ability to gain widespread acceptance among consumers in their roles both as payers and as payees. Most new payment methods face the chicken-and-egg problem that people on one side of the transaction will not want to use the method until enough people on the other side of the transaction have decided to accept it. The ability to break this impasse is arguably the most important attribute of a new payment method because a payment method will be of no use to a consumer if the other party to the transaction is unwilling to use it.

The potential for universality depends on two factors. The first factor is how attractive consumers would find the payment method if they were already set up to use it and could be assured the other party to the transaction would be willing to use it. The answer to this question depends on the cost and convenience of using the service after setup and on other attributes of the payment that directly affect the benefits to the consumer, such as speed, payer control, and security. The second factor is the cost to the consumer of setting up to use the service. This cost includes both the time required to enroll and learn how to use the service and the cost of any equipment needed, such as a smartphone. The cost also depends on whether the consumer must have an account with a participating bank or card network to access the service and, if so, how likely the consumer is to already have such an account or be able to establish one.

As traditional P2P payment methods, cash and checks rank high in universality. Cash is widely accepted for small-dollar payments between individuals in the same geographic area, while checks are widely accepted for larger payments and payments between individuals in different areas. A major advantage of checks in achieving universality has

been their low setup cost. Having a bank account is all that is needed to use the method, and most consumers would establish such an account whether or not they used checks.<sup>11</sup> The low setup cost helps explain why checks remain so widely used for P2P payments despite their other disadvantages. These disadvantages include high resource costs, inconvenience for consumers who like to conduct business electronically, and as discussed above, low speed, payer control, and security.

### III. EVALUATION OF NEW P2P PAYMENT METHODS

The characteristics discussed in the previous section provide a useful framework for evaluating new P2P payment methods. This section looks separately at the three main types of new P2P payment methods introduced over the last decade—nonbank-centric, bank-centric, and card-centric. For each method, the section first explains how payments are processed. Special attention is paid in this discussion to the clearing and settlement process, which has an important but sometimes neglected bearing on the ability of the methods to meet the needs of consumers. Each method is then ranked in terms of the four key characteristics.<sup>12</sup>

#### *Nonbank-centric P2P payment methods*

The nonbank-centric P2P methods are similar in the way payments are initiated, authorized, and authenticated. The methods generally require that the payer have an account with the intermediary before initiating payment. Many also require that the payee either already have an account or establish an account to receive the payment. Establishing an account generally entails creating a user ID and password and providing a home address, email address, and phone number. The other key requirement is to designate a source from which the intermediary account and payments can be funded, the main alternatives being a bank account or a payment card. In all cases, the payer initiates the payment by logging on to the website or mobile payment application of the nonbank intermediary.

How nonbank-centric payments are cleared and settled depends on a variety of factors, including the funding source used by the payer and the way funds are received by the payee. Three main possibilities can be distinguished, with different implications for the four key payments characteristics introduced in the previous section.

*Payment by account transfers on intermediary books.* The simplest way of clearing and settling a payment is through a book transfer from the intermediary account of the payer to the intermediary account of the payee. As indicated in Table 1, Amazon, Obopay, PayPal, and Serve all allow P2P payments to be cleared and settled in this way. This approach requires that the payer have funds in her intermediary account before she initiates payment and that the payee leave the funds in his intermediary account for future spending. Book transfers are advantageous to the intermediary in that no processing fees have to be paid to banks, ACH operators, or card networks for the transfer of funds from payer to payee.<sup>13</sup> However, anecdotal evidence suggests that except for frequent buyers and sellers in online auctions, most consumers do not use book transfers to make P2P payments because they prefer funds to reside in their bank accounts.

*Split payment with ACH credit to payee funded by ACH debit to payer.* A more common way of clearing and settling nonbank-centric P2P payments is through split payments, with funds passing from the payer to the intermediary and then from the intermediary to the payee. In most of these schemes, both payments are executed over the ACH network. In the first leg of the transaction, the intermediary requests its bank to pull funds from the payer's bank account via an ACH debit, using the account information provided by the payer to the intermediary. In the second leg of the transaction, which may begin before the first leg is finished, the intermediary instructs its bank to push funds to the payee's account via an ACH credit, using the account information provided by the payee to the intermediary. (See Appendix for further details.)

*Split payment with ACH credit to payee funded by payer's card.* The last possibility is for the payee to be paid through an ACH credit to his bank account but for the payer to fund the payment with a debit, credit, or prepaid card instead of an ACH debit to her bank account. The intermediary sends a message through the card network to the bank that issued the payer's card requesting approval of the payment. After verifying the account is valid and has sufficient funds, the payer's bank sends a message to the intermediary approving the payment. At that time, the payer's bank also debits the payer's account (PIN-centric debit card or prepaid card) or places a hold on the payer's account (signature debit card or credit card). Clearing and settlement for the

payment from the payer to the intermediary is the same as for other card payments, involving a series of ACH or wire transfers among the banks involved—the payer’s bank, the settlement banks of the card networks and card processors, and the intermediary’s bank (Littell; Hayashi and others). Clearing and settlement for the payment from the intermediary to the payee is the same as in the previous payment method.

