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A NEWCOMER'S VIEW OF THE U. S. BANKING INDUSTRY*

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Being a newcomer to the public sector of the U. S. banking industry, it would be presumptuous for me to suggest a diagnosis and cure for any and all problems facing the practicing commercial bankers in Pennsylvania. My remarks this morning will reflect only my intense personal interest in improving the efficiency of the nation's financial system. Indeed, as a novice public official, I have far more questions than answers. May I emphasize that I speak only for myself and not for my colleagues in the Federal Reserve System.

** Remarks delivered before the 37th Annual Convention of the Pennsylvania Bankers Association, Atlantic City, New Jersey on May 24, 1972.*

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My perspective on your industry is different from that of a management consultant because I am charged with responsibilities of helping to achieve maximum benefits from the operation of the financial system for our entire society, while your major responsibility is to your shareholders. My thoughts about the industry began with my efforts to look at my own activities—not just at what I am required to do, but in terms of what I, the Bank, and the System should be doing to improve the functioning of our financial system. This in turn gave rise to all kinds of questions about your activities—and I would like to share a few of the questions with you. I would also welcome an opportunity to have the benefit of your response to these questions.

The really fundamental issue that concerns me this morning is: What is the optimal financial system for the U.S. today? Now I know that you are as interested in the answer to this question as I am, but our interpretations of the question may differ. Let me amplify this point. When I ask you what would you consider to be the optimal banking system, what I am asking is what kind of banking industry would you, the practicing bankers, create if there were no regulatory authority to constrain you, keeping in mind that there would still be a monetary authority to meet the country's changing needs for money. Alternatively, what should be the business of banking? Would your product-mix or activities be different than now?

Presumably, if you were free to do so, each of you would proceed to develop your institution as one best suited to your own needs. The resulting banking structure would be a summation of your individual choices. As a public official, I have a different perspective. When I consider what is the optimal or ideal banking system, I must think in

terms of the benefit to our entire society. The ideal banking system from this view is one that provides the desired level of banking services at the lowest possible cost. With such a banking structure, we would obtain an optimal allocation of scarce resources and a stable monetary structure. It is important to know how far your ideal is from society's because of the implications this has for the appropriate degree and type of banking regulation.

My point is that the present set of bank regulations is not necessarily consistent with either of our ideas regarding an optimal banking system. Because there is increasing sentiment along these lines, it seems quite possible that changes are in store for us.

But let's go back to the beginning. Banking is not only a very important industry in the sense that it is the producer of the nation's money supply and the principal arm of monetary policy, but it is also a very regulated industry. Today, banks are subject to controls affecting their number, their organizational structure, the type of services they can offer, the composition of their assets, their capitalization, and their location—to mention a few that come most readily to mind. Although the Federal Reserve is not the only regulatory agency for the industry, we do contribute our share of regulations, including A through Z, excepting W, for member banks. Additional constraints are imposed on the behavior of commercial banks by the Federal Deposit Insurance Corporation, the Comptroller of the Currency, and state banking authorities.

But why do all these regulations and restrictions on banking exist? The stock answer has been that these regulations were instituted to insure the stability and safety of the banking system.

In view of all this supervision, one might get the

mistaken idea that bank regulations are the principal determinant of the nature and structure of the commercial banking system. In fact, of course, antitrust laws and basic laws of economics have probably much more significant influences on the banking system.

Yet, it does seem that the safety objective of regulation has been achieved. In the post-World War II period, bank failures have been infrequent. In the few exceptions when banks have failed, they have often been absorbed by other banks. When insured banks have closed, the loss to depositors has been substantially diminished by deposit insurance.

What is also apparent is that these regulations have had effects other than stabilization of the nation's financial system. One way of getting at these effects is to ask the question that I asked earlier: What would be the effect on your operations if all banking regulations were removed? How would the banking industry differ? What would you do that you are not doing now and how would you do it if the banking regulatory scaffolding were removed? Obviously, there are a number of alternative activities in which you could be engaged. But, I wonder, do you have—in the short run—the management resources to do some of these things? And—in the long run—would they be profitable uses of your resources? I guess that I am going back to the basic question of what is the business of banking? Are you in the business of providing a range of services to the local community, or is it more desirable for you to specialize in a limited number of products or to operate in distant markets to maximize profits?

