INTERNATIONAL EFFECTS ON THE U.S. CAPITAL MARKET

David G. Hartman

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ABSTRACT

This paper presents evidence bearing on the question of international influences on the U.S. capital market. Both the examination of relative magnitudes of international asset holdings and the estimation of a simple partial-equilibrium capital market model indicate that such influences are potentially quite important. In particular, we find that the effects on international flows on the long-term new-issue corporate bond rate in the U.S. are highly significant. Since this interest rate is often seen as crucial in domestic investment decisions, the paper provides reason to believe that investment in the U.S. is significantly influenced by international capital transactions.

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The past decade brought dramatic changes in the U.S. economy's dependence
on events occurring abroad. Some aspects of this dependence have been studied
extensively and are now understood quite well. Changes in the functioning of
the U.S. capital market due to external influences, while a matter of serious con-
cern in policy debates, have not been examined in detail. The purpose of this
paper is to explore how significant a role is played by international capital
flows.

Much of the previous research on international capital holdings is concerned
with explaining the flows of capital themselves.[1] In the case of the U.S., capital
flows have been explained by conditions in the domestic capital market, with no
attention given to a possible simultaneous effect of international capital trans-
actions on the domestic market. While an assumption that such impacts are negli-
gible seemed quite reasonable in the past, it is now the case, as we shall see, that
international capital transactions are sizable relative to the U.S. market.[2] Before
turning to a more formal analysis of the effects of international capital transac-
tions on the U.S. capital market and, in particular, on the determination of
long-term interest rates, we will examine the nature and magnitudes of international
capital transactions. In Section II a model of the U.S. capital market is adapted
to allow examination of foreign influences. In Section III, empirical evidence
is presented which confirms the significance of international impacts on the
domestic capital market.

I. International Capital Holdings

In this section, we will describe and analyze the levels of international

asset holdings to evaluate their potential for affecting the U.S. capital

market. At the outset an important question of aggregation arises.

Since our goal is a study of macroeconomic effects, it might seem sufficient

to follow the convention, found in theoretical models of the open economy, of

considering net aggregate international capital holdings. These theoretical

models rely on a characterization of international capital flows as occurring

because of a premium in the overall return to capital in the recipient country.

Even a crude empirical investigation suggests that the explanation of

capital flows into and out of the U.S. is more complicated. Table 1 shows the

correlations among the following quarterly capital flows during the decade of

the 1970's: U.S. direct investment abroad (DI^o), foreign direct investment in

the U.S. (DI^i), U.S. purchases of foreign equity (E^o), foreign purchases of

U.S. equity (E^i), U.S. purchases of foreign bonds (B^o), foreign purchases of U.S.

private bonds (B^i) and foreign purchases of U.S. governemnt bonds (GB^i).

What seems remarkable in these numbers is the lack of high correlations

among the flows. In particular, inflows and outflows of the same categories

of capital fail even to exhibit the expected negative correlation in two of

three cases (or in one of three cases with data detrended); and the correlations

which are of the "correct" sign are not large. In only 9 of 21 cases (8 of 21

using detrended data) do the data confirm the expectation that capital outflows

would be positively related, capital inflows would be positively related, and

inflows would be negatively related to outflows.

While this evidence is far from conclusive, it does suggest that interna-

tional flows of various assets have been determined over the past decade by a

Table 1

Correlations Among Capital Flows Involving the U.S.

(Raw Data)

	DI^o	DI^i	E^o	E^i	B^o	B^i	GB^i
DI^o	1						
DI^i	.085	1					
E^o	.026	.190	1				
E^i	.114	-.020	-.105	1			
B^o	.367	.336	.313	.377	1		
B^i	.105	.127	-.021	-.139	.315	1	
GB^i	.199	-.202	-.116	-.073	.133	.468	1

Correlations Among Capital Flows Involving the U.S.

(Detrended Data)

	DI^o	DI^i	E^o	E^i	B^o	B^i	GB^i
DI^o	1						
DI^i	-.020	1					
E^o	-.023	.045	1				
E^i	.076	-.196	-.181	1			
B^o	.330	.004	.198	.302	1		
B^i	.066	-.010	-.091	.088	.225	1	
GB^i	.207	-.226	-.112	-.068	.185	.488	1

Notation is as defined in text.[3] All flows are defined such that,, for example, a foreign purchase of U.S. stock and a U.S. purchase of foreign stock are both positive. Detrended data are obtained by regressing series on a trend variable.[4]

variety of factors. To gain further insight into the nature of international

asset holdings, the remainder of this section will be devoted to discussions of

each asset category.