When a P2P payment is funded with a payment card, the intermediary must pay an interchange fee to the card issuer for the card transaction. In most cases, this interchange fee significantly exceeds the fee that the intermediary would be charged by its bank for carrying out an ACH debit pull on the payer’s account. As a result, funding from a payment card tends to be much more costly to the intermediary than funding from a bank account.<sup>14</sup>

*Evaluation of nonbank-centric payment methods.* Speed of payment depends on how the payment is cleared and settled. Payment is immediate when it involves a book transfer from the intermediary account of the payer to the intermediary account of the payee. For split payments funded by an ACH debit on the payer’s bank account, payment speed can be characterized as low-to-medium. If the nonbank intermediary is unwilling to initiate the ACH credit to the payee until the ACH debit on the payer has been completed, the payee may not receive access to funds for several days.<sup>15</sup> In this case, payment speed can be described as low. However, if the intermediary is willing to send funds to the payee before it has received funds from the payer, the payment could be completed as soon as the next day, just as with a check deposited on the same day it was written. Thus, payment speed in this case can be rated as medium. Finally, when payment is funded from a payment card, the intermediary may be willing to initiate the ACH credit to the payee immediately, because the intermediary will have communicated with the card issuer through the card network to verify that the funds are available. As a result, payment speed can again be characterized as medium.

Payer control also varies across the three types of nonbank-centric payment methods. Control is high with book transfers between intermediary accounts, because the payer can verify her account balance when initiating the payment and can be certain the funds will be transferred from her account immediately afterward. For split payments funded by an ACH debit on the payer’s bank account, payer

control is only moderate due to two factors. First, the payer may be in a poor position at the time the payment is initiated to determine if she has enough funds in her bank account to cover the payment. Second, because the initiation of the debit pull is at the discretion of the intermediary and its bank, the payer cannot be certain when the withdrawal will occur or what her account balance will be when it does. Nonetheless, payer control is still greater than with checks because the payer has less reason to worry that the authorization to withdraw funds will be misplaced or end up in the wrong hands. If the intermediary is unable to contact the payee to arrange payment, it will advise the payer, reducing the payer's uncertainty about the status of the payment. Finally, when funding is from a payment card, payer control is weaker than with book transfers but stronger than when funding is through an ACH debit pull. Because the intermediary communicates with the payer's bank through the card network, the payer learns immediately if she has insufficient funds in her account to cover the payment. Thus, the risk of accidental overdrafts is eliminated.

Security, like speed and payer control, is highest for payments using book transfers. In such payments, neither the payer nor the payee has to reveal account information to the other party. Also, with book transfers, the entity that authenticates the payer is the same one that holds the payer's account, leading to stronger authentication and lower risk of fraud. When payment is funded by an ACH debit on the payer's account, security can be characterized as medium—lower than for book transfers but higher than for checks. In this case, payers do not have to reveal their bank account information to payees, giving the method an advantage over checks. However, payers and payees do have to give their bank account information to a nonbank intermediary, which may be a concern to some consumers if the intermediary is new or unknown. Another problem with this method is that payees not already enrolled in the service may be required to follow an email link to a website where they are asked to provide their bank account information, a procedure vulnerable to phishing attacks. Nonbank-centric payments funded by a payment card are also subject to phishing attacks on the payee. However, this payment method has the advantage that card networks tend to employ strong authentication procedures, of their own, reducing the risk that the payer will be impersonated by

a fraudster. Thus, security is somewhat higher than when payments are funded by ACH debits on payers' bank accounts.

All the nonbank-centric payment methods face obstacles in gaining widespread acceptance among consumers. To make a payment using one of the methods, a consumer must go to the time and trouble of establishing an account with an intermediary. Intermediaries often try to make adoption "viral" by requiring payees to establish an account with the intermediary to receive a payment. The hope is that these consumers will choose to use the service when the need arises for them to make a payment. But payees, like payers, may be reluctant to go to the effort of enrolling in a new service, preferring instead to be paid by cash or check. Some payees may also be hesitant to use a service that requires them to reveal their bank account information, which they could avoid if paid by check. Such security concerns are likely to be greater if the payee has to provide his account information by following a link to a possibly spurious website. Thus, potential for universality can be considered low with nonbank-centric payment methods, notwithstanding the impressive growth of PayPal since its inception.

### *Bank-centric P2P payment methods*

Bank-centric P2P payment methods resemble the first type of nonbank-centric method discussed above in that funds are transferred from the bank account of the payer to the bank account of the payee over the ACH network. However, bank-centric methods differ from nonbank-centric methods in two important respects. First, payment is initiated by the payer interacting directly with her bank instead of a nonbank intermediary. Second, the funds used in the payment do not reside even temporarily in accounts held by the payer or payee with a nonbank intermediary. The transfer of funds is always direct from the payer's bank account to the payee's bank account, although it need not occur in a single step.<sup>16</sup>

To use a bank-centric payment method, the payer must have an account with a bank that participates in the service.<sup>17</sup> The payer initiates the payment by logging on to her bank's website or mobile payment application and opting to use the P2P service. As in other methods, the payer provides the email address or mobile phone number of the payee.