Remember, however, that you would remain subject to other restrictions. Society's interests are well served by competition, and the antitrust tradition is deeply rooted in this country.

The fact remains that banking regulations—as well as the realities of economics and antitrust laws—have had effects on the operations of the banking industry in addition to the effect on safety. There are unanticipated costs as well as anticipated benefits from detailed regulation. The most obvious such cost is some loss of institutional flexibility, which is harmful both to public and private interests. Responsible public officials must be concerned about the total impact of an act or regulation. We must keep asking: Are the costs of a regulation less than the value of the benefits to society? Can a different set of regulations be designed to achieve the same desired goals at a lower cost? What is the ideal (highest benefit-lowest cost) regulatory structure? These are questions that we must continue to explore.

Let me give some examples of the effects of regulation whose costs and benefits have to be considered in the evaluation of the present set of regulations.

First, I think we can agree that public policy has influenced the number, size, and organizational structure of banks. It has done so, for example, through restrictions on *de novo* entry and branching and through the concern for competition among banks. Developments in the structure of the banking industry have mirrored regulatory changes and judicial rulings, as well as economic factors.

From the Bank Merger Act of 1960 until the end of 1971, almost 20 percent of the banks in the Fourth Federal Reserve District were absorbed through merger activity. We are currently observing a regulation-constrained expansion of one-bank holding companies into bank-related activities. Judicial rulings on merger cases in the first half of the 1960's and the Bank Merger Act of 1966 affirmed the applicability of antitrust laws

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to the banking industry. The Bank Holding Company Amendments of 1970 placed one-bank holding companies under the regulatory jurisdiction of the Federal Reserve. It is evident, therefore, that public policy in the form of state statutes, court rulings, and national legislation blend to form banking's legal environment, and such an environment is likely to be retained no matter what changes are made in those detailed regulations specific to banking. Moreover, whether one takes a banker's viewpoint or the public perspective, we need to know: What is the most efficient bank size? I do not know that this question can be answered without specifying the extent of the market or the type of banking services effectively demanded, but some studies have suggested that per unit cost of bank services does not differ significantly for a wide range of bank sizes from, say, less than \$5 million to \$500 million in deposits. This implies that bank growth is not a royal road to low costs; moreover, it raises questions about the benefits to society of increasing concentration in banking. Moreover, insofar as regulation has influenced bank structure, one wonders if, on balance, the effect has been to the advantage of society and/or the industry.

Regulations have also affected the compositions of assets held by commercial banks in the United States. And, again, it is worth asking if the net effect has been positive or negative to the industry and society as a whole. I have in mind regulations specifying the level and types of assets that must be held as reserves. Restrictions also apply to the types and amounts of loans and investments that may be made. It appears that the goal of a stable banking system has been met, but what costs have been incurred? These regulations have affected the flow of funds to sectors such as high-risk ventures and long-term capital investment. My point is that

regulations designed to enhance the stability of the banking system have had effects that are beyond those intended, and these effects may be unnecessarily pushing us away from an ideal situation both from society's and the industry's viewpoint. We must be continually alert to the possibility that regulations may become restrictive of innovation rather than protective of the public interest.

The very nature and composition of banking liabilities have also been affected via rules regarding the definition of deposits, reserve requirements, and interest limitations, for example. A by-product of these regulations that is difficult to reconcile with a societal point of view is the discrimination against small savers that has occurred during periods of high interest rates. There is also a danger here that our regulations have restricted innovation in the provision of services—although at times it appears that our regulations have spurred really imaginative, but costly, methods of avoidance.

