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

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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

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[1] Robert E. Krainer, "The Valuation and Financing of the Multi-
National Firm," KYKLOS, 25 (1972, Fasc. 3), 553-573.

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.

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[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:[5]

$$\ln \left(\frac{D^e}{D^a}\right) = \begin{array}{cc} 2.951 & - & 5.078 \\ (1.290) & & (-2.243) \end{array} \frac{i^e}{i^a} \qquad (1)$$

$$R^2 = 0.22 \quad \bar{R}^2 = 0.18 \quad DW = 1.4 \quad R = 0.47$$

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.

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[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.[8]/ 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).

$$\ln\left(\frac{D^e}{D^a}\right) = -2.839 + 0.124 \ (i^e) + 1.097 \ P \qquad (2)$$
$$\qquad\qquad (0.039)(i^a) \quad (2.151)$$

$$R^2 = .39 \quad \bar{R}^2 = .3. \quad DW = 1.51 \quad R = .62$$

where P = 0, 1965:3 to 1967:4
      1, 1968:1 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

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8/ 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.[9] 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

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[9] 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 nega-

tive 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.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

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10/ This argument, and the first two arguments in favor of a negative
relationship, also apply _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.[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.[12/]

$$\frac{D^e}{D^e + D^a} = \underset{(-2.956)}{-1.192} + \underset{(3.389)}{1.279} \left(\frac{i^e}{i^a}\right) \quad \begin{matrix} \bar{R}^2 = .381 \\ DW = 1.283 \end{matrix} \tag{3}$$

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, out-

weighs any attempt to minimize borrowing costs, at least in the short

run.[13/] The existence of omitted variable is indicated by the low

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

12/ European interest rates for straight debt were taken from Mcrgan
Guaranty Trust Company, 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. Interna-
tional 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: SEC Statistical Bulletin.

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 rate
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 in-
dividual 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-1968 voluntary program, the regression is estimated
for the sample period during which the FDIP was in force.

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[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.

$$\frac{i^e}{i^a} = \frac{1.010}{(53.809)} + \frac{.327}{(3.389)} \left(\frac{D^e}{D^e + D^a}\right) \quad \bar{R}^2 = .38 \quad DW = 1.073 \quad (4)$$

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 ssegmented 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).