The bank verifies that the payer has sufficient funds in her account to cover the payment and, if so, approves the payment. After that point, the processing of the payment depends on whether the payee has an account at a participating bank and how the payment is cleared and settled—through a split payment over the ACH network, or a single ACH payment from the payer to the payee.

*Split payment with ACH credit to payee funded by ACH debit to payer.* The main example of a split-payment bank-centric method is Popmoney. The authentication and authorization process in this case involves a series of communications between the P2P service and the other participants—the payer’s bank, the payee, and the payee’s bank (Popmoney 2012a and 2012b; Fifth Third Bank 2012a and 2012b). The payer’s bank begins the process by transmitting the necessary payment information to the P2P service. The service then notifies the payee of the payment and uses the payee’s email address or mobile phone number to determine if he has a registered account at a participating bank. If he does have such an account, the P2P service transmits the payment information to the bank, and the payee goes to the bank’s website to authorize the deposit. If the payee does not have a registered account at a participating bank, he receives payment by following a link to the P2P service’s website and providing the service with the necessary account information.

Clearing and settlement in this case is very similar to the nonbank-centric model with split ACH payments (Benson 2009a). In the first leg of the process, the P2P service instructs its bank to pull funds from the payer’s bank account using an ACH debit. In the second leg, the service tells its bank to send funds to the payee’s account using an ACH credit. The account information for the debit pull was provided to the P2P service by the payer at registration. The account information for the credit push was provided to the service by the payee at registration (if he has a registered account at a participating bank) or is obtained directly from the payee (if he does not have a registered account at a participating bank). As in the split payment nonbank-centric model, the ACH credit may sometimes be initiated before the ACH debit has been completed. (See Appendix for further details.)

*Single payment—ACH credit to payee from payer.* In the second type of bank-centric P2P model, funds are transferred by means of a single ACH credit from the payer’s bank account to the payee’s bank account. Some of the single-payment schemes are operated by individual

banks, while one is operated by clearXchange, a consortium of three of the nation's largest banks.

When the P2P service is operated by an individual bank, the payee can receive payment using an account at any bank. The bank operating the service sends the payee an email or text message informing him of the payment and asking for his bank account information. The bank uses the information to send an ACH credit to the payee's account if the account is at another bank, or to make a book transfer to the payee's account if the account is at the same bank.

When payment is through a consortium such as clearXchange, a payee with an account at a member bank can go directly to his bank's website to receive the payment instead of providing his account information to the P2P service. While clearXchange has not revealed all the details of its operations, the authentication and authorization process likely would be similar to that used by Popmoney. Specifically, the consortium would use the payee email address or mobile phone number provided by the payer to determine if the payee was signed up for the P2P service with a member bank. If the payee was signed up, the consortium would transmit the payment information to the payee's bank, after which the payee could go to his bank's website to accept payment. If the payee was not signed up, he would be asked to go to the consortium's website to provide his account information.

Clearing and settlement would likely consist of a single ACH credit from the payer's bank account to the payee's bank account. If the payee was signed up with a member bank, he would indicate the account into which he wanted the payment deposited when he went to his bank's website to receive payment. After the payee made this choice, his bank would transmit the account information to the payer's bank through the consortium. If the payee was not signed up with a member bank, he would be asked to provide his account information on the consortium website, and the consortium would pass the information on to the payer's bank. In both cases, the payer's bank would use the payee's account information to send him an ACH credit. (See Appendix for further details.)

*Evaluation of bank-centric payment methods.* Speed of payment is likely to be at least as high with bank-centric payments as with non-bank-centric payments funded by payment cards. As in card-funded payments, the payment will not be approved until the payer's bank

has verified that the payer has enough funds in her account to cover the payment. As a result, the payee's bank should be willing to grant the payee quicker access to the funds than if the payment were funded from a bank account but initiated at a nonbank intermediary.<sup>18</sup> Speed of payment should be even higher in the single-payment bank-centric schemes, because only one ACH payment needs to clear before the funds reach the payee's bank instead of two.<sup>19</sup>

Payer control over the transfer of funds is high with bank-centric services. The payer does not have to worry about an overdraft on her account because the bank will not approve the payment unless she has sufficient funds. Also, because the payer must be logged on to her on-line banking account to initiate the payment, she will be in a better position to check her account balance than if she had to go to the website of a nonbank intermediary to initiate a payment from the account. A final advantage of bank-centric schemes is that consumers enrolled in the service may be able to agree to automatic deposit of payments into their bank accounts (Fifth Third Bank 2012b). When both the payer and payee are enrolled in the service, this arrangement eliminates the uncertainty that payers face with checks and other P2P payment methods as to when the payee will start the process of receiving payment.