This morning, I have tried to challenge you to think about what the banking industry should be. It is clearly a heavily regulated industry. We must constantly evaluate the total societal effects of regulation and weigh their costs and benefits. There always remains a possibility, therefore, that the type and degree of regulation will be changed toward a different set of public restrictions, permitting perhaps more competition with less emphasis on the survival of specific institutions. That is certainly the drift of the Hunt Commission Report. The Federal Reserve must carefully weigh the long-range consequences in terms of costs and benefits of the present and alternative systems. Perhaps with open lines of communication between the public and private sector, we can approach a system that is closer to the ideal financial structure that all of us desire.

THE NATURE AND USE OF FORWARD EXCHANGE

Gerald H. Anderson

Forward exchange—foreign currency purchased or sold for future delivery—may be one of the more arcane aspects of international monetary economics, but it plays a vital role in international commerce. The primary use of forward exchange is to offset the risks of international commerce that are caused by the possibility of changes in exchange rates. Consequently, interest in forward exchange was sharpened in 1971 when several nations allowed their currencies to float relative to the U. S. dollar for various periods of time. Although the floating of most currencies ended in December 1971, many nations then began to permit spot rates for their currencies to fluctuate within a four and one-half percent band relative to the U. S. dollar. This situation has exposed participants in international trade transactions to potentially greater losses from adverse movements of exchange rates and has resulted in a growing need for forward exchange.

This study of forward exchange is being presented in two parts. The present article describes forward exchange and the market in which it is traded and discusses the maturities and currencies in which forward exchange is available. The uses of forward exchange are explained in detail. A future article will discuss the theory, policy, and problems of forward exchange.

FORWARD EXCHANGE CONTRACTS AND RATES¹

A forward exchange contract is an agreement to deliver (or accept delivery of) a specified amount of a foreign currency at a specific price on a future date stipulated in the contract.² It may be compared with a spot exchange contract, which calls for the prompt delivery of a specified amount of foreign currency at an agreed price. Most spot transactions call for delivery in one or two business days (depending on the currency), although some are for "value today," indicating same-day delivery.³

¹This and the following section draw heavily on Paul Einzig, *A Dynamic Theory of Forward Exchange* (2nd ed.; New York: St. Martin's Press, 1967) and Alan R. Holmes and Francis H. Schott, *The New York Foreign Exchange Market*, Federal Reserve Bank of New York, New York, 1965.

²Option contracts, described later, are an exception to the requirement for a specific date.

³International transactions between banks in the United States, regardless of whether they are forward transactions or spot transactions with "value date" today, tomorrow, or in two business days, are usually settled in clearinghouse funds. There is, however, a move underway to have all international transactions among banks in the United States settled in immediately available funds.

History of Forward Exchange—A Thumbnail Sketch*

Little is known about the early development of forward exchange dealings, although there is some documentary evidence of transactions in the 14th century. In the 19th century, trading in foreign paper money for forward delivery developed; and, toward the end of that century, forward dealing in mail transfers developed. There was an active forward exchange market in most countries, except England, in the closing decades of the 19th century. At that time, British merchants held such a dominant position in international trade that they could insist on import and export contracts being denominated in sterling, thus obviating the need for a forward market in London. It was not until shortly before World War I that a forward market developed in London.

Prior to World War I, the predominant use of forward exchange was in connection with various forms of arbitrage; but after the war, importers and exporters became the primary users. In the early 1920's, the substantial fluctuations of most exchange rates caused a great demand for forward exchange facilities. However, in the early 1930's, the Great Depression and the concurrent reduction of confidence in the banking system substantially reduced the availability of these facilities. After a resurgence in the mid-1930's, the use of forward exchange was severely hampered in the late 1930's. Forward dealing in the mark and the lira stopped completely because of severe exchange restrictions, and informal restrictions on forward dealings in many other currencies began to develop. These restrictions were intended to inhibit speculation and capital outflows through interest arbitrage and were made mandatory in most nations at the beginning of World War II. There was no forward market in London from September 1939 to December 1951, although there was some forward exchange activity in New York. Since the early 1950's, forward exchange markets have generally become more active.

*Based on Paul Einzig, *A Dynamic Theory of Forward Exchange*, (New York: St. Martin's Press, 1967) Chapter I.

