A HISTORY OF THE FUTURE OF BANKING: PREDICTIONS AND OUTCOMES

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A HISTORY OF THE FUTURE OF BANKING: PREDICTIONS AND OUTCOMES

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I. INTRODUCTION

For decades, banking analysts have been predicting the coming of the cashless and checkless economy as more and more payments are made electronically. In the *American Banker*'s Century Edition, Marianovic (2000) wrote, "In 1963, Dale L. Reistad of the American Bankers Association said at the first ABA National Operations and Automation Conference that we would be a checkless society by 2000. Mr. Reistad, who went on to become a consultant and perhaps the most renowned payment-system futurist, never lived that misfire down, but it did not seem unreasonable at the time."

By the middle of the 1990s, Internet fever was rampant in the United States and it intensified as the decade wore on. The dramatic actual growth in Internet-related, nonfinancial activity such as e-mail fueled predictions of dramatic future growth in Internet-based banking and payments. A 1995 *Business Week* cover story, "The Future of Money (subtitled: E-cash could transform the world's financial life)," cited predictions that the number of electronic purchases would grow more than seven-fold by the year

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2000 and that, by 2005, nearly 20 percent of all purchases would be made electronically. Furst, Nolle, and Lang (2001) reported that, at the end of the 1990s, Internet banking activity was widely predicted to grow very rapidly—on average, by more than 20 percent annually. Figure 1 plots the actual and predicted numbers of households to have online banking accounts for the years 1996-2000 and 2000-2005, respectively.

Some have tried to rein in optimism about how fast the world of payments and banking will change. Only a few pages earlier in the *American Banker*'s Century Edition, Teixeira (2000) wrote, "Technology penetrates over long periods of time. Yet legacy processes, concepts, and methods will always be with us--and usually in much greater number than we realize. The usual predictions that such-and-such new technology will displace archaic processes are doomed to disappointment."

Forecasting is well-known to carry reputation risk. Putting numbers with future dates requires courage; even moderate accuracy often requires luck and intellect. It is easy to find examples of predictions gone far awry. As WWII was ending, leading economists expected the U.S. economy to plunge back into a deep depression as a result of the likely cuts in military spending. In the 1970s, Henry Kaufman, the managing partner of Salomon Brothers, accurately predicted that interest rates would rise and in so doing made enormous profits for his company and earned both credibility and the appellation "Doctor Doom." When some of his later predictions went awry, they cost Salomon Brothers a few hundred million dollars and cost Kaufman his aura of infallibility.

The difficulties of accurately predicting have led some to be extremely cautious, or even cynical, in their approach to forecasting. One Fed economist, when asked how he

forecasted, averred that he did so "only under duress." Others have quipped that predictions should be made for horizons far enough into the future that they would be forgotten by the time that future arrived.

Regardless of how accurate predictions have been, their great potential value for planning and decision-making has sustained the demand for efforts to foretell the future, both in the private sector and in government. The most obvious examples are forecasts of near-term macroeconomic outcomes, such as those for interest rates or the growth rate of GDP over the next quarter or year. Predictions about banking are no different. Predicting difficulties in the banking system seems to have been neither easier nor harder than predicting downturns in the macroeconomy. There is also an ongoing demand for predictions of secular trends, particularly advances in technology and in analytics, which are in many cases less amenable to analysis using the economist's traditional toolbox of data and theoretical and empirical models.

As a consequence, many, and perhaps most, publicly available predictions that depend on judgment about such advances have been made not by economists but rather by journalists, business executives, practitioners, and consultants with extensive industry experience. Regional and national banking association meetings, which play an important role in helping bankers keep up with current developments, have provided a forum for many executives, banking analysts, and others to predict the future of banking. Unfortunately, many, and probably most, of the predictions about longer-term effects and outcomes are qualitative rather than quantitative, which makes them difficult to evaluate.

Here we present some predictions that were made a few decades ago about the rate of adoption of several key technological advances and their longer-term effects on

banking. We also present some evidence on the degree to which actual outcomes matched those predictions. We selected three specific longer-term developments in banking as being representative of the kinds of changes that banking has seen, that bankers have suggested are important to the future of banking, and that are likely to continue into the future. These developments were deliberately chosen to include at least one that was largely driven by technology in the traditional sense of advances in electronics and mechanical devices (automated teller machines); one that was driven by the combined effects of technological change, regulation, and inter-industry competition (the switch from paper-based to electronic-based payments); and one that, though facilitated by advances in computer technology and the desire to escape regulatory costs, was largely the product of financial engineering (securitization).

We then discuss the outcomes associated with these innovations and compare them with what had been predicted. We also note some of the common features of the deviations of actual from predicted outcomes. We then relate those observations to predictions and outcomes of the growth and structure of the banking industry as a whole.

II. AUTOMATED TELLER MACHINES

A History of ATMs

Here we examine the history of automated teller machines (ATMs), focusing particularly on early predictions about their use and deployment. In 1971, Seattle First National Bank installed what were considered to be the first ATMs in the United States (*ABA Banking Journal*, 1979). Most early ATMs could be used only for cash withdrawal and to make deposits. Many were installed within or just outside bank branches and offered limited hours of operation. Different banks had different goals and expectations

for their ATM programs, perhaps due to disparate assessments of the prospects for ATM technology.

What were the driving forces behind banks' decisions to install ATMs? Some analysts believe that changing economic conditions in the early 1970s, when rising inflation and interest rates made it more difficult for consumers to borrow, reduced consumers' loyalty to their local banks (Moore, 1984). These changes in economic conditions and consumer attitudes stimulated competition among financial institutions. For banks that could afford the investment, "ATMs represented an attractive strategy through which to distinguish themselves and achieve a competitive market advantage." (Moore, 1984) Thus, prior to 1975, the vast majority of banks that installed ATMs reported doing so to increase market share.

In the second half of the 1970s, more institutions began to install ATMs to enhance customer service and as a defensive measure against competition from other banks. Cost savings to banks were not a driving factor. Consumers used ATMs to access their accounts more frequently, so that the overall number of transactions increased. Moore (1984) made an analogy to the proliferation of convenience stores, which did not reduce use of supermarkets, but rather increased the frequency with which consumers make food and other purchases.

In the 1980s, other factors began to influence ATM installations. Because construction and operation of brick and mortar branches became increasingly expensive, some banks limited branch expansion or closed branches. ATMs provided a partial substitute for those lost branches. Also, banks began to face more competition from other financial services providers. Some of these other providers (e.g., Sears, Merrill Lynch)

operated nationwide. Banks--which were still prohibited from branching across state lines--saw ATMs as a vehicle for competing across wider geographic areas (*Credit Union Magazine*, 1983).

A survey commissioned by the Board of Governors of the Federal Reserve System in the mid 1980s provides a snapshot of the demographic characteristics of ATM cardholders and users (Board of Governors, 1984). The survey findings indicated, among other things, that 42 percent of families had ATM cards, but only 30 percent of families had actually used the cards in the month before the survey. Ownership of ATM cards was "positively related to income and higher levels of education and inversely related to age. [...] Use of automated teller machines [was] also positively related to income and negatively related to age." (Avery et al., 1986) Thus, there was great potential for ATM usage to grow over the ensuing years.

Consumers now generally expect to be able to access their accounts in a much wider range of locations and times than they did thirty years ago. Initially, ATMs were installed only on bank premises. By 1998, according to a study by Dove Associates, over half of all supermarkets, gas/convenience stores, and malls in their survey had ATMs. Consumer acceptance has fueled this growth.

Predictions about ATMs

From the mid-1970s, most observers expected that ATMs would eventually be accepted and used by the general population. Early predictions reflected the belief that consumers would adopt even newer technologies--to the point of conducting their financial transactions from home. These predictions suggested that ATMs were likely to be displaced by banking from home.

Table 1 shows some of the key findings from a survey of consumer perceptions about ATMs conducted in 1976. Most respondents did not see a need for additional ATMs and, in fact, thought they would be infrequently used (Mears et al., 1978). At that time, only 5,000 ATMs had been installed in the U.S. The researchers surmised that respondents preferred personal interaction with a teller to the convenience offered by ATMs. Many bank customers had not yet used ATMs, leading researchers to conclude that raising consumer acceptance and usage of ATMs would require a substantial educational campaign.

Respondents were asked whether or not they agreed with each statement as well as how strongly they agreed. The authors constructed an Agree Potency Index (API) to reflect the intensity of respondents' feelings regarding each statement. Although survey respondents did not anticipate the proliferation of ATMs, they believed that existing machines would be used for more than just withdrawing cash and making deposits. For example, more than half of those surveyed agreed with the statement that bank machines would allow users to make loan payments, including mortgage payments, and over 40 percent agreed with the statement that bank machines would offer cash advance loans.

By 1977, consumer acceptance was on the rise. The monthly rate of machine installations almost doubled in 1977, and there was "every indication that this higher rate will continue and perhaps quicken over the next several years." (Zimmer, 1978)

A 1980 article on the future of branch banking by Richard Rosenberg, then Vice-Chairman of Wells Fargo Bank, began, "I trust that no one who reads this today will look me up in the year 2000 in the event that my predictions have been totally inaccurate. The best I can hope to do is to extrapolate some current and emerging trends in banking,

technology, and social attitudes, and then generously season the results with imagination." (Rosenberg, 1980) He went on to predict that ATMs will be "obsolete by the year 2000" because most people will be using home-based devices to conduct personal business transactions. He also expressed the belief that, because most transactions would be handled electronically, the number of bank branches would decrease and remaining branches would have "few, if any, support staff members." Rosenberg anticipated that technological advances would be such that households would have a comprehensive record of their finances in a home appliance that would be so reliable that taxpayers would be able to get a discount by allowing the government to tap into those devices when processing tax returns.