Bank-centric P2P payment methods also rank high in terms of security. Account information is likely to be well protected when both the payer and payee are enrolled in a bank-centric P2P service. In the single-payment consortium model, the payee's information is transmitted directly from the payee's bank to the payer's bank through the consortium, affording a high degree of protection. In the split-payment model, the payer's and payee's account information is stored with the P2P service but is provided to the service by their banks, which have the incentive and resources to ensure the information is transmitted safely. Authentication of payers also tends to be strong in bank-centric payment methods. Although nonbank intermediaries can become skilled at authentication, the payer's bank is usually in a better position to verify her identity because the bank deals with her on a regular basis and is required by regulators to know all its customers.

The main drawback of the bank-centric methods is the same as with the nonbank-centric methods—difficulty in achieving universality. Like the nonbank-centric services, bank-centric P2P services must persuade payers to enroll in the service and payees to accept payment

through the service. In trying to gain traction, bank-centric services face the additional challenge that a payer cannot sign up for the service unless her bank participates. As a result, bank-centric services must expand their user bases by first signing up banks and then persuading customers of those banks to use the service. The silver lining is that by signing up banks, a bank-centric service may be able to attract entire blocks of new customers, since the setup cost will be low for consumers whose banks already participate.

*Card-centric P2P payment methods.* The last category of P2P payment methods are those in which the payment is processed entirely over a card network. The payment is funded from a payment card of the payer, just as in some of the nonbank-centric methods. In addition, however, payment is made directly to a card account of the payee. Also, payment information is transmitted over a card network. Clearing and settlement of the card-centric P2P methods depends on which type of card network is used for processing—a credit or signature debit network, or a PIN debit network.

*Payments using credit or signature debit network.* As noted in Section I, the most prominent example of P2P payments processed over a credit or signature debit card network is VMT. This service allows a customer of a participating bank to send funds from her own Visa account to the Visa account of the payee (Visa 2011). After logging on to her bank's website, the payer enters the amount of the payment, the payee's email address or mobile phone number, and the payee's Visa card number. If the payee's Visa card is a signature debit card, the funds ultimately flow to the bank account to which his debit card is linked, just as in the split-payment and single-payment P2P methods. If the Visa card is a credit card, the payee's credit card balance is credited. Clearing and settlement occurs over Visa's signature debit and credit card network and resembles the processing of a credit to a cardholder's account following a store return. Payment is guaranteed by Visa, but the payee's bank has up to two days to credit the payee's account unless the bank has signed up for a program called Fast Funds, in which case it must grant the payee immediate access to the funds (Visa 2012).

*Payments using PIN debit network.* When processing is over a PIN debit card network, both the payer and the payee must have an account with a bank affiliated with the network. The payer initiates the

payment by logging on to either her bank's website or the website of a sponsoring nonbank intermediary such as Obopay and entering the payee's card number. In contrast to the previous case, the payer's bank account is debited as soon as the payment has been approved, as is standard in PIN debit payments. Clearing and settlement occurs over the PIN debit network. Although settlement is usually not completed until the next day, the payee may be given immediate access to the funds by his bank. In the P2P services offered by PIN debit networks jointly with Popmoney, the payer initiates the payment from her bank's website, just as for other Popmoney payments. However, instead of using the ACH network to transfer funds from the payer's bank account to the payee's bank account, Popmoney transmits the payment information to the PIN debit network for processing.

*Evaluation of card-centric P2P payment methods.* Most providers of card-centric payment methods claim that payment is immediate. The reason given is that notification by the card network that sufficient funds are available eliminates the risk to the payee's bank of making funds available to the payee before they are received from the payer. However, such quick availability of funds is not automatic in the card-centric models. It is up to the payee's bank whether to grant the payee immediate access to funds, since the transfer of funds from the payer's bank can take more than a day to complete (Noyes 2010). For this reason, the speed of payment in Table 1 is characterized as high, but at the discretion of the payee bank.

Card-centric P2P payment methods offer payer control over the transfer of funds. When the payer initiates the payment, the card network sends a message to her bank to verify that the account has sufficient funds or available credit to cover the payment. If funds are not available, the payment is rejected, eliminating the chance of an accidental overdraft. Furthermore, if the payer initiates the payment from her bank's website rather than the website of a nonbank sponsor such as Obopay, she will be in a position to check her account balance before authorizing the payment, providing still greater control over the transfer of funds.

Security can also be characterized as high in card-centric P2P payments. In most services, the payment can be initiated at the payer's bank. As suggested in the discussion of bank-centric services, authen-

tication of the payer tends to be strong in this case because the payer's bank is in a good position to verify her identity. If a card-centric payment is initiated on the website of a nonbank sponsor such as Obopay, authentication may not be quite as strong. However, the requirement that the payer also be authenticated by the card network helps limit the chances of fraudsters using a stolen card number to impersonate a consumer in a P2P payment. Finally, card-centric services provide some degree of security for payees because the service can obtain the payee's card number directly from the payee, making it unnecessary for the payee to reveal that information to the payer.

