DETERMINANTS OF INTEREST DIFFERENTIALS BETWEEN THE U.S. AND EURODOLLAR CREDIT MARKETS

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1. INTRODUCTION

The origins of the Eurodollar market can be traced back to the late 1950's. Since that time it has grown into what many observers believe to be second to only the U.S. financial market. Its growth has been paralleled by a considerable volume of literature. This volume reflects partly confusion and controversy regarding the true nature of this phenomenen. Our concept of the Eurodollar market is that of an external market for intermediated funds denominated in dollars. In other words, we argue that the Eurodollar phenomenon reflects the fact that financial institutions operating *outside* the United States (and its regulatory framework) compete successfuly with banks *within* the U.S. when it comes to attracting dollar denominated (time) deposits and competing for dollar denominated loans. There are a number of reasons which explain this fact, among others the absence of reserve requirements, the lack of other (costly) regulatory obligations, the wholesale nature of the market, fierce competition, and related factors.

Thus, we view the Eurodollar market simply as a competing external

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market for dollar denominated funds, and its viability depends upon its competitiveness in terms of lending and deposit rates vis a vis those of the US market for bank credit. In other words, the lending rate in the Eurodollar market must be lower than the lending rate in US credit market, and the deposit rate in the Eurodollar market has to be higher than the US deposit rate to assure the continued survival of the Eurodollar market as a competing external credit market.(1)

Before 1974, this characteristic of the Eurodollar market as a competing external credit market was disguised because of the US capital control programs. The existence of the US capital control programs limited interst arbitrage between the US domestic market and the Eurodollar market and this forced investors as well as researchers to focus their attention on the availability of US dollars rather than the competitive pricing mechanism that governed the relationship rates in the two markets.

However, starting from February 1974 when all US capital control programs were effectively removed, the behavior of Eurodollar interest rates has shown the true characteristic of the Eurodollar market. The lending rates in the Eurodollar market have been consistently lower than those in US deposit market and the deposit rates have been consistently higher than those in the US credit market.(2) (Exhibit I)

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(1) Lutz, Friedrich A. (7).

(2) For a meaningful comparison, we have to compare *effective* interest rates in both markets. Particularly, prime rates in US market have to be adjusted for the compensating balance requirements while lending rates in the Eurodollar market must be adjusted for the premium charged to borrowers on top of the London Interbank Offer Rates (LIBOR).

Note also that in this paper US certificate of deposit rates are used as counterparts of Eurodollar deposit rates. Previous studies on the relationship between US and Eurodollar deposit rates used US Treasury Bill rates. However, the risk characteristics of securities issued by the US government are different from those of the Eurobanks, which are basically commercial banks.

The LIBOR, US prime rates, London Interbank Deposit Rates and were from *International Reports*, a weekly reporting service for international financial affairs. US prime rates were divided into 0.85 to adjust for an assumed compensating balance requirement of 15 percent The premia on LIBOR were obtained from *World Financial Market*, a monthly puplication issued by Morgan Guaranty Trust Co. of New York.

One further item of interest is the time difference in the quotation and the effective dates of the Eurodollar interest rates. In the US market, the interest rates quoted are effective on the quotation date. However, in the Eurodollar market, the quoted interest rates are for the second business day, For example, the Eurodollar deposit rate quoted on Monday is effective on Wednesday, while the US deposit rate quoted on Monday is effective on Monday. Therefore, even though quoted on the same day, the rates in US market and Eurodollar market are not

The only significant deviation from the constellation of rates just described came during "scare period" in July and August 1974 when there was suddenly great uncertainty about the solvency of many Eurobanks after the traumatic downfall of the Herstatt Bank in Germany. Smaller Eurobanks were spurned by investors and the bigger ones were very cautious in their lending activities to other institutions. This forced lending rates in the Eurodollar market temporarily higher than those in US credit market. Also,

