

# ECONOMIC REVIEW

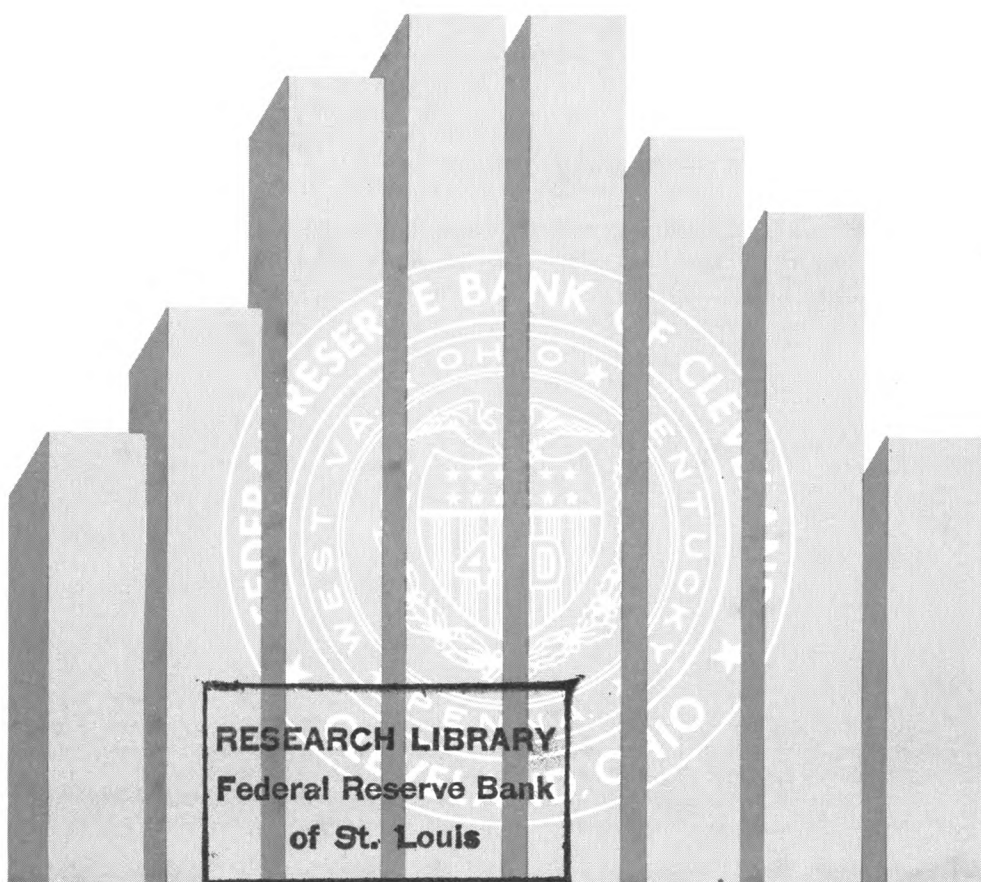
FALL 1976

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Future of Demand Deposits



# Economic Review

FALL 1976

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*The foreign exchange market is an elaborate network of telephone and telex facilities, connecting customers, commercial banks, brokers, and central banks, that operates to arrange the purchase and sale of national currencies and set their prices. Participants in the market encounter risks because of the daily changes in exchange rates.*

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# The Foreign Exchange Market

Gerald H. Anderson

Foreign exchange is essentially bank deposits denominated in a foreign currency. To Americans, German marks and British pounds are foreign exchange. To Germans and British, U. S. dollars are foreign exchange.

Dollars, pounds, marks, and other currencies<sup>1</sup> are bought and sold—converted from one to another—in the foreign exchange market. The foreign exchange market is also where exchange rates are determined.<sup>2</sup> An exchange rate is the price of one currency measured in terms of another currency; for example, recently the exchange rate between the British pound and the U. S. dollar was £1 = \$1.65 and the dollar-German mark exchange rate was \$1 = DM 2.43.

This article describes how the foreign exchange market is organized and how it operates to arrange exchanges of currencies and to determine exchange rates. But first, the importance of exchanges of national currencies and exchange rates is explained.

## NATIONAL CURRENCIES AND EXCHANGE RATES

Almost every country has its own national currency, which is used for most economic transactions within the country. A large and growing volume of transactions, however, involves residents of two different countries, and exchanges of national currencies are necessary to facilitate them. Import and export trade, for example, has soared; the value of world exports increased from \$280 billion in 1970 to almost \$800 billion in 1975. Similarly, international investment has experienced strong growth as multinational corporations often finance investments with nonlocal currencies, as private investment portfolios become larger and more internationally diversified, and as the governments of some oil exporting nations place the revenues from their new-found wealth. Also, an increase in international payments of dividends and interest has accompanied the growth of international investment.

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<sup>1</sup>In this article, the term "currency" is used to include all forms of a nation's money, whether paper currency or bank deposits, and the terms "foreign exchange" and "foreign currency" are used synonymously. In the foreign exchange market, exchanges of paper currency are miniscule compared to purchases and sales of bank deposits.

<sup>2</sup>Exchange rates for currencies that are not convertible, that is, not freely traded, are usually determined by government decision. This article, however, pertains mainly to the market for currencies that are convertible, which is the case for the currencies of most major nations.

Either the payor or the recipient can initiate the currency conversion involved in an international transaction. For example, if an American importer is paying a French exporter for a shipment of wine, the importer can buy francs in the foreign exchange market and pay them to the exporter. Alternatively, the American might pay in dollars and the French exporter would then sell the dollars for francs in the foreign exchange market.

Exchange rates are important because they are the vehicle that translates prices measured in one currency into prices measured in another currency. Changes in exchange rates affect the prices of imports and exports and in turn may influence the rate of inflation, export sales, and competition from imports. Similarly, exchange rate changes affect international borrowers and lenders by changing the value, measured in one currency, of assets and liabilities denominated in another currency.

## DETERMINING EXCHANGE RATES

In the long run, the underlying forces that determine the exchange rate between two currencies are supply and demand from commercial and financial transactions. These transactions, of course, are influenced by such factors as the government's monetary policy and the private sector's attitudes toward thrift, efficiency, and work. In the short run, however, supply and demand are strongly influenced by expectations about the direction in which the exchange rate is likely to move. For example, if a currency seems likely to rise in value, persons who have payments to make in that currency will tend to buy the currency and make the payments sooner; persons who need to sell that currency to obtain a second currency with which to make a payment will tend to delay their currency sale. This process of leads and lags, by increasing the demand for and decreasing the supply of the currency, will tend to push the exchange rate in the expected direction.

In a still shorter time frame, the announcement of favorable or adverse economic or political news can have an almost immediate impact on the exchange rates at which foreign exchange dealers are willing to buy and sell. Thus, exchange rates change from day-to-day and even from moment-to-moment.

Each national government has its own exchange rate system, or policy toward exchange rate changes. Two of the most important are independent floating and the fixed exchange rate systems.<sup>3</sup> In the floating system, a nation's authorities, usually the central bank, do not attempt to prevent fundamental changes in the rate of exchange between their own currency and any other currency, although usually they do attempt to maintain orderly trading conditions in the market. In the fixed rate system, a currency is kept fixed within a narrow range of values relative to some "reference currency" by governmental action. The U. S. dollar is the most frequently used reference currency. A currency fixed to the dollar is in effect also fixed to any other currency fixed to the dollar, but is floating, with the dollar, against currencies not so fixed. Most industrial nations allow their currencies to float against the dollar; most developing nations use a fixed rate system.

National authorities can influence exchange rates directly by intervention, that is buying or selling<sup>4</sup> foreign currency in the market, and indirectly by policy actions that

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<sup>3</sup>For a discussion of the five most common exchange rate systems used by the 126 member nations of the International Monetary Fund, see the author's "The World's Exchange Rate Arrangements," *Economic Commentary*, Federal Reserve Bank of Cleveland, May 17, 1976.

<sup>4</sup>To sell foreign currency in the spot market, a central bank must first acquire it. Foreign currency may have been acquired from previous intervention purchases, from nonmarket purchases with another asset such as gold or International Monetary Fund Special Drawing Rights, or by borrowing from foreign commercial banks, international organizations, or foreign central banks. A central bank's ability to sell foreign currency, therefore, is limited by its assets and its ability to obtain credit.

influence the volume of private transactions. A third method of influencing exchange rates is exchange control—direct control of foreign exchange transactions.<sup>5</sup>

The efforts of national authorities notwithstanding, exchange rates change, whether within the narrow range of a fixed system or more widely in a floating system. An exchange rate will also change if national authorities devalue or revalue their currency by choosing a new lower or higher narrow range of values within which to keep it fixed.

The possibility, indeed probability, of exchange rate change thrusts a measure of uncertainty upon persons engaged in international commerce requiring a foreign currency to be paid or received at a future date. A forward exchange contract can eliminate this uncertainty. In a forward contract, foreign exchange is purchased or sold for delivery at a future date, but at a price or exchange rate specified when the contract is made.<sup>6</sup>

Foreign exchange transactions thus can be characterized as spot transactions, where the foreign currency is delivered within 2 business days; and forward transactions, where delivery is several days or months later. Another common transaction is the swap, a combination of a spot purchase (or sale) and an offsetting forward sale (or purchase). A forward swap is a combination of two offsetting transactions for different forward dates. All of these transactions can be done in the foreign exchange market.