The most frequent reason for engaging in a forward contract is to avoid the uncertainty and risk inherent in not knowing what the spot exchange rate will be when a currency is to be received or delivered. The price, or exchange rate, in a forward exchange contract is not affected by the spot rate that exists on the delivery date.

In the forward exchange market, rates are usually quoted for funds to be delivered in one, three, or six months. These quotations, which are for interbank transactions, form the basis for the rates that a bank will quote to a customer, even though a customer may often seek a contract for some period other than one of these standard periods. Forward exchange contracts may, in fact, be arranged for much longer periods, although the longer contracts are difficult to arrange. When a customer does not know exactly when he will receive or need to deliver foreign exchange, an option contract is used. In this type of contract, the customer is given the option of delivering the foreign exchange to his bank (or receiving delivery) at any time within a specified period, typically a ten-day period at the beginning, middle, or end of a month.

The three methods that are used to express forward exchange rates can easily be explained by a hypothetical example. Assume that the spot rate for sterling in New York City is 260.00 U. S. cents and the rate for sterling to be delivered in three months is 262.60 cents. The forward rate may be expressed outright—262.60 cents—or in terms of the margin between the spot and forward prices—a 2.60 cent premium. A third way to express the rate is to state the margin on a percent-per-annum basis. In this example, with a margin that is one percent of the spot rate and a contract for one-fourth of a year, it may be said that forward

sterling is at a premium of four percent per annum. If forward sterling is at a premium over the spot rate, then forward U. S. dollars are being quoted at a discount. The discount on forward dollars would, by mathematical necessity, be of a slightly different percentage. In this example, the discount would be 3.96 percent per annum.

FORWARD EXCHANGE MARKETS

Active forward exchange markets are found in the world's major financial centers. In addition to New York and London, forward exchange markets exist in Zurich, Frankfurt, Paris, Amsterdam, Brussels, Montreal, and Toronto. In New York, there is active trading in contracts for forward delivery of sterling, Canadian dollars, Deutsche marks, and Swiss francs. The forward market for other currencies is rather thin. In London, there is an active forward market for U. S. and Canadian dollars, French and Swiss francs, Deutschmarks, and Dutch guilders. In times of great uncertainty, however, such as the weeks immediately following the suspension of gold convertibility by the United States in August 1971, it may be difficult to arrange forward contracts, even in the major currencies.

The market for forward exchange is essentially the same market in which spot exchange is traded. It consists of the foreign exchange trading rooms of commercial banks and foreign exchange brokers, which are all connected by direct telephone lines. Brokers are used as intermediaries for transactions between banks in the same city, but transactions between banks in two different countries are arranged directly by the banks.

A nonbank customer buys or sells forward exchange in a direct dealing with his commercial bank rather than dealing in the interbank (or

wholesale) market through a broker.⁴ In these transactions, the bank acts as a principal and does not charge a commission. The bank quotes firm rates to its customers and makes its profit on the difference between the rates at which the currency is purchased from some customers or the interbank market and sold to other customers or the interbank market.

Banks generally exercise great care in assessing the credit-worthiness of a customer with whom it is contemplating forward transactions, because the delay between the making of the contract and its execution presents the risk of customer default. If there are indications that a customer's proposed forward exchange transaction is speculative, most banks will refuse to accommodate the customer, and those few banks that would accept the transaction probably would require the customer to put up a margin to protect the bank in case of default.⁵ In practice, however, it may be difficult to distinguish between hedging and speculative transactions.

A bank with a substantial amount of international business is normally buying a currency forward from some customers and selling it forward to others. To the extent that these transactions offset each other, the bank's risk of loss is reduced. When a bank is either a net buyer

⁴The Chicago Mercantile Exchange began trading in forward contracts for Canadian dollars, sterling, Swiss francs, Deutschmarks, Japanese yen, Italian lire, and Mexican pesos on May 16, 1972.

⁵Herbert Grubel reports that in August 1961 a ten percent margin deposit was required by a large New York bank. See his *Forward Exchange, Speculation, and the International Flow of Capital* (Stanford, California: Stanford University Press, 1966), p. 27. Holmes and Schott, *op. cit.*, p. 46) also suggest ten percent as a typical margin.