A. U.S. Government Securities

From a level of just over $10 billion at the beginning of 1970, foreign

holdings of U.S. government debt had, by the end of 1978, grown to almost

$138 billion, or approximately 20.23 percent of such bonds outstanding. This

marked increase is indicative both of the desirability of U.S. government obliga-

tions as a relatively safe store of value and of the role of the U.S. dollar as

the official reserve currency. The desire of oil-producing nations for the secur-

ity and liquidity provided by U.S. government bonds has been a particularly large

influence. More recently, foreign government interventions in the foreign exchange

market have been given as an explanation for massive changes in foreign holdings.

While the reasons for these transactions are both interesting and important, a

thorough examination is outside the primary focus of this paper.

The foreign presence in the U.S. government bond market appears, from

casual observation, to be sufficiently large that the possibility of a significant

effect on the economy cannot be ruled out. Not only do foreign holdings make

up a sizable fraction of the government debt outstanding, but also the net

foreign purchases on a year-to-year basis are large and volatile enough to

drive a considerable wedge between the federal budget deficit and the domestic

deficit finance required. The pattern is shown in Table 2. In 1971, for example,

a federal deficit if $22 billion was offset by even greater U.S. government

borrowing from foreign sources.[5] Also striking has been the situation in more

recent years. In contrast with 1975, when the record federal deficit of over

$70 billion was almost ninety percent financed at home, the $74 billion deficit

Table 2

U.S. Fderal Budget Deficit and Its Foreign Finance;

Percentage of Debt Outstanding Held by Foreigners

Year	U.S. Federal Budget Deficit	Net Foreign Purchases of U.S. Gov't Debt	Domestic Deficit Finance (Col.3 - Col.2	Percentage of Total Federal Debt* Held by Foreigners
1960	$ -3.0 B	$ .5 B	$ -3.5 B	4.9%
1961	3.9	.5	3.4	5.0
1962	4.2	1.3	2.9	5.4
1963	-.3	.6	-.9	5.6
1964	3.3	.4	2.9	5.7
1965	-.5	-.1	-.4	5.7
1966	1.8	-2.5	4.3	4.6
1967	13.2	2.1	11.1	5.3
1968	5.8	-.5	6.3	4.8
1969	-8.5	-2.0	-6.5	4.0
1970	12.1	9.3	2.8	7.1
1971	22.0	26.3	-4.3	15.3
1972	17.3	8.4	8.9	16.8
1973	6.7	.2	6.5	15.9
1974	10.7	3.7	7.0	15.8
1975	70.6	8.1	62.5	14.7
1976	53.6	11.6	42.0	14.8
1977	46.3	31.5	14.8	18.2
1978	27.7	28.2	-.5	20.2
1979	11.4	-14.0	25.4	16.4

* End of year level; exclusive of U.S. federal holdings

during 1977-1978 was accompanied by foreign financing of over eighty percent of that amount. Then, during the first half of 1979, foreign governments, in attempting to stabilize a rising dollar, <u>sold</u> almost $18 billion of U.S. government obligations.

Whether foreign holdings of government securities have a significant impact on the U.S. capital market is a question left for the more formal analysis of Section III. However, to the extent that the domestic financing of government deficits is believed to have important effects, the raw data point to the significance of foreign transactions in government debt as well.

B. Direct Investment

Direct investment is the transfer of capital across national boundaries for use in an operation over which the provider of the capital has control. Specifically, capital transfers are designated by the Commerce Department as direct investment, rather than portfolio investment, when a firm incorporated abroad which receives the transfer is at least ten percent owned by the parent firm providing the capital. Direct investment abroad by U.S. firms has long represented the most sizable U.S. long-term capital outflow. For that reason, it has raised considerable opposition in the U.S., particularly among those who fear that transferring U.S. capital abroad harms immobile factors of production such as U.S. labor.

Foreign firms also make direct investments in the U.S., but these capital flows are a more recent and still much smaller phenomenon. While U.S. firms had invested a total of $174.5 billion abroad by the end of 1979, foreign investment in the U.S. stood at only $46.7 billion. These figures reflect a very significant recent growth, both in absolute terms and relative to the total shareholders'

equity in U.S. corporations. From the beginning of 1970 until the end of 1979, U.S. direct investment abroad grew from a level of 7.0 percent as large as total U.S. corporate equity to a level of 14.2 percent. At the same time, foreign direct investment in the U.S. more than tripled as a percentage of total U.S. corporate equity: from 1.3 percent to 4.2 percent.

In recent years some Americans have voiced concern about this rapid growth in foreign control over U.S. production. Viewed in relation to U.S. capital employed abroad, the level of foreign direct investment in the U.S. does not seem so alarming. In addition, a close examination of the data reveals that, while the level of foreign investment in the U.S. grew enormously in the period 1973-1974, even the rate of growth in U.S. investment abroad has not been markedly smaller in other recent periods (see Figure 1).

