INTERNATIONAL FINANCE DISCUSSION PAPERS

THE FINANCING OF THE MULTI-NATIONAL FIRM: COMMENT AND EXTENSION

by

Alan K. Severn

Discussion Paper No. 20, December 6, 1972

Division of International Finance
Board of Governors of the Federal Reserve System

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The Financing of the Multi-national Firm: Comment and Extension

In a recent issue of KYKLOS, Robert E. Krainer applies the Modigliani-Miller theorem to the debt-equity mix of the multinational firm.\(^1\) He correctly notes that the applicability of this theorem is limited by a) the tax deductability of interest payments, and b) the difficulties facing portfolio investors who attempt to obtain personal loans in foreign countries. Krainer then presents empirical results to show that U.S. firms -- whether direct investors or not -- minimized interest costs by floating a larger proportion of their total bond issues abroad, the lower were foreign interest rates relative to U.S. rates. Thus, his empirical results are concerned only with the relative sources of a given total amount of borrowing, and not with the firm's reliance on debt versus equity.

This note is an attempt to show that the primary determinant of the international bond issues by U.S. firms in recent years has not been relative interest rates, but rather the Foreign Direct Investment Program (FDIP), instituted by the U.S. at the beginning of 1968. The FDIP regulates only U.S.-based multinational firms, and is shown to

have affected foreign capital markets, by raising interest rates on
Eurobonds, relative to U.S. rates. Thus, Krainer interprets causality
in the wrong direction.

Krainer uses quarterly data over the period 1965:3 to 1970:2
to show that the ratio of U.S. corporate debt issued in Europe to that
issued in the U.S. is inversely related to relative interest cost.
He presents a graph of his data, 2 which shows European interest rates
lower than the U.S. rate on straight debt (Moody's Aa yield) from 1967:3
to the end of his sample period. But his European interest rate is
"the average yield on convertible and non-convertible debt of U.S. firms
issued in Europe. 3 Since rates on convertible bonds are generally
lower than on straight debt, his ratio of European to European to U.S.
rates is biased downward. 4 Furthermore, he compares Euro-bond issues
by U.S. direct investors with bond issues by all U.S. firms. Yet most
U.S. bonds are issued by firms in industries such as utilities and
communications, which have little or no direct investment.

2 Krainer, "Valuation and Financing", p. 568.
3 Krainer, "Valuation and Financing", p. 572.
4 Even an average of rates on convertible as well as non-convertible
debt representing the U.S. rate would be misleading in comparison to
Krainer's average of European debt, since rates on convertible debt
depend heavily on the terms of conversion and on relative expected
yields in the bond and stock markets. Therefore Krainer's understatement
of Euro-bond rates varies over time.
Krainer's result which is subject to the limitations cited, was replicated as:

\[
\ln \left( \frac{D_e}{D_a} \right) = 2.951 - 5.078 \frac{i_e}{i_a} \tag{1}
\]

\[R^2 = 0.22 \quad \hat{R}^2 = 0.18 \quad DW = 1.4 \quad R = 0.47\]

where: \(D_e\) = U.S. corporate debt issued in Europe
\(D_a\) = Corporate debt issued in the U.S.
\(i_e\) = Average yields on convertible and non-convertible debt of U.S. firms issued in Europe
\(i_a\) = Moody's Aa rated bond yield

In fact, rates on non-convertible Euro-bonds of U.S. firms were generally higher than the U.S. rate (Moody's Aa) during sample period.\(^6\) Despite the higher rates, U.S. firms issued sizeable amounts of international bonds throughout the period.\(^7\) Therefore cost minimization does not explain this behavior, and we must look elsewhere for the reason.

\(^5\) Krainer's use of rates on convertible debt meant that his relative rates had to be read from his graph. In addition, Krainer measures foreign borrowing as quarterly totals, and domestic borrowing as monthly averages.

\(^6\) In the one quarter when this was not true, the difference was only one basis point (i.e., .01 per cent). While a precise comparison of U.S. and Euro-bond rates is hard to make, direct investors in the U.S. clearly increased their total interest cost by issuing Euro-bonds instead of U.S. bonds.