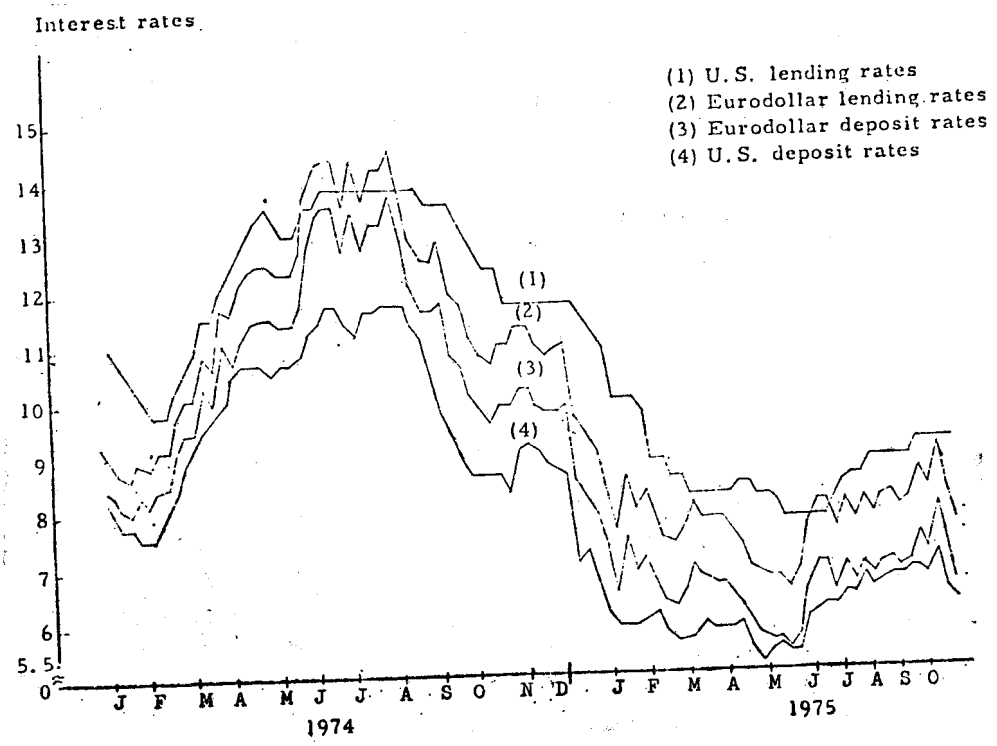

Fig. 1. U.S. and Eurodollar interest rates, 1974—1975.
Data: See Appendix.

the breakup of the market into many "tiers," or classes of financial institutions whose membership changed almost daily, made the usual quoted rates unreliable indicators of "the" true rate. However, the force of interest arbitrage between two markets brought the abnormal interest structures back

exactly comparable. The truly comparable rates would be expected US rates two days hence and the Eurodollar interest rates quoted today. However, under the assumption that today's interest is the best available estimate of the future interest rate, the US interest rates are compared to the Eurodollar interest rates quoted on the same day.

to normal from September 1974 on.

2. THE BEHAVIOR OF THE EURODOLLAR INTEREST RATES WITHIN THE LIMITS

In the previous sections, it was hypothesized and demonstrated that the upper and lower limits for Eurodollar interest rate movements were US lending and deposit rates respectively. However, one can also notice that the size of interest differentials between US and Eurodollar lending and deposit rates was not constant over time.

The major hypothesis to be tested in this paper in regard to the interest differentials between US and Eurodollar credit markets is that the interest differentials are a function of (a) the size of the limits and (b) the relative attractiveness of Eurodollar market relative to the US domestic market and other (nondollar) money markets.

2.1 The impact of changes in the size of the limits on the interest differentials between the US and Eurodollar credit market.