Like other new P2P payment methods, card-centric methods face obstacles achieving universality. To use one of these services, both the payer and payee must have a card that can be processed on the network on which the service is based. P2P services using signature debit and credit cards have the advantage that the two main networks account for the vast majority of cards. As a result, a substantial fraction of consumers already have a card from one of those networks.<sup>20</sup> P2P services based on PIN debit cards differ in that there are many more networks and the distribution of cards is not as concentrated. However, unlike signature debit and credit cards, PIN debit cards can often be processed on more than one network. As a result, several of the largest PIN debit networks have market coverage comparable to Visa and MasterCard in terms of numbers of consumers who hold the networks' cards.<sup>21</sup> In addition, it is technically feasible for PIN debit networks to make their P2P services interoperable, in the sense that a payment could start on one network and end on another.<sup>22</sup> Both types of card-centric methods have the disadvantage, however, that a payer can make a payment with the method only if the bank that issued the card has agreed to participate.<sup>23</sup> Thus, the potential for universality is rated only medium—higher than for the nonbank-centric methods but the same as for most of the bank-centric methods.

#### IV. CONCLUSIONS AND POLICY IMPLICATIONS

Three basic models of new P2P methods have emerged over the last decade: nonbank-centric methods, bank-centric methods and card-centric methods. Because they are electronic and can be used with mobile devices, the new methods have lower resource costs and greater conve-

nience than the traditional methods for making P2P payments—cash and checks. Some of the new methods are also faster than checks, especially the card-centric methods that give cardholders immediate access to funds and the bank-centric methods that require only a single payment between bank accounts. Payer control is only moderately higher than checks in most of the new nonbank-centric methods. However, both the bank-centric and card-centric methods provide strong control—in the bank-centric methods because the payer initiates the payment on her bank’s website, and in card-centric methods because the card network verifies that the payer has sufficient funds before approving the payment. Finally, all the new methods are more secure than checks in the sense of protecting account information. Bank-centric and card-centric methods have the additional advantage of securely verifying the payer’s identity.

The most important shortcoming of the new P2P methods is their inability to gain widespread acceptance. Nonbank-centric services have tried to overcome the chicken-and-egg problem by requiring payees to open an account to receive payments. PayPal had considerable success with this technique but is still much less used than checks for P2P payments. The bank-centric and card-centric services face an additional challenge, which is that a consumer cannot sign up unless the bank holding her account or issuing her payment card has joined the scheme. As a result, the P2P services must first sign up banks and then take advantage of the low setup costs for consumers whose banks already participate.

The above assessment suggests that ample scope remains for innovation in P2P payments. The Federal Reserve could contribute to this effort in two ways. The first would be to work with the private sector to speed up the processing of ACH payments. Because both the nonbank-centric and bank-centric P2P methods make heavy use of the ACH network, faster ACH settlement could significantly increase payment speed for these methods. The Federal Reserve took an important first step in this direction in 2010 when it introduced optional same-day settlement of ACH debits. NACHA, the private-sector organization that sets the rules for ACH transfers, recently gave a further nudge to the effort by proposing mandatory same-day settlement for both ACH debits and ACH credits (NACHA 2011; Digital Transactions 2011d).

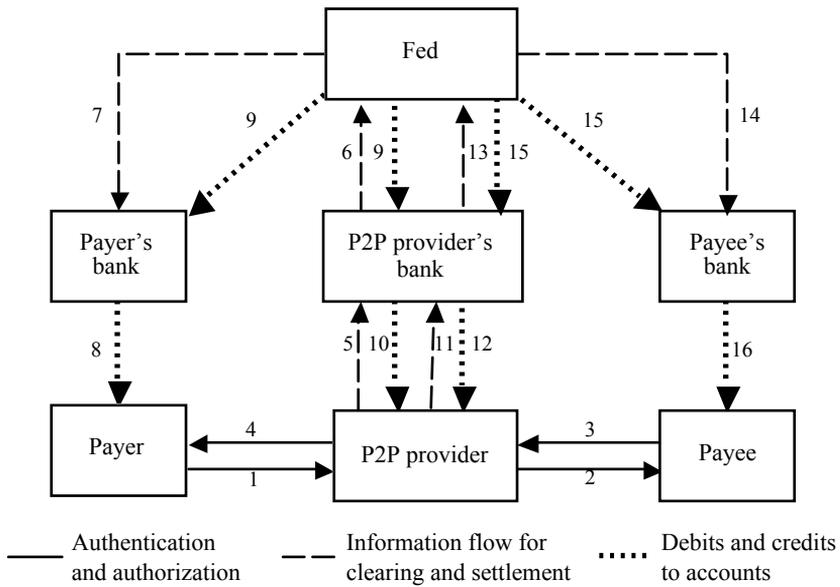
The second way the Federal Reserve could assist innovation in P2P payments would be to take the lead in developing a directory service for bank account information. New payment methods relying on transfers between bank accounts have been held back by the inconvenience to payers of having to obtain the payee's account information and the reluctance of payees to divulge that information to payees or third parties. With a directory service, the payee could provide the payer with only an email address or mobile phone number, which the payer's bank could use to retrieve the payee's account information. To be useful, such a directory service would need to be easily accessible by all banks and highly trusted by consumers. The Federal Reserve would be well suited to create and manage a directory service with these qualities because it has secure electronic links to all U.S. banks and a clear mission to promote a safe and efficient payment system.