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or seller for a particular maturity of forward contracts, the bank must either accept the risk inherent in such a position or engage in an offsetting transaction in the interbank market.

The profit (or loss) that a bank will realize from not offsetting a net position is determined by the spot price of the currency when the contracts mature. For example, if a bank is a net buyer of a currency for forward delivery on a certain date (i.e., it has a long position for that maturity), a profit will be made if the spot rate at which the currency can be sold is higher than the forward rate at which it was purchased. If the spot rate is lower than the forward purchase price, the bank will incur a loss. The reverse would be true if the bank were a net forward seller of a currency for a particular maturity (net short position for that maturity). Most banks attempt to avoid having any position in a currency, but some banks actively seek positions in foreign currencies from which they expect to profit.

In addition to the position in forward contracts in a currency for a particular maturity or date, a bank is concerned about the "overall position" that results from all outstanding contracts in that currency. This overall position is the sum of a bank's balances with correspondent banks in the currency plus the total value of its forward purchase contracts for all maturities, minus the total value of the bank's forward sale contracts for all maturities. As new contracts are made and existing contracts mature, this position constantly changes. It is easier, however, for a bank to keep its overall position in balance than its position for any particular maturity, because the long positions for some dates that result from an imbalance in transactions with customers for those dates may be offset by short positions for other dates.

A bank may, therefore, have no overall position

in a currency, but be long spot and short forward or be long in some maturities and short in other maturities. The exchange risk that could be associated with such position may be illustrated by an example.

Sterling Position – March 3, 1972

Balance with correspondents	£100,000
Purchase to be delivered on May 3	£200,000
Total balance and purchase	£300,000
Sale to be delivered April 3	£300,000
Overall position	—0—

The bank has no overall position in sterling, yet it is still exposed to exchange risk. On April 3, the bank will have only £100,000 available with which to meet its obligation to deliver £300,000. To be able to deliver the £300,000 on April 3, the bank could purchase £200,000 spot on April 3 (actually, two business days before) to fulfill the contract. The bank, however, would then have a long position in sterling because of the delivery of £200,000 due to be received on May 3. To eliminate this long position, the bank could sell £200,000 spot on May 3 (or two business days earlier). The exchange risk in purchasing £200,000 spot on April 3 and selling £200,000 spot on May 3 lies in the possibility that the spot rate for sterling may differ on these two days. The bank, of course, would not know the extent of its loss or gain until May 3.

To avoid the exchange risk in such a situation, the bank could engage in a swap transaction. A swap combines a purchase and offsetting sale of foreign exchange and involves either a spot transaction and forward transaction or two forward transactions of different maturities. In the previous example, the bank could seek a swap transaction composed of a purchase of £200,000 for delivery April 3 and an offsetting sale of

£200,000 for delivery May 3. This transaction would eliminate the exchange risk inherent in the bank's sterling position. The bank could still incur a loss or gain on the transaction if the prices of 30- and 60-day forward sterling are not identical, but the amount of loss or gain would be known as soon as the swap had been contracted.

Most transactions between banks in the forward exchange market are swaps, whereas most forward transactions between a bank and its customers are outright; i.e., they have no offsetting spot or forward counterpart. A customer requires an outright transaction if he is covering the exchange risk involved with importing or exporting, but he requires a swap if he is engaging in covered interest arbitrage. These operations are described in the following section.

USES OF FORWARD EXCHANGE

Forward exchange has numerous uses. It is used to avoid the exchange risk connected with importing and exporting, to hedge against loss of assets owned abroad, and to provide cover for the exchange risk inherent in international interest arbitrage. In addition, forward exchange may be used as a vehicle for speculation on future changes in exchange rates.

Commercial Covering. When a contract for the export or import of merchandise is signed, it usually specifies the value to be paid for the goods on a stipulated future date. Since the two parties to the agreement probably are in different countries, the currency in which the payment is denominated will be foreign to at least one of them. The party dealing in foreign currency is subject to exchange risk because he has no way of knowing what the spot exchange rate will be at the time he is to pay or be paid. Covering with a forward exchange contract can eliminate this risk.