## MARKET LOCATION

The foreign exchange market, unlike the stock and commodity markets, has no central physical location in which participants, or their agents, come together for face-to-face bargaining. Instead, participants in the foreign exchange market—customers, commercial banks, brokers, and central banks—are connected by telephone and telex facilities. Thus, the foreign exchange market is an arrangement rather than a place. An exception to this generalization is some foreign markets. In Frankfurt, Paris, and some other foreign cities, there are physical market places, often within the stock exchange building, in which some foreign exchange trading occurs in face-to-face transactions. Although usually only a small portion of foreign exchange trading in those cities occurs in these meeting places, the exchange rate established, or “fixed,” in this trading is often the rate used in many routine transactions with bank customers.<sup>7</sup>

The foreign exchange market in the United States is closely linked to foreign exchange markets in other major countries. Major banks in the United States often contact foreign banks, by telephone or telex, to get exchange rates and market information and to arrange trades. Arbitrage between markets keeps exchange rates very close together. Furthermore, major United States banks often have branches in foreign financial centers, and foreign banks have offices in the United States, thus providing even closer personal contacts between the markets. For these reasons, the foreign exchange markets in the major countries tend to be parts of the same market.

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<sup>5</sup>See “The World’s Exchange Rate Arrangements,” *op. cit.*, for a more detailed discussion of these three approaches.

<sup>6</sup>For a detailed discussion of forward exchange, see the author’s “The Nature and Use of Forward Exchange,” *Economic Review*, Federal Reserve Bank of Cleveland, April–May 1972.

<sup>7</sup>Another place where some face-to-face trading occurs is the International Monetary Market (IMM), which began operating in Chicago in May 1972. It has a trading floor on which participants buy and sell standardized forward exchange contracts for eight currencies, in much the same manner as standardized futures contracts for frozen pork bellies and other commodities are traded at the IMM’s parent organization, the Chicago Mercantile Exchange. Spot exchange is not traded on the IMM, and the volume of forward exchange trading is much smaller than the volume traded in the traditional market.

Although distance doesn't separate markets that have electronic communications, time does. The European foreign exchange markets open before the United States market, and their market days overlap only during the morning hours in New York. Banks in the United States often start their trading operations before usual banking hours, and European banks sometimes continue trading beyond the end of their usual banking hours.

## Overview of the Market

An overview of the foreign exchange market in the United States, and how it relates to other countries, can set the stage for a more detailed description of its several parts. Typically, a customer, usually a corporation, buys (or sells) foreign exchange from (or to) its bank. Corporations with a substantial amount of foreign transactions usually will establish a relationship with a bank with a large international department; those with only occasional transactions may use a smaller bank. Consequently, most foreign exchange business goes directly to the relatively few banks who are active in foreign exchange.

Most banks are not active in foreign exchange. When they need to purchase (or sell) foreign exchange to accommodate a customer, they buy from (or sell to) a correspondent bank that is more active in foreign exchange. Thus, most banks may be called agent or nondealing banks.

Of this nation's 14,000 banks, perhaps fewer than 100 act as principals by dealing in foreign exchange, and among these there are substantial differences in the extent of their activity. Some are active in only one or two currencies while the most active banks may make markets in all of the major currencies. The principal or dealing banks not only accommodate their customers and correspondent banks but deal with each other, arranging deals directly or through a broker. They also deal with banks abroad.

The Federal Reserve sometimes buys or sells in the interbank market. The Federal Reserve and other central banks also deal directly with each other or act as each other's agents in their domestic markets. These several layers or parts of the market will be discussed in turn.

## CUSTOMER-BANK TRANSACTIONS

A corporation that wants to buy or sell foreign exchange must normally deal directly with a bank. Brokers will not arrange trades for corporations and there is no efficient way in which a corporation may directly find another corporation with which to trade foreign exchange. However, multinational firms sometimes reduce their need for foreign exchange transactions by netting-out payments among subsidiaries and the parent corporation.

A corporate treasurer who wants to purchase foreign exchange will usually telephone his bank to inquire about the spot or forward exchange rate for the currency he needs. Often the transaction will be made in this conversation and later confirmed in writing. Sometimes, however, a customer will also telephone a few of its other banks to get exchange rates and then take the best price.

Three factors tend to limit such comparison shopping for foreign exchange. First, the opportunity to reduce cost usually is limited because dealing rates are usually little different among banks that are all participating in the same market. Second, rates are firm for only a short time, perhaps a few minutes. Finally, corporations get some services from banks which implicitly are paid for by the corporation doing such business as foreign exchange transactions with the bank. For example, a bank may advise a corporation



about likely trends in exchange rates, for which the *quid pro quo* is foreign exchange transactions on which the bank can earn profits.<sup>8</sup> Because of these limitations, comparison shopping is generally done only by larger customers who have relationships with several banks and who need to purchase or sell a substantial amount of foreign exchange.<sup>9</sup>

When a bank sells foreign exchange to a customer, rather than earn a commission on the transaction, the bank intends to earn a profit by selling at a higher price than it has paid (or will pay). Agent or nondealing banks usually base the rates offered to customers on rates they obtain from their correspondent principal or dealing bank, and simultaneously purchase from a principal bank the exchange they are selling to their customer. In this way the bank is not exposed to the possibility of loss from an adverse change in the exchange rate.

Other banks, with larger volumes of exchange transactions, do not match each sale with an offsetting purchase. Such a bank may expect sales to some customers to be offset by purchases from other customers and will expect, on balance, its sales to be at a higher average price than its purchases. If purchases from customers differ substantially from its sales, a bank's position in the currency in question may change more than it wants. Over the course of a day a dealing bank will frequently adjust its position with interbank transactions—that is, with purchase or sale transactions with other banks.

## INTERBANK TRANSACTIONS

An agent bank generally purchases (or sells) currency from (or to) a principal, correspondent bank to accommodate its transactions with commercial customers. Principal banks trade currencies as a service both to their nonbank customers and correspondent banks; they also trade with other dealing banks, sometimes in order to offset unwanted position changes and at other times purposely to change their position in a currency. A dealing bank will usually be dealing simultaneously with customers, correspondent agent banks, other domestic dealing banks, and foreign banks.

The most active dealing banks trade currencies on a very large scale—sometimes on the order of several hundred million dollars per day. They use their trading skills to seek profits, particularly from fluctuations in exchange rates that occur within a day, as well as from movements over longer periods. A bank's daily trading volume will greatly exceed its average position in a currency. For some of these banks, foreign exchange trading earns millions of dollars each year.

A bank will enter into spot, forward, and swap transactions with its corporate customers. Spot transactions are easy to arrange in the interbank market, so it is not difficult for a bank to maintain a fairly balanced spot position in currency. Forward transactions with a corporate customer will usually be for a specific date,<sup>10</sup> however, and it is difficult for a bank to arrange an offsetting forward contract for the same date in the interbank market. The interbank market, however, does deal in forward and swap contracts of standard maturities such as 1, 2, 3, and 6 months. "Tomorrow-next" or "rollover" swaps are also easily arranged; these match a purchase (sale) for delivery tomorrow with an equal sale (purchase) to be delivered the day after tomorrow. Consequently, if a bank has, say, a short position in pounds for, say, 35 days forward

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<sup>8</sup>A few banks provide their foreign exchange advisory service on a fee basis.

<sup>9</sup>Price shopping may also tend to move the rate in a direction that is adverse for the shopper. See Talat M. Othman, "How Foreign Exchange Markets Work" in D. R. Mandich, Ed., *Foreign Exchange Trading Techniques and Controls*, American Bankers Association, Washington, D. C., 1976, p. 17.

<sup>10</sup>Banks also will make option contracts with customers; these are forward contracts that specify a range of perhaps 10 days in which the customer must perform the contract.

because it has sold pounds forward to a corporate customer, it may be able to close its position fairly well with a 1-month outright forward purchase in the interbank market. Because swaps are much easier to arrange than outright forward contracts in the interbank market, a much more common procedure is to buy pounds spot, then arrange a swap that sells pounds spot and buys them 1 month forward. Open positions for just a few days ahead can be closed using rollover swaps.

For a brief period, an additional method was available to arrange interbank transactions. The Tafex System, sponsored by Transamerica Corporation, operated from October 1974 to July 1976. Each bank that subscribed to the Tafex System had a computer terminal through which it could anonymously enter its own bids and offers for foreign exchange and request a cathode ray screen display of the best bids and offers that it and other subscribers had entered. The equipment automatically executed a transaction when bids and offers matched, immediately typing out on a data-printer confirmations for both buyer and seller.

One advantage of this system was that buyer and seller could immediately examine their hard copy confirmations to assure that transaction information and delivery instructions were correct. However, the system never developed a volume of business sufficient for it to be a commercial success.

Banks arrange their foreign exchange transactions with other banks through a broker or directly. There are about a dozen broker firms in New York City, which is the focal point of the foreign exchange market in the United States. The brokers, who are not banks, are connected by direct telephone lines to the banks for whom they arrange trades.

A broker matches buyers with sellers, charging the seller a commission for his service. Commissions brokers charge are usually identical. They vary among currencies, but are all very small percentages of the amount traded; for example, the commission on a sale of 1 million pounds sterling, worth about 1.75 million dollars, is \$100.

A bank's foreign exchange trader, who wants to buy £ 500,000, will ask a broker for the current price of sterling. The broker will give both bid and offer prices. If the prices are actual bids and offers that the broker has obtained from other traders, he will state that these are rates at which he can "deal"; if instead the rates are the broker's estimates of

prices at which trades can be arranged, he will state that these are "quotes." If the offer price is satisfactory, the trader will tell the broker to buy £ 500,000 at that price; if the offer is unsatisfactory, the trader probably will bid the broker at a price he is willing to pay for £ 500,000, and the broker may be able to find a match for him later.