The US lending and deposit rates represent the upper and lower limits of the Eurodollar interest rate movements. The size of the limits, which will be referred to as the "US spread" can be subdivided into three parts; (1) the difference between US and Eurodollar lending rates, (2) Eurodollar market spread, and (3) the difference between Eurodollar and US deposit rates. Consequently, a change in the US spread will affect the differences between the two lending rates and/or the two deposit rates unless the change in the US spread is compensated by an equivalent change (in absolute terms) in the Eurodollar spread. It is hypothesized that changes in the US spread will not be wholly absorbed by changes in the Eurodollar spread because we believe that (a) competition in the Eurodollar market is relatively more intense than in the US market, (b) there are neither regulations or political pressures which prevent or slow down interest rate adjustments on both the deposit or lending side, and (c) US domestic banks have more diversified sources of funds as well as more diversified loan categories which may cause rate adjustments on large deposits and corporate loans to be less rapid than in the Eurodollar market. Note further that even equivalent *percentage* changes in the Eurodollar market spread will not

suffice to absorb the changes in US spread, because the Eurodollar market spread is smaller to start with. And there is no a priori reason to believe that the unabsorbed portion of the changes in the US spread will be solely absorbed either by the differences between two lending rates or by the two deposit rates. Therefore, changes in the US spread were simply included as a determinant of the differences between two corresponding lending and deposit rates. The hypotheses to be tested, then, are that the differences of two lending and deposit rates are positively related to the changes in the US spread.

$$R_L^{US}-R_L^{ES}=f(R_L^{US}-R_D^{US}) \quad \cdots\cdots(1)$$

and

$$R_D^{ES}-R_D^{US}=f(R_L^{US}-R_D^{US}) \quad \cdots\cdots(2)$$

where

R_L^{US}=lending rate in US market

R_L^{ES}=lending rate in Eurodollar market

R_D^{US}=deposit rate in US market

R_D^{ES}=deposit rate in Eurodollar market

2.2 Relative attractiveness of the Eurodollar market against US credit market.

Since the denomination of the Eurodollar lending and deposit is the same, i.e. US dollar, exchange risk does not affect the investor's choice between US and Eurodollar market. Therefore, the investor's preference of one market over the other will be dependent on (a) interest differentials between two markets and (b) the availability of funds.

In respect to interest differentials, the most important factor is the existence of the governmental regulations in the US credit market, especially Reserve Requirements and the Federal Deposit Insurance Fees, which makes the cost of intermediation in the US higher relative to the cost of intermediation in the Eurodollar market. Therefore, Eurobanks can operate with a smaller spread which enables them to offer lower lending rate simultaneously with higher deposit rates. Given that the lending rate is always

lower and the deposit rate is always higher in the Eurodollar market, the question arises why anybody would go to the US credit market at all.

Taking the perspective of a US investor, the risk characteristics of the Eurodollar transactions appear somewhat different from those of transactions in the US credit market. First, while Federal Reserve System serves as a lender of last resort to alleviate any liquidity difficulties of the member banks, it is sometimes questioned whether Eurobanks have the same contingency support, even though many are branches of US domestic banks. Furthermore, the fact that Eurobanks are, by definition, under foreign jurisdiction may entail the risk of future capital controls.

Therefore, a certain residual level of interest differentials between two lending rates and deposit rates will not be arbitraged. However, if for some reason the interest differential between two markets deviates more than the risk premium attached to the Eurodollar transaction, investors will immediately take advantage of the arbitrage opportunity.

Therefore, the interest arbitrage functions between US and Eurodollar markets are:

$$(R_L^{US}-R_L^{ES})_t=f(R_L^{US}-R_L^{ES}-RP_L)_{t-1} \quad \cdots\cdots(3)$$

and

$$(R_D^{ES}-R_D^{US})_t=f(R_D^{ES}-R_D^{US}-RP_D)_{t-1} \quad \cdots\cdots(4)$$

where RP_L=risk premium attached to Eurodollar borrowings

RP_D=risk premium attached to Euro deposit activity

When the interest differentials between US and Eurodollar lending rates are larger than the risk premium attached to the Eurodollar borrowings at time t-1, there will be increased demand for the Eurodollar loans, putting upward pressure to Eurodollar lending rates, which in turn will reduce the interest differential between two lending rates at time t.