For example, assume that a United States exporter is to be paid £10,000 by a British importer in 90 days. The exporter does not know how many dollars £10,000 will purchase in 90 days because he cannot know what the dollar-pound exchange rate will be at that time. To eliminate this uncertainty, he can engage in a forward contract with his bank. Such a contract could require the customer to deliver £10,000 to his bank in 90 days in exchange for an amount of dollars specified in the contract. When the sterling payment is received from the British importer, the exporter simply delivers the sterling to his bank and receives the specified number of dollars in return. (In actual practice, the exporter would probably have his bank collect the sterling proceeds for him.)

An alternative way for the exporter to avoid exchange risk would be to insist that the payment for exported merchandise be made in dollars, thus shifting the exchange risk to the British importer. The importer, however, might not be willing to purchase the goods on those terms.

A United States importer is exposed to a similar exchange risk if he contracts to pay for imports in sterling at some future date. He could, of course, buy the necessary sterling at the time he contracts for the imports, but that would tie up capital. To avoid the uncertainty about the exchange rate inherent in waiting until payment is due before buying the sterling, the importer can purchase the necessary sterling forward.

Banks usually advise their customers to obtain forward cover as a matter of course, so that the customers will not have to be concerned with foreign exchange risks. To be perfectly rational, an exporter or importer who routinely obtains forward cover to avoid exchange risk would use the appropriate forward exchange rate, rather than

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the current spot rate, in his calculations of revenue or cost when negotiating a trade contract. In practice though, some exporters and importers use the current spot rate in their calculations. After the trade contract is signed, they choose between speculating in foreign exchange in the amount of their trade contract on the one hand and eliminating their risk at the cost (gain) of the forward premium (discount) on the other hand.

In addition to covering the exchange risk in importing and exporting, forward contracts are used to offset the exchange risk inherent in any future foreign currency payment or receipt. For example, firms with international operations may obtain revenues in one currency but have periodic dividend or tax obligations to be paid in another currency. These firms can use forward contracts to convert the revenue currency into the needed tax or dividend currency.

Hedging. A firm owning assets in another country may, with forward exchange, hedge to protect itself from loss if it expects that the currency of the foreign country will be devalued. For example, suppose an American firm owns a branch factory valued at DM10,000,000 in Germany. With an exchange rate of DM1 = \$.31, the firm would show the value of the factory as \$3.1 million on its consolidated balance sheet. If the Deutschemark were then devalued to DM1 = \$.28, the factory, still valued at DM10,000,000, would then have to be shown on the consolidated balance sheet as being worth \$2.8 million, an apparent loss of \$300,000. There could have been an offset to this loss, however, if the firm had hedged against the devaluation by selling Deutschemarks forward. For example, if the firm could have sold DM10,000,000 forward at a rate of DM1 = \$.30 prior to the devaluation and if the forward contract had matured after the devaluation when

the spot rate was DM1 = \$.28, the firm would show a profit of \$200,000 on its hedging transaction. The net loss from the devaluation would then be \$100,000 instead of \$300,000.⁶

It is difficult to measure the true amount of exposure to exchange risk to which a firm with foreign assets is subject. Some assets, such as inventories of raw materials imported into the foreign country, may be expected to rise in value, measured in the foreign currency, by an amount that would fully offset the impact of a devaluation of the foreign currency. Fixed assets may also rise in value to some extent if a devaluation is preceded or followed by inflation. Foreign liabilities also can reduce the net exposure to devaluation risk. A firm that hedges against a foreign devaluation by more than its true exposure is actually speculating.

Covered Interest Arbitrage. International interest arbitrage is a transaction carried out in an attempt to benefit from a difference in interest rates on similar financial instruments in two countries. When the exchange risk in such a transaction is eliminated with a forward contract, the operation is termed covered interest arbitrage.