APPENDIX

This appendix provides a detailed, step-by-step explanation of payment processing in three of the new P2P payment methods. First is the nonbank-centric method with an ACH credit to the payee’s bank account funded by an ACH debit on the payer’s bank account (Figure A1). Second is the bank-centric method with an ACH credit to the payee’s bank account funded by an ACH debit on the payer’s bank account (Figure A2). Last is the bank-centric method operated by a consortium of banks with a single ACH credit from the payer’s bank account to the payee’s bank account (Figure A3).

Figure A1

NONBANK-CENTRIC P2P: SPLIT PAYMENT TO BANK ACCOUNT FUNDED BY BANK ACCOUNT



**Assumptions:** Payer needs to pay \$100 to payee. Both the payer and payee have accounts with the P2P provider linked to their bank accounts. Both the payer’s bank and payee’s bank use the Federal Reserve for their ACH processing.

**Authentication and Authorization**

1. Payer logs on to P2P provider’s website, indicates she wants to pay \$100 to the payee from her linked bank account, and provides payee’s name and email address or mobile phone number.

2. P2P provider sends email or text message to payee informing him of payment.
3. Payee logs on to P2P provider's website and indicates that he wants to receive payment in his linked bank account.
4. P2P provider sends email or text message to payer informing her that payee has accepted payment.

**Clearing and Settlement—Payment from payer to P2P provider**

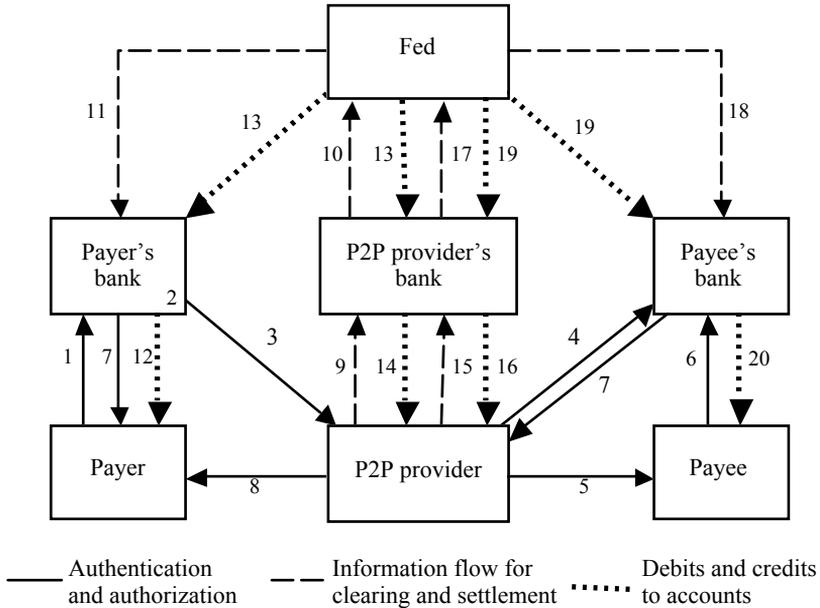
5. P2P provider tells its bank that it has been authorized to pull \$100 from payer's bank account at payer's bank.
6. P2P provider's bank sends ACH file to Fed with a debit to payer's bank account, using account information provided by payer to P2P provider at registration.
7. Fed sends ACH file to payer's bank with debit to payer's bank account.
8. Payer's bank posts debit to payer's bank account.
9. Fed debits reserve account of payer's bank and credits reserve account of provider's bank.
10. P2P provider's bank posts credit to provider's bank account.

**Clearing and Settlement—Payment from P2P provider to payee**

11. P2P provider tells its bank that it has been authorized to push \$100 to payee's account at payee's bank.
12. P2P provider's bank posts debit to P2P provider's bank account.
13. P2P provider's bank sends ACH file to Fed with credit to payee's bank account, using account information provided by payee to provider at registration.
14. Fed sends ACH file to payee's bank with credit to payee's bank account.
15. Fed debits reserve account of provider's bank and credits reserve account of payee's bank.
16. Payee's bank posts credit to payee's bank account (could occur earlier).

Figure A2

**BANK-CENTRIC P2P: SPLIT PAYMENT TO BANK ACCOUNT FUNDED BY BANK ACCOUNT**



**Assumptions:** Payer needs to pay \$100 to payee. Both the payer's bank and the payee's bank participate in the P2P service, and both banks use the Federal Reserve for their ACH processing.

**Authentication and Authorization**

1. Payer logs on to her bank's website, indicates she wants to pay \$100 to payee using the P2P service, and provides payee's name and email address or mobile phone number.
2. Payer's bank verifies that payer has sufficient funds.
3. Payer's bank transmits payment information to the P2P provider.
4. P2P provider ascertains from payee's email address or mobile phone number that he has a registered account at a participating bank and transmits payment information to the payee's bank.
5. P2P provider sends email or text message to payee informing him of payment.
6. Payee logs on to his bank's website and is informed that payment is waiting. Payee agrees to receive payment and chooses which registered account to use for deposit.
7. Payee's bank tells P2P provider that payee has accepted payment and indicates which registered account he wants to use for deposit.
8. P2P provider sends email or text message to payer telling her that payee has accepted payment.