The broker keeps the trading banks' names confidential until a trade is arranged, but takes care to assure that trades he arranges are between banks whose names are mutually acceptable. After a broker has arranged a trade, he tells each trader the name of the other bank. The banks then send each other written confirmations. A confirmation would include the amount of foreign currency, the price, and delivery instructions; that is, the name of the foreign bank in which the foreign currency is to be deposited. Each bank would also cable its foreign correspondent bank with instructions. In the example above, the selling bank would instruct its London correspondent bank to deposit £ 500,000 in the London bank that is the correspondent of the buying bank. The buying bank would instruct its London correspondent to receive the deposit. Sometimes these London correspondents will be branches of the trading banks.

The "back office" of a bank's foreign exchange department must keep accurate records of trades and accurately arrange deliveries of currencies. This work is just as important as making the trades, although it may be less glamorous. Errors in confirmations and nonreceipts of currency on the proper date present substantial challenges to the back office staff. Spot transactions and the spot half of swaps often must be settled before written confirmations can be exchanged through the mail. Consequently, the back office staff often supplements the written confirmation with a telephoned confirmation of the details of trades the same day they are made.



## DIRECT DEALING

Although most principal banks use brokers for domestic transactions, some banks deal directly. It is customary that trades between banks on the broker system are arranged only through brokers; in contrast, transactions between direct dealing banks, and between a direct dealing bank and a bank on the broker system are arranged directly. Trades between U. S. banks and banks abroad are always arranged directly. Banks can contact each other by telephone or telex to ask for dealing prices. When a trader makes a market by making a bid and an offer, he is obligated, by custom, to buy or sell a reasonable amount of the foreign currency at the prices he has given. Naturally, if he is more interested in selling than in buying, or vice versa, he will adjust his rates accordingly. When two traders agree on a deal, they will exchange delivery instructions; all aspects of the trade will later be confirmed by their back offices.

Preferences for direct dealing and use of brokers vary among banks and depend on the type of deal being done and the proclivities of the traders. Using a broker has the advantage of saving a trader's time and preserving his anonymity. Anonymity may be helpful to a bank that often does the same kind of trade. For example, a bank may have several large customers who import goods from Canada, for which they pay Canadian dollars. Consequently, in the interbank market the bank usually would be a buyer of Canadian dollars, rather than a seller. Knowing this, traders at other banks might then raise their Canadian dollar rates when this bank contacts them. One disadvantage of using a broker is that, when a large amount is bid or offered through a broker, it quickly becomes known to the market and may tend to move rates adversely for the trader involved. The broker's commission, of course, is another disadvantage.

Traders keep abreast of market rates through their contacts with brokers and each other. Another source of market rates, which has become available recently, is the Reuters Monitor. Over 700 banks in the U. S. and several other countries subscribe to this service. Each subscriber is equipped with a cathode ray screen on which it can call up the rates of any of the approximately 150 banks who put their rates into the system. Actual transactions cannot be arranged through the equipment, but subscribers who put their rates in the system achieve additional visibility in the market.

Another information source important to traders is the news machine. Announcements of economic and political developments influence market rates, so a typical trading room will have Dow Jones and Reuters equipment to help traders keep abreast of the latest developments.

## RISKS

A bank incurs risk<sup>11</sup> in its foreign exchange activities. Three of these are exchange rate risk, credit risk, and political risk. A bank's exchange rate risk is the possibility that it will incur a loss from a decline in the price of a currency it holds, either from a change in supply or demand from the private sector or from a government decision to devalue the currency. Consequently, bank managements usually establish exposure limits; that is, self-imposed limits on the amount of exposure, or net position, for each currency in which its trades. A conservative policy would be to balance purchases and sales each day so that the position at the end of the day is small, to avoid the possibility of large loss from any events that might substantially change the exchange rate overnight or during a weekend. Exchange rates also change during a day, of course, so intraday exposure limits are also specified.

Forward exchange contracts make it possible to have future exposures too. A bank may have either a "long" or "short" forward position; that is, have forward purchases

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<sup>11</sup>Although called risks by market participants, the adverse potential events discussed here are more in the nature of uncertainties.

exceed forward sales, or vice versa. Even when total forward purchases and sales are equal so there is no net forward exposure, a bank can be exposed if there is a gap in its forward book. For example, there is a gap if forward contract maturities are bunched in such a way that a bank is, say, short 1 month forward and long 2 months forward. Consequently, bank managements usually establish spot exposure limits, forward exposure limits, and gap limits.

A second hazard of foreign exchange business is credit risk; that is, the risk that a customer, or another bank, will refuse or be unable to perform a foreign exchange contract when the exchange rate has moved adversely for the customer. A bank, therefore, will do a credit analysis of customers and other banks to decide which "names it will take"; that is, which banks and firms it will do business with, and the maximum size of deals it will do with them.

Finally, banks that deal in foreign exchange incur political risk. Political risk, as used here, means the risk that foreign exchange regulations will be changed in such a way as to make it impossible or more expensive for a bank or customer to fulfill its contractual obligations. Consequently, banks with substantial dealings in foreign exchange usually try to keep abreast of political and economic trends in the countries in whose currencies they deal.

## FEDERAL RESERVE TRANSACTIONS

The Federal Reserve sometimes buys and sells foreign exchange in the market to help maintain orderly trading conditions. The Federal Open Market Committee authorizes System foreign exchange operations and determines foreign exchange policy.<sup>12</sup> These decisions are implemented by the Manager of the System Open Market Account at the Federal Reserve Bank of New York (FRBNY). The System's foreign exchange operations are done in close consultation with the U. S. Treasury and foreign central banks.<sup>13</sup>

The FRBNY also acts as agent for the U. S. Treasury, making purchases and sales in the market both for intervention and to meet routine Government needs. In addition, the FRBNY acts as agent for foreign central banks for routine transactions and for intervention. This may be done when, because of time differences or holidays, the market in the foreign central bank's country is closed but the New York market is open.

## TRANSACTIONS BETWEEN CENTRAL BANKS

Central banks sometimes purchase or sell foreign exchange directly with each other. One type of direct transaction is sometimes called "customer business" in which, for example, the FRBNY might purchase foreign exchange from a "correspondent," usually a central bank or international organization, as a service to the correspondent.

A second type of direct transaction is a drawing on a "swap line." In this context, a swap is essentially an exchange of currencies between the Federal Reserve and another

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<sup>12</sup>For details, see the "Authorization for Foreign Currency Operations" and the "Foreign Currency Directive" in Board of Governors of the Federal Reserve System, *Annual Report* 1975, pp. 159-164.

<sup>13</sup>Detailed information about the System's foreign exchange market intervention, together with developments in foreign exchange markets, on a currency by currency basis, can be found in a series of articles titled "Treasury and Federal Reserve Foreign Exchange Operations." These reports are published semi-annually, usually in the March and September issues of the Federal Reserve Bank of New York *Monthly Review* and the Federal Reserve *Bulletin*. The semi-annual reports began in September 1962 and have been supplemented since July 1973 by a series of interim reports that usually appear in the June and December issues of the same publications.

central bank with an agreement to reverse the exchange later, usually in 3 months.<sup>14</sup> The Federal Reserve initiates a swap usually to obtain a foreign currency to use in market intervention. For example, the FRBNY might obtain German marks in a swap with the Bundesbank, Germany's central bank. The Bundesbank would obtain dollars in return. The FRBNY could then sell the marks to a commercial bank in the foreign exchange market, in order to counter disorderly trading conditions in the market. Later, when market conditions have stabilized, the FRBNY could purchase marks and reverse the swap with the Bundesbank. A foreign central bank may initiate a swap with the FRBNY in order to augment the dollar resources it has available for market intervention.

## Market Evolution

The foreign exchange market changes in response to technological, political, and economic developments. The development of the telephone and telegraph made practical the near elimination of physically centralized foreign exchange market places, and their replacement with today's system of decentralized trading. Instantaneous communications, together with arbitrage, have virtually eliminated any differences in foreign exchange rates among financial centers.

Political developments also bring changes. Liberal banking and payments laws can encourage the development of a financial center and foreign exchange trading, whereas excessive legal restrictions, or war, can do the opposite.

Economic changes also affect the foreign exchange market. For example, the U. S. dollar's reduced dominance as the currency of international commerce in the last decade has increased the importance of the foreign exchange market in the United States relative to European markets. If trade between Germany and the United States is paid for in dollars, it is the German importer or exporter who must convert marks to dollars or dollars to marks. Usually he would make this transaction through his bank in Germany. If the goods were paid for in marks, it would fall to the American to make the conversion between dollars and marks, and he would do this through a bank in the United States. Consequently, the increased use of European currencies in international commerce in recent years has contributed to the growth of the foreign exchange market in the United States.

Another economic change that has affected the foreign exchange market is the evolution in most major nations from a system of generally fixed exchange rates to a system of generally floating exchange rates. With substantial rate changes now occurring more frequently, most firms engaged in international commerce have become more active in adjusting and/or hedging their foreign currency exposures. This activity has been a major contributor to increased trading in the foreign exchange market.

This article has described the market as it exists today. The market's present structure is the cumulative result of its adaptation to changing technological, political, and economic realities. The market is a vigorous and important institution that will continue to evolve in response to changing circumstances.

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<sup>14</sup>For greater detail on swaps, see the author's "Federal Reserve Swaps," *Economic Commentary*, Federal Reserve Bank of Cleveland, February 9, 1976.

# Characteristics of High Performance Banks 1969-1975

Marvin M. Phaup, Jr.

One objective of bank management is to earn sufficient profits to compensate shareholders and to provide capital strength to the bank. When pursuing this objective, bankers use working hypotheses that link management decisions to earnings performance. These theories help management to anticipate the consequences of alternative operating policies and to rationally choose between them.

Profitability for a particular bank depends importantly on the "correctness" of that bank's theory. For example, if a banker believes earnings are directly related to the share of funds placed in consumer loans, he may attempt to increase his bank's earnings by placing greater emphasis on consumer lending. His success will depend on the "true" relation between consumer loans and earnings.