Covered interest arbitrage is engaged in by both lenders and borrowers. A firm with funds to invest for three months might normally purchase U. S. Treasury bills. Suppose, however, that the British Treasury bill rate is 6 percent and the U. S.

⁶The terms "covering" and "hedging" are often used interchangeably in discussions of forward exchange, but Paul Einzig (*op. cit.*, pp. 82-83) emphasizes a difference between them: covering is associated with a self-liquidating arrangement whereas hedging is not. When an importer covers his exchange risk, the imported goods are normally sold to generate the funds needed to honor the forward contract. In a hedging transaction, there is no intention of selling the asset being protected against exchange risk to honor the forward contract.

Treasury bill rate is only 4 percent. The firm could purchase British Treasury bills in order to obtain the higher yield. To do so would require a spot purchase of sterling. When the bills matured, they would be redeemed and the sterling proceeds sold for dollars. Although the investment is of the highest quality, a risk exists because the spot rate for sterling could be higher when the sterling is purchased than when it is sold three months later. The 2 percentage point spread in interest rates per annum yields a profit of 1/2 percent on the interest arbitrage during the three-month investment. If the sterling rate is more than 1/2 percent lower at the end of the three months, the interest rate gain will be more than offset by the foreign exchange loss.

The firm in the example could eliminate exchange risk by using a forward contract to sell the expected sterling proceeds. Actually, the firm engages in a swap, purchasing sterling spot and selling it forward. When making the investment decision, not only the gain from the difference between the two bill rates is considered, but also the loss (or gain) from the swap transaction.

Covered interest arbitrage can also be used to reduce borrowing costs. If the cost of credit is lower abroad than at home, a borrower might obtain funds abroad and engage in a swap, selling the foreign currency spot and buying it forward for delivery at the time the loan is to be repaid.

Speculation. A speculator simply buys currency forward if the forward rate is lower than he expects the spot rate to be on the delivery date. He would sell a currency forward if the forward rate is higher than he expects the spot rate to be on the delivery date. On the delivery date, he simply sells (or buys) in the spot market the currency received (or to be delivered) from the forward contract. If his expectations are correct,

he profits from buying cheap and selling dear. If he is wrong, he breaks even or incurs a loss.

Speculation on exchange rates can also take place without the use of forward exchange. For example, a speculator who expects the spot rate to rise might buy a currency spot and later sell it. If he expects the spot rate to fall, he might borrow the currency and sell it and later buy the currency needed to repay his loan. This type of speculation, however, has the disadvantage of requiring capital or incurring loan costs. With the use of forward exchange, no loan costs are incurred, and no capital is required unless the speculator's bank requires a margin to protect the bank from default.

At times, some governments have discouraged commercial banks from engaging in forward exchange contracts with speculators. As mentioned earlier, most banks try to avoid providing forward exchange facilities to speculating customers. In practice, however, it is often difficult to distinguish between commercial and speculative transactions. A firm with foreign assets that hedges by more than its actual exposure against a change in foreign exchange rates is, in fact, speculating. Importers and exporters may also be speculating when they deviate from their customary foreign exchange practices. For example, an exporter who normally does not obtain forward cover for expected foreign currency receipts may decide to cover if he hears a rumor that the foreign currency is to be devalued. For another example, an exporter who routinely obtains forward cover for his expected foreign currency receipts may choose not to cover if he strongly suspects that the foreign currency may be revalued. By not selling his foreign currency receipts forward, the exporter reduces the supply of forward exchange, which in turn tends to increase the forward premium on the

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currency. This is similar to the effect of an outright speculator whose purchases of forward exchange increase the demand and drive up the forward premium.

Triangular Arbitrage. If the spot rates among three currencies are disorderly, or inconsistent, arbitrage will occur. For example, consider the following hypothetical set of exchange rates for the French franc (FF), Deutschemark (DM), and U. S. dollar.