Theoretically valid as they are, equations (3) and (4) are really hard to test empirically. Communications between US and Eurodollar markets are so fast that any deviations of interest differentials from the normal risk premium are immediately known to and arbitraged by the investor. The time interval between t and t-1 is in reality, at the longest, hours. Since actual interest rates on all hourly basis are not publically available, no

attempt is made to test equations (3) and (4).

In respect to the availability of dollar funds, the following appears critical: when monetary conditions in the US are getting "tighter" and the US commercial bank is running short of loanable funds, the unsatisfied US loan demand will spill over to the Eurodollar market. With the higher demand for the Eurodollar loans, the Eurobanks will not have to differentiate their lending rates too much from the US lending rate in order to attract borrowers. This will tend to reduce the differences between US and Eurodollar lending rates. Simultaneously, however, Eurobanks will try to attract more (Eurodollar) deposits to satisfy increased Eurodollar loan. To succeed, Eurobanks will be forced to offer higher premia over US deposit rates, which in turn will tend to increase the differences between the US and Eurodollar markets.

On the other hand, when monetary condition in US is getting easier, Eurobanks can get by with smaller premium on its deposit rates over US deposit rates. However, with demand lower for Eurodollar loans because of the easier monetary conditions in US, the Eurodollar lending rate must differentiate more from US lending rates, which will increase difference between US and Eurodollar lending rates.

Changes in the federal funds rates will be used as proxies for changes in US monetary conditions. Federal funds market is on overnight market where banks trade excess reserves. When the monetary conditions are getting tighter, the excess reserves of the banking system become smaller and there will be more competition for additional liquidity, which in turn will put upward pressure on the federal funds rate. Therefore, an increase in the federal fund rate was taken as a proxy for the tighter monetary condition in US, while a decrease in the federal fund rate was used as a proxy for the easier US monetary condition.

In equation form, hypotheses to be tested are:

$$\triangle (R_L^{US} - R_L^{ES}) = f(\triangle R_{FF}) \quad \cdots\cdots (5)$$

and

$$\triangle (R_D^{ES} - R_D^{US}) = f(\triangle R_{FF}) \quad \cdots\cdots (6)$$

where R_{FF}=Federal funds rate.

However, since the dependent variables in equation (1) and (2) are absolute differences, equations (5) and (6) are modified as follows:

$$(R_L^{US}-R_L^{ES})=f(R_{FF}) \quad \cdots\cdots (5)'$$

$$(R_D^{ES}-R_D^{US})=f(R_{FF}) \quad \cdots\cdots (6)'$$

Statistically, equation (5)′ will produce the same coefficient for the Federal funds rate as equation (5) because:

$$(R_L^{US}-R_L^{ES})_t=a+b(R_{FF})_t$$

minus

$$(R_L^{US}-R_L^{ES})_{t-1}=a+b(R_{FF})_{t-1}$$

equals

$$(R_L^{US}-R_L^{ES})_t-(R_L^{US}-R_L^{ES})_{t-1}=b[(R_{FF})_t-(R_{FF})_{t-1}]$$

which in turn is equal to

$$\triangle(R_L^{US}-R_L^{ES})=b[\triangle R_{FF}]$$

The expected singns of equation (5)′ and (6)′ are negative and positive respectively.

2.3 Credit conditions in foreign money markets as determinants of U.S. and Eurodollar interest rate differentials

This section explores the influence of conditions in non-dollar credit markets on Eurodollar interest rates. Since both lenders and borrowers move funds readily between the world's major money markets in response to cost or return incentives, one would expect that there exists a close relationship between Eurodollar loan and deposit rates and rates in competing, foreign-currency money markets. This is indeed the case although the relationship is complicated by the existence of exchange rate expectations and controls over the movement of funds into or out of foreign money markets.

