Why do we use so many checks?

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Introduction and summary

The primary question we address in this article is why consumers, merchants, and financial institutions are reluctant to embrace electronic payments even though electronic payment networks, such as the credit card and automated clearinghouse (ACH) networks, have existed for more than 25 years. While most Internet-based transactions are primarily processed via credit card networks, most noncash off-line payments by both consumers and businesses in the United States are made with checks.

In the United States, there are over 15 checks written per month per person.[1] This is more than three times the number of checks written per person in Canada or the United Kingdom and at least 15 times more per person than in Germany, Italy, Belgium, the Netherlands, Sweden, or Switzerland (Bank for International Settlements, 2000, and Federal Reserve System, 2001).[2, 3]

In this article, we incorporate various strands of the payment literature to provide a more integrated view as to why payment system participants are reluctant to use electronic payments. Brito and Hartley (1995), Hirschman (1982), Mantel (2000), Murphy (1988), and Whitesell (1992) focus on consumer choice issues. Radecki (1999) and Wells (1996) discuss the revenue earned and cost to financial institutions from providing check services. Food Marketing Institute (1994, 1998, and 2000), Chakravorti and To (1999), and Murphy and Ott (1977) concentrate on the merchants' perspectives. McAndrews (1997) and Weinberg (1997) investigate the network issues. Connolly and Eisenmenger (2000), Benston and Humphrey (1997), Green and Todd (2001), Guynn (1996), and Lacker and Weinberg (1998) discuss the Federal Reserve's role in the payment system. A more integrated analysis of the underlying incentives of various payment system participants has been developed by Baxter (1983), Chakravorti and Emmons (2001), Chakravorti and Shah (2001), Rochet and Tirole (2000), and Wright (2000).

We study the incentives underlying the payment network to examine why, unlike several other industrialized countries, the United States has been slow to abandon checks. Many observers claim that electronic payments are less expensive than checks. However, these social cost comparisons usually ignore transition costs and the underlying incentives to each payment participant. Furthermore, the provision and usage of payment services exhibit network effects, more commonly referred to as the chicken-and-egg problem, which may impede the adoption of new payment technologies. Even if electronic payments are less expensive and they can overcome the chicken-and-egg problem, consumers, merchants, and financial institutions may still be reluctant to move to electronic payments. We analyze why this is so. In addition, we explore actions by the Federal Reserve to improve the check processing system and whether this could possibly hinder the migration away from checks. Finally, we discuss potential drivers to the adoption of electronic payments.

Check usage

We use two different sources of check data in this article. The first source is the annual payments data published by the Bank for International Settlements

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(BIS). The second source of data is a comprehensive review of the retail payment systems by the Federal Reserve System (Fed) (2001). The Fed study indicated that the total volume of check payments in the United States was significantly lower than previously estimated. However, the data published by the BIS still provide valuable insights into check usage in other countries and check usage trends in the United States. We rely on the new Fed study for current check values and volumes and use the older data reported to the BIS by the Fed for trends in check values and volume.

According to the new Fed benchmarking study released in November 2001, 49.6 billion checks were written in the U.S. in 2000, valued at $47.7 trillion (Federal Reserve System, 2001).[4] Checks represented around 60 percent of non-cash consumer transactions. The Fed study estimates that consumers wrote around 51 percent of checks but only accounted for 19 percent of the total value. According to the BIS (1991–2000), per capita check volume grew at a compounded annual growth rate (CAGR) of 1.13 percent, while per capita check value grew at a 1.91 percent CAGR from 1991 to 1999.[5]

Unlike most other industrialized countries, the U.S. seems to have experienced growth in total check volume and value during the 1990s. For every Group of Ten (G-10) country except the United States, the volume of check usage (see figure 1) and value (see figure 2) declined during the 1990s.[6] Among the reasons that have been cited to explain U.S. check volume growth are differences in financial institutions per capita, cash usage, laws and regulations, and pricing of financial services (see BIS, 1999 and 2000, and Humphrey, Pulley, and Vesala, 2000).

By increasing the price of checks vis-à-vis other payment options, financial institutions in Scandinavian countries have been successful in decreasing check usage. For example, in Finland, during the mid-1980s, banks began implementing a small per-check fee of about 10 cents. Palva (2000) states that this pricing policy coincided with a drastic reduction in the use of checks (see figure 3).

Adopting similar policies, Norwegian banks also successfully decreased check usage. Humphrey, Kim, and Vale (2001) found that a 1 percent increase in the price of checks resulted in a 1.07 percent decrease in check usage. They also found that online debit cards were a close substitute for checks at the point of sale.[7] As a result, check usage in Norway decreased from 72 million checks in 1988 to only 6.2 million in 2000. Furthermore, the volume of payments made by payment cards, primarily debit cards, was 62 times that of checks in 2000 (Bank of Norway, 2000).

Other countries have used different approaches to reduce check usage. For example, Canadian banks give check payees immediate credit and availability of their funds (see Humphrey, Pulley, and Vesala, 2000). Furthermore, checks are backdated to remove any float benefit to paying banks. In addition, corporations are charged for the float when the distance is significant between the bank where the check is drawn and where it is first deposited.