Without providing specific numbers, Rosenberg was predicting such widespread use and acceptance of new technologies that consumers would have little reason to visit either bank branches or ATMs. His remarks suggest, albeit implicitly, a sharp rise in the use and deployment of ATMs, followed by a quick decline as consumers switched to home banking by the end of the 1990s. Although his predictions may ultimately prove correct, it is clear that these shifts have not occurred as quickly as he suggested they would.

In the early 1980s, industry observers continued to predict growth in ATM use and deployment, possibly followed by a decline in favor of home banking. Here are a few examples of predictions about ATMs made during the early 1980s:

"ATM growth is not at maturity but at its beginning. There is a tremendous amount of growth still to take place." (Edwards, 1982)

"In 1980 a milestone was passed, with ATM shipments passing the 5,000 unit mark. 1981 was a record-smashing year, with 8,456 machines shipped, bringing the cumulative net installed base in the U.S. to 26,800. Forecasts for 1982 are even brighter, and it would come as no surprise if ATM shipments this year surpass 10,000 units." (Zimmer, 1982)

"By 1990, forecasters say, there will be 125,000 ATMs in place. Even if home banking catches on, ATMs will still be useful for on-the-spot cash needs." (*Credit Union Magazine*, 1983)

"During 1982, consumer usage of ATMs showed stunning growth. [...] Indeed, several estimates suggest that by 1985 the number of ATMs in the U.S. will reach the 84,000 level." (Duffy, 1983)

"Generally, the ATM may be viewed as a major success story for EFT [electronic funds transfer] in the 1970's, with impressive growth in installations adoption by consumers. [...] Indeed, the [adoption] pattern is similar to the demographic patterns of adoption of checking accounts in the early 1950's." (Murphy, 1983)

"This delivery system [self-service banking] will develop very quickly up until 1990 when it will start to slow down and eventually decline in favor of home banking. In the year 2000, home banking and self-service banking will compete for routine transactions." (Loviton, 1985)

ATM Outcomes

In general, the predictions made in the 1980s were overly optimistic, as shown in Figure 2. This over-optimism is similar to predictions about home banking and about a cashless society. There were approximately 324,000 ATMs in the United States by early

2001. Tables 2 and 3 show that the number of ATMs in operation has grown steadily over the past three decades. The growth in ATMs was especially dramatic in the 1970s and early 1980s. For the 1973-1984 time period, for instance, ATMs grew at an annualized rate of about 36 percent. Similarly, the average number of transactions per ATM has increased almost every year since 1983 (*Bank Network News*, 1995 and *ATM & Debit News*, 2001).

By 1994, although the availability of ATMs had increased tremendously, banks had yet to see cost reductions that many had anticipated. "[W]hile ATMs were successful in reducing the cost of each depositor transaction, depositors increased the number of transactions, leaving total costs relatively unchanged or slightly higher." (Humphrey, 1994) The advent of shared ATM networks in the early 1990s and the lifting of the ban on surcharging in 1996 spurred recent ATM growth. Not surprisingly, "[t]he ability of ATM owners to levy a fee on cardholders dramatically altered the economics of the business, leading to a surge in ATM placements." (Dove Associates, 1998) As banks and non-bank competitors such as Independent Sales Organizations (ISOs) and retailers continued to deploy more ATMs, the percent of ATMs on shared networks rose from 59 in 1985 to 100 by 1995 (*Bank Network News EFT Network Data Book*, 1995). While the number of ATMs grew at an annualized rate of 10.1 percent from 1983 through 1996, the growth rate rose to 18.4 percent over the 1996-2001 period. The monthly number of transactions per machine peaked at about 6,500 in 1995. Average monthly transactions per machine gradually declined to approximately 3,500 by March 2001.

Current Predictions about the Future of ATMs

Perhaps chastened by experience and suggestive of the wider range now warranted for confidence intervals, industry observers today are more likely to point out possibilities than to make predictions. They note that web-enabled ATMs, for example, might offer a wide range of services to consumers. Some machines already offer stamp sales and now ATMs can dispense movie tickets, coupons, and maps. But cash dispensing is still thought to be the "killer-app" of ATMs (Newell, 2001). Large numbers of customers still rely on ATMs for cash, but few consistently use them for other services.

III. ELECTRONIC FUNDS TRANSFER

Paper checks have long had a larger market share (by number of retail transactions) in the United States than in Europe or in Japan. Payments in Europe have long been more oriented toward smart cards and electronic payments; payments in Japan have long been more oriented toward cash.

By the 1970s, however, the ever-increasing volume and costs (due to the time lags in check processing and the associated amount of float) associated with paper currency and check and the availability and falling costs of computer technology combined to stimulate the use of electronic funds transfer (EFT). Thus, individuals, banks, retailers, and governments increased greatly the proportion of their payments made electronically rather than via paper currency or checks. As making more payments via EFT seemed increasingly cost-effective, the prospects for even more EFTs in the future seemed likely during the 1970s. Credit cards issued by banks and retailers had already become quite popular and common. Debit cards were introduced in 1972 and transferred funds at

point-of-sale (POS) terminals in retail stores. Although they were still rare in the 1990s, their usage continued to increase. EFT payments via automated clearing houses (ACH) were displacing payroll and other checks for periodic payments of salaries, utility bills, insurance bills, and other direct deposits. Thus, the rising business and consumer acceptance of payment arrangements that had some electronic component and the falling relative costs of EFTs probably contributed to predictions that check usage would soon peak and that EFT volume would grow rapidly.

The Growth of Checks

A report prepared by Arthur D. Little, Inc. for the National Science Foundation estimated the overall annual cost of the payments system in the mid 1970s was about $14 billion, with about $8 billion attributable to checks. Banks and government were concerned that the high costs associated with the rapid growth of paper-based payments volume would eventually make the payments system very inefficient. Banking analysts were perhaps influenced by the practice in the late 1960s of halting trading on the NYSE for one afternoon each week so that back offices could catch up on their backlog of paperwork. As a result, much attention and effort was devoted to EFT as a substitute for paper checks.

Predictions

Although there was much talk about checkless societies, nobody really expected checks to disappear. No matter how optimistic one's view about checks being displaced by EFT, the consensus was that checks would not be replaced as an important method of payment. Rather, predictions tended to suggest that checks would lose market share.

Mainstream predictions called for volume, measured by the number of checks cleared, to grow at 7 percent per year primarily due to growth in the macroeconomy and the number of check users. But, some were even more optimistic about the development of EFT and more pessimistic about the future viability of the paper-based checking system. They foresaw a decline in the rate of growth of check volume for the remainder of the 1970s due to an expected rise in postage costs and clerical costs for check handling, a decline in the rate of productivity growth in check handling, and capacity constraints arising from the already high volume of checks being handled. As for the ability of EFT to attract some of the volume then handled by checks, many felt optimistic that per-unit costs of electronic data processing would decline as EFT volume rose.

Predictions were also made about the government's role in maintaining the checking system. In 1974, much discussion took place about the government's making social security payments by directly depositing the payments into individual accounts rather than by paper checks. In addition, the Federal Reserve's subsidy of paper-based check services (by charging nothing for them) was expected to end.

Outcomes

Figures 3 and 4 plot actual numbers of checks cleared during the 1970s and 1980s, along with predictions made about check volumes in the early 1970s and middle 1980s. Figure 3 shows that the predictions gleaned from statements made during the early 1970s by Federal Reserve officials and others about the mid 1980s tended to over-predict ensuing check volumes. (Sherrill, 1971; Bucher, 1972; Sheehan, 1972) For example, the estimated check volumes in 1980 predicted in 1974, 1975, and 1976 were 45 billion, 40 billion, and 37 billion, respectively. Actual volume in 1980 was about 33

billion. Naturally, predictions of check volume in 1980 were scaled back as time revealed that volumes were falling short of prior predictions.

During the 1980s, the opposite was true. Figure 4 shows that predictions made in the middle 1980s drastically under-predicted check volumes through the middle 1990s (Federal Reserve Bank of Atlanta, 1983; Lipis, Marschall, and Linker, 1985). By the middle 1990s, actual volume was more than 50 percent higher than had been predicted. Predictions of leveling and even declining check volumes were based on displacing checks with EFTs. Thus, under-predicting the former was tantamount to over-predicting payments made via ACH, to which we now turn.

Automated Clearing Houses

One element of the EFT system is the automated clearing house (ACH). An ACH is a paperless-entry facility that acts on behalf of local, regional, or national associations of commercial banks to make direct deposits and preauthorized payments. ACH is used for preauthorized payments of recurring bills, including car payments, utility bills, and mortgages. ACH is also used to make direct deposits of payroll and Social Security payments into recipients' accounts. ACH can replace checks and check-clearing facilities by transferring and processing the same information via tapes, discs, or e-messages between financial institutions. ACH was designed to replace checks as a means for making mortgage, insurance, utility, and other recurrent payments by consumers as well as wage, dividend, and other recurring payments to consumers. The first ACH was established in California in 1972. As local ACH associations expanded in number and size, the National Automated Clearing House Association (NACHA) was formed in 1974 with 18 charter member regional associations representing population centers in all 12

Federal Reserve Districts in order to facilitate the interregional exchange of ACH transactions on a national scale.

Although views on the development of ACH varied, many observers were hopeful that local and regional ACHs would eventually expand into an efficient, accessible, and widely used nationwide electronic payments clearing system. However, until banks faced and passed along to their customers more of the total costs of their check and currency processing services, incentives for customers to switch to the ACH remained muted.