We will continue our discussion in the framework of the limits placed on Eurodollar loan and deposit rates by the corresponding US rates in the absence of controls or special circumstances. It is well known that the level of dollar-denominated interest rates is linked to the level of foreign currency rates and the expected rate of change of the exchange rate. The linkage

with foreign interest rates and currency expectations is described by the interest rate parity theorem of exchange rate expectations. Both notions have received empirical support for the period under consideration.(3) The former states that covered interest arbitrage ensures that the interest rate differential between two currencies equals the forward premium or discount; the latter that the interest rate differential reflects the expected rate of change of the exchange rate.

In this section we will argue that not only is the *level* of Eurodollar rates related to foreign interest rates and currency expectations, but also the *differential* between U.S. and Eurodollar rates can be explained by these factors. Since Eurodollar deposits and loans must compete with foreign-currency deposits and loans, one would expect that, *ceteris paribus*, a rise in foreign interesst rates, domestic or external, or higher expectations for foreign currency values would attract investors out of, and borrowers into, the Eurodollar market. The effect would be to reduce the U.S.-Eurodollar loan rate gap, $R_L^{US}-R_L^{ES}$, and to widen the U.S.-Eurodollar deposit rate gap, $R_D^{ES}-R_D^{US}$. A drop in foreign interest rates or currency expectations would have the reverse effect. Our hypothesis, then, may be stated as follows:

$$R_L^{US}-R_L^{ES}=f\,(\text{foreign interest rates, currency expectations})$$

$$R_D^{ES}-R_D^{US}=f\,(\text{foreign interest rates, currency expectations})$$

But how to measure these? There's the rub. Some studies have simply employed foreign interest rates as measures of foreign credit conditions.(4) This, however, ignores the influence of currency expectations.

Others(5) have sought to solve this problem by using foreign interest rates *covered* in the forward market, in order to segregate the influence of currency expectations. But if the interest rate parity theorem holds, then covered interest differentials are zero and the equation

$R^{ES}=f$ (covered foreign interest rates) becomes a tautology.

(3) On the interest rate parity theorem, see Agmon and Bronfeld (1), Marston (8) and Frenkel and Levich (5). On the interest rate theorem of exchange rate expectations, see Aliber (2) and Giddy and Dufey (4).

(4) See Kwack (6).

(5) See Mills (9).

A third alternative might be to use covered interest differentials, to the extent that they exist.(6) From our point of view, however, any so-called covered arbitrage incentive is unlikely to represent an incentive at all, for if such incentives existed they would be quickey arbitraged away. Unless he possess information about arbitrage opportunities *before* the market has had a chance to take advantage of them, the ordinary researcher will never observe real covered arbitrage incentives. International arbitrage activity occurs so rapidly that deviations from interest rate parity are almost invariably eliminated by the time data are recorded. Most of the observed covered interest differentials that are discussed in the literature are the result of inaccurate data.(7)

Given that interest parity between Eurocurrency markets is established so rapidly, how may the researcher identify and measure the influence of foreign-currency credit conditions on Eurodollar rates? The approach taken in the present study is to assume that *if* incentives to move funds between Eurocurrency markets existed, *then* companies would have responded by shifting deposits or loans from one currency to another. For example, if German mark interest rates rose or the mark (DM) became stronger, investors would deposit more in marks and borrowers would borrow less in marks. The result would be a capital flow from the U.S. to Germany, which can be measured *ex post*. In other words, capital flows respond to incentives of the kind we are seeking to identify; so capital flows can be used to measure such incentives.

In the remainder of this section we shall examine the merit of this approach more closely. Assume as before that an investor perceives the effective interest rate on DM deposits (nominal rate adjusted for the effect of an expected currency charge) is higher than the Eurodollar deposit rate. He would then withdraw his deposit in the Eurodollar market and make a DM deposit. In making a DM deposit, he has two alternatives: to make a deposit in the German deposit market or in the Euro DM market.