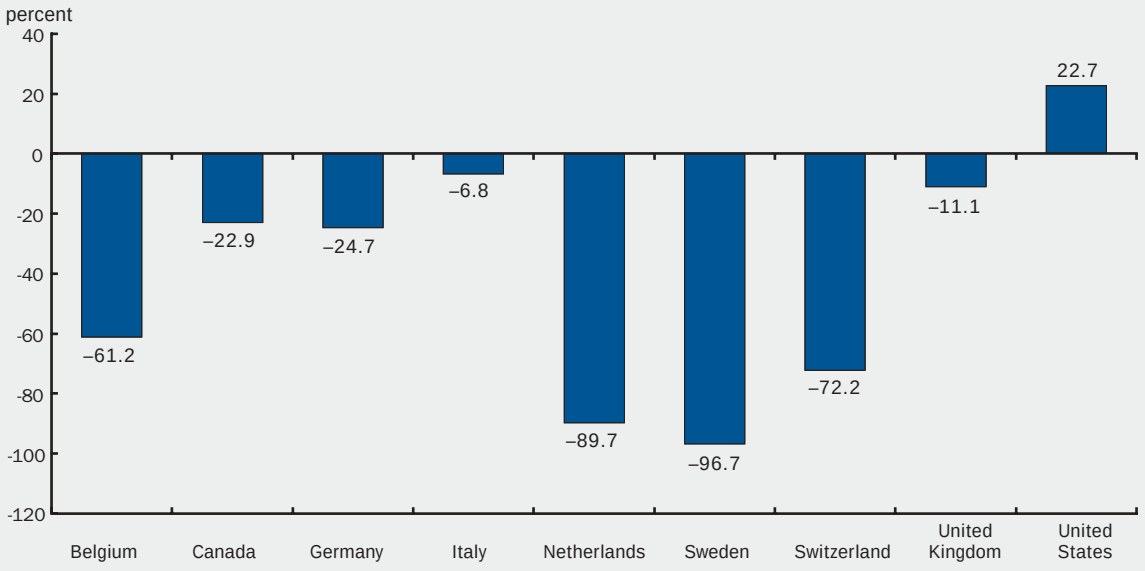
The decline in check usage across most countries indicates that, given market incentives, there is a movement toward electronic instruments. Electronic alternatives to accessing transaction accounts for purchases are held to be less expensive than checks. Humphrey and Berger (1990) were the first to calculate the total social cost of each instrument in the United States. Social cost is the sum of the real resource cost borne by each participant to convert a given payment into good funds. They found the social cost of a cash transaction to be the lowest at 4 cents and a credit card transaction to be the highest at 88 cents. An ACH payment, an online debit transaction, and a check transaction have social costs of 29 cents, 47 cents, and 79 cents, respectively. Wells (1996) updated Humphrey and Berger's study and found that ACH payments cost between one-third to one-half as much as a check payments but found significantly higher social cost estimates for both checks and ACH payments.

A difficulty with comparing social cost among payment instruments is that a given payment instrument may not be preferred for both small and large transactions. While cash transactions outnumber all other types of transactions, the average transaction size is relatively small compared with other payment instruments. Consumers tend to prefer checks for larger transactions. The average consumer check transaction is estimated at $364 (Federal Reserve System, 2001). Furthermore, consumers may not be able to use all payment instruments for all types of transactions. For example, cash cannot be used for bill payment via mail and checks are difficult to use for Internet transactions. Additionally, these social cost calculations may not adequately adjust for the risk of not being able to convert the payment into good funds that may play a role in the acceptance of certain payment instruments. Some characteristics of payment instruments are difficult to quantify, such as the convenience and comfort levels enjoyed by the participants.

These estimates also ignore transition costs and network effects. Consumers, merchants, and financial institutions may be unwilling to invest in emerging payment technologies due to uncertainty about whether they will be widely accepted in the marketplace.

FIGURE 1

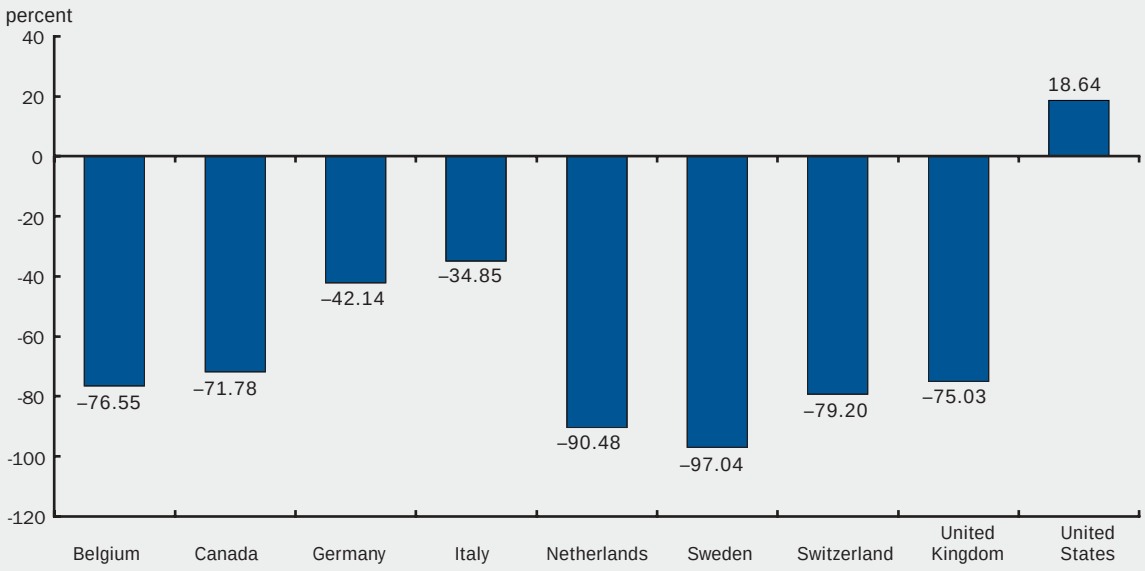
Percent change in check volume (1990–99)



Source: BIS (1991–2000).

FIGURE 2

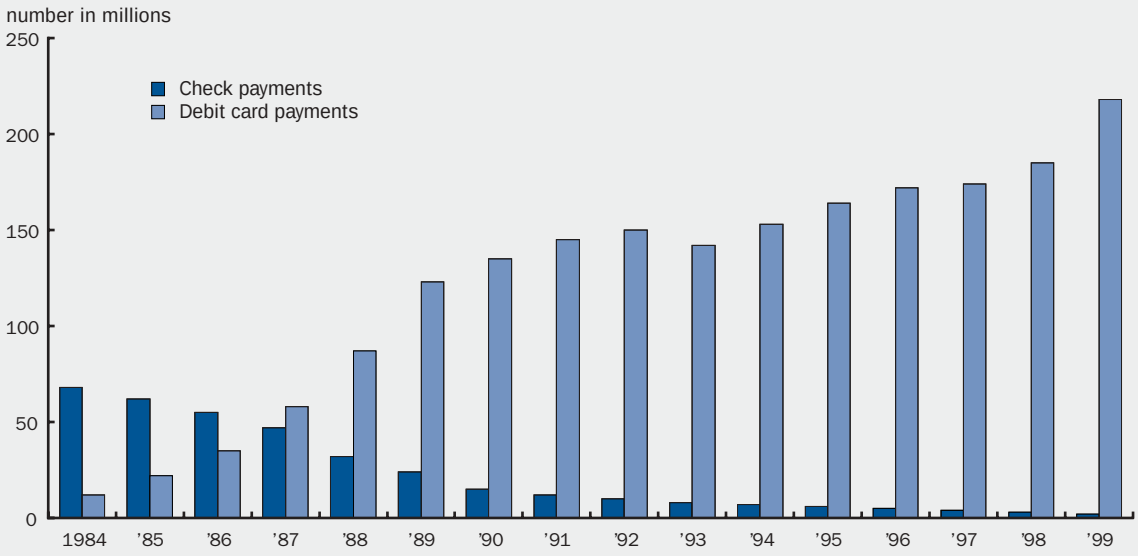
Percent change in check value (1990–99)



Source: BIS (1991–2000).