Even as late as the middle 1970s, ACH volume was tiny. While over 25 billion checks were processed in 1976, for example, fewer than 0.1 billion ACH transfers occurred. Of course, ACH volume was growing considerably in percentage terms, but from a very small base.

Predictions and outcomes

In 1976, it was expected that the number of payments processed annually through the national ACH network would approximately quintuple by 1980, approaching 350 million. (Nilson, 1978) Figure 5 plots the actual and predicted volumes of ACH transfers. By 1980, actual ACH volume was about half as large as had been predicted four years earlier.

In 1979, it was predicted that, by 1985, 15 percent of all check-type payments would be handled through direct deposits and preauthorized payments. (Golson, 1980) Furthermore, preauthorized payments of industrial and commercial payrolls were anticipated to eliminate 3 billion checks annually. In addition, analysts foresaw consumer-initiated, or “GIRO”, payments, such as those for telephone, electric utility,

and department store charges, comprising a significant share of ACH volumes. In fact, George C. White Jr., a vice president of Chase Manhattan Bank, anticipated that the greatest growth in ACH volume would come from GIRO payments.

Figure 6 plots the actual and predicted volumes of ACH transfers for the years 1979 to 1985. Compared with the prediction that ACH volume would be 15 percent of check-type payments (and therefore nearly 7 billion transfers) ACH volume still hovered well below 1 billion transfers in 1985. Thus, electronic-based ACH transfers consistently fell far short of what was predicted for them during this period.

Credit, Debit, and Smart Cards

By the 1970s, bank and nonbank credit cards were widely held and widely used. More than half of all banks provided credit card service by the early 1970s and most banks belonged to one or more of the major bank credit card associations. In addition to banks, institutions such as travel companies, oil companies, retailers, and non-bank financial institutions issued credit cards for use in their own stores. In fact, these nonbank cards developed decades before bank cards and were more widely held and used for many years after the development of the bank credit card. As late as 1978, the number of retail credit cards was almost three times that of bank credit cards.

Debit cards, unlike credit cards, are fed into a point-of-sale (POS) terminal that instantaneously deducts the amount of the purchase from the cardholder's account and credits it to the retailer's account, thereby eliminating float and credit risk. Although debit cards made their debut in the early 1970s, the volume of payments made with such cards constituted a very small share of total card volume until the 1990s. However,

Figure 7 shows that from their minuscule volumes in the middle 1980s, debit card volumes were predicted to rise enormously. (Osterberg, 1984)

More recently, advances in computing technology have permitted the development of "smart cards," which contain a computer chip sophisticated enough to carry vast amounts of data and permit a variety of transactions. So far, smart cards have achieved greater market penetration in Europe and in parts of Asia more than they have in the United States. Because of their versatility and convenience, smart cards were predicted to grow extremely rapidly in the 1990s.

Predictions

Because of their convenience and extension of credit and float, credit cards have become very popular. With credit card accounts growing at about 30 percent each year, the future for both bank- and retailer-issued credit cards looked promising in the 1970s. Figure 8 plots the numbers of actual and predicted credit card transactions for the years 1978 to 1985.

Outcomes

The growth of credit card transactions over the period 1978 to 1985 tended to be over-predicted. Actual credit card transactions in 1985 were about 15 percent below what had been predicted in the late 1970s. (Miller, 1979)

Debit card volume was greatly over-predicted. As late as 1992, EFT/POS volumes were only about one-tenth as large as they had been predicted only a few years earlier to become.

Figure 9 plots the actual and predicted percentages of U.S. households using smart cards for each of the years 1995 to 2000 (Ice, 1996). The pace of adoption of smart

cards has been dramatically over-predicted. While it was predicted six years earlier that roughly half of all households would be using smart cards by the year 2000, the actual proportion is close to 2 percent and has been growing rather slowly.

Thus, the history of the future of banking, in particular with regard to payment instruments, is replete with examples where the market shares of newer instruments have grown far more slowly than predicted. It may be discouraging to some that the market has been so slow to loosen its embrace of older, less technically efficient payment instruments. The upside is that banks may be able to lower their predicted rate of technological obsolescence when calculating the cost of capital for payments operations. (A lower obsolescence rate is akin to a lower depreciation rate in that regard.) Thus, slower adoption of newer instruments reduces the effective cost of capital for existing instruments.

IV. SECURITIZATION

Securitization has been defined narrowly by Pavel (1989) as "the pooling and repackaging of loans into securities." Although it can be argued that securitization in this sense occurred much earlier, it is generally regarded as having begun in 1970. At that time, the Government National Mortgage Association (GNMA) first issued "pass-through" securities that simply passed through the principal and interest payments from a pool of FHA-insured or VA-guaranteed one-to-four family mortgages. Since that time, the Federal National Mortgage Association (Fannie Mae) and Federal Home Loan Mortgage Corporation (Freddie Mac) have greatly expanded the volume and variety of mortgage-backed securities. More recently, large private sector financial institutions

have gone into the business of securitizing both loans that they have underwritten themselves and loans originated by other lenders.

Securitization was a major step toward creating a true “secondary market” in mortgages. Prior to 1970, many thrifts and mortgage companies sold off some or all of the mortgage loans that they originated to institutional investors like insurance companies and pension funds. However, because of the difficulty of evaluating the credit quality of those loans, the purchasers generally held them to maturity; trading was virtually nonexistent. In contrast, there is an active market today for many issues of asset-backed securities.

Prerequisites for Securitization

Although the details differ greatly, depending on the type of loan or other asset that is securitized, at least three ingredients appear to be prerequisites to every successful securitization: pooling of assets, standardization, and credit enhancement in one form or another. Pooling of many individual loans into a portfolio is the most essential ingredient of securitization, because it replaces a single risky asset--e.g., an individual mortgage loan--with a portfolio of loans to borrowers in many locations and subject to many different economic circumstances, thereby achieving the benefits of diversification. To be sure, for any given issue of asset-based securities, the degree of diversification is limited by the need for some degree of standardization of the underlying assets.

Standardization of the assets underlying any given issue of asset-backed securities is important because it makes it easier for buyers of the securities to evaluate their collective credit risk. The mortgages underlying the first pass-through securities were relatively homogeneous because they were all required to meet the FHA’s or VA’s

standards for issuing insurance or guarantees, as well as GNMA's standards for the purchase of mortgages. Thus, they were similar in terms of size, maturity, loan-to-value ratio, type of property, and default risk. It was only slightly more difficult to standardize credit card receivables, car loans, and other consumer loans for the purpose of securitization. Currently, the difficulty of standardizing small and middle market business loans, let alone custom-tailored loans to large corporations, remains a significant barrier to the further growth of securitization (Snyder, 1990; Feldman, 1995). However, the ingenuity of market participations in solving what were initially viewed as insurmountable problems in the securitization of mortgage and consumer loans suggests that it is just a matter of time until securitization of business loans becomes commonplace (Feldman, 1995; Olson, 1986; Shapiro, 1985).

But pooling and standardization by themselves are rarely sufficient to overcome the reluctance of investors to purchase securities collateralized by assets whose default risk is difficult for anyone other than the originator to gauge. As a consequence, virtually all issuers of asset-backed securities offer some form of credit enhancement. In the case of GNMA's pass-through securities, this took the form of guarantees of repayment of the underlying mortgages by government agencies. Other types of credit enhancement that have been used include over-collateralization, the retention by the issuer of a subordinate interest in the securities, or a limited guarantee by the selling bank or an independent third party. (Carney, 1989)

Benefits of Securitization

Although the rapid growth of securitization in recent decades creates a strong presumption that it is serving some well-defined human purposes, these purposes have

not been evident to all observers. As Schwarcz (1994) asked, "[I]s the securitization process a zero-sum game or does it truly reduce net financing costs?" Schwarcz himself, and most other analysts who have looked closely at the market, have concluded that "securitization is an alchemy that really works." Like many other developments in finance in recent decades, securitization is a part of the ongoing "unbundling" process that breaks financial transactions into their constituent components, separating the loan origination and servicing functions from the bearing of credit and interest rate risk. By doing so, it is possible to achieve a closer match between the various components of the credit-granting process and the needs, desires, and abilities of those who participate in it.

Among the many benefits of securitization are reduced credit and interest rate risk for the banks and thrifts originating the securitized loans, many of which sell off their own securitized assets and then purchase asset-backed securities issued by other financial institutions to diversify their portfolios. To the extent that securitization results in a net shrinkage in depository institutions' balance sheets, it enables them to reduce or avoid several regulatory taxes, including capital requirements and reserve requirements. Investors benefit from having access to a highly liquid asset with risk-return characteristics that were previously not available. Finally, borrowers benefit from the increased supply of loans and reduced interest rates that result from broadening the range of investors willing and able to purchase the new class of asset-backed securities.

Predictions

Banking analysts offering predictions of the future of banking during the 1970s and early 1980s were aware of the developments in securitization. Nonetheless, they generally failed to predict either its rapid growth or its immense importance to banks.

For example, in his excellent and widely praised book, *The Bankers,* Mayer (1974) devoted much attention to predicting the future of banking. However, he completely ignored the implications of securitization for the future of banking; indeed, the term does not even appear in the book. Similarly, there is no mention of securitization, or even of the secondary market for mortgages, in one of the most comprehensive and widely-used textbooks on commercial bank management in the 1980s (Sinkey, 1986). We cite these examples not because they are outliers but because they are perceptive works that nevertheless, like most other analyses and assessments of the future of banking made at that time, overlooked a major development that was already underway.