(6) See, for example, Argy and Hodjeva (3).

(7) Aliber (2) has argued that this need not always be the case, for covered interest differentials could remain if investors perceived foreign currency deposits as bearing a greater risk because of the possibility of capital controls being imposed. Again, however, this would imply that apparent covered interest arbitrage opportunities would not represent disequilibria but instead a risk premium associated with possible capital controls.

If he makes a DM deposit in the German deposit market, Germany's international liabilities would be increased. In this case, the impact of the investor's choice of DM over Eurodollar deposits can easily be detected from German short term capital movement statistics.

If the investor chooses DM deposit in the Euro DM market, there are two sequential impacts. The initial impact is a reduction in the Euro DM interest rate. The stock of Euro DM deposit changes only if the relative competitiveness of the Euro DM and German deposit markets changes and therefore is not a function of the investor's choice between Eurodollars and EuroDM. Therefore, given the stock of EuroDM, the increased demand for EuroDM could only be accomodated by a reduction in the interest rate on EuroDM deposits. However, a reduction in the EuroDM interest rate without corresponding interest changes in the German deposit market will create an interest arbitrage opportunity between EuroDM and German deposits, resulting in a capital movement into Germany until the German deposit rate is also reduced to restore equilibrium between the EuroDM and German deposit markets. Hence even though the investor chose the EuroDM market instead of the German deposit market to shift funds from the Eurodollar market, the impact of the investor's operation is ultimately reflected in the German short term capital movement statistics. Therefore in periods of no capital controls, the investor's choice of DM over Eurodollar deposits can be detected from German short-term capital movement statistics.

If, however, capital controls are in effects, the alternative of making a DM deposit in the German deposit market is absent. The only alternative would be a DM deposit in the EuroDM market, which in turn would reduce the EuroDM deposit rate. However, because of the capital control program, there would be no interest arbitrage between EuroDM and German deposits. Therefore, under an effective capital control program, the investor's choice of DM over Eurodollar deposits will not create any capital movement into Germany, but only the change in the interest rate on EuroDM deposits.

This study relies on capital flows into and out of Germany to measure the effect of foreign-currency credit and exchange rate conditions on Eurodollar rates. The choice of the German figures reflects the fact the DM is the most frequently used arbitrage currency between dollar and foreign markets and probably represents conditions in other European markets

because the mark is tied to other major currencies via the European "snake".[8]

For the period under study (from February 1974 to September 1975) the German authorities maintained various schemes to discourage capital inflows into Germany. The withholding tax on interest income in Germany was 25% and the reserve requirement on deposits made by the nonresident was twice as high as on deposits by residents in order to discourage German banks from accepting nonresident deposits. These regulations influenced the effective interest rate on German deposits, which investors consider when making a decision as to where to deposit their funds. Yet the regulations were not absolute capital controls: they did not prohibit capital movements per se. Therefore, the investor's choice at the margin between Eurodollar and DM deposits can be detected by actual capital movements into and out of Germany.

If equation form, the hypotheses to be tested are:

$$R_L^{US}-R_L^{ES}=f\ (\text{NGSTC}) \quad \cdots\cdots(7)$$

and

$$R_D^{ES}-R_D^{US}=f\ (\text{NGSTC}) \quad \cdots\cdots(8)$$

where NGSTC=Net German Short Term Capital Movement. A positive NGSTC means that increase in German claims was larger than increase in German liabilities, which in turn means a capital outflow from Germany. Negative NGSTC on the other hand means a capital inflow into Germany.