FIGURE 3

Electronic payments in Finland



Source: Finnish Bankers' Association and Palva (2000).

U.S. smart card trials demonstrated that consumers and merchants may not be willing to adopt new forms of payment rapidly.[8]

Lack of incentives

In this section of the article, we analyze the cost and incentive structure faced by each participant in the payment network. We address two fundamental questions for consumers, merchants, and financial institutions. First, are electronic payment alternatives less expensive than checks for each participant? Second, if electronic payment forms are less expensive, are participants reluctant to abandon checks because they lack the right incentives to adopt alternative payment instruments?

Consumers

While checks might be more costly to society as a whole, several studies point out that consumers may view the marginal cost to use a check to be zero.[9] Recently, several banks have reintroduced free checking accounts to entice new customers.[10] Humphrey, Pulley, and Vesala (2000) state that most U.S. consumers prefer accounts with fixed monthly fees or no fees with minimum balance requirements to those with per-check transaction fees. Furthermore, merchants rarely impose additional fees for check payments.

Moreover, some consumers still view check float as a major benefit. Today, most checks are processed overnight and interest rates on transaction accounts, if they are offered, are quite low, resulting in low float benefits. Wells (1996) calculated that float is no longer significant for consumer check payments. Nonetheless, some consumers still may perceive significant float benefits.

Ironically, checks do not have a built-in feature that automatically declines a transaction if the customer's account does not have sufficient funds. While non-sufficient-funds fees are relatively high and may lead to several other checks bouncing, most consumers seem to ignore these costs. However, non-sufficient funds fee income is large for financial institutions, potentially reducing banks' incentive to promote some electronic payment alternatives.

Independent of the cost of check payments, we can identify three key reasons consumers have resisted abandoning checks. First, checks are easy to use. The 1998 *Survey of Consumer Finances* indicated that about 87 percent of U.S. households had checking accounts, making checks the most accessible noncash payment instrument.[11] Checks are also one of the most widely accepted forms of payment by merchants at the point of sale.[12] For bill payments, checks are the most popular instrument because, unlike other forms of payment, they are almost always accepted by billers.[13]

Second, consumers are reluctant to switch to electronic alternatives unless they offer superior benefits to checks. While consumers may believe that electronic payments are less expensive overall, they are reluctant to change unless they view the shift as beneficial to them. Credit card issuers often offer additional services such as extended warranties, dispute resolution services, and frequent-use awards, along with interest-free short-term loans to those who pay off their balances each month.

Third, some consumers feel checks give them greater control over the timing of their payments, leading to better budgeting. Hirschman (1982) argues that some consumers believe that checks may enhance their ability to track, budget, and control spending better than other payment instruments. Mester (2000) argues that checks give consumers more control over when to pay bills than pre-authorized ACH payments and can more easily attach remittance information. Yet, consumers can also access their checking accounts via their debit cards and maintain budgeting, tracking, and control over their funds. When using debit cards, consumers cannot overdraw their accounts unless previous credit lines have been established. However, debit card usage in bill payment is relatively low, given the slow adoption of the necessary infrastructure.

Because consumers perceive checks to be a low-cost payment instrument and are comfortable with them, they are reluctant to change unless there are strong incentives to do so. From a cost standpoint, checks are relatively inexpensive if one ignores non-sufficient-funds fees. As we noted earlier, explicit per-check charges by financial institutions in other countries have been effective in changing consumers' payment habits.

Merchants

A primary issue for merchants is the cost of payments. There are significant differences in the cost of accepting alternative payment instruments. The Food Marketing Institute (FMI) (2000) estimates the merchant's cost to accept each payment instrument (see table 1). Online debit cards are the second least expensive payment instrument for merchants to accept at 80 cents per $100 of transactions. They offer merchants immediate funds, low per-transaction fees, and little, if any, settlement risk. While cash processing costs are low at 90 cents per $100 of sales, most consumers are reluctant to use cash for larger purchases. Credit card and off-line debit card transactions cost merchants an average of $1.80 per $100 in sales. The average check transaction costs merchants 80 cents per $100 in sales, though this cost varies widely depending on whether the check was verified.

Given the rapid increase in the use of check verification systems during the last decade, it is important to analyze check costs using this technology. Nilson (2001a) estimates that 9.14 billion checks were verified at the point of sale. Using Federal Reserve System (2001) point-of-sale check numbers, we estimate that between 75 percent and 97 percent of checks written at the point of sale were verified in 2000.[14] The typical cost for these services ranges from 2 cents to 20 cents per check (Nilson, 1997b). Nilson reports an average cost of 3 cents in 1998.[15]

Merchants have found that check verification services significantly reduce the risk that they will not receive good funds. As a result, they have been able to lower their costs by over 23 percent and to reduce losses from exception items from 0.50 percent of the value of the check to 0.05 percent of the value of the check (FMI, 1998).[16]

According to FMI (2000), a verified check payment is actually the cheapest form of payment for the merchant to accept, costing a merchant 60 cents per $100 in sales versus $3.00 per $100 in sales for an unverified check.[17] Since the majority of checks at the point of sale appear to be verified, it is important to concentrate on the cost of verified checks. According to FMI (2000), the cost of a verified check per $100 in sales is significantly less than cash, off-line debit cards, and credit cards. Although FMI (2000) did not report a cost for ACH-based debit card transactions, FMI (1998) reported an average cost of 82 cents in 1997.