One of the few analysts who did suggest that securitization would grow rapidly and have profound effects on the nature of banking was Sanford Rose, long a feature writer for *Fortune* magazine and later an associate editor of the *American Banker*. Rose proved to be extremely prescient in claiming that the secondary mortgage market would blossom and have important implications for banks. In 1982, he predicted that, "...by the end of the decade, banks may make more money on the flow of assets through (and around) their balance sheets than on the stock of assets on those balance sheets." (Rose, 1982) This prediction referred not only to securitization; it also pertained to loan sales and a wide range of banks' off balance sheet activities. As it turned out, this was something of an over-prediction, as noninterest income remains well below half of current income for all but a tiny minority of banks. Regardless, Rose was one of the few to foresee the magnitude of the coming wave of securitization.

Outcomes

Figure 10 shows the growth in the proportions of outstanding mortgage debt and consumer installment debt that are securitized for the years 1970 through 1999. Because consumer loans were not securitized until the late 1980s, there are no data for them before 1989. As can be seen, by 1999 nearly half of all mortgage debt and over 30 percent of consumer installment debt were securitized.

Just as most assessments of the future of banking made prior to the mid 1980s failed to foresee the enormous expansion of securitization, other analyses done a few years later exaggerated the negative impact of securitization on banks. Some predicted the demise or sharp retrenchment of banks as loans disappeared from banks' balance sheets when they were sold or securitized in order to avoid regulatory taxes in the form of reserve and capital requirements, to reduce banks' concentration and interest rate risks, and to eliminate excess capacity from the industry (Moose, 1987). The next section discusses how an uncritical reading of faulty data led many to conclude that the role of banking in the financial system had declined much more than it actually had.

V. THE ALLEGED 'DECLINE OF BANKING'

Predictions

A prediction encountered often in the popular press, banking publications, and even in several learned treatises in recent decades is that the commercial banking industry is in an incipient state of decline and that banks will soon lose their traditional role as the most important type of financial intermediary in the United States and perhaps in the rest of the world as well. Many of the trends in the data that led to such conclusions have become familiar to us all. The most striking is the decline in commercial banks' share of

the total assets of all financial institutions in the United States from over 70 percent in 1860 to around 38 percent in 1960, followed by a precipitous drop from 35 percent in 1980 to 25 percent by 1993. Since then banks' share of financial institution assets has declined much more gradually to just above 20 percent.

What is not clear from looking solely at these trends is that the meaning of the observed data changed significantly between the earlier part of the period and the most recent period. The general decline in banks' market share from 1860 until about 1960 probably reflected fairly accurately what was happening to banks' true relative importance in the financial system. Thus, the measured decline in commercial banks' share of financial institution assets from 1860 through the late 1920's appears to have been quite real, as the amount of assets was an accurate reflection of the volume of banking services, which continued to be dominated by traditional borrowing and lending activities.

Much of the decline in banks' market share from the end of World War II through about 1970 reflected the competitive handicaps that had been placed on banks by the Banking Acts of 1933 and 1935, enacted in response to the banking collapse of the early 1930s. These took the form of capital and reserve requirements, deposit interest rate ceilings, restrictions on bank investments, and the separation of commercial and investment banking. Although they were largely nonbinding until loan demand revived and market interest rates began to rise in the 1950s, these restrictions became more and more burdensome as the years passed. They were largely responsible for the advent in 1972 of money market mutual funds, whose share grew over the following decades to a level roughly comparable to that of total bank deposits.

Despite these handicaps, the renewed decline in banks' share of assets since about 1970 is largely illusory (Edmister, 1982; Boyd and Gertler, 1994; Kaufman and Mote, 1994). The reason is that the total of bank assets has become a progressively less satisfactory measure of banking activity and output with the passage of time. This, in turn, is due to the fact that the nature of banking activities has changed dramatically in recent decades. Probably the most important change has been the reduction in banks' role as a lender to nonfinancial corporations. Improvements in information technology have greatly increased the availability to investors of previously proprietary information on the creditworthiness of companies of all sizes and more and more of the larger companies have found it economic to obtain short-term funding from the securities market rather than by borrowing from banks. Thus, the ratio of commercial paper outstanding to bank commercial and industrial loans, which was just over 10 percent in 1960, rose to about 30 percent in 1975 and to more than 100 percent by the early 1990s.

But banks remain a major source of credit for small and medium-sized businesses, as well as for households. Securitization of business and consumer loans, while in many cases resulting in the removal of assets from banks' balance sheets, does not eliminate them from the process. First of all, although the market has shown considerable ingenuity in securitizing assets that did not initially appear to lend themselves to that process, all of the assets that are easy to securitize have already been securitized. As efforts are made to extend the process to custom-tailored business loans, the difficulties will mount exponentially (Bryan, 1991). But even if these obstacles are overcome, it is likely to be a long time until small businesses can bypass banks and access the securities

market directly. Until then, banks will retain a key role in the process as the originators of the loans to be securitized (Bennett, 1987).

Banks also offer a growing variety of services for fees, ranging from accounting and data processing to investment advising and the management of mutual funds. With the deregulation of deposit interest rates in the early 1980s eliminating the need to pay depositors for the use of their funds in the form of services provided free or at below-market prices, banks have also worked to increase fees on those services to market levels --an endeavor accompanied by considerable customer resistance and the loss of much institutional goodwill. Between 1984 and 1992, the aggregate ratio of noninterest income to total income for all commercial banks in the United States rose from 24.6 percent to 33.0 percent. In 1992, fee income, including service charges on deposit accounts, constituted at least 90.5 percent of total noninterest income, while the remaining 9.5 percent was divided between trading gains and fees from foreign exchange transactions, other foreign transactions, and assets held in trading accounts.

None of these so-called "off-balance-sheet activities" shows up in the Federal *Reserve's Flow of Funds* data from which the asset shares of banks and other financial institutions are typically calculated. Even if those data did not exclude such fee-based activities, total assets is a less than optimal measure of banking output because it does not capture important differences in the amount of risk-bearing and other ancillary services associated with loans, securities, and other earning assets of banks.

To overcome these shortcomings of the *Flow of Funds* data, one study used IRS data on total revenue and value added--which, in addition to including all types of noninterest income, do capture such differences--to calculate commercial banks' share of

the output of the financial sector for every year from 1938 through 1989 (Kaufman and Mote, 1994). The results suggest that, aside from fluctuations of a few percentage points that persisted as long as five years to a decade, there has been almost no trend in banking's market share since the early 1960s. Not only has the output of the commercial banking increased in absolute terms in all but a few years over that 52-year period but, after a brief decline in the late 1930s and early 1940s, value added in commercial banking as a percentage of gross domestic product has risen almost continuously ever since, more than tripling between 1943 and 1989. Similar conclusions were reached by Boyd and Gertler (1994) in the study mentioned earlier and by Levonian (1994 and 1995), based on the stock market's evaluation of future bank profitability. This is hardly the picture of a dying industry offered by some of the more sensationalistic journalism of the early 1990s.

Of course, there is no guarantee that the banking industry will do as well in the future as in the past. However, the recent health of the industry--as reflected in the sharp recovery of both its ROA and ROE from the depths of the recession of the early 1990's, capital ratios that are higher than at any other time in recent decades, and the relatively low delinquency rates for this stage of the business cycle--all suggest that banking problems on the order of magnitude of those experienced between 1982 and 1992 are unlikely anytime in the near future. Most importantly, the dismantling over the past 20 years of the most burdensome of the regulations imposed in 1933, as well as geographic restrictions that go back to the turn of the century, culminated with the enactment of the Riegle-Neal Interstate Banking and Branching Efficiency Act of 1994 and the Gramm-Leach-Bliley Financial Institutions Modernization Act of 1999. Both should do much to

enhance the competitiveness of U.S. commercial banks vis a' vis other financial institutions, both domestic and foreign.

VI. A LOOK BACK AT LOOKING AHEAD

Predictions about the market penetration of three important aspects of banking have generally been far off the mark. Starting at least three decades ago industry analysts and bankers predicted that electronic payments would produce a checkless society within, at most, two decades. Over the past three decades, check volume has risen substantially. In contrast, the extent of home banking seems to have fallen far short of the typical predictions for it.

Similarly, the advent and rapid growth of automated teller machines (ATMs) gave rise to predictions that they were the vanguard of a major shift toward electronic banking. The shift toward using ATMs was envisioned to involve their providing many additional services, such as deposit-taking and acceptance of loan applications and displacing physical branches and paper-based payments. However, despite the continued rapid expansion in the number of ATMs, their use has overwhelmingly been confined to dispensing cash and occasionally providing account balances. Ironically, by bringing new security and convenience to getting cash, technological advances in ATMs probably retarded the adoption of electronic banking.

In contrast to the generally over-optimistic predictions about how quickly households would move to electronic payments and home banking, securitization grew far more rapidly and extensively than was generally predicted. However, many analysts then greatly over-predicted its effects on the role of banks.

It may be that adoption speeds were unexpectedly rapid in business-to-business technologies because the scale of operations made adoption profitable. Households' adoption of new technologies may have been hindered by unexpected lags in legal clarifications and protections for households.

It may be that predictions about checkless payments, the disappearance of ATMS, the extent of home banking, and perhaps other aspects of retail banking erred primarily by overestimating adoption speeds for electronic banking by households. For many technology-based and other aspects of banking, however, timing is a crucial aspect of prediction. Accurate prediction of timing often dramatically influences the value and usefulness of predictions.

Prediction errors about the decline of banking stem, to some extent, from the tendency to cling to long-standing proxies for the amount of activity in banking. Historically, assets on the balance sheet were a good proxy. But, as securitization proliferated, less and less bank activity left its imprint in balance sheet assets. Further, banks' newer activities often produced few balance sheet assets. Thus, the ratio of banking's balance sheet assets to its value added declined more than banking itself declined.