If investors believe that DM deposits are more attractive on an effective

(8) The obvious alternative of using US short-term capital movement statistics was not adopted in this paper because the U.S. statistics are not classified in such a way as to segregate interest sensitive capital movement,

On the other hand, the Bundesbank classifies short-term capital movement statistics into four categories: (1) bank credit and liabilities; (2) financial credit and liabilities; and (4) official institutions' credit and liabilities. Of these, (1) and (2) can be categorized as interest sensitive movements. Trade credit and liabilities are also interest sensitive because the interest rate affects production cost and thus trade flows. However, there will be time lags before any interest changes affect trade flows and thus trade credits and liabilities. As for the official institution's short term credit ant liabilities, interest rate differentials are not the sole motivations for official transactions. On the contrary, to stabilize the market, the official institution often go against market expections.

In this study, therefore, the sum of (1) and (2) was used as a measure of interest-sensitive German short-term capital movements.

interest rate basis (negative NGSTC), demand for Eurodollar deposit will decrease and demand for Eurodollar borrowing will rise. This will create upward pressure on Eurodollar lending and deposit rates, which in turn will tend to reduce the interest differential between US and Eurodollar lending rates and increase the interest differential between U.S. and Eurodollar deposit rates. Therefore, the expected sign of the coefficient in equation (7) is positive while that in equation (8) is negative.

3. EMPIRICAL EVIDENCE

Least-squares multiple regressions, combining equations (1), (5) and (7) for lending rates differences and (2), (6) and (8) for deposit rates differences between US and Eurodollar market, were run on monthly data for the period from February 1974 to September 1975. The choice of the base month was intended to avoid the impacts of the U.S. capital control programs on Eurodollar interest rates. The U.S. capital controls were officially eliminated on January 29, 1974. The regressions yielded the following results:[9]

(a) U.S.-Eurodollar loan rate differentials:

$$R_L^{US}-R_L^{ES}=-0.541+0.726(R_L^{US}-R_D^{US})-0.075R_{FF}+0.224\ NGSTC$$
$$(-1.28)\ (6.95)^{**}\qquad (-2.28)^{*}\qquad (1.33)$$
$$R^2=0.78805^{**}\qquad DW=1.6956\qquad n=20$$

(b) Eurodollar-U.S. deposit rate differentials:

$$R_D^{ES}-R_D^{US}=-0.646+0.202(R_L^{US}-R_D^{US})+0.122R_{FF}-0.182\ NGSTC$$
$$(-1.96)\ (2.46)^{*}\qquad (4.74)^{**}\ \ (-1.38)$$
$$R^2=0.66566^{**}\qquad DW=2.2762\qquad n=20$$

The values of the t-statistics are shown in parentheses. Those marked** are significant at the 1% level while those marked* are significant at the 5% level.

The signs of all coefficients in both multiple regressions were congruent with the theoretically expected signs. Both interest rate differentials—on the

(9) Data for federal funds rates and net German short-term capital movements were obtained from the *Federal Reserve Bulletin* and the *Bundesbank*. Since the German short-term capital movement statistics were only available on a monthly basis, all interest rates represent the closing rate on the last Friday of the month. Having to use monthly data limited the number of observations to 20.

loan and deposit sides—were positively related to the spread between U.S. loan and deposit rates (the upper and lower limits on Eurodollar rates). This confirms that changes in U.S. spreads result in much smaller changes in Eurodollar spreads. The U.S.-Eurodollar loan rate differentials were negatively related to U.S. monetary conditions as measured by the federal funds rate; but Eurodollar-U.S. *deposit* rate differentials were *positively* related to U.S. monetary conditions. This finding is an interesting one, for it has significant implications for how a corporate funds manager should use Eurodollar market. Generally, a corporate funds manager actively seek Eurodollar loans when monetary conditions in the U.S. are tight. However, our results suggest that when U.S. monetary interest rates are high, lending rate differentials between the U.S. and Eurodollar markets are smaller. There will thus be only a marginal benefit to going to the Eurodollar market. Rather a corporate funds manager should seek Eurodollar loans when monetary conditions in the U.S. are easier because lending rate differences between the U.S. and Eurodollar markets are larger at such times. The reverse strategy applies to making dollar deposits. A corporate fund manager is advised to make deposits in the Eurodollar market when the monetary conditions in the U.S. are tighter. Making a Eurodollar deposit when U.S. interest rates are low will not provide substantial interest advantages because the deposit rate differential between the Eurodollar and U.S. markets is smaller, the easier are U.S. credit conditions. Net German short term capital movements were positively related to the interest differential between the two lending rates suggesting, as was expected, that an investor's choice of Eurodollar deposits over German deposits tends to put downward pressure on Eurodollar lending rates and upward pressure on Eurodollar deposit rates.