The cost difference between a verified check transaction and an online debit card transaction might also be growing. Between 1997 and 2000, FMI (1998 and 2000) found that the cost of online debit cards increased by 14 percent, or 10 cents per $100 in sales.[18] Recently, several networks have announced plans to increase their fees significantly.[19]

Even if checks are more expensive than electronic alternatives, merchants may continue to accept checks

TABLE 1

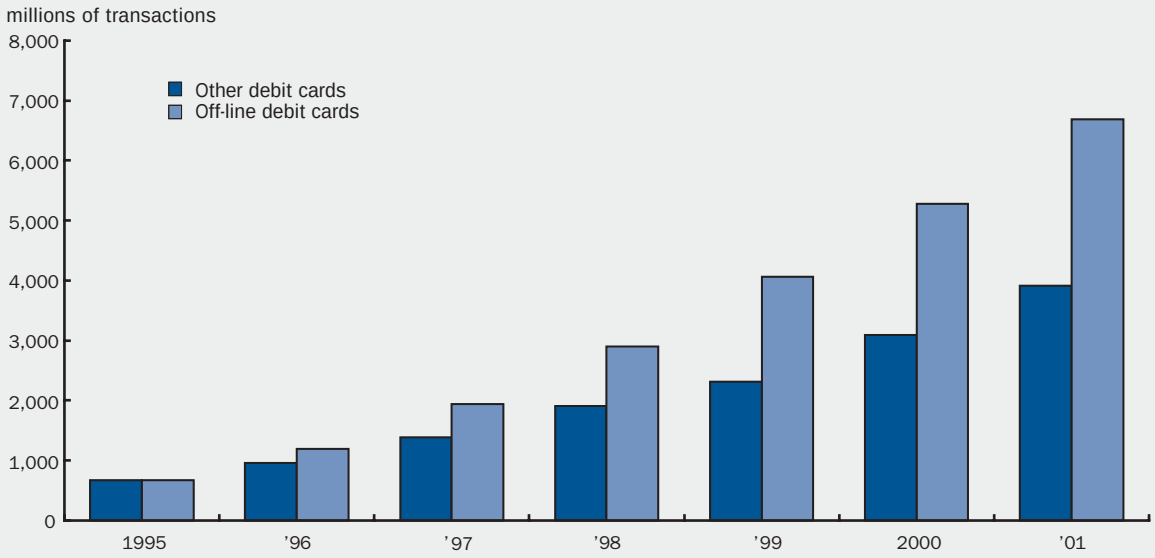
Merchant costs to accept a payment instrument

Cost per transaction (dollars)	Cash	Check not verified	Check verified	Credit	Online debit	Off-line debit
Cost per $100 sales	.90	3.00	.60	1.80	.80	1.80

Source: Food Marketing Institute, 2000.

FIGURE 4

U.S. debit card use at point of sale



Source: Nilson (1996–2001), Nos. 737, 726, 705, 678, 654, and 627.

for three reasons. First, the potential cost savings from electronic alternatives might not be large enough to justify the transition costs to make this change and/or risk movement to more expensive payment vehicles. Second, cheaper electronic payment alternatives at the point of sale have only recently flourished. Last, checks might offer merchants some level of benefits that they are willing to "pay" for.

Given the slow movement away from checks, merchants, banks, and third-party providers have started to convert check transactions to ACH transactions at the point of sale to reduce costs.[20] However, this may involve high initial set-up costs related to implementing a new system, purchasing equipment, and training staff. Furthermore, merchants may be reluctant to make large investments in new payment technologies with uncertain futures.

Furthermore, even though online debit cards are a relatively inexpensive payment option, they have become widespread only recently. Annual per capita transaction volume in the United States increased from 0.76 transactions per year in 1990 to 11.3 transactions in 2000 (BIS, 1991–2000, and Thomson Financial, 2001). Figure 4 shows the rapid increase in debit card transactions over the last five years. Figure 5 shows the increase in online debit card terminals installed by merchants, indicating substantial growth in merchant acceptance of online debit cards over the last 13 years.

Lastly, some evidence suggests that merchants are willing to accept high-cost payment instruments because they offer benefits not offered by other instruments. Credit cards generate sales to illiquid consumers who may not otherwise be able to purchase goods and services.[21] In some instances, merchants may choose to accept certain instruments because they are tied to other instruments that they choose to accept. For example, merchants accepting Visa or MasterCard credit cards are required to accept their off-line debit card products. A large group of retailers led by Wal-Mart has sued the credit card associations, alleging that this tying of their credit card and debit card products is illegal.

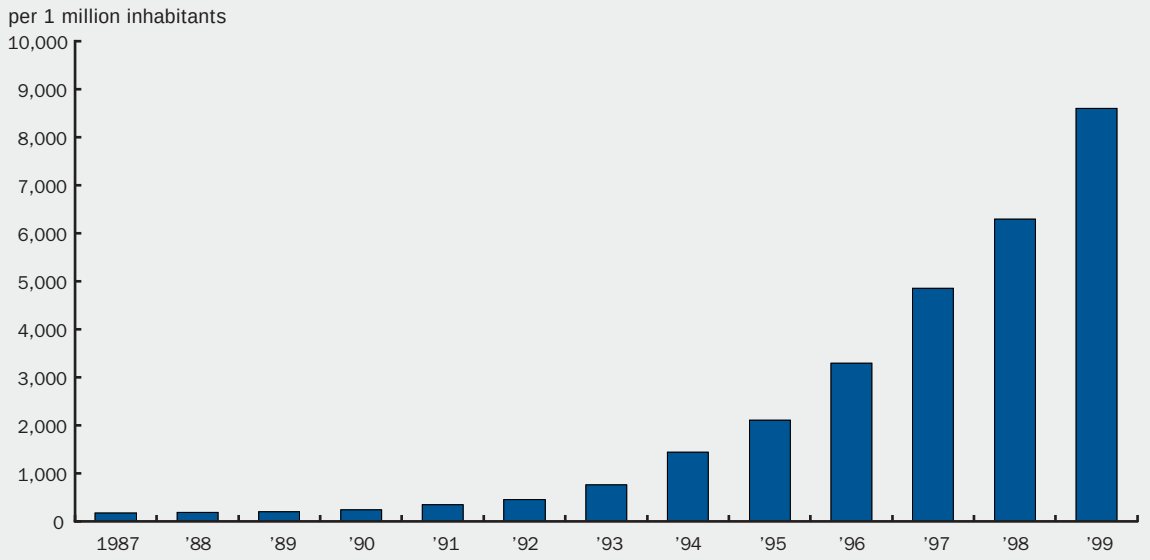
Available U.S. data do not indicate a significant cost reduction if merchants move toward electronic payments. Furthermore, the benefits of accepting electronic payment instruments may not outweigh the investment that may be required. Merchants may be willing to accept relatively expensive payment instruments because they offer benefits such as the potential to increase sales and profits.