The innovations that we focused on suggest that we may generally tend to overestimate the speeds at which retail banking evolves and underestimate the speed at which wholesale banking evolves. Our small sample makes for a very wide confidence interval around that generalization. The speeds of adoption of new technologies seemed to be much slower in retail than in wholesale banking. If anything, it would make predicting retail banking developments easier. And differential adoption speeds alone

would not explain why prediction errors about adoptions speeds would differ so systematically. Thus, the differences between the prediction errors for retail banking and the prediction errors for wholesale banking merit further investigations.

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Table 1: Consumer Perceptions About ATMs[1]

Agree Potency Index Rank	% Agree	Statement
1	89.9	Give me a printed statement describing my transactions.
2	88.9	Credit deposits immediately to my account.
3	86.5	Provide my current account balances.
4	82.4	Provide a telephone in case I need help.
5	79.1	Will be something I use most while my bank is closed.
6	81.4	Deduct withdrawals immediately from my account.
7	75.0	Be activated by a special card used only for the machine.
8	75.3	Have access to a live teller.
9	74.9	Have a two-way communication system.
10	68.2	Limit the amount of money I can receive from the machine.
11	72.3	Reduce trips made to the bank.
12	65.2	Provide privacy similar to a voting booth.
13	71.6	Be used at a bank while teller lines are long.
14	64.9	Be located in all major shopping centers.
15	67.6	Be the same as machines used by other banks.
16	68.9	Be near where I work.
17	64.2	Be used from my car.
18	61.1	Let me make mortgage payments.
19	57.8	Identify me by name.
20	61.0	Will be something I will have to get used to.
21	58.4	Be used to make loan repayments.
22	48.3	Handle most checking and savings transactions.
23	45.9	Will replace the need for cashing checks.
24	45.4	Be found in all major grocery stores.
25	43.2	Let me take out cash advance loans.
26	43.4	Be located at an information booth in a retail store.
27	40.9	Be installed at a few selected branches.
28	36.8	Be the way most banking will be done in the future.
29	22.3	Be used more often than bank tellers.

[1] Source: *"An Empirical Investigation of Banking Customers' Perception of Bank Machines,"* Peter Mears, Daniel McCarty, and Robert Osborn, Journal of Bank Research, Summer 1978.

Table 2. ATMs Installed and in Operation[2]

Year	Annual	Cumulative	Net Installed
1973	935	1,935	1,935
1974	965	2,900	2,900
1975	1,156	4,056	4,056
1976	1,249	5,305	5,305
1977	2,444	7,749	7,749
1978	2,001	9,750	9,750
1979	4,680	14,430*	13,800*
1980	5,428	19,858*	18,500*
1981	8,456	28,314*	25,790*
1982	11,035	39,349*	35,721*
1983	13,983	53,332*	48,118*
1984	12,352	65,684*	58,470*

* Cumulative shipments and net installed base began differing in 1979 due to warehousing, replacement and scrapped machines.

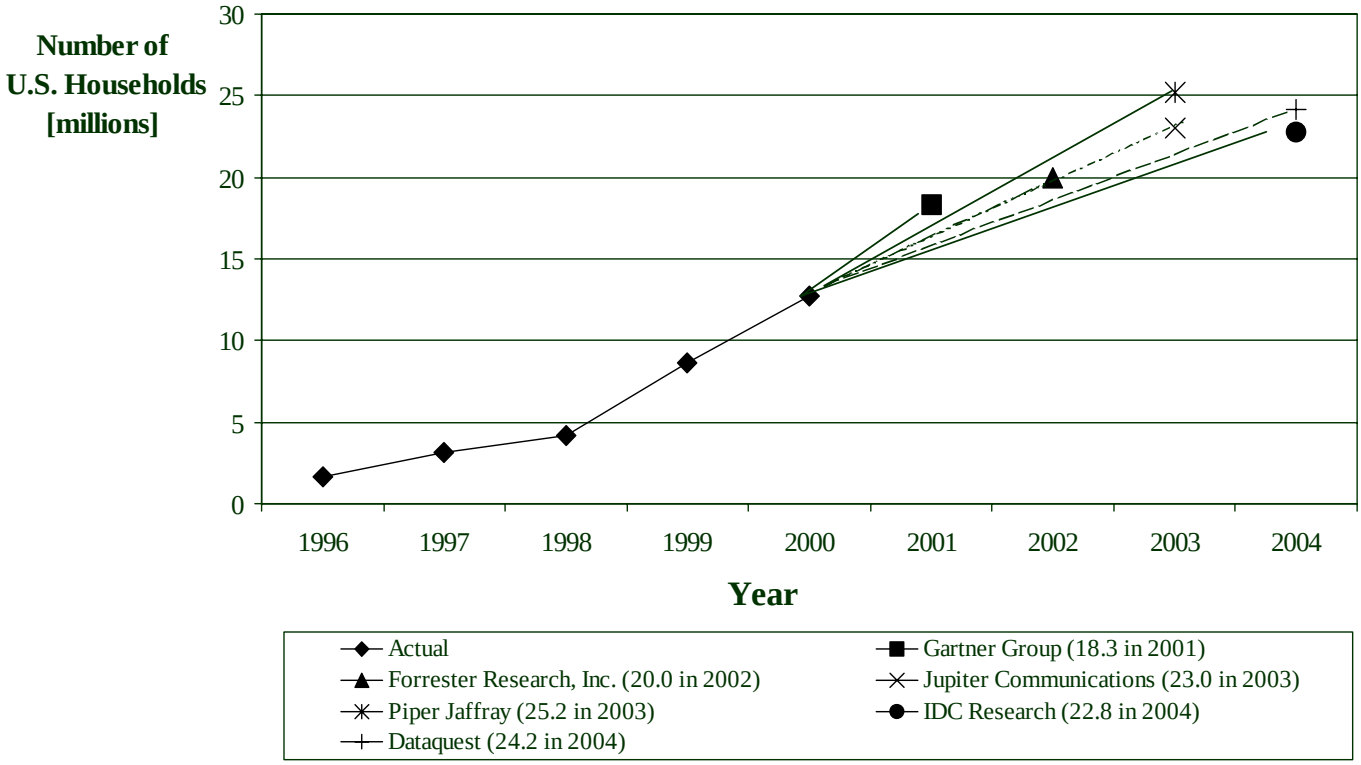
Table 3. ATMs in Operation and Monthly ATM Transactions[3]

Year	Total ATMs	Transactions (millions)
1983	40,000	200.0
1984	55,000	261.0
1985	60,000	297.1
1986	64,000	302.1
1987	68,000	337.4
1988	72,492	373.4
1989	75,632	426.4
1990	80,156	479.3
1991	83,545	534.9
1992	87,330	600.5
1993	94,822	642.1
1994	109,080	704.5
1995	122,706	807.4
1996	139,134	890.3
1997	165,000	910.0
1998	187,000	930.0
1999	227,000	907.4
2000	273,000	1,070.0
2001	324,000	1,132.0

[2] *"ATMs and Electronic Banking A Status Report,"* Linda Fenner Zimmer, The World of Banking, July-August 1985.

[3] *Sources:* Bank Network News EFT Network Data Book, November 24, 1995; ATM & Debit News, September 13, 2001.

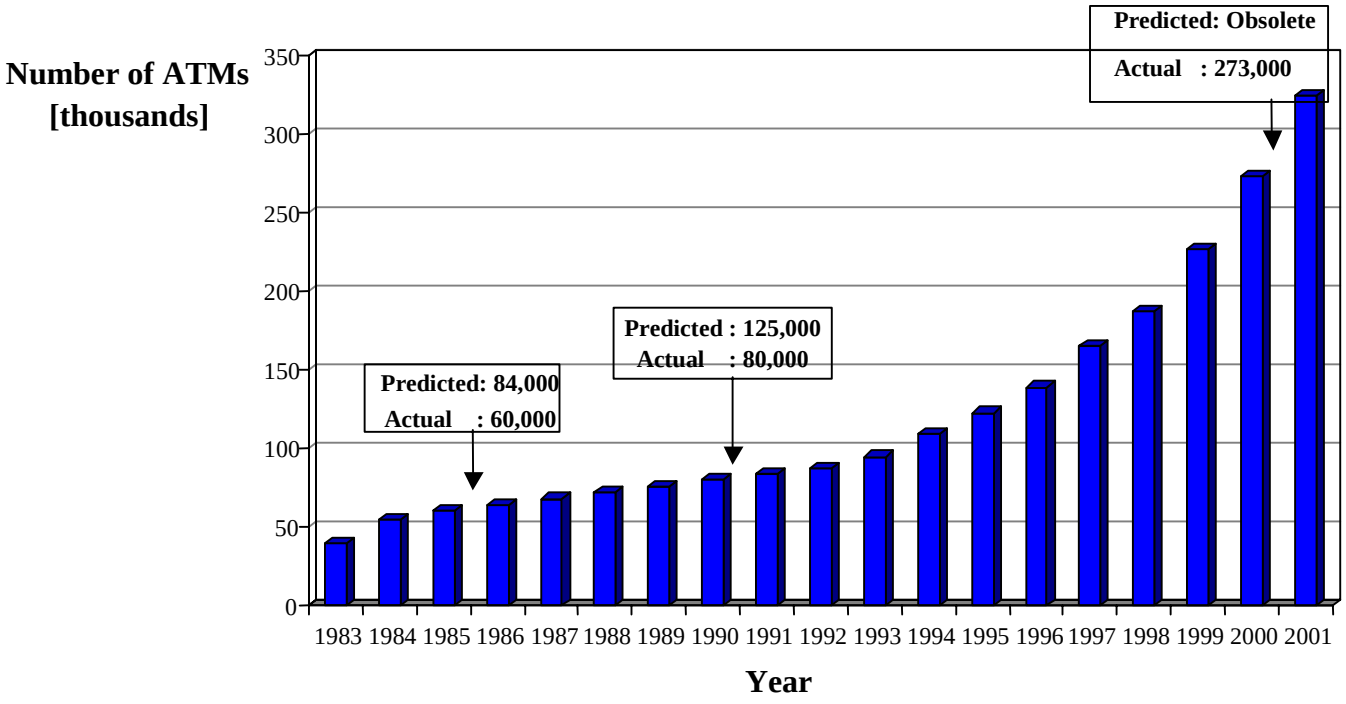
Figure 1-- Number of U.S. Households Banking On-line 1996-2004