The coefficients of our measures of the US spread and US monetary conditions were significant at the 0.05 level. However, in both multiple regressions, net German capital movements were significant only at the 0.20 level, which means that the chance of a type II error is one in five. This inconclusive result may be attributed to the nature of the data. The German short-term capital movement data show aggregated short-term capital movements, not only between Germany and the US, but also between Germany and other European countries. Therefore only part, although a

significant part, of total German short-term capital flows are related to the choice between US dollar and German mark deposits and loans.

4. CONCLUSIONS

The origin and growth of the Eurodollar market has often been attributed to the US balance of payments deficit and to the US capital control program. The elimination of US capital controls in 1974 and the strong performance of the US the US balance of payments in 1975, however, have demonstrated the shortcomings of these explanations: in both years the net size of the market rose significantly (by about 30% per annum).

This paper takes the approach that the growth and strength of the market for externally-intermediated dollar credit rests solely on its being competitive with corresponding domestic credit markets. Therefore, as long as the Eurodollar market can offer lower lending rates and higher deposit rates than the competing US credit market, the Eurodollar market will survive and grow. And as long as the US maintains reserve requirements, requires federal deposit insurance and retains other constraints on US banks which add to the intermediation cost in the US credit markets, the Eurodollar market will continue to outcompete the US credit market to a large extent.

Using the concept of the Eurodollar market being a competing external credit market as a point of departure, this paper hypothesizes that interest rate differentials between US and Eurodollar markets are determined by the size of the US spread, US monetary conditions and the investor's choice between Eurodollar and other Europan credit markets' influence of foreign credit conditions and currency expectations. Each of these hypotheses, with the possible exception of the last, is supported by empirical tests applied to data from the period since the removal of the U.S. capital controls.

References

1. Agmon, Tamir and Bronfeld, Saul, "The International Mobility of Short-Term Covered Arbitrage Capital," *Journal of Business Finance and Accounting*, Summer 1975.
2. Aliber, Robert Z., "The Interest Parity Theorem: A Reinterpretation," *Journal of Political Economy*, December 1973, pp. 1451-9.

3. Argy, Victor and Hodjera, Zoran, "Financial Integration and Interest Rate Linkages in Industrial Countries, 1958-71," *IMF Staff Papers*, March 1973, pp. 1-73.
4. Dufey, Gunter and Giddy, Ian, "Interest Rates in the International Money Market," Unpublished draft, Jan. 1975.
5. Frenkel, Jacob A., and Richard M. Levich, "Covered Interest Arbitrage: Unexpected Profits?" *Journal of Political Economy*, April, pp. 325-338.
6. Kwack, Sung, "The Structure of International Interest Rates: An Extension of Hendershott's Tests," *Journal of Finance*, September 1971, pp. 897-900.
7. Lutz, Friedrich A., "The Euro-Currency System," *Banca Nazionale del Lavoro Quarterly Review*, September 1974, pp. 183-200.
8. Marston, Richard C., "Interest Arbitrage in the Eurocurrency Market," *European Economic Review*, forthcoming.
9. Mills, Rodney H., "Structural Change in the Eurodollar Market: Evidence from a Two-Equation Model," Board of Governors of the Federal Reserve System, Discussion Paper No. 33, November 1, 1973.