**Clearing and Settlement—Payment from payer to P2P provider**

9. P2P provider tells its bank that it has been authorized to pull \$100 from payer's bank account at payer's bank.

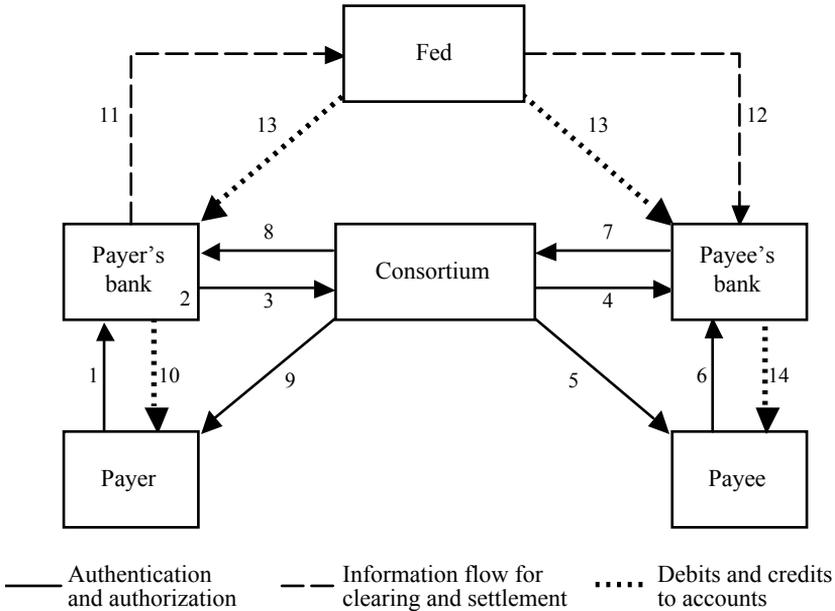
10. P2P provider's bank sends ACH file to Fed with debit to payer's bank account, using account information provided by payer to provider at registration.
11. Fed sends ACH file to payer's bank with debit to payer's bank account.
12. Payer's bank posts debit to payer's bank account (could occur earlier).
13. Fed debits reserve account of payer's bank and credits reserve account of P2P provider's bank.
14. P2P provider's bank posts credit to P2P provider's bank account.

**Clearing and Settlement—Payment from P2P provider to payee**

15. P2P provider tells its bank that it has been authorized to push \$100 to payee's bank account at payee's bank.
16. P2P provider's bank posts debit to P2P provider's bank account.
17. P2P provider's bank sends ACH file to Fed with credit to payee's bank account, using account information provided by payee to provider at registration.
18. Fed sends ACH file to payer's bank with credit to payee's bank account.
19. Fed debits reserve account of P2P provider's bank and credits reserve account of payee's bank.
20. Payee's bank posts credit to payee's bank account (could occur earlier).

Figure A3

**BANK-CENTRIC P2P: SINGLE PAYMENT TO BANK  
ACCOUNT FUNDED BY BANK ACCOUNT  
(CONSORTIUM MODEL)**



**Assumptions:** Payer needs to pay \$100 to payee. Both the payer's bank and the payee's bank belong to the consortium and use the Federal Reserve for their ACH processing.

**Authentication and Authorization**

1. Payer logs on to her bank's website, indicates that she wants to pay \$100 to the payee using the P2P service, and provides payee's name and email address or mobile phone number.
2. Payer's bank verifies that payer has sufficient funds.
3. Payer's bank transmits payment information to consortium.
4. Consortium ascertains from payee's email address or mobile phone number that he has an account at a member bank and transmits payment information to the payee's bank.
5. Consortium sends email or text message to payee informing him of payment.
6. Payee logs on to his bank's website and is informed that payment is waiting. Payee agrees to receive payment and chooses which account to use for deposit.
7. Payee's bank sends message to consortium indicating that payee has accepted payment and providing payee's account information.
8. Consortium passes message from payee's bank on to payer's bank.
9. Consortium sends email or text message to payer informing her that payee has accepted payment.

**Clearing and Settlement**

10. Payer's bank posts debit to payer's bank account.
11. Payer's bank sends an ACH file to Fed with credit to payee's bank account, using account information sent by payee's bank through consortium.
12. Fed sends ACH file to payee's bank with credit to payee's bank account
13. Fed debits reserve account of payer's bank and credits reserve account of payee's bank.
14. Payee's bank posts credit to payee's bank account (could occur earlier).

## ENDNOTES

<sup>1</sup>Unless otherwise noted, the term “bank” is used in this article to refer to any depository institution including commercial banks, thrifts, and credit unions. For convenience, this article also refers to the payer in a P2P transaction as “she” and to the payee as “he.”

<sup>2</sup>The schemes that have been operated by individual banks include Chase’s QuickPay, ING’s Person2Person Payment, and Uninvest’s P2P.