\(^7\) International bond issues by U.S. firms averaged one-seventh the size of domestic bond issues by manufacturing and extractive firms during Krainer's sample period.
Clearly, the amount of U.S. corporate debt issued in Europe increased during Krainer's sample period in response to the U.S. Foreign Direct Investment Program. During the first half of this period, U.S. firms were encouraged, on a voluntary basis, to take various measures to improve the U.S. balance of payments. Only one of these measures was to issue debt abroad rather than in the U.S. In contrast, the Foreign Direct Investment Program (FDIP) was instituted on a mandatory basis at the beginning of 1968. Firms were restricted in their use of U.S. funds for direct-investment purposes. The result was that they were forced to borrow abroad in order to carry out their desired levels of direct investment. A simple way of approximating the increased impact of the FDIP, relative to the voluntary program, is to add a dummy variable to Krainer's equation (1) With this dummy, the coefficient of relative interest cost is quite small (and positive).

\[
\ln \left( \frac{D^e}{D^a} \right) = -2.839 + 0.124 (i^e) + 1.097 P \\
(0.039) (1.851)
\]

\[ R^2 = 0.39 \quad R^2 = 0.3 \quad DW = 1.51 \quad R = 0.62 \]

where \( P = 0, 1965:3 \) to 1967:4

1, 1965:1 to 1970:2

The addition of the Program dummy raises the explained proportion of variation in relative borrowing from 18% to 31%; in fact, dropping the

\[ 8 / \text{ Krainer takes note of "increased government intervention during the 1965-70...period" (p.567n). He tested a dummy variable starting in 1969, not 1968, which left his results unchanged in sign.} \]
interest rate variable raises the proportion still further to 35% (after adjustment for degrees of freedom).

Thus, the inception of the FDIP caused U.S. firms to increase their issues of international bonds, just as the original voluntary program initially caused them to begin such issues.\textsuperscript{2} It is clear that Krainer's data do not show a negative relationship between relative bond issues and relative interest rates when the FDIP is taken into account. There are several reasons, however, why a firm may issue a larger quantity of Euro-bonds when rates on such bonds decline even when the rates exceed U.S. rates and when the FDIP forces firms to obtain some funds abroad. First, firms may take advantage of a decline in foreign rates by borrowing sufficient funds to provide for future needs, or to fund existing foreign short-term debt. If capital markets are not fully integrated, a decline in the absolute level of foreign rates may coincide with a decline in the ratio of foreign rates to U.S. rates. Second, a rise in foreign interest rates may cause the firm to cancel or postpone marginal investment projects, thereby reducing the amount of foreign borrowing needed for purposes of the FDIP. Third, flotation costs (as a percentage of proceeds) decline with the size of the issue, so one large foreign issue may be preferable to one foreign

\textsuperscript{2} U.S. firms did, of course, borrow abroad, prior to 1965, in forms other than bonds, such as bank loans or by means of debt contracted by their foreign affiliates. Krainer's article, and this note, ignore affiliate borrowing and sources of parent-firm borrowing other than bonds. See, for example, U.S. Department of Commerce, Office of Foreign Direct Investments, "Foreign Affiliate Financial Survey, 1966-1969," (Washington, U.S. GPO, June, 1971).
issue and one U.S. issue, even though foreign rates are marginally higher. Thus, at least in the short run, relative U.S. and foreign bond issues may be negatively related to relative interest rates.

But any such relationship may not be readily apparent after the inception of the FDIP. U.S. rates rose for reasons internal to the U.S. economy, while international bond issues (by U.S. firms) rose because of the FDIP.

But apart from the timing of the FDIP, there may be no negative relationship between relative bond issues and relative interest rates. Foreign rates may decline because of slack in foreign economies. If this slack causes U.S. firms to curtail direct investment, they can borrow smaller amounts abroad and still remain in compliance with the FDIP.\textsuperscript{10} Therefore, any observed relationship between relative rates and a firm's financing decisions may be either positive or negative. All that a single-equation model can do is to determine which set of effects is stronger. In other words, are financing decisions dominated by a substitution effect, or by an "income effect," as changes occur in other variables which are corrected with interest rates?

This question may be answered by using a later sample period than that available to Krainer. By omitting those quarters prior to

\textsuperscript{10} This argument, and the first two arguments in favor of a negative relationship, also apply \textit{mutatis mutandis}, to a decline in U.S. rates.
the FDIP, it is possible to test the relationship during a period (1968:1 to 1972:2) in which restrictions on U.S. firms remained substantially the same.\textsuperscript{11/} Since there is no good reason for Krainer's log-linear form, European bond issues are taken as a ratio of total bond issues. Regression of this variable on relative interest rates indicated that the positive relationship was stronger during the period in which the FDIP was in force than in Krainer's earlier period.\textsuperscript{12/}

\[
\frac{D_e}{D_{a+d}} = -1.192 + 1.279 \left( \frac{i_e}{i_a} \right)^2 \quad \text{DW} = 1.283
\]

(3)

A plausible interpretation of this result is that from the viewpoint of the individual direct investor, the combined effect, of the FDIP and of omitted variables correlated with relative interest rates, outweighs any attempt to minimize borrowing costs, at least in the short run.\textsuperscript{13/} The existence of omitted variable is indicated by the low

\textsuperscript{11/} The liberalization of the FDIP during this period mainly affected small firms, which are unlikely to issue bonds abroad in any case.