This article presents data against which bankers may tentatively, but conveniently, test the profitability assumptions underlying their operating policies. First, the article compares the 7-year average operating ratios of 105 Fourth District member banks classified as either long-term high or low earners between 1969 and 1975. Differences are found in the operating characteristics of high and low earnings banks which cannot be attributed to mere chance. Second, the article examines the association between earnings and various operating ratios for the full sample of 434 Fourth District member banks for which data are available from 1969 to 1975. The results reinforce the findings of the high and low earnings banks comparison.

The data presented in the article are similar to the data presented in other recent reports which compare the operating characteristics of high and low earnings banks in a single year.<sup>1</sup> Yet, because one year's earnings can be dominated by extraordinary events, most bankers prefer to measure earnings performance over several years. The data presented here are 7-year averages.

## Financial Ratios of High and Low Earnings Banks

Bank management tests the "truth" of its view of the determinants of bank profitability by comparing financial characteristics of banks with different earnings performances. This comparative analysis attempts to identify those characteristics most closely associated with superior earnings. For example, if high earnings banks are frequently heavily involved in consumer loans, this reinforces the view that these loans are highly profitable.

However, comparative analysis is a limited test of a bank management model because: operating characteristics vary widely within a group of high and low earnings

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The motivation for this paper began to develop at the Bank Administration Institute School for Bank Administration held at the University of Wisconsin where the author was an instructor during the summers of 1974 and 1975. I am also indebted to Michael Bagshaw and Steve Ruetschi for many helpful discussions and research assistance. Mary Stupnik supplied useful information about the nonfinancial characteristics of the high and low earnings banks. The author is now employed at the Congressional Budget Office.

banks; comparative analysis does not measure all factors that affect bank earnings; and comparative analysis cannot identify cause and effect.

Within any large group of banks with similar earnings, financial characteristics vary widely. No "magic" asset is either an unfailing source of profits or an absolute barrier to high earnings. Variable operating characteristics within homogeneous earnings banks means that the comparative analyst must draw inferences from characteristic tendencies rather than characteristic uniformities. Fortunately, analysis enables the investigator to account for variations within groups statistically so that significant variations between groups can be found.

Another limitation of comparative analysis is the exclusion of some factors that probably affect earnings but which are difficult to measure for individual banks. The intensity of competition in a bank's market, the cost of doing business in the area, the demand for bank services, the credit standing of the bank and the maturity structure of its assets are examples of these relevant, but unmeasured variables.

Comparative analysis is also limited by its inability to distinguish cause and effect. If a statistically significant tendency for high earnings banks, operating in similar markets, to have a strong (or weak) consumer loan emphasis is found, no causal relationship is implied. With varying degrees of plausibility, the consumer loan policy may be the cause of high earnings, the consumer loan policy may be the result of high earnings or both may be caused by a third unspecified variable.

Despite these limitations, comparative analysis is a part of the process of formulating, testing and modifying views of the determinants of bank earnings. The role of comparative analysis assumes increased importance when the results are consistently at odds with widely-held assumptions about the financial characteristics of high earnings banks.

## EARNINGS RATIOS

The measure of earnings used in this article is net income after taxes before securities gains or losses as a percent of equity capital (including all reserves). For the 434 Fourth District member banks for which complete data are available from 1969 to 1975, earnings ranged from -12.7 to 24.4 percent and averaged 11.22 percent. The first part of this article concentrates on 57 high earnings banks whose 7-year average earnings were 14.00 percent or more and 48 low earnings banks whose 7-year average earnings were 8.44 percent or less.<sup>2</sup>

The 7-year average return on equity after taxes but before securities transactions for high earners is more than double that for low earners (Table 1). The relative size of earnings of the two groups of banks is little affected by netting the effects of securities transactions out of earnings or by expressing net income as a percent of total assets.

## INCOME AND EXPENSE

Gross income per dollar of assets is slightly lower for high earnings banks (Table 2), but analysis indicates it is not significantly different for the two groups of banks.

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<sup>1</sup>"Contrasts in 1974 Bank Profitability: Two Profiles," *Economic Commentary*, Federal Reserve Bank of Cleveland, August 18, 1975. "Some Banking Rules-of-Thumb and Recent Earnings Experience," *Economic Commentary*, Federal Reserve Bank of Cleveland, December 22, 1975.

<sup>2</sup>The high earnings banks are those whose average return on equity between 1969 and 1975 was one standard deviation or more above the mean for all Fourth District member banks for which complete data are available for the same period. The low earnings banks are those whose return was one standard deviation or more below the mean. For normally distributed variables, approximately 16 percent of the observations will be one standard deviation or more above the mean and the same number will be one standard deviation or more below the mean.



In contrast, operating expense per dollar of assets is significantly different for the high and low earnings groups. The operating cost per asset dollar of a low earnings bank averaged 20 percent more than for a high earnings bank. This income-expense result is provocative because it runs counter to a prevalent notion that high earnings banks are "aggressive" on the income side of operations.

Bankers sometimes prefer making loans over investing in securities because a higher loan/asset ratio is thought to promote deposit growth. These loan-dependent deposits may be used to make additional loans. Although the assumed link between loans and deposit growth may be plausible, the experience of these two groups of banks provides scant evidence to support it. Total deposits increased an average of 76 percent for the high earnings, low loan/asset banks between 1970 and 1975. Deposit growth for low earnings banks over this period averaged 49 percent.

Differences in the growth rates of deposits of the two groups of banks may result from local economic conditions beyond the banks' control. For instance, several high earners are located near the coal fields of Eastern Kentucky that enjoyed an economic boom during the energy crisis which surfaced in the latter part of the period covered by this article. Data to support this explanation are ambiguous. On average, per capita income grew more rapidly, but from a lower level, in counties where high earnings banks were located during 1969-1973 (the last year for which data are available). In counties with low earnings banks, per capita income increased 35.6 percent or \$1,224. In counties with high earnings banks, per capita income grew 41.3 percent or \$1,132, significantly higher. However, it should be remembered eight counties in the District have at least one high and one low earnings bank.

Operating cost as a percent of total assets includes four categories of operating expenses: salaries, wages, and benefits; interest on deposits; net occupancy expense; and all other, which includes such diverse items as office equipment and supplies, marketing expense and provision for (or actual) loan losses. Each of these expense components is significantly lower for the high earnings banks (Table 3). The least significant of these differences is interest paid on time and savings deposits.

If the high earnings banks were located in small towns where costs of doing business are presumably lower than in large cities, cost differences might be attributable to differences in location; but location is not a reliable explanation for cost differences. Twelve low and seven high earners are headquartered in major metropolitan areas or in nearby political subdivisions classified as "urbanized areas" by the U.S. Bureau of the Census. Thirty-six of the low earners are in places not classified as urbanized. Eight counties in the District have at least one high and one low earnings bank.

Nor do differences in size or holding company affiliation (with implied economies of scale) provide ready explanations for differences in operating expense. Deposits averaged \$42 million at high earnings banks and \$44 million at low earnings banks. Three high earners and five low earners had more than \$100 million in deposits, and three high earners and six low earners had less than \$5 million in deposits. One high and one low earnings bank are lead banks in holding companies; nine high earners and ten low earners are multi-bank holding company affiliates.

## ASSET COMPOSITION

A plausible explanation may be that the expense differences for salaries, wages and benefits, net occupancy, and all other (Table 3) are related directly to differences in asset composition (Table 4). High earnings banks differ significantly from low earnings banks in three asset categories. High earners have a greater proportion of assets in securities

Table 1  
SELECTED NET INCOME RATIOS\*

	<u>Low Earners</u>	<u>High Earners</u>
Net income after taxes before securities gains or losses/equity	6.62%	15.45%
Net income/equity	6.81	15.55
Net income/total assets	0.63	1.32

\*The ratios in this and following tables are unweighted averages of individual high and low earnings Fourth District member bank ratios. The individual bank ratios are averages of annual ratios from 1969 to 1975. Annual ratios are computed from beginning-of-year and mid-year reports of condition and calendar year income statements.

Table 2  
INCOME AND EXPENSE

	<u>Low Earners</u>	<u>High Earners</u>	<u>t-* statistic</u>
Total operating income/ total assets	6.69%	6.65%	0.39
Total operating expense/ total assets	5.92	4.93	7.52

\*The t-statistics shown in Tables 2 through 8 increase in size with the statistical significance of the difference between the average ratios for the two groups of banks. A t-statistic of 2.00 or more is considered to signal a significant difference in the two averages because the probability that the difference is due to chance variation in the ratios is less than 5 percent. The t-statistics shown are based on separate variance estimates for the two groups.

Table 3  
OPERATING EXPENSE COMPONENTS

	<u>Percent of total assets</u>		
	<u>Low Earners</u>	<u>High Earners</u>	<u>t-statistic</u>
Salaries, wages, and benefits	1.40%	1.14%	4.93%
Interest on time and savings deposits	2.89	2.55	2.91
Net occupancy expense	0.22	0.17	3.13
All other expenses	1.40	1.07	4.68

issued by States and other political subdivisions (so-called tax-exempt securities) and smaller proportions in loans, and bank premises and real estate.

The administrative and processing costs of securities investments are substantially lower than the cost for loans, which may partially account for lower operating expense. Lower occupancy expense also may be reasonably attributed to the smaller scale of investment in bank premises observed at high earnings banks.

Additionally, the larger share of assets low earners allocate to bank premises does not appear to be related to the difference in the number of branches. High earners had an average of 2.9 branches, compared with 3.1 for the low earners.