The size of these capital holdings leads one to anticipate that they might have important effects on the U.S. capital market. Also, as Figure 2 shows, the quarterly flows of capital are quite volatile. This volatility to transactions implies significant quarter-to-quarter changes in the total direct investment outstanding, contributing to the effects on the U.S. market which will be explored later in this paper.

C. Portfolio Investment in Private Securities

Foreign portfolio holdings of private U.S. securities, at a level of $60.1 billion at the end of 1979 was only slightly exceeded by the figure ($61.7 billion) for U.S. holdings of foreign securities. However, the composition of the assets held differs markedly. Just over eighty percent of the foreign portfolio consists of the stock of U.S. firms, while nearly eighty percent of the U.S. holdings are foreign bonds.

FIGURE 1
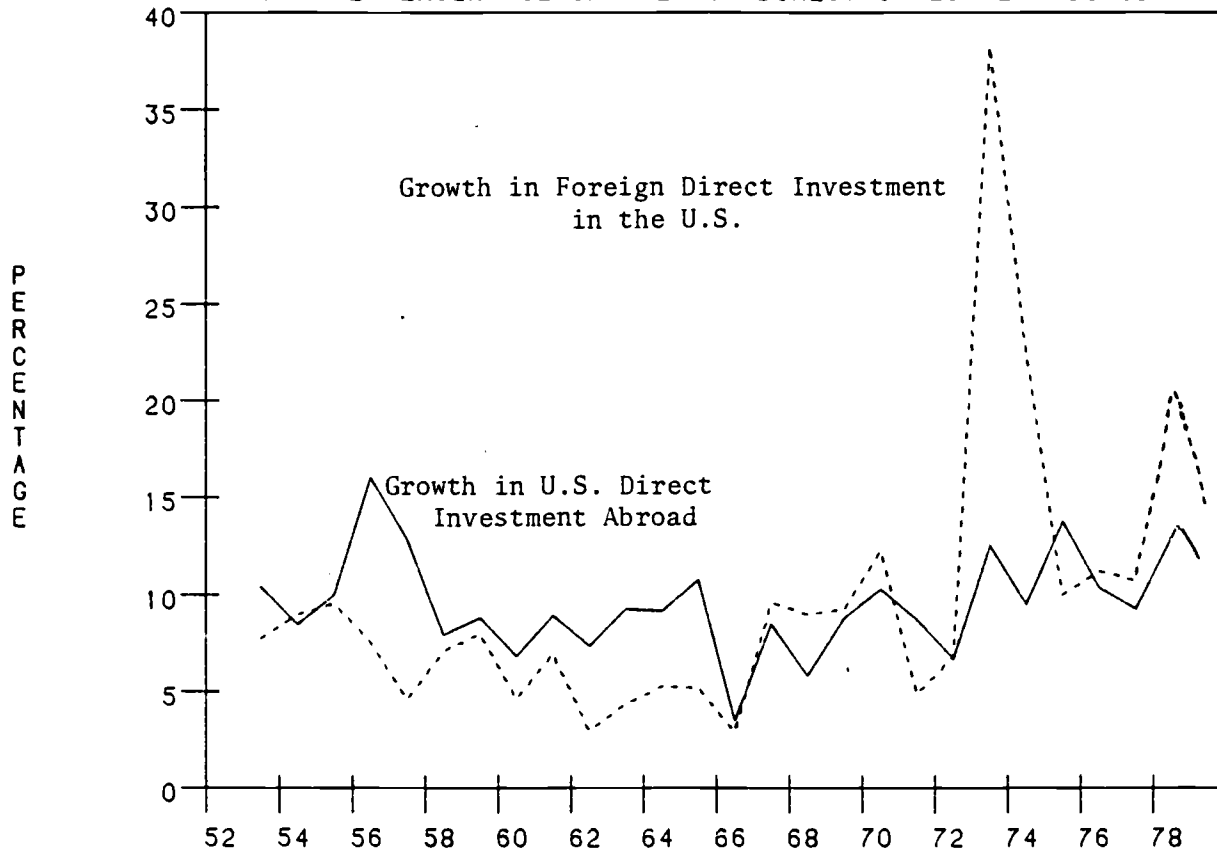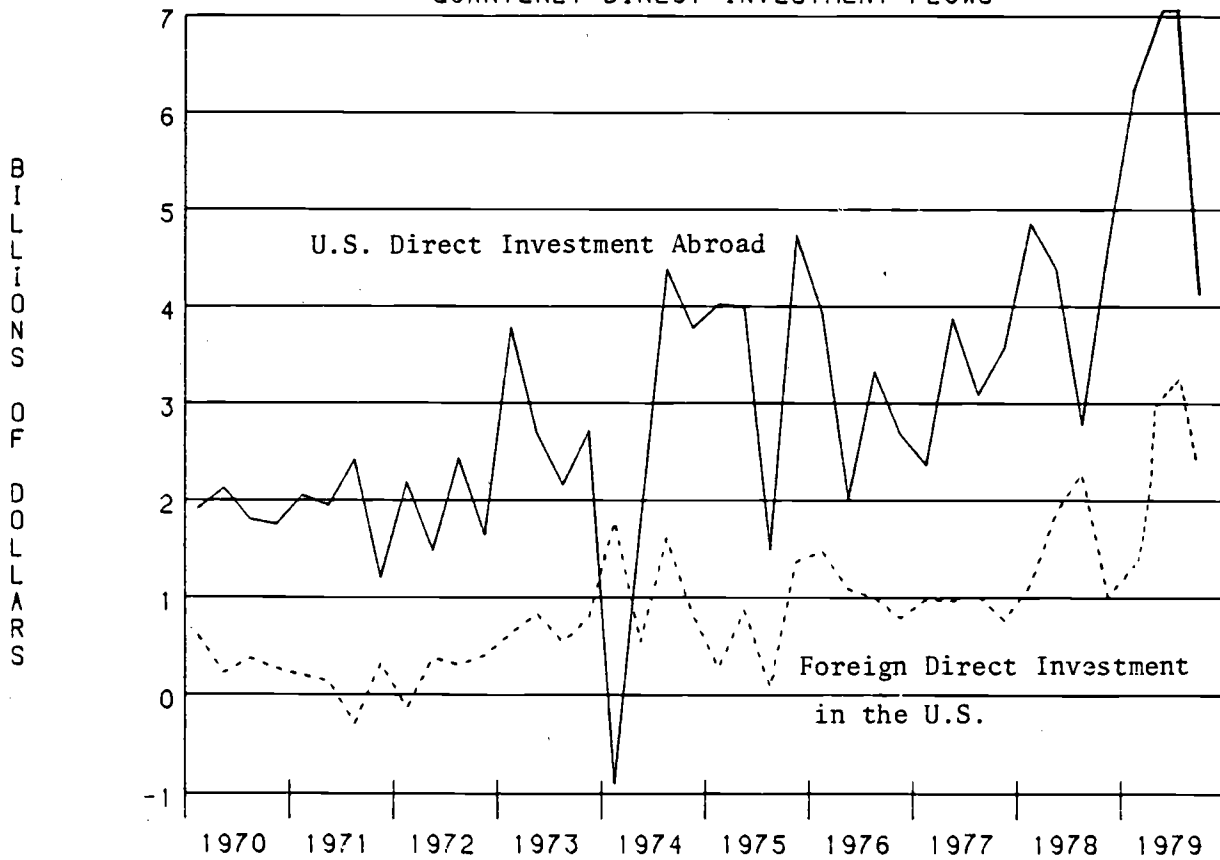## ANNUAL PERCENTAGE CHANGES IN DIRECT INVESTMENT LEVELS