<sup>3</sup>These figures were calculated by the authors by matching the banks listed on the Popmoney website in June 2012 with banks filing official call reports. Popmoney indicated that 1,400 banks participated, somewhat more than calculated by the authors. Some of the discrepancy is due to the inclusion in the 1,400 figure of multiple, separately branded branches of a bank. The deposit share includes U.S. Bank, which in June 2012 had not yet switched from ZashPay to Popmoney and thus was not in the list of banks on the Popmoney website.

<sup>4</sup>PIN stands for personal identification number, a code that the consumer must enter when using the card to withdraw money at an ATM or make a purchase at a store.

<sup>5</sup>See Summers and Wells for a more general comparison of consumer payment methods in terms of these and other characteristics. That this article focuses on the four characteristics mentioned does not imply that differences in cost and convenience among the new P2P payment methods are unimportant. A payment method that is costly or inconvenient not only yields less benefit to a consumer using it but, as noted below, can also reduce the method’s potential for universality.

<sup>6</sup>According to this view, a payment method that transfers funds in the same amount of time as another method but makes it easier for the payer to reverse the payment should rank lower in terms of payment speed.

<sup>7</sup>After being deposited, a check is almost always delivered to the payer’s bank overnight and debited from the payer’s account the next day. With certain exceptions, the payee’s bank is required to make funds available within two days of the deposit and to make the first \$200 available within one day. Some banks make funds available to the payee sooner than required, however.

<sup>8</sup>Although security is defined as a separate characteristic, it can be affected by speed of payment. In commercial P2P transactions, rapid payment reduces the risk to the seller that a fraudulent payment will be reversed before he receives access to the funds but after goods or services have been delivered to the fraudster.

<sup>9</sup>Some of the disadvantages of checks in terms of payer control over the transfer of funds result from the fact that they are a form of “debit pull.” In such payments, the payer authorizes the payee or an intermediary acting on behalf of the payer to “pull” funds from the payer’s bank account. As a general rule, debit pulls involve lower payer control than “credit pushes,” in which the payer instructs her bank to “push” funds from her account to the payee.

<sup>10</sup>The ACH is an electronic network for direct transfers between bank accounts. These transfers are carried out by the Federal Reserve or the Electronic Payments Network, a private-sector clearing organization.

<sup>11</sup>The FDIC estimates that in 2009, 92.3 percent of U.S. households had a bank account (FDIC).

<sup>12</sup>For other recent reviews of new P2P payment methods, see First Annapolis 2011b, Shy, and Windh.

<sup>13</sup>Such fees would still need to be paid when customers added funds to or withdrew funds from their intermediary accounts. However, to the extent customers left funds in their accounts to use as working balances, processing fees would be reduced. The benefit to customers of these lower processing costs would depend on the extent to which the intermediary passed its cost savings on to them by lowering its own fees.

<sup>14</sup>As suggested in the previous note, how an increase in the cost of processing payments affects consumers depends on the extent to which the intermediary passes the extra cost on to them by raising its own fees.

<sup>15</sup>This approach is commonly referred to as the “good funds” model.

<sup>16</sup>PayPal and Obopay have collaborated with banks to offer P2P services that allow the payer to initiate payment from the bank’s website rather than the intermediary’s website. However, the payee must still establish an intermediary account through which funds flow during the clearing and settlement process. Thus, the services do not satisfy the definition in this article of a bank-centric service, although they share some of the same features.

<sup>17</sup>Popmoney allows consumers without an account at a participating bank to make P2P payments by providing their bank account information to Popmoney and going to the service’s website to initiate payments (Popmoney 2012b). This variant of Popmoney is more accurately classified as a nonbank-centric service.

<sup>18</sup>Some Popmoney banks offer two delivery options—a standard option, in which funds are received in three days, and a higher-cost expedited option, in which funds are received the next day (Fifth Third Bank 2012a).

<sup>19</sup>Payment may be immediate when the payee holds an account at the same bank as the payer and payment is through book transfer. This case is analogous to book transfers at a nonbank intermediary but is of little practical importance because only a small share of total P2P payments will be between customers of an individual bank.

<sup>20</sup>In 2010, 99.5 million consumers had a Visa credit card; 75.2 million, a MasterCard credit card; 40 million, a Discover card; and 37 million, an American Express card (Nilson 2011). By comparison, the 18-and-over population was 234.6 million (U.S. Census Bureau). These figures understate the numbers of consumers who could use a P2P service based on Visa or MasterCard because a consumer could hold a signature debit card from a network without holding a credit card from the network.

<sup>21</sup>No data exist on the numbers of consumers holding cards affiliated with each of the PIN debit networks. However, based on other data, the authors estimate that in 2008, as many as 132 million consumers had a card with STAR; 80 million, a card with Pulse; 77 million, a card with NYCE; and 17 million, a card with Accel/Exchange (Nilson 2009 and ATM & Debit News and Prepaid Trends).

<sup>22</sup>The need for greater interoperability of PIN debit networks to facilitate P2P payments was pointed out in the mid-2000s by BITS. For a more recent statement of this point, see Digital Transactions 2011a.

<sup>23</sup>Visa has issued rules requiring member banks to let their cardholders receive payments through VMT (Visa 2012). However, the network cannot force member banks to let cardholders make P2P payments (Noyes 2010).

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