Table 4  
ASSET COMPOSITION

	<u>Percent of total assets</u>		
	<u>Low Earners</u>	<u>High Earners</u>	<u>t-statistic</u>
U.S. Treasury securities	15.73%	15.60%	0.09
Securities of other U.S. Government agencies and corporations	3.57	3.63	0.07
Obligations of States and other political subdivisions	8.93	15.15	6.18
Gross loans	53.76	47.46	3.44
Cash assets	10.30	10.77	0.96
Bank premises and real estate	1.97	1.34	4.09

High and low earnings banks differ significantly in the share of assets allocated to gross loans, but differences in the composition of loans for high and low earners are not statistically significant. The high earnings banks did, however, hold larger shares of agricultural and consumer loans and smaller shares of real estate and commercial loans.

Table 5  
LOAN COMPOSITION

	<u>Percent of Loans</u>		
	<u>Low Earners</u>	<u>High Earners</u>	<u>t-statistic</u>
Real estate	43.40%	38.87%	1.73
Agricultural	5.39	7.20	1.13
Commercial and industrial	16.83	15.14	0.80
Consumer loans	32.05	36.27	1.79
All other loans	2.32	2.52	0.33

High and low earnings banks obtain about the same gross rates of interest on Treasury securities (Table 6). However, high earners generate significantly higher rates from the loan portfolio and holdings of tax-exempts. The higher rate on State and municipal securities is probably due to differences in maturities and ratings. Because the gross rate of return on loans is calculated for the entire loan portfolio, it is impossible to determine if the higher loan rate for the high earners is due to differences in loan composition (though not statistically significant, the high earners do hold more consumer loans and lesser amounts in real estate) or to differences in rates on the same types of loans.

Table 6  
**GROSS INTEREST RATES**

	<u>Low Earners</u>	<u>High Earners</u>	<u>t-statistic</u>
U.S. Treasury securities	6.09	6.10	0.13
Obligations of States and other political subdivisions	4.19	4.69	2.71
Loans	8.05	8.30	2.30

The degree of competition in a banking market is thought to influence interest rates commercial banks charge. Competitiveness is difficult to measure, but clearly high earnings banks are not exempt from the discipline of competition. High earnings banks have an average of 4.6 banks in their counties. Low earnings banks have an average of 5.7 competitors in their counties.

Given that the major asset composition difference between the high and low earners involves tax-exempt securities and loans, it is not surprising to find that high earnings banks obtain a larger share of their operating income from the obligations of State and local political subdivisions and a smaller share from interest and fees on loans than do the low earners (Table 7). No other differences in the composition of income are statistically significant.

Table 7  
**SOURCES OF INCOME**

	<u>Percent of total operating income</u>		
	<u>Low Earners</u>	<u>High Earners</u>	<u>t-statistic</u>
Interest on U.S. Treasury securities	14.46%	14.57%	0.08
Interest on agencies	3.46	3.80	0.39
Interest on State and municipal securities	5.75	10.77	7.08
Interest and fees on loans	64.50	58.09	2.77
Interest on Federal funds sold	5.15	6.03	0.96
Service charges on deposit accounts	2.44	2.38	0.21
Trust department income	0.54	0.30	0.91

## OTHER OPERATING RATIOS

Statistically significant differences between high and low earners are also found in the proportion of total deposit liabilities in time and savings deposits and in net loan losses as a percent of loans (Table 8). High earnings banks held a smaller proportion of time and savings deposits and their loss experience per dollar of loans was only 60 percent that of the low earnings banks. Differences in equity capital per dollar of assets and in interest rates paid on time and savings deposits were not significant.

Table 8

### OTHER RATIOS

	<u>Low Earners</u>	<u>High Earners</u>	<u>t-statistic</u>
Total equity/total assets	9.08	8.54	1.26
Time and savings deposits/ total deposits	65.98	58.83	3.17
Interest paid on time and savings deposits/ total time deposits	4.96	4.82	1.44
Net losses on loans/ total loans	0.30	0.18	2.40
Total loans/total deposits	61.33	53.71	3.62

## SUMMARY OF HIGH/LOW EARNINGS COMPARISONS

For the two groups of Fourth District member banks located on the extremes of the average earnings distribution for the last 7 years, the following observations may be made:

- Differences in cost, not income, accounted for differences in earnings. Lower costs were associated with lower loan/deposit ratios, lower personnel expense, more modest loan losses, smaller shares of deposits in time and savings form resulting in lower interest expense, and lesser expenditures for bank premises.
- High earnings banks as a group had about the same ratio of risk assets (loans and tax-exempt securities) to total assets as the low earnings banks, but the high earners held a larger proportion of tax-exempts and a smaller share of loans.
- Although high earners held a smaller share of total loans as real estate loans and larger shares as agricultural and consumer loans, these differences were not statistically significant.
- No significant differences were observed in either equity capital leverage or interest rates paid on time and savings deposits.



## Profitability and Operating Relationships for All Member Banks

The comparative analysis in the previous section is based on a limited sample of high and low earnings banks. The question naturally arises whether those findings would be confirmed by an analysis of all Fourth District member banks. Thus, for the second part of this article, the degree of association between earnings and various bank financial ratios for all 434 member banks in the Fourth District for which data are available from 1969 to 1975 was calculated, using statistical correlation techniques. The correlation coefficients indicate if, when one ratio increases, another ratio is also likely to increase (a positive correlation) or decrease (a negative correlation). Values of 0.10 or greater or -0.10 or less are considered statistically significant. The ratios that were correlated are listed in Table 9, and the values that were calculated for each pair of ratios are shown in Table 10.

The analysis tends to confirm that differences in after-tax earnings are unrelated to differences in operating income per dollar of assets (ratios 1 and 2 are not significantly correlated with ratio 4). Of course, a bank generating no income will have losses equal to its costs. The findings here indicate only that, within the observed range of experience in which all 434 banks were successful in producing some income, variations in income bore no systematic relationship to variations in earnings. Care should be taken to avoid similar possible misinterpretations in other findings.

More importantly, the finding that differences in earnings are strongly related to differences in expense is also confirmed by the analysis of the full bank sample (ratios 1 and 2 are significantly correlated with ratio 9). The negative relationship implies that high performance banks are more likely to be those with relatively low expenses.

The associations between earnings ratios and asset composition ratios are all consistent with those found in the high-low earnings comparisons. Return on equity is positively related to the share of assets in tax exempts, negatively related to the share in loans and bank premises, and unrelated to the share of assets in U.S. Treasury securities and cash. Return on assets shows an even closer relationship to these variables and additionally is positively related to the shares of assets in U.S. Treasury securities and cash. (Compare the correlations of ratios 1, 2, and 11 with ratios 42, 44, 46, 47, and 48). All three measures of earnings are negatively related to the loan/deposit ratio and to the loan losses/loan ratio (ratios 1, 2, and 11 are significantly correlated with ratios 41 and 56). Again, this observation must be interpreted within the range of experience of banks in the sample. A conclusion that a bank with no loans would be the most profitable is not warranted.

Bank earnings are affected simultaneously by many factors such as location, structure and nature of the market the bank serves, deposit size and quality of management. Studies of bank profitability, therefore, usually employ multivariate analysis in which measurement of the influence of each of these factors is attempted. In this report, only simple (bivariate) correlation is used. The results are, in general, consistent with those obtained using multivariate techniques as reported in M. Phaup "The Effects of Federal Reserve Membership on Earnings of Fourth District Banks," *Economic Review*, January-February 1973, pages 3 to 18, and in M. Phaup, M. Bagshaw, K. Sayan, and A. Severn, "Bank Earnings by Portfolio Category," an unpublished paper. (These studies are available upon request by writing to the Research Department, Federal Reserve Bank of Cleveland.)

With one minor exception, the associations between earnings to equity ratios and loan composition ratios are consistent with the high/low earnings comparison which indicated that differences in loan composition are not associated in any systematic way with differences in earnings (ratios 1 and 2 are not significantly correlated with ratios 49, 52, 53, and 54). The share of loans made up of consumer loans is weakly, but significantly and positively related to earnings to equity. There is further weak evidence of a positive association between earnings to assets and agricultural loans and a negative association with real estate loans (ratio 11 is weakly correlated with ratios 49 and 52).

A few other associations between earnings and other ratios in the full bank sample are mildly at odds with the results that emerged from comparing high and low earnings banks. Although the earlier comparison found no significant difference between the two groups in equity capital per dollar of assets, analysis of the full bank sample shows that earnings to equity is weakly but significantly negatively related to equity capital to assets (ratios 1 and 2 are weakly correlated with ratio 57). More heavily capitalized banks did exhibit a tendency toward a lower return on equity. Furthermore, the high, positive association between earnings to assets and equity to assets is plausible in that banks with a high level of equity capital have lower operating costs because one of their important cost of funds, the cost of capital--or compensation to shareholders--is not included in operating expenses. The earlier comparison also found no significant difference between the interest paid on time deposits by high and low earnings banks, but analysis of the full bank sample shows a significant and negative relationship between them (ratios 1,2, and 11 are significantly correlated with ratio 59).

The variance of earnings to equity calculated for individual banks from seven annual observations (ratio 65) was negatively associated with its 7-year mean for individual banks. That is, banks with higher average earnings over the 7-year period

Table 9  
**KEY TO VARIABLES USED IN TABLE 10**

Variable Number\*

1	Income after taxes, before securities gains and losses/equity capital
2	Net income/equity capital
4	Total operating income/total assets
9	Total operating expense/total assets
11	Net income/total assets
41	Net loan losses/loans
42	U.S. Treasury securities/total assets
44	Obligations of States and political subdivisions/total assets
46	Gross loans/total assets
47	Cash/total assets
48	Real estate and bank premises/total assets
49	Real estate loans/loans
52	Loans to farmers/loans
53	Commercial and industrial loans/loans
54	Consumer loans/loans
56	Loans/deposits
57	Total equity capital/total assets
58	Time and savings deposits/total deposits
59	Interest on time and savings deposits/total time deposits
65	Time series variance of variable 1 for individual banks
66	Average deposits 1970-1975
67	Percent change in total deposits 1970-1975

\*Numbers 1-59 correspond to same number variables reported in *Member Bank Operating Ratios* published by this Bank.