Financial institutions

Although electronic payments are generally perceived to be less expensive than paper-based payments for financial institutions, several U.S. studies indicate the costs of processing ACH and check payments are not very large for financial institutions.

FIGURE 5

EFT point-of-sale terminals



Source: BIS (various years).

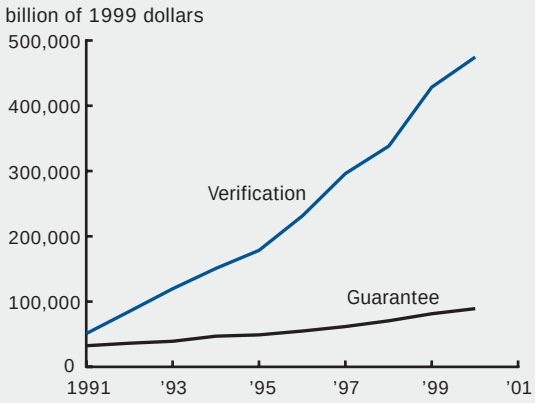
The Federal Reserve Board's 1994 Functional Cost Analysis estimated that the average cost per transaction for an ACH payment was 14 cents and the average cost for a check payment was 14.6 cents. Wells (1996) estimated that the cost of processing a check ranged from 15 cents to 43 cents, while the cost of processing an ACH payment ranged from 12 cents to 45 cents. Guynn (1996) questions whether ACH payments are really less expensive for banks to process than checks. However, evidence from Norway indicates that check transactions cost banks two to three times as much as electronic giro services and electronic funds transfer point-of-sale transactions (Robinson and Flatraaker, 1995).

Furthermore, financial institutions earn significant revenue from the provision of check services. On average, they charge customers 21 cents and merchants 5 cents to process each check.[22] In order to spur adoption, online debit cards should offer financial institutions similar revenue opportunities assuming similar cost structures, or similar profit opportunities resulting from offsetting cost savings. Online debit cards provide a potentially lucrative revenue stream in the form of the fee paid by the merchant's bank to the customer's bank, commonly referred to as the interchange fee. Yet, as of the end of 2001, no online debit card network had interchange fees higher than 20 cents.[23] Recently, a few online debit card networks have significantly increased their processing fees. Several institutions have also implemented per-transaction fees for using personal identification number (PIN) based debit cards at the point of sale.[24]

Financial institutions also earn significant revenue from fees related to overdrafts to checking accounts. According to Bank Administration Institute and PSI Global (1998), in 1995, banks earned $8.1 billion from non-sufficient-funds check fees. The Board of Governors of the Federal Reserve System (1996) estimated that banks' losses from check fraud amounted to $615 million in 1995, $215 million of which was

FIGURE 6

Check verification and guarantee dollar value



Source: Nilson, 2001a, 2000b, 1999b, 1997b, and 1996b, Nos. 742, 715, 691, 644, and 618.

eventually recovered. Debit cards could significantly reduce or eliminate overdrawn accounts, because transactions are only processed if funds are available. However, by promoting online debit cards, financial institutions would reduce their revenue from non-sufficient-funds fees.[25]

If electronic payment instruments were less expensive than checks, financial institutions might be able to influence consumer usage and merchant acceptance of electronic payments as evidenced in Norway and Finland. However, U.S. financial institutions may be reluctant to impose explicit per-check usage fees due to competitive pressures.

Some financial observers have argued that the large number of payment providers in the United States might prevent financial institutions from implementing price increases and cost-saving measures. One initiative by a Midwest bank to charge consumers for using bank tellers initially met with consumer resistance and little support from other financial institutions. Stavins (1999) found that regional competition prevented banks from not returning canceled checks because they feared customers might switch to a rival bank that returned checks. Yet, some financial institutions were eventually successful in implementing both of these policies.

Whether electronic payments are less expensive to process than checks for financial institutions is debatable. However, even if electronic payments are less expensive, the potential revenue from checks, especially in the form of non-sufficient-funds fee income, is difficult for financial institutions to forgo.

The Federal Reserve

Central banks differ in the roles they play in the operation and oversight of their domestic payment system (see Bank for International Settlements, 1999 and 2000). Most central banks of industrialized countries are involved in the settlement of retail payment transactions and some also play a clearing role. In the United States, the Fed is a provider of interbank check clearing services and is the largest ACH operator.

Whether there remains a compelling need for the Fed to provide check-processing services is debatable, given technological and regulatory changes. When creating the Fed, the U.S. Congress stipulated that it should improve the efficiency and safety of the payment system.[26] At the time the Fed was created in 1913, checks were the primary means of interbank funds transfer. Today, large-value domestic transactions are processed electronically via Fedwire, which is operated by the Fed. In addition, electronic retail payment alternatives, such as credit cards, debit cards, and ACH payments, are increasing their market shares.[27]

The Federal Reserve has historically played an important role in the development of check processing. However, some have questioned this role. Green and Todd (2001) argue that as the United States transitions to the next generation of payment instruments, the Fed should promote "efficiency, integrity and accessibility primarily by means other than direct service provision—such as participation in the setting of standards, the drafting of model legislation and the regulation of payment services markets" (Green and Todd, 2001, p. 1). They further argue that "encroaching on activities that the private sector can perform efficiently and equitably" may erode the Fed's reputation as a trustworthy and neutral institution.