\textsuperscript{12/} European interest rates for straight debt were taken from Morgan Guaranty Trust Company, \textit{World Financial Statistics}. Data from various annual samples were linked by means of weights on two adjacent samples for a given year, in order to hold average seasoning constant. International bonds were entered on a gross-proceeds basis, to conform to data on domestic bonds. Source: U.S. Dept. of Commerce, Bureau of Economic Analysis. U.S. bond issues were represented by those of manufacturing and extractive firms only. Source: \textit{SEC Statistical Bulletin}.

\textsuperscript{13/} This is clearly true in the case of straight bonds denominated in U.S. dollars. Rates on bonds which are convertible and/or denominated in other currencies are presumably scaled from the rate on straight dollar bonds, depending on conversion terms and expected exchange-rate changes, respectively.
Durbin-Watson statistic. The relative unimportance of cost minimization again suggests that causation runs from the FDIP to relative borrowing.14/

To this point, causation has been discussed in terms of the firm's reaction to relative interest rates and the FDIP, i.e., at the micro level. But the results presented in equations (2) and (3) have implications for the international bond market as well. As all U.S. direct investors borrow abroad because of the FDIP, Euro-bond rates rise. The extent of the rise depends on the aggregate size of their borrowing, on the degree to which capital markets are not integrated internationally, and on the length of time allowed for adjustment. The approximate size of the short-run effect of relative borrowing on relative rates can be indicated by regressing relative interest rates on relative borrowing. But the resulting estimate will be downward biased. The size of the bias is determined by the unknown negative effect of cost minimization; i.e., the greater the degree to which individual firms do take advantage of relative decreases in Euro-bond rates, the smaller will be the overall, positive relationship between relative borrowing and relative rates. Because this negative effect was probably stronger during the pre-1963 voluntary program, the regression is estimated for the sample period during which the FDIP was in force.

14/ This is compatible with the ultimate causation of real direct investment being economic conditions abroad, whenever foreign interest rates exceed U.S. rates. The profit-maximizing firm would finance a given level of real direct investment by means of domestic bonds, in absence of the FDIP.
\[
\frac{\Delta e}{\Delta a} = 1.010 + 0.327 \left( \frac{D^e}{D^a + D^e} \right) \quad R^2 = 0.38 \\
DW = 1.073
\]  

(4)

The low Durbin-Watson statistic indicates that the statistical significance of the borrowing term is overstated. It also signals the existence of omitted variables; an obvious example is variables associated with monetary policy.

During this sample period more recent than Krainer's, U.S. manufacturing and extractive firms issued about one-sixth of their total bond issues abroad. With a U.S. bond rate of 7-1/2%, this implies that the short-run effect was to raise the Euro-bond rate by 40 basis points over what it would have been if U.S. firms had issued all of their bond in the U.S. market. But attributing all Euro-bond issues by U.S. firms to the FDIP is an extreme assumption. Furthermore, the bias in the estimated short-run effect of relative bond issues may be quite small. The data used to estimate (4) show a Euro-bond rate higher than the U.S. rate in all but one quarter. Therefore, even a single firm had little scope for cost minimization. Thus, despite the bias, the long-run effect of the FDIP-induced issues of Euro-bonds is probably much lower than the short-run effect estimated by a time-series equation such as (4).

Even with the several U.S. capital-control programs bond markets are not fully segmented internationally. For example, Canadian and Mexican borrowers are exempt from the U.S. Interest Equalization Tax. Therefore they can arbitrage between the U.S. and the Euro-bond markets. Thus,
the long-run effect should approach zero as the length of "run" increases.

In summary, the results presented here suggest that minimization of interest cost has had little effect on financing decisions of U.S. direct investors, since the inception of the FDIP. Rather, the causation runs from the FDIP, to financing, to relative interest rates. While the strength of this chain of causation cannot be assessed accurately outside of a multinational econometric model, the effect of the FDIP has been to raise Euro-bond interest rates in the short run, relative to U.S. rates.

The ultimate effect of the FDIP on national capital markets and economies abroad is beyond the scope of this note. However, U.S. firms have accounted for less than one-third of all international bond issues. Therefore, issues of Euro-bonds by U.S. firms have probably crowded out other issues and raised interest rates in national capital markets.

This effect on foreign economics, however, must be weighed against one other effect. Because the FDIP has forced U.S. firms to borrow abroad, these firms have been placed on a more nearly equal footing with foreign-owned firms which have not had access to the U.S. capital market (either because of the VFCR and IET, or because of market imperfections associated with size and location).