Growth in Foreign Direct Investment
in the U.S.

Growth in U.S. Direct
Investment Abroad

PERCENTAGE

52 54 56 58 60 62 64 66 68 70 72 74 76 78

FIGURE 2
QUARTERLY DIRECT INVESTMENT FLOWS

BILLIONS OF DOLLARS

U.S. Direct Investment Abroad

Foreign Direct Investment
in the U.S.

1970 1971 1972 1973 1974 1975 1976 1977 1978 1979

1. Stocks

The dominance of foreign purchases of U.S. stocks (capital inflows) over portfolio equity capital outflows also stands in sharp contrast, of course, to the situation with direct investment. With portfolio and direct investment taken together, U.S. equity investment abroad is far greater than foreign equity investment in the U.S.

U.S. portfolio holdings of foreign equity, which stood at about $13.8 billion at the end of 1979, or a value 1.1 percent as large as U.S. firms' total equity outstanding, had, until 1979, exhibited very little fluctuation (see Figure 3). The average rate of growth in U.S. dollar ownership of foreign stock since 1965 has been about five percent per year. From the data on net purchases of foreign stock presented in Figure 4 it is clear that the long-run increase in investment position has resulted primarily from increases in the dollar value of foreign stocks held, since net purchases had merely fluctuated around zero for many years prior to 1979.

From popular press reports, it would seem that U.S. investors are becoming more interested in equity investments abroad. This interest has only recently been reflected in the statistics on U.S. portfolios. In aggregate U.S. investors were actually net sellers of over one-half billion dollars of foreign stocks in 1978, but unprecedented purchases occurred in 1979. For the present, at least, U.S. holdings of foreign stocks seem inconsequential compared to the size of the U.S. equity market.

Of apparently greater potential importance in the U.S. capital market are foreign holdings of U.S. stocks. Such foreign holdings were in 1960 less than nine billion dollars; they rose to $39.1 billion by 1972 and have fluctuated considerably since, standing at about $49.9 billion at the end of 1979 (or over four percent of total U.S. stock outstanding). Changes in stock values are a