The Fed's role in check processing has declined over the past two decades, partly due to regulatory changes such as the Monetary Control Act of 1980 (MCA), the removal of interstate branching restrictions, and changes to Regulation CC to allow banks to settle checks in same-day funds. In the five years following the passage of MCA—under the terms of which the Fed had to price its financial services and make them available to all financial institutions—the Fed's share of interbank check clearing decreased sharply.[28] Summers and Gilbert (1996) claim that the Fed's share of check volume decreased from 61.0 percent in 1980 to 49.8 percent in 1985.[29] For the same period, its share of check value decreased from 48.5 percent to 31.7 percent.

The Fed also experienced a sharp decrease in the number of checks handled from 1993 to 1995. Given the lack of reliable non-Fed check volume data for this period, it is difficult to determine the cause of this decrease. Some financial observers claim that changes in Regulation CC and the removal of interstate branching restrictions were at least partially responsible. In 1994, Regulation CC was changed to allow banks to settle checks in same-day funds. These changes may have resulted in more institutions using private clearinghouses. We would also expect that as banks merged, the ratio of on-us transactions would increase. However, most estimates indicate that on-us check volume has remained constant at around 30 percent.[30]

Alternatively, total check volume may have decreased during this period as a result of the adoption of electronic alternatives. Therefore, the drop in Fed volume would be attributable to a decrease in overall check volume and not a change in market share. Perhaps a more plausible explanation is that both a shift to private-sector alternatives and substitution of other payment instruments were responsible for the reduction in check volume. However, as stated before, in the absence of reliable data, we can not determine the magnitude of each effect.

According to Federal Reserve System (1998), the Fed processes a greater proportion of checks for smaller depository institutions than private sector providers. During the Committee on the Federal Reserve in the Payments Mechanism (also known as the Rivlin Committee) public forums, several community banks indicated that they feared that private entities would not process checks at similar prices to those currently charged if the Fed left the check processing industry. Several banks and clearinghouses "freely admit that they would charge more to clear these items than the Federal Reserve now does, citing the higher costs involved in serving these endpoints" (Federal Reserve System, 1998). These institutions suggested that the Fed subsidizes small institutions, especially those located in remote locations.

The Fed has denied cross-subsidizing across its priced-services product. According to Rivlin (1997, p. 5), then vice-chair of the Board of Governors of the Federal Reserve System, each product in a multiproduct firm "should recover at least its incremental production cost" to ensure that no individual product is being subsidized.[31] Using this standard, the Fed does not subsidize any of its products. Similar arguments could be made about the allocation of fixed costs among customers that may result in certain customers paying a higher proportion of fixed costs. However, some distributions of allocating fixed costs among customer segments may deter competitors from entering industries where economies of scale and scope are present.

Chakravorti, Gunther, and Moore (1999) suggest that private-sector providers could cherry-pick the profitable customers and leave the higher cost ones with the Fed if low-cost customers pay more than the marginal cost to serve them. They argue that as low-cost customers find other less-expensive check processors, the price charged should rise for those remaining customers. Eventually, the rise in cost may result in an exit strategy for the Fed. Thus, these more expensive-to-serve customers may eventually choose to promote non-check payment alternatives by charging higher check fees to their customers.

However, if the Fed improves check-processing technology, such incentives would be reduced. Recently, the Fed has made large investments in improving check-processing technology to lower its costs.[32] It continues to promote electronic check presentment.[33] In 2000, the Fed electronically presented about 20 percent of the checks it handled. From 1995 to 2000, the number of checks presented electronically grew from 1 billion to 3.5 billion, or a 28.5 percent compound annual growth rate (CAGR). Though the physical checks still followed, this program allowed for faster presentation of the check for payment. The Fed also participated in projects where the check was imaged or truncated at either the payee bank or at the Fed and no paper was sent to the paying bank. More than 7 percent of the checks the Federal Reserve handled were processed in this manner in 2000.

While these changes are aimed at decreasing check-processing costs, they may also affect the migration to electronic alternatives. Specifically, a less-expensive check-processing system may reduce the incentives for financial institutions to migrate to electronic alternatives. Lacker and Weinberg (1998, p. 19) argue that "ECP (electronic check presentment) could be viewed as an attempt to stem the expected decline in check use. By reducing the cost of paper checks, ECP could slow the transition to fully electronic payment instruments that are even more beneficial."

Benston and Humphrey (1997) suggest that the Fed may not have sufficient reason to continue in the check-processing business. Furthermore, they point out that the Fed is virtually alone among central banks of developed countries in the provision of check-processing services to financial institutions. Bullock and Ellis (1998) suggest that the "heavy involvement" of the Fed in check processing, along with its role in regulating the industry, has kept the check competitive with other payment instruments.

On the other hand, improvements in check processing may allow for the electronification of checks, while maintaining some features not presently available in competing payment instruments in the United States, ultimately facilitating the movement to electronic alternatives. Connolly and Eisenmenger (2000) argue that in some instances there is a need for the Fed to take an operational role to improve the processing of checks where the private sector may not be willing to invest the necessary funds initially to adopt the necessary infrastructure. Guynn (1996) suggests that certain improvements in check processing may actually improve the adoption of electronic instruments.

Drivers to change

Given today's underlying incentive structure, it would appear that U.S. consumers, merchants, and financial institutions are not likely to change their payment preferences in the near future. However, given technological enhancements and competition from nonbank payment providers, the incentives for payment system participants to use electronic alternatives will increase. Financial institutions, along with merchants, have started to "electronify" checks by converting them to ACH payments. Given the right

incentives, consumers may also increase their use of electronic payment instruments. In this section, we discuss drivers that might aid the transition away from checks in the future.

U.S. consumers have only recently had electronic alternatives for different types of payments. Credit cards have surpassed checks as the most popular instrument used for point-of-sale transactions.[34] Debit cards are becoming increasingly popular at the point of sale, and ACH payments continue to gain popularity for recurring bill payment and payroll disbursements. In addition, third-party providers are using new technologies to deliver payment card products and ACH payments to new market segments.