Table 10

**CORRELATION COEFFICIENTS FOR SELECTED LONG-TERM OPERATING RATIOS  
FOURTH DISTRICT MEMBER BANKS--1969-1975**

	1	2	4	9	11	41	42	44	46	47	48	49	52	53	54	56	57	58	59	65	66
1	1.0																				
2	.98	1.0																			
4	-.01	-.03	1.0																		
9	-.40	-.41	.78	1.0																	
11	.67	.68	-.17	-.70	1.0																
41	-.21	-.21	.38	.41	-.24	1.0															
42	-.01	.03	-.43	-.42	.13	-.25	1.0														
44	.29	.29	-.25	-.26	.39	-.04	-.30	1.0													
46	-.15	-.17	.61	.63	-.38	.27	-.66	-.24	1.0												
47	-.01	-.01	-.15	-.25	.14	.03	.06	-.20	-.22	1.0											
48	-.24	-.26	.35	.43	-.32	.23	-.30	-.13	.31	.08	1.0										
49	-.03	-.03	-.30	-.12	-.12	-.31	.20	-.01	-.05	-.40	-.14	1.0									
52	-.01	.01	-.18	-.20	.12	-.18	.16	-.17	-.07	.10	-.12	-.12	1.0								
53	-.05	-.06	.19	.16	-.07	.26	-.28	.06	.11	.34	.11	-.56	-.32	1.0							
54	.11	.11	.36	.20	.10	.26	-.12	.08	.08	-.02	.20	-.50	-.32	-.09	1.0						
56	-.16	-.19	.63	-.62	-.33	.31	-.69	-.20	.98	-.18	.31	-.15	-.10	.19	.12	1.0					
57	-.10	-.10	-.23	-.53	.61	-.16	.16	.19	-.34	.22	-.16	-.11	.16	-.04	-.01	-.24	1.0				
58	-.15	-.16	.16	.43	-.41	-.02	-.08	.06	.29	-.78	-.09	.49	-.18	-.30	-.09	.23	.37	1.0			
59	-.11	-.12	.37	.48	-.36	.21	-.34	-.02	.34	-.06	.16	-.17	-.13	.30	-.02	.37	-.37	.18	1.0		
65	-.38	-.39	.16	.22	-.19	.25	-.03	-.11	.04	-.05	.07	-.15	-.03	.07	.11	.04	.10	.05	.04	1.0	
66	-.02	-.04	.04	.04	-.03	.11	-.20	.06	.08	.22	-.05	-.24	-.15	.46	-.16	.17	.01	-.12	.20	-.02	1.0
67	.23	.24	.13	.02	.08	-.06	-.01	-.16	.01	.15	.08	-.14	.16	-.01	.05	-.02	-.08	-.13	.16	.02	-.05

Correlation coefficients are estimates of the degree to which two variables are linearly (in straight-line fashion) related. Correlation coefficients have a maximum value of +1 and a minimum value of -1. A value of +1 means the two variables have a perfect, linear association that is positive, i.e., if one variable increases, so will the other. A value of -1 implies a perfect, linear *negative* association, i.e., if one variable increases,

the other will decrease. A value of zero means that the two variables are independent of one another. Here, correlation coefficients between .10 and -.10 are not significantly different from zero. Some, but not all, of the relationships discussed here have been checked for nonlinearities. No such relationship was detected.

tended to have more stable earnings year-to-year than banks with lower 7-year average earnings. There does not appear to be a trade-off between the level and variance of earnings. In the case of the earnings to assets ratio, the annual variance of the ratio is independent of the 7-year mean (this correlation is not shown in Table 10).

The very small association between earnings and bank size indicates the absence of any simple relationship between these variables (ratios 1, 2, and 11 are not significantly correlated with ratio 66). It is also interesting to note that the variance of earnings to equity over time for an individual bank is independent of bank size (ratio 65 is not significantly correlated with ratio 66). This observation should not be confused with another (not shown in Table 10); the variance of earnings across banks for a specified time period decreases as bank size increases. That is, the inter-bank variation in earnings performance is greater for banks under \$100 million in deposits than for banks over \$100 million, but the variance in earnings for an individual bank over time is independent of size.

The analysis also shows a positive association between earnings to equity and deposit growth, but the earnings to assets ratio is too weakly correlated with deposit growth to be considered significant (correlate ratios 1, 2, and 11 with ratio 67).

## SUMMARY OF EARNINGS CORRELATION DATA

Analysis of the full bank sample generally supports results found in the comparison of high and low earnings banks. When the full sample of banks is used to estimate the association between high performance and various financial ratios, it was found that:

- Differences in earnings were much more closely related to differences in expense than to differences in income.
- Earnings were positively related to holdings of tax-exempt securities as a share of total assets and negatively related to the share of assets in loans.
- The consumer loan component of total loans was the only loan type positively (though weakly) associated with earnings to equity.
- Both the share of total deposits made up of time and savings deposits and the rate paid on time deposits were negatively related to earnings.
- Higher leverage was weakly associated with high earnings rates.
- High earnings banks did not appear to be subject to greater annual fluctuations in earnings than low earnings banks.

## Closing Comment

Bankers outside the Fourth District using the data in this article will wish to keep in mind that U.S. banks generally may differ from banks in the Fourth District. Further, it should be recalled that the techniques used in this analysis fail to take account of several important but unmeasured determinants of bank profitability. However, some findings of this analysis seem inconsistent with some widely-held assumptions about the characteristics of high performance banks. In particular, these findings suggest that more attention should be accorded the cost side of banks' income statements in discussions of bank profitability.

# The Future of Demand Deposits

E. J. Stevens

Substantial changes in the payments system raise questions about the future of demand deposit accounts as a form in which customers will hold, as contrasted with transfer, balances. New accounts that allow customers to earn interest on short-duration transactions balances seem to have a decided advantage. So do computer and communication technologies that allow customers to earn interest by more active economizing on daily demand balances. The future may indeed seem to be a time when, "it is entirely possible that demand deposits, as such, will practically disappear, leaving all financial deposits in some form of interest-bearing 'savings' accounts."<sup>1</sup>

Innovations in the payments system may make it possible for demand deposits to "practically disappear," but the tradition in American banking of providing banking services in return for demand deposit balances may prevent it. Free services, such as account processing activities, lines of credit, cash management, investment and economic advice, can be thought of as an implicit return on demand balances where explicit interest payments are prohibited by law. New interest-bearing payment accounts and new ways of economizing on demand balances, while more attractive than holding demand deposits at zero interest, may not be as attractive as holding demand balances with a sizable implicit return in the form of services.

How high is this implicit service return on demand balances? This is the subject of a recent study undertaken at this Bank.<sup>2</sup> While there is no single unambiguous measure, estimates of the service return in the aggregate for the U.S. banking system indicate that it has been broadly comparable in both level and trend to interest rates on alternative assets in the post-war period. This conclusion is based on a comparison of several estimates of the service return derived by a method developed by Professor Benjamin Klein of UCLA.<sup>3</sup> The remainder of this note briefly recounts some of the results of the study and explores their implications for EFT-related technological and institutional changes at work in the demand deposit market.

## The Service Return

Some banking services compensate customers for demand balances held for payment purposes that might, in the absence of a legal prohibition, earn interest. Some demand balances are held to compensate banks for services that would otherwise involve a fee. More generally, services provided without fee to holders of demand balances may be viewed as an implicit return on balances.

Demand deposits are money that depositors can draw out of accounts at will, and banking services are usually provided simply as part of an ongoing bank-customer relationship. The link between size of balance and quantity of service is therefore not likely to be as rigid as that between interest payments and the size of a savings deposit balance, for example. However, competition in banking markets would tend to enforce a

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<sup>1</sup> Arthur D. Little, Inc., *The Consequences of Electronic Funds Transfer*, June 1975, p. 212.

<sup>2</sup> E. J. Stevens, "Measuring the Service Return," Working Paper, Federal Reserve Bank of Cleveland, October 1976.

<sup>3</sup> Benjamin Klein, "Competitive Interest Payments on Bank Deposits and the Long-run Demand for Money," *American Economic Review*, December 1974, pp. 931-948.



dependable average relationship over time between services and balances in at least two ways.

First, particularly for consumer and small business checking accounts where profitability monitoring of each account is not feasible, banks can monitor service costs and aggregate average balances in such accounts. The mix of free and fee services, and therefore the service return of each depositor and of the average depositor, can be modified by the bank in an effort to improve or maintain profitability. Also, depositors can compare the mix of free and fee services among banks, for example, by looking at service charges and minimum balance requirements, seeking the highest service return on the average balance they would be likely to hold.

Second, particularly for large corporate and institutional depositors, the relationship between a bank and a depositor normally involves an informal or formal understanding about the mix of free and fee services provided as well as the average balance that the depositor will maintain. Periodic monitoring of each customer relationship will surface deviations from the initial understanding and signal the need for more rigorous enforcement or a new understanding.

Both of these processes describe how competition in the banking market will tend to produce a dependable average relationship between free services and demand balances that can be termed the service return. Banks can adjust the mix of free and fee services for identifiable groups of depositors and for individual customers in the light of average balances; customers can shop for a bank whose package of free and fee services generates the highest service return on their expected average balance. As a result, the service return offered at competing banks to a given type of customer should tend toward a common value.