Source: Furst, Lang, Nolle (2001)

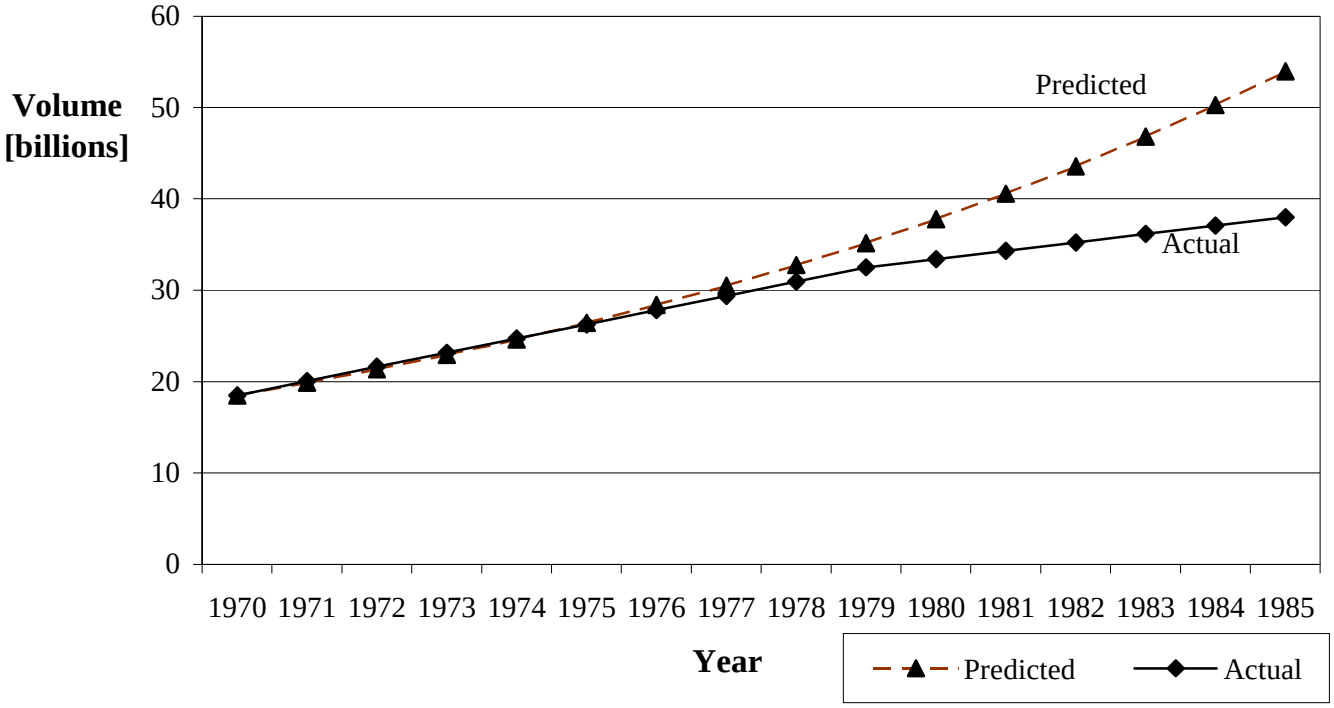
Figure 2-- Number of ATM Terminals

1983-2001



Sources: Rosenberg (1980), Credit Union Magazine (1983), Duffy (1983), Bank Network News (November 1995), and ATM & Debit News (September 2001)

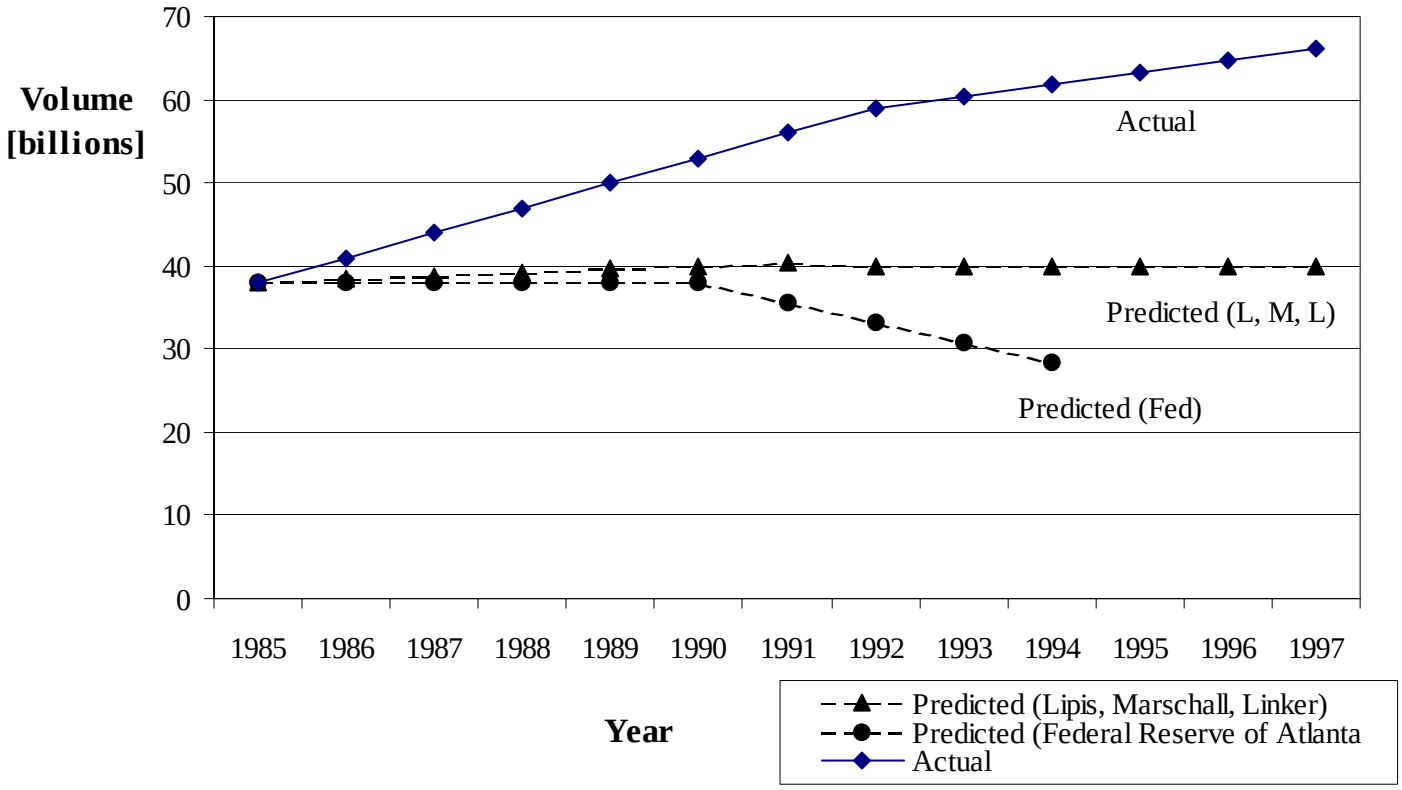
Figure 3--Number of Checks Cleared 1970-1985



Sources: Sherrill (1971), Bucher (1973), Sheehan (1972), and Department of the Treasury Financial Management Service (1990)