Debit cards show the greatest promise to decrease check volume at the point of sale. Debit cards offer consumers access to their transaction account like checks and allow merchants to receive their funds relatively quickly, incurring little, if any, settlement risk. Merchant acceptance of debit cards and the number of consumers holding debit cards are growing rapidly. From 1995 to 1998, the number of households with a debit card increased by a 27 percent CAGR. The success of promoting debit card usage is partly due to the leveraging of existing credit card and automated teller machine (ATM) networks and financial institutions' ability to easily put the product in the wallets of their consumers by increasing the functionality of their ATM cards.[35]

Earlier, we noted that financial institutions may not have sufficient incentives to promote online debit cards. Recently, several electronic funds transfer networks have consolidated. In the process, several of the largest networks have publicly stated that they intend to increase the revenue to financial institutions for participating in their networks (Breitkopf, 2001a). Two of the most prominent networks announced their plans to almost double their interchange fees (Breitkopf, 2001b). However, these plans were delayed more than six months after several large retailers indicated that they would discontinue processing transactions over the networks if the rate increases went through.

Off-line debit card usage has also increased rapidly and these cards now outnumber their online counterparts in the United States. These cards provide financial institutions with similar levels of interchange fees to those offered by credit cards, usually a percentage of the purchase price. A few years ago, a group of merchants filed a lawsuit against Visa and MasterCard, challenging the "honor-all-cards" rules of the card associations.[36] These rules stipulate that if merchants accept one of the card association's products such as credit cards, they must accept all of the association-branded products.[37] The merchants claim that few alternatives exist to the general-purpose credit cards. Therefore, they are unwilling to stop accepting credit cards but want the ability to decline the associations' off-line debit cards.

A significant but not often discussed payment segment is the person-to-person (P2P) payment segment.[38] The Federal Reserve System (2001) estimates that 11.2 percent of total check volume and 6.7 percent of total check value in 2000 were consumer-to-consumer payments. Individuals are usually unable to accept ACH payments or credit or debit card transactions. In the last two years, banks and nonbanks have started to enable individuals to accept these payment instruments.[39] While the initial impact of P2P has been mostly limited to the online auction community, recent initiatives by P2P providers have been geared toward capturing a larger share of the non-auction online transactions.[40] Some small businesses have begun to use P2P payment services as a means to accept payments both within and outside the auction community.

In the bill payment arena, depository institutions (DIs) are facing competitive pressures from both third-party providers and non-depository financial institutions. Third-party providers began promoting the use of electronic payments to many of the most profitable customers for DIs. Brokerage firms and credit-card banks, which already have a connection to many of the DIs' high-net-worth customers, have also been actively promoting electronic bill payment services. Depository institutions risk losing these integral relationships if they do not match or exceed the services offered by these competitors. Thus, other providers appear to have accelerated the incentives for DIs to promote some forms of account-based electronic payments.

While checks continue to dominate the proportion of non-cash payments, we have discussed several drivers that should facilitate the migration to electronic alternatives. Leveraging existing networks, debit cards have gained significant market share, and financial observers believe that debit card growth rates will continue to be higher than those of other established payment media. As more commerce is conducted remotely, such as via the Internet, electronic payments' share of total payments will also increase, since paper instruments may not be appropriate for these environments. Furthermore, new payment providers, especially nonbank providers, have started to leverage existing networks, such as debit and ACH networks, to allow electronic person-to-person payments. As consumers and merchants become comfortable with electronic payments in certain payment segments, there will likely be spillover effects to other payment segments that have traditionally been dominated by checks.

Conclusion

In this article, we have examined why U.S. consumers, merchants, and financial institutions have been unwilling to significantly reduce their check usage. Consumers lack incentives to change their habits. In the United States, credit card issuers have been successful in gaining point-of-sale market share by offering incentives such as frequent-use awards and interest-free short-term loans if monthly balances are paid in full. However, in some environments, such as online purchases, consumers may have little choice but to use electronic alternatives. Consumers may become more comfortable with electronic alternatives the more they use them, resulting in faster market adoption.

For merchants, the cost to process checks, including the risk of not being able to convert a payment to good funds, may not be significantly greater than for electronic alternatives such as online debit cards. However, merchants are also realizing the benefits of online debit cards as evidenced by the rapid deployment of point-of-sale terminals and the merchants' antitrust suit against the credit card associations. Merchants may be gaining sufficient bargaining power with payment providers to impact existing cost structures in ways that may increase usage of electronic alternatives.

Financial institutions in Finland and Norway have been successful in convincing consumers to significantly curtail their check usage and increase their use of electronic payment forms by imposing per-check fees. However, checks remain a substantial source of revenue for U.S. financial institutions, especially in terms of non-sufficient-funds fees. Electronic alternatives, such as online debit cards, may not have been as financially attractive, but new pricing policies by the online debit card networks may entice financial institutions to promote them more heavily.

Some have questioned the role of the Fed in the retail payments arena. While the Federal Reserve is actively promoting electronic alternatives, it continues to improve check processing. Such improvements may distort the market incentives to move to electronic payments. Even though the United States lags behind other industrialized countries in its continued high usage of checks, no studies to date have concluded that the migration to electronic substitutes for checks is welfare enhancing in the U.S. context.

In this article, we have identified several potential drivers of electronic payments, such as greater choice of payment instruments for consumers for different payment segments, greater non-face-to-face shopping opportunities, competition from non-bank payment providers, and a greater role by merchants to offer the low-cost payment alternatives. Anecdotal evidence suggests that U.S. consumers are slowly changing their payment habits, and we would expect this trend to continue.

Further research is warranted as to why the United States lags other industrialized countries in adopting electronic alternatives. We have suggested that changes need to occur in the underlying incentive structure to convince all payment participants to migrate to electronic payments. U.S. consumers, merchants, and financial institutions are more likely to make the transition to electronic payments, given the growth in remote purchases, developments in technology, and greater market-based incentives to use electronic alternatives.

NOTES

[1]The number of checks written includes consumer, business, and government checks. We focus only on consumer checks in this article. We use U.S. check data for 2000 from the new Federal Reserve System check survey and 1999 figures from BIS for the other countries (Federal Reserve System, 2001, and BIS, 2000).

[2]The level of confidence in the payment statistics published by BIS is questionable. Therefore, a great amount of care should be exercised in interpreting them.

[3]A portion of the difference in per-capita check usage might be attributable to higher levels of cash use in some of these countries. Some countries with low check usage may have a high level of cash usage, such as Japan. See BIS (1999) for a more detailed discussion of these differences.