The inducement for customers to hold balances can thus be thought of as a combination of the productivity of balances as an inventory of funds from which to make payments and of the banking services that balances entitle their holder to receive. A depositor holds a balance because this combined value of a dollar in a demand account is greater than the interest he could earn on a dollar switched from a demand account to an earning asset (net of any brokerage fee involved).

Estimating the service return on demand deposits requires a measure of banking services provided without fee to holders of demand balances. Increasingly both banker and customer have an explicit measure of both services and balances, as banks develop more refined account profitability analysis procedures that monitor a customer's use of a full range of banking services as well as the size of his balances.<sup>4</sup> However, only a limited number of banks participate in a system that compiles information for banks.<sup>5</sup> Therefore, estimates of an aggregate or average service ratio must be derived from indirect evidence.<sup>6</sup>

The method of generating indirect estimates reported here is one used by Professor Klein. Rather than assume that both the implicit and the explicit return on demand balances is zero, this method assumes that, when explicit interest payments are legally prohibited, competition among banks for market shares results in a 100 percent payout of bank earnings on demand deposits in the form of banking services to customers. Thus, the service to bank depositors is arrived at by estimating the presumed maximum expense banks would be willing to assume in supplying free services. That expense will be equal to the additional earnings banks are able to acquire by an additional dollar of demand deposit financing. That is, it will equal some measure of the loan rate,  $r_L$ , times  $(1 - rrDD)$ , where  $rrDD$  is the proportion of demand deposits held by the banking system in the form

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<sup>4</sup>For discussion of account profitability analysis see R. Knight, Kansas City Federal Reserve Bank *Review*, March 1975, September-October 1975; P. S. Nadler, "Compensating Balances and the Prime at Twilight," *Harvard Business Review*, January-February 1972, pp. 112-120.

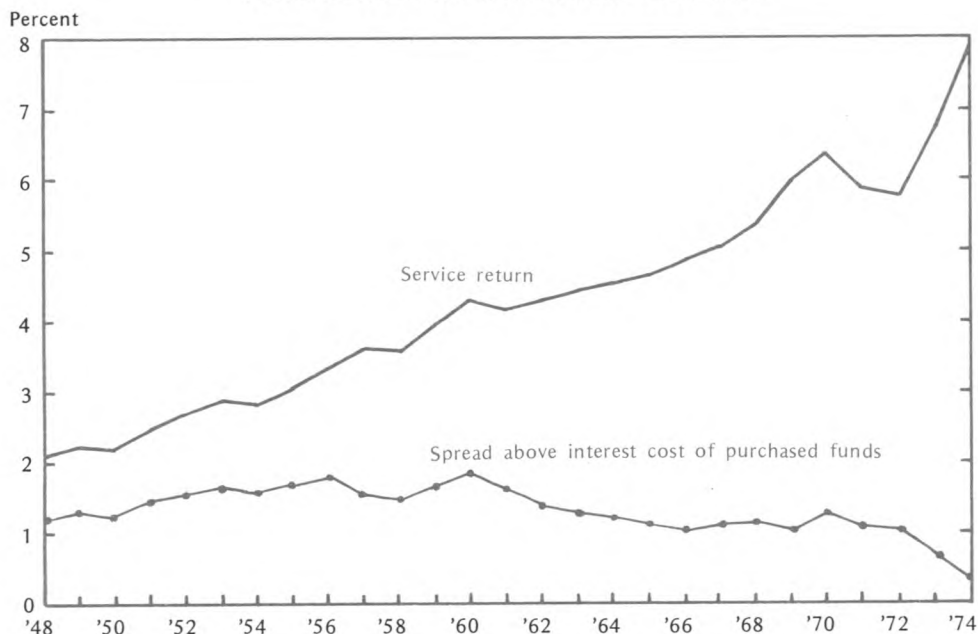
<sup>5</sup>The system is the voluntary Functional Cost Analysis program of the Federal Reserve. A self-selected group of 862 member commercial banks furnished data in 1975.

<sup>6</sup>The method used to derive the estimates used here is explained in more detail in Stevens, *op. cit.*

of nonearning reserve assets. The estimates are in the form of annual average measures for the banking system in the years 1948 through 1974.<sup>7</sup>

A striking feature of the estimated service return is that it is large (Chart 1). In part, this may reflect two kinds of upward bias in the estimates. First is a conceptual problem. Bank services, as implicitly defined here, include what might be termed promotional expenses such as for advertising and customer relations. Whether these items are viewed as a service to customers, or are simply an expense of drawing the attention of customers to services is open to debate. Second, an upward bias associated with the assumption of a 100 percent payout and with the treatment of loan losses can be identified. The overstatement cannot be determined year-by-year, but probably ranges from about 20 basis points in early years to perhaps 50 basis points in more recent years.<sup>8</sup> Even after

Chart 1  
SERVICE RETURN ON DEMAND DEPOSITS



allowing for this bias, however, services provided by commercial banks without fees to holders of demand balances over the post-war period, expressed as the implicit rate of return on these balances, were substantially greater than zero, and rose, on average, by an amount comparable with the increase in many market interest rates.

## BANKS

Three features of the service return are noteworthy when examined in the context of bank earnings and costs over the post-war period.

<sup>7</sup>1974 is the last year for which complete banking system data are currently available. Estimating the service return is complicated by the realization that not all reserve assets of the banking system are acquired at the cost of lost earnings. In particular, the banking system may acquire some reserves via Fed float, government demand deposits, and sometimes at a "subsidy" rate via the discount window. These amendments are quantified in the estimated service return.

<sup>8</sup>Two sources of upward bias can be roughly quantified. First, analyzing bank profits using the estimated service return suggests that slightly less than 100 percent of earnings on deposits is paid out in the form of services. Second, loan losses between 1948 to 1974 would lower the service return by slightly less than 14 basis points on average, but how much of actual losses to remove from each year's service return is uncertain.

First, total costs of services associated with demand balances (the estimated service return multiplied by average annual demand balances at insured commercial banks) have increased less rapidly than total noninterest costs of banks since 1948 (Table 1). Service return expense of demand deposits has increased, but demand deposits have grown much more slowly than other sources of bank financing and therefore more slowly than other noninterest costs of bank administration. In addition, fees have become a more important method of compensating banks for services, covering a greater portion of noninterest costs of banks.<sup>9</sup>

Second, the service return has decreased relative to average interest expenses per dollar of time deposits and other purchased funds (Chart 1). Reserve costs undoubtedly favor nondemand deposit financing, and the same apparently has been true of nonreserve costs, as indicated by the excess of the service return over the average interest cost of purchased funds. This spread has narrowed since 1960 as large denomination negotiable CD's and other liabilities whose interest rates are unregulated have assumed an increasing role in bank financing.

Table 1  
**DECLINING ROLE OF SERVICE RETURN EXPENSE: 1948-1974**  
Increase in Selected Bank Expenses and Deposits  
(all insured commercial banks)

	Annual Average Percent Increase
Service Return Expense*	6.3%
Total Noninterest Expense	6.5
Fee Income	6.4
Demand Deposits, net	3.5
Time Deposits and Borrowed Funds	6.6

\*Estimated service return times demand deposits, net.

Source: Federal Deposit Insurance Corporation;  
Federal Reserve Bank of Cleveland

Third, the service return cost of demand deposits [ $r_L(1-rr_{DD})$ ] has increased relative to the cost of reserves ( $r_L=rr_{DD}$ ) in the total cost of demand deposit financing. Service costs increased from 83 percent to 92 percent, and reserve costs declined from 17 percent to 8 percent of total estimated demand deposit costs between 1948 and 1974. This decline in reserve costs can be attributed to reduced legal reserves required of member banks as well as to the increased share of demand deposits maintained at nonmember banks who had a smaller reserve ratio to begin with, and have reduced that ratio since 1948.

## CUSTOMERS

An important feature of the service return from a customer's point of view is its size relative to the income that might be earned on alternative assets. Substantial changes have marked these relations since 1948 (Chart 2). An indication of rates available to consumers and other holders of small balances in the past can be seen in the Regulation Q maximum rate payable on savings deposits with maturities of less than a year. This rate was higher than the service return immediately after World War II, but has been below the service return since 1951, and by a growing margin since 1965.

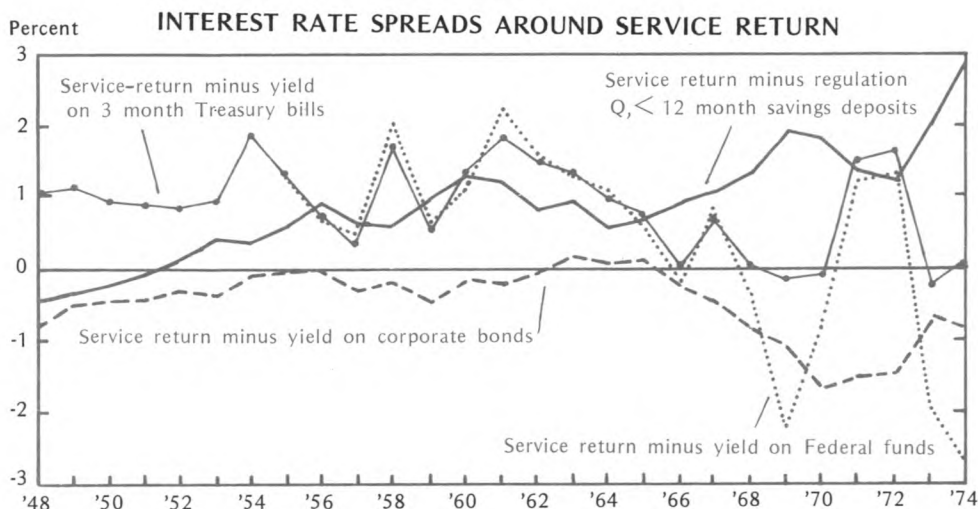
Holders of large balances faced a similar situation with respect to short-term securities between 1955 and 1965. The service return was higher than yields on

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<sup>9</sup>"Fees" here refer to all noninterest income of banks except fees and service charges on loans.

representative short-term securities such as Treasury bills and Federal funds. This pattern changed after 1965. Shortest-term yields, represented by the rate of Federal funds, were higher than the service return in all but 3 of the years from 1966 to 1974. Somewhat longer-term yields, represented by that on 3-month Treasury bills, were higher than the service return in 2 of those 9 years, and approximately equal to the service return in 4 other years. Long-term capital market yields have always been higher than the service

Chart 2



return except briefly between 1963 and 1965. Since then, the spread has widened substantially.