Figure 4--Number of Checks Cleared

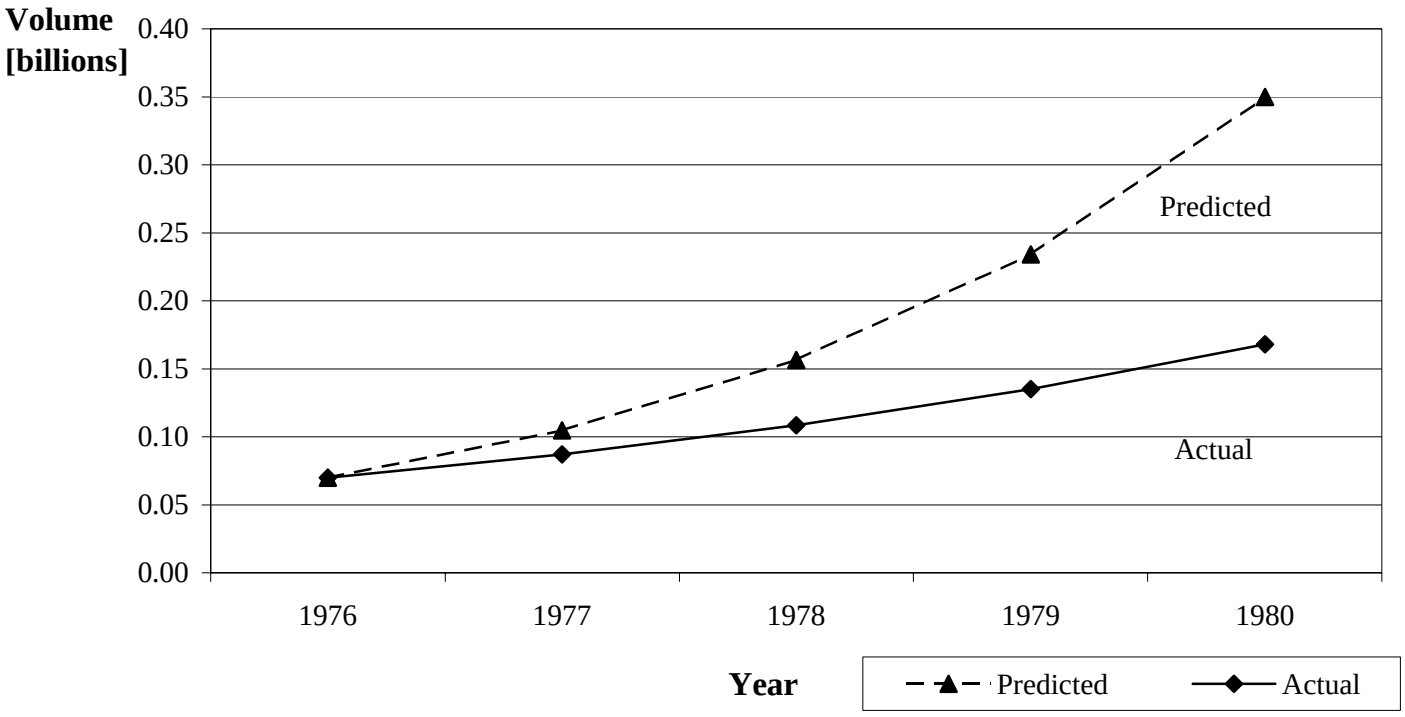
1985-1997



Sources: Department of the Treasury Financial Management Service (1990), Lipis, Marschall, Linker (1985), Beckwith (1987), and Bank for International Settlements (1999)

Figure 5--Number of ACH Transfers

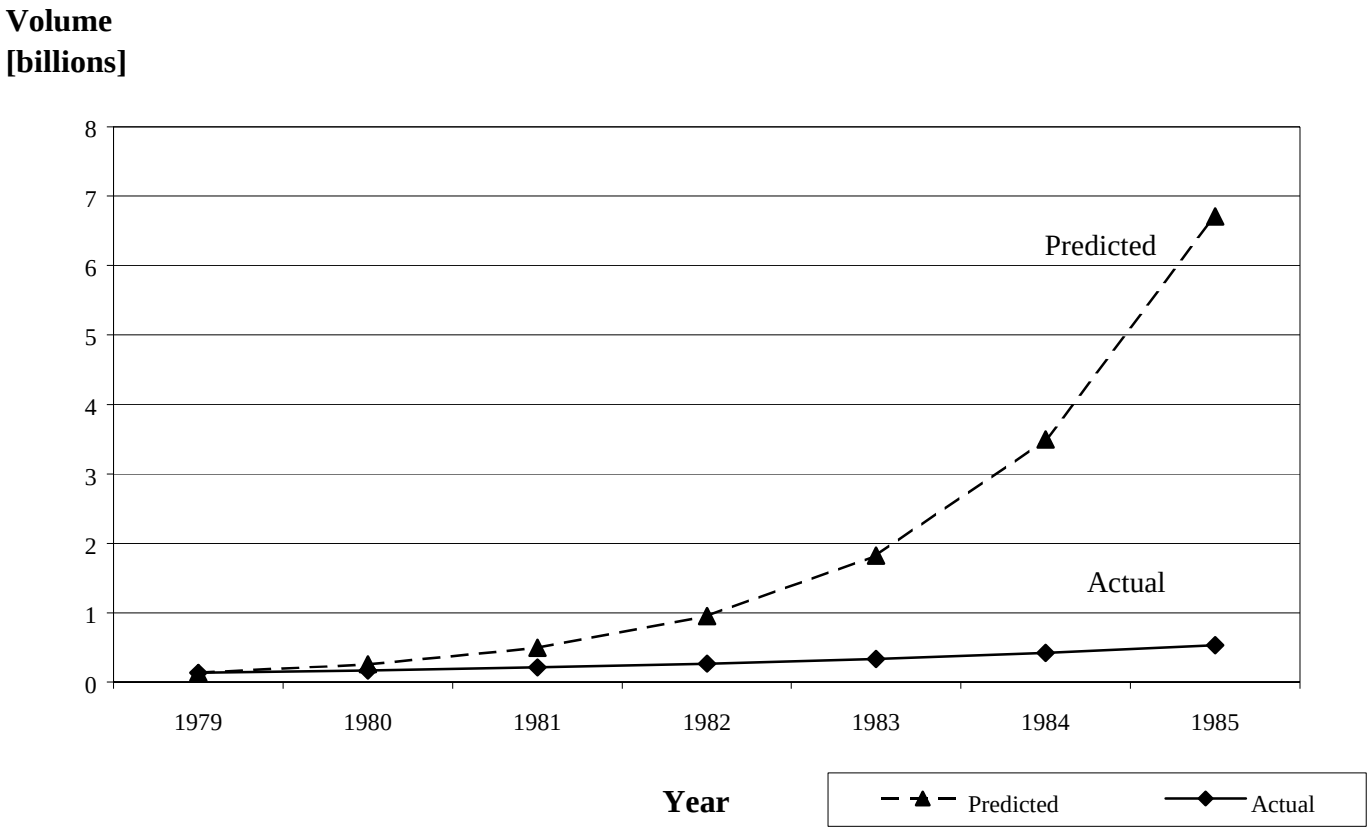
1976-1980



Sources: Nilson (1978) and Bank for International Settlements (1980, 1989)

Figure 6--Number of ACH Transfers

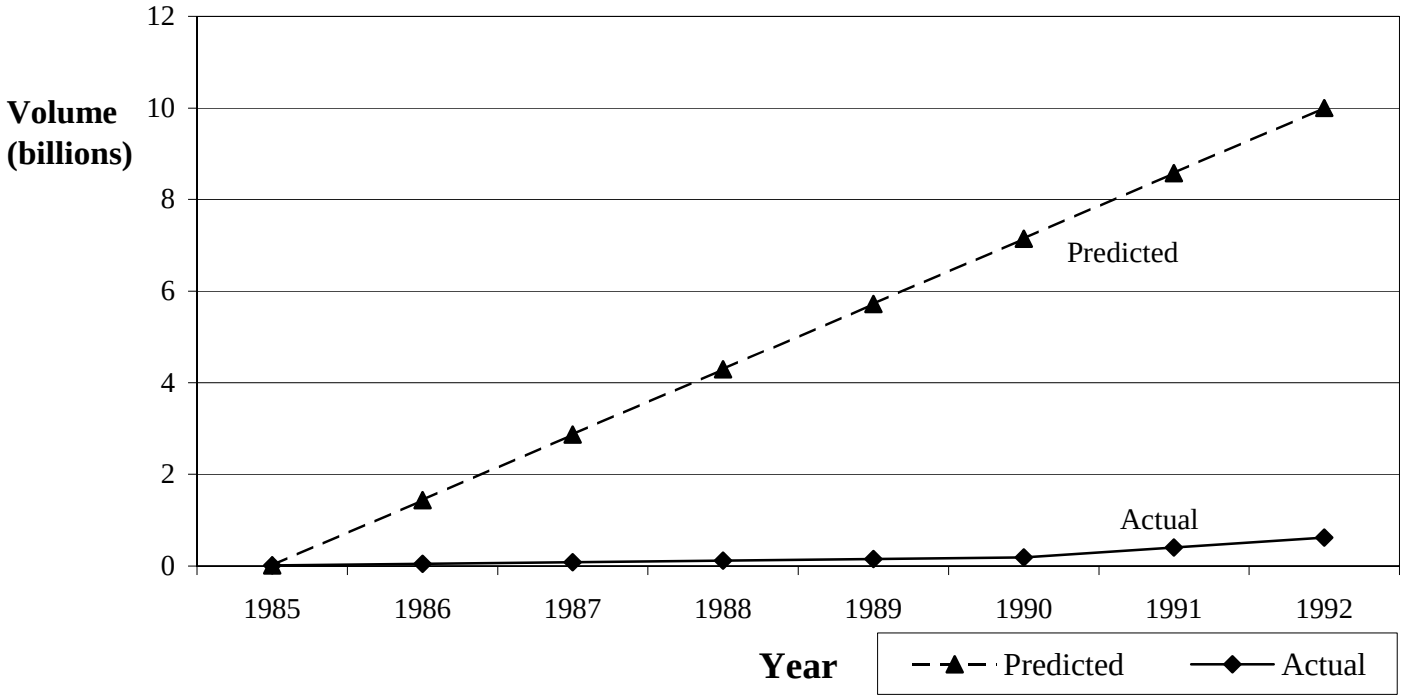
1979-1985



Sources: American Bankers' Association (1976), Golson (1980), and Bank for International Settlements (1989)