[4]Determining the volume and value of checks is difficult. While the Federal Reserve knows the number and value of checks it processes, it estimates the volume of checks processed by others. In 1999, Nilson (1996–2001), BIS (2000), and Green (1999) estimated total U.S. check volume between 64 billion and 69 billion, accounting for $47 trillion to $83 trillion. Prior to the 2001 study, the Federal Reserve's last benchmarking study was conducted in 1979. For more recent years, non-Fed check volume was extrapolated from the 1979 study.

[5]We would expect that these numbers overestimate the growth rate in check usage, given the 2001 Fed study, but no reliable evidence indicates that growth has been negative during this period.

[6]The G-10 countries are Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, and the United States. Japan is not included in the figure because check usage in Japan is extremely limited, and France is not included because it did not report check data for 1999.

[7]There are two types of debit cards—online and off-line. Online debit cards use ATM networks to authorize and process transactions and require customers to use a PIN (personal identification number) code. Off-line debit cards use credit card networks and are signature-based.

[8]For a discussion of why stored-value did not succeed in the United States, see Chakravorti (2000).

[9]However, there are fixed costs such as the opportunity cost of holding funds in a zero- or low-interest bearing account and potential monthly fees.

[10]Bank of America, Washington Mutual, Bank One, Harris Bank, and Fifth Third have recently started to promote free checking accounts (Thomson Media, 2001).

[11]In comparison, 72.5 percent of households had a credit card and 34.5 percent of households had a debit card in 1998 (a substantial increase from 17.6 percent of households in 1995).

[12]However, there are several types of merchants, such as gas stations and restaurants, that do not usually accept checks.

[13]For more on bill payment, see Andreeff et al. (2001).

[14]Federal Reserve System (2001) estimates that of the 49.6 billion checks written in 2000, 19 percent were written at the point of sale and 12 percent were written at either the point of sale or for remittance. Therefore, between 9.42 billion and 12.4 billion checks were written at the point of sale.

[15]In addition, merchants used third parties to guarantee another 2 percent of the total check volume. According to Nilson (1999b), the cost for check guarantee services averaged 1.56 percent of the value of the check in 1999. Note that guaranteed check costs are significantly higher than those of online debit cards and may be more than off-line debit cards and credit cards.

[16]FMI (2000) does not break out the cost of fraud for verified and unverified checks, so we are using FMI (1998) for this portion of the analysis.

[17]We should note that based on the average cost per transaction, FMI (2000) shows that online debit cards are still the cheapest means of payment. On a per transaction basis, online debit cards cost $0.34, verified checks cost $0.36, and unverified checks cost $0.38.

[18]Comparatively, on a per transaction basis, the cost of debit cards rose from an average of $0.30 in 1994 and $0.29 in 1997 to $0.34 in 2000.

[19]Both the Star and NYCE networks have increased their maximum fees for supermarkets to 19 cents, while Interlink has raised this fee to 20 cents.

[20]In 2000, 32 million checks were converted to ACH payments at retail locations (National Automated Clearing House Association, 2001).

[21]For a theoretical exposition of credit extensions and their benefits to merchants, see Chakravorti and To (1999).

[22]The Board of Governors of the Federal Reserve System (2001) states that the average per check fee was about 21 cents for interest-bearing accounts. Check revenue would be similar for accounts that did not charge per-check fees if the average account holder wrote 9.5 checks. See FMI (1998) for merchants' fees from checks.

[23]As of the end of 2000, Interlink charged the highest online debit-card-processing fee of 20 cents for point-of-sale transactions. After recent price increases, Interlink still charges the highest fees with a maximum of 45 cents for point-of-sale transactions.

[24]According to a recent survey by Dove Consulting and Pulse EFT, 6 percent of financial institutions charge extra fees for using PIN-based debit cards at the point of sale. The study found that an average fee of $1 is being charged to consumers because the low-interchange offered on PIN-based debit transactions does not adequately cover processing costs. See Breitkopf (2002).

[25]Off-line debit cards offer issuers significant revenues in the form of interchange fees that could offset the decrease in insufficient-funds fees. This lucrative interchange revenue may be partly responsible for the increase in popularity of debit cards since their introduction in the early 1990s (see figure 4).

[26]For a historical perspective on the Fed's role, see Gilbert (1998) and Summers and Gilbert (1996).

[27]See Federal Reserve System (2001).

[28]For a discussion of the private sector response to Fed pricing polices resulting from the MCA, see Frodin (1984). For a historical perspective on retail payment services and the MCA, see Kuprianov (1985).

[29]The Fed's share is taken as a percentage of interbank check volume ignoring any changes in on-us volume.

[30]The last comprehensive study of the payment system by the Federal Reserve prior to the 2001 study placed the share of on-us check volume at 30 percent in 1979. The 2001 Fed study also put the on-us check share at 30 percent.

[31]For more discussion of cross-subsidization, see Faulhaber (1975).

[32]By mandate, the Fed must recover costs from the financial services it provides. Investments in equipment are amortized over years. Thus, it appears that the Fed expects the demand for its check-clearing services will not decline significantly in the near future.

[33]A number of other private-sector initiatives have also been undertaken to truncate checks at the point of sale and through lock boxes. In most cases, these initiatives take the magnetic ink character recognition (MICR) information and turn the payment into an ACH transaction.

[34]Some observers do not categorize credit cards as electronic payments, because in most instances the statement is provided on paper and most payments are made by check. However, for most merchants, credit cards are processed, cleared, and settled electronically.

[35]There are differences in consumer liability across payment instruments. For a discussion, see Spiotto (2001). For a discussion of how evolving payment instruments and applications have leveraged the existing payment infrastructure, see Mantel and McHugh (2002).

[36]This case is currently awaiting trial.

[37]See Evans and Schmalensee (1999) for a discussion of network rules and history.

[38]For more details on online P2P systems, see Kuttner and McAndrews (2001) and McHugh (2002).

[39]In some cases, P2P providers have created their own medium of exchange, but most also allow consumers to easily convert the value into good funds.

[40]PayPal, the leading provider of electronic person-to-person payments, indicated that 66.9 percent of its payment volume in 2001 originated from online auctions. See McHugh (2002) for a discussion of PayPal and its services.

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