DM1 = \$.30
DM1 = FF 1.5
FF1 = \$.22

This set of exchange rates is inconsistent because, disregarding transactions costs, one Deutschemark will yield 30 cents if converted directly to dollars, but will yield 33 cents (1.5×22 cents) if converted first into francs and then into dollars. The profit opportunity from arbitrage in this case is obvious. A foreign exchange trader would simultaneously buy Deutschemarks with dollars, buy francs with Deutschemarks, and buy dollars with francs. Such arbitrage, requiring no capital and carried out on a large scale, would quickly change all three rates so as to make them more consistent. In this example, the dollar price of Deutschemarks would rise, the franc price of Deutschemarks would fall, and the dollar price of francs would fall. The new set of rates could be:

DM1 = \$.31
DM1 = FF 1.4762
FF1 = \$.21

This set of exchange rates is consistent because one Deutschemark sold directly for dollars will yield 31 cents and will yield the same amount (1.4762×21 cents) if converted first into francs and then into dollars.⁷

⁷Three comments about this example are in order.

(a) Actually 1.4762×21 cents = 31.0002 cents.

Triangular arbitrage may also occur in forward exchange if there is an inconsistency in the exchange rates of forward contracts with an identical maturity. In addition to triangular arbitrage in forward exchange, there are other forces tending to keep forward cross rates orderly, or consistent. Triangular arbitrage in spot exchange combined with covered interest arbitrage between each pair of countries tends to reduce the amount of triangular arbitrage in forward exchange. If cross spot rates are consistent (as would be the case if sufficient triangular arbitrage in spot exchange occurs) and if the relationship between forward and spot rates in each of the three currency markets is consistent with interest rate differentials between the three countries (as would be the case if covered interest arbitrage leads to interest rate parity⁸), then forward rates will be consistent and there would be no opportunity for profitable triangular arbitrage.⁹ In fact, however, these strict conditions rarely, if ever, occur and therefore triangular arbitrage in forward exchange can and does take place.

(b) In practice, very little incentive is needed to cause arbitrage to occur, so an arbitrageur would rarely, if ever, be faced with the large incentive presented in this hypothetical example.

(c) The degree to which arbitrage changes each rate to eliminate a situation of disorderly cross rates will depend upon the relative thinness of each of the three exchange markets.

⁸Interest rate parity exists when the difference in interest rates on similar financial instruments in two countries is just offset by (is consistent with), the discount on forward exchange. The notion of interest rate parity and the mechanism by which covered interest arbitrage tends to cause interest rate parity will be explained in detail in a forthcoming article.

⁹For a proof, see Herbert G. Grubel, *op. cit.*, pp. 23-24 or John Spraos, "The Theory of Forward Exchange and Recent Practice," *Manchester School of Economic and Social Studies*, May, 1953, pp. 88-90.

APPENDIX

Sources of Data on Forward Exchange Rates and Volume

1. *The Wall Street Journal* reports prices for 30- and 90-day forward sterling in its Foreign Exchange section.
 2. *The Weekly Bond Buyer* reports daily prices for 90-day forward contracts for sterling, Swiss francs, Deutschemarks, and Canadian dollars.
 3. *The Financial Times* (London) reports one-month and three-month forward rates between sterling and thirteen other major currencies.
 4. *The Federal Reserve Bulletin* table "Arbitrage on Treasury Bills," gives weekly prices for 90-day forward sterling and 90-day forward Canadian dollars.
 5. Samuel Montagu and Company's *Montagu Monthly Review* provides daily data on one-month and three-month sterling rates in London for 12 currencies.
 6. Herbert Grubel has provided weekly averages of three-month forward exchange rates for eight exchange markets for the period July 4, 1955 to June 12, 1961. See his *Forward Exchange, Speculation, and the International Flow of Capital* (Stanford, California: Stanford University Press, 1966) pp. 59-60 and 167-181.
 7. There are no currently published data on the volume of forward exchange contracts outstanding. Weekly data on the volume of forward exchange contracts outstanding, by currency, were formerly published by the U. S. Treasury Department. See: *Statistics of Capital Movements Between the United States and Foreign Countries and Purchases and Sales of Foreign Exchange in the United States*, published quarterly, 1936-1938, and *Treasury Bulletin*, published monthly, January 1939-March 1950.
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