Figure 7--Number of EFT/POS Transactions

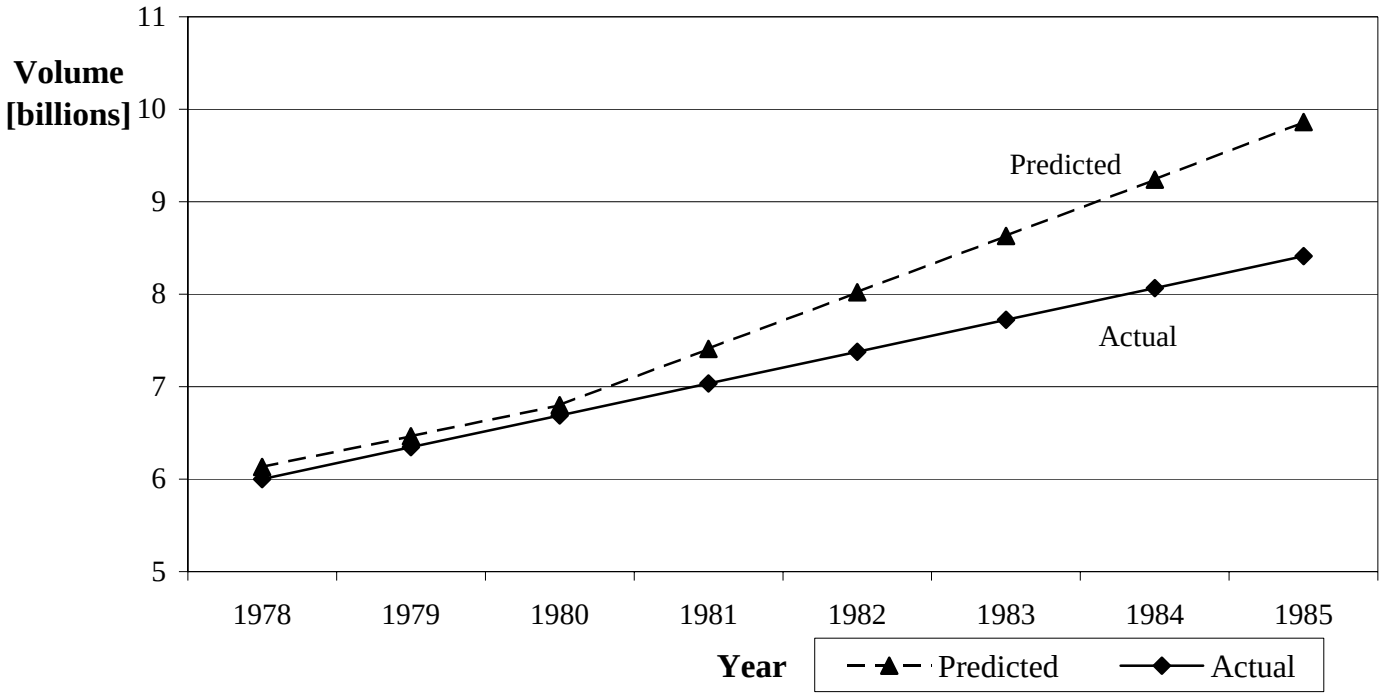
1985-1992



Sources: Osterberg (1984), and Bank Network News (1999)

Figure 8--Number of Credit Card Transactions

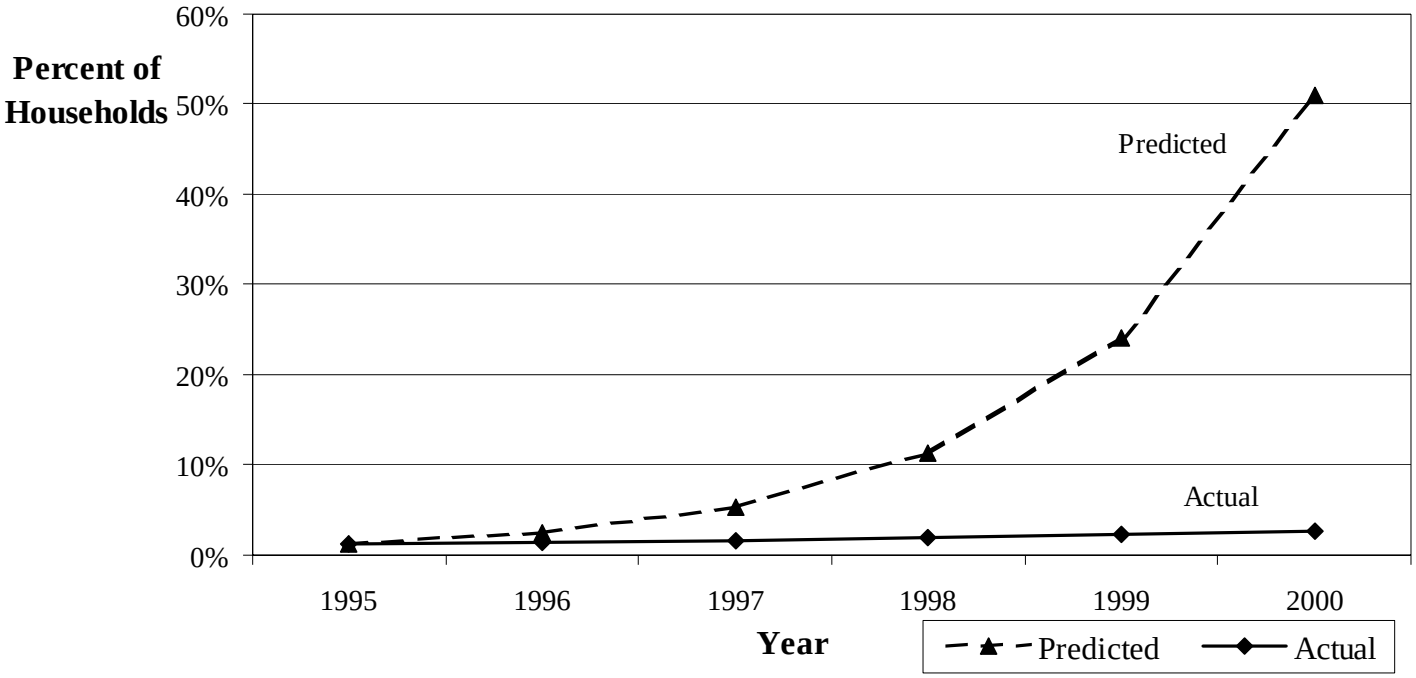
1978-1985



Sources: American Bankers' Association (1976), Miller (1979), and Bank for International Settlements (1989)

Figure 9--Percent of Households with Smart Cards

1995-2000

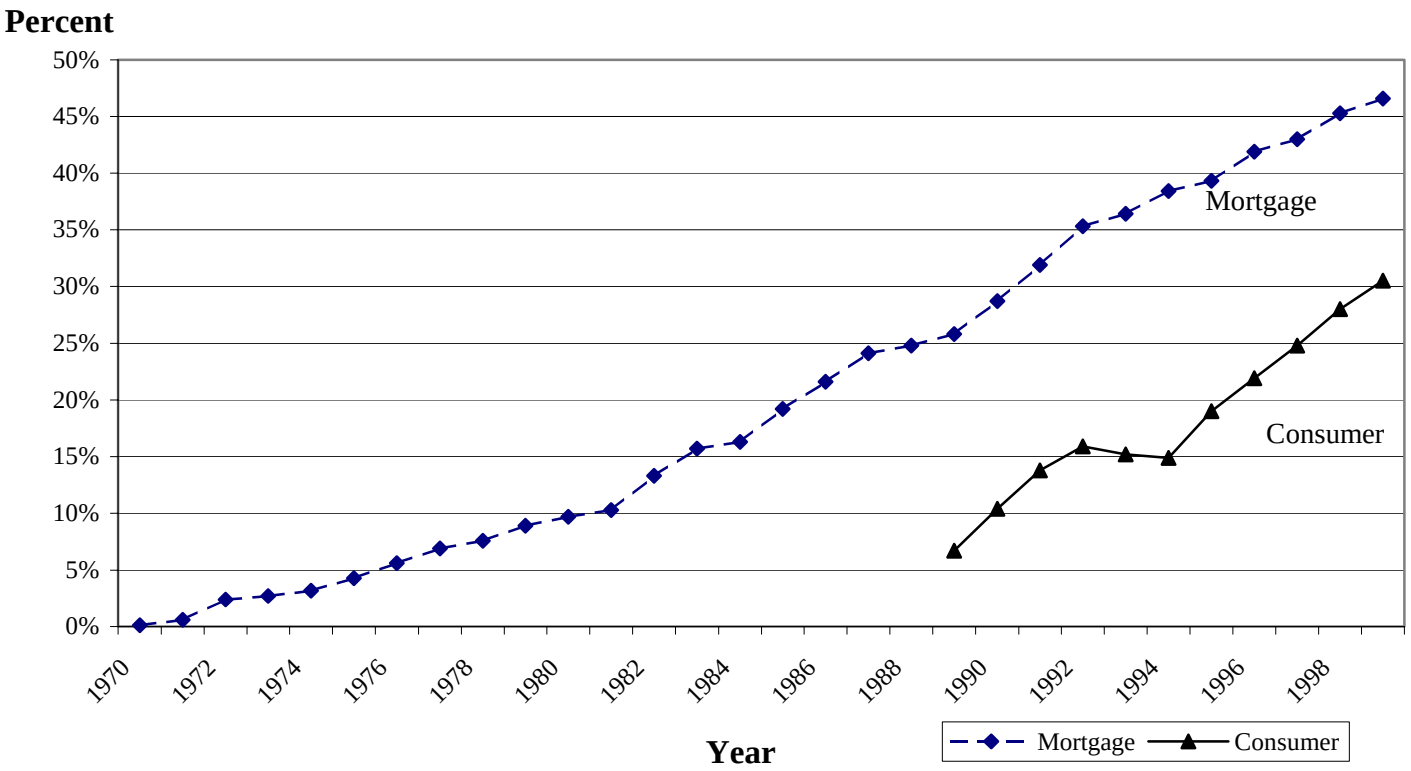


Sources: Ice (1996), and Federal Reserve Bank of Philadelphia (2001)

Figure 10--Mortgage and Consumer Installment Debt

(Percents that are Securitized)

1970-1999



Sources: Board of Governors of the Federal Reserve System