These disparate changes can be summarized in two points. First, the service return has increased relative to rates available on consumer short-term accounts over the past decade, while it has tended to decline relative to yields available on marketable securities. This latter tendency is consistent with the pervasive emphasis on cash balance economizing by business firms and other large institutions during the past decade. Second, in spite of these changes in relative rates, the level and general trend of the service return has been broadly comparable to that of interest rates in general in the post-war period. It is this finding that provides a basis for investigating the future of demand deposits in the context of innovations in the payments system.

## Implications for the Future

What bearing does the service return have on questions about the future viability of demand deposits? Answers to this question can be arranged under three headings corresponding to three ways of viewing innovations in the payments and banking system.

### NEW INSTRUMENTS

New instruments could eliminate or reduce a bank customer's need for a demand deposit balance to make payments. A prime attraction of all such instruments is presumably the possibility of earning interest on funds that otherwise would be held in a demand balance.

The estimated service return suggests that the choice between a new instrument and a demand deposit is not as simple as it might at first appear. Taking services into account, in fact, an "average" demand deposit holder since 1948 would have had a clear incentive to hold an alternative asset only in recent years, and only if that alternative were marketable securities. His demand balance was generally associated with a package of banking services roughly comparable in value to the interest income on alternative assets.

Past average relationships, however, do not mean that commercial bank demand deposits will remain competitive with existing and new alternative instruments in the future for all depositors. The same innovations that are producing new competing instruments are capable of changing the determinants of the service return.

Float, for example, might be eliminated by electronic payments technology. Federal Reserve float is a source of reserve assets that is costless to the banking system because reserve assets supplied by float are neither purchased by selling earning assets, nor borrowed at the Discount window. Similarly, changes in membership in the Federal Reserve System, in legal reserve requirements of member and nonmember banks, and in banks' desired clearing balances at the Federal Reserve and prudential vault cash reserves all would change the proportion on nonearning assets per dollar of deposits for the banking system, and thereby the value of services some banks could finance per dollar of deposit. Foreseeing the likelihood and the costs of the variety of factors influencing future reserve holdings is a job for further research.

Table 2

**DEMAND DEPOSITS EARNINGS NET OF ACCOUNT ACTIVITY EXPENSE  
FCA SAMPLE BANKS -- 1975**

Type of Account	Deposit Size of Banks		
	<50 million	>50, <200million	>200 million
Commercial	4.2%	4.2%	3.8%
Personal	0.2	0.5	-0.9

Percentages represent portfolio income per dollar of deposit balance net of account activity expense per dollar of deposit balance. Excludes service charge and fee income.

Source: Functional Cost Analysis: 1975 Average Banks

An average relationship like the service return may obscure important distinctions among different kinds of depositors and different situations of banks. Consumers hold an estimated 25 percent of demand deposits and businesses and other institutions hold the remaining 75 percent. The distinction between consumer and other accounts is important because cost accounting evidence suggests the service return on consumer accounts is approximately matched by account activity expenses (Table 2). That is, the services consumers receive in return for demand balances are almost entirely in the form of payment services such as deposits and check collections, or are offset by service charges. The competitiveness of new consumer payments accounts with existing consumer demand deposit accounts therefore may depend largely on a comparison of explicit interest payments and service charges between demand deposits at commercial banks and new payments accounts.

The stark simplicity of this comparison presents a visible challenge in retail, and especially consumer-oriented banking. Not all banks are equally situated in the market, however. Consumer deposits make up 34 percent of demand deposit financing at smaller banks, but only 18 percent at large banks. More than half of these smaller banks have less than \$25 million in total deposits.

The market for commercial demand deposit accounts is more complex. Commercial accounts appear to have account activity expenses significantly smaller than their service



return, and that return includes a wide range of services not limited to account activity, and potentially including cash mobilization, collection, bookkeeping, computer, money management, loan processing, informal credit line, foreign exchange, trust, investment, and economic advisory services. Judging the potential competitiveness of new accounts entails comparisons of alternative methods of acquiring this wide variety of additional services, plus explicit interest rates and service charges. Account profitability analysis and "enforcement" of balance requirements may be prerequisites for banks in controlling their service return in the face of the competitive challenge of new instruments. Payment services and other banking services provide a wide field in which cost reduction and productivity improvement may allow banks to maintain a competitive service return for business and other institutional demand deposit customers

## REDUCED COSTS AND NEW SERVICES

A second aspect of payments system innovations, closely associated with the general category of EFTS, is directed at cost reduction and service enhancement. Viewing EFTS from this technological perspective, independent of new institutions competing for a share of the demand deposit market, illustrates the importance of service return information and the need for additional information.

Cost reduction in producing bank payment services would allow a more valuable package of services to be provided in the service return on demand balances. An important distinction must be made, however, between the cost improvements arising from EFTS technology and the cost improvements that would assure the competitive standing of demand balances vis-a-vis new accounts and instruments available to consumers and business. Cost savings from EFTS as a technology for the payments system depend on the adoption of the new technology by participants in a network. The network may be among various financial institutions, as in an automated clearinghouse, or among merchant customers of one or more financial institutions, as in a point-of-sale system, or both. This means that EFTS may only confer cost advantages when relatively high volume usage is attained, implying that cost advantages may take some time to be realized.<sup>10</sup> Further, the cost advantage will not be limited to commercial bank issuers of demand deposits if other financial institutions are part of the network. EFTS in this grand sense of the term might eventually provide a means of increasing, or preventing cost increases from reducing, the value of service returns at commercial banks. But without specifying what set of institutions will offer EFTS payment services, it is not possible to foresee how the competitiveness of service returns in commercial banking will be affected. More information about participants and the cost structure of various potential participants is needed.

New payments techniques resulting from EFTS may reduce customers' own administrative costs, such as payroll preparation and receipts processing. They may also make deposit balances a more convenient device for payments purposes, and thereby influence the amount of demand deposits customers wish to hold independent of any change in service return. For example, cash dispensers and automated tellers might allow more convenient transactions, and therefore, more frequent withdrawals of cash, and a different demand deposit balance on average during a period. Instantaneous clearing and settlement, via automated clearinghouse or debit card, may eliminate mail float, making it easier for customers to manage the size of their balances accurately.

These and other improvements in the ways that demand deposit balances can be used for payments purposes can be loosely described as productivity changes, but their impact on desired balances is very difficult to predict. The fact that the estimated service return on demand deposits is comparable to returns on other assets seems to indicate that the current value of the payments productivity of demand deposits is a relatively small

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<sup>10</sup>Arthur D. Little, Inc., *op. cit.*, pp. 94-101.

part of the total inducement to hold balances, at least as measured by the foregone interest return, net of service return, involved in holding demand balances rather than other assets. Any change in productivity would therefore seem likely to be quite important when expressed as a percentage of this small base. Questions arise, however, about how the value of new services and productivity improvements can be measured,<sup>11</sup> and how a given change in this value will be translated into a change in balances held.<sup>12</sup> Bank marketing efforts as well as monetary policy and regulatory decisions would benefit from estimates of the direction and size of changes in desired demand balances. The service return may provide a tool for further research in this area.

## INTEREST ON DEMAND DEPOSITS

Finding that the service return on demand deposits is roughly comparable to explicit yields on competing assets raises a final question. Would the future of demand deposits be significantly different if, as frequently suggested, the prohibition on interest payments were removed? The size of the estimated service return suggests that, if an equivalent interest payment were made, and services were sold for fees, both banks and customers would be neither better or worse off.<sup>13</sup> The case is probably more complex than this.

Some customers undoubtedly use services with a value less than the average service return and other customers use more. Paying all customers the equivalent of the average service return as explicit interest would not necessarily leave total demand deposit balances unchanged. Some customers might hold more balances because the explicit interest payment is more attractive than the smaller-than-average return they had previously accepted. Other customers might reduce balances because their explicit interest payment is less than the above average value of service return they had previously received. Without knowing more about what kinds of customers are in which groups, it is not possible to say whether balances would rise or fall. The growing tendency of banks to take advantage of back office computerization and cost accounting to monitor account profitability will be useful to them in deriving this information as well as in estimating more precisely what is the service return on demand deposit balances.

## Concluding Comment

Quantifying the relationship between demand deposits and bank services may be an interesting exercise in itself, but the importance of measuring the service return depends on its usefulness in further work. Changing instruments, regulation, and technology in the payments system may allow widespread changes in patterns of deposit holding. Predicting and preparing for potential change may be aided by techniques for quantifying and analyzing the effects of change on banks and depositors. The service return is a device that may prove useful in this process.

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<sup>11</sup>Some beginnings are being made as marketing efforts seek ways of quantifying the costs and benefits to customers of new services. See, for example June Willard, "Selling by the Numbers," *NACHA Quarterly Update*, Supplement 2, July 1976.

<sup>12</sup>Demand for money studies based on a quantified price of deposit services is one way of approaching this question. See Benjamin Klein, *op. cit.*, and Stevens, *op. cit.*

<sup>13</sup>This suggestion is made in Arthur D. Little, Inc., *op. cit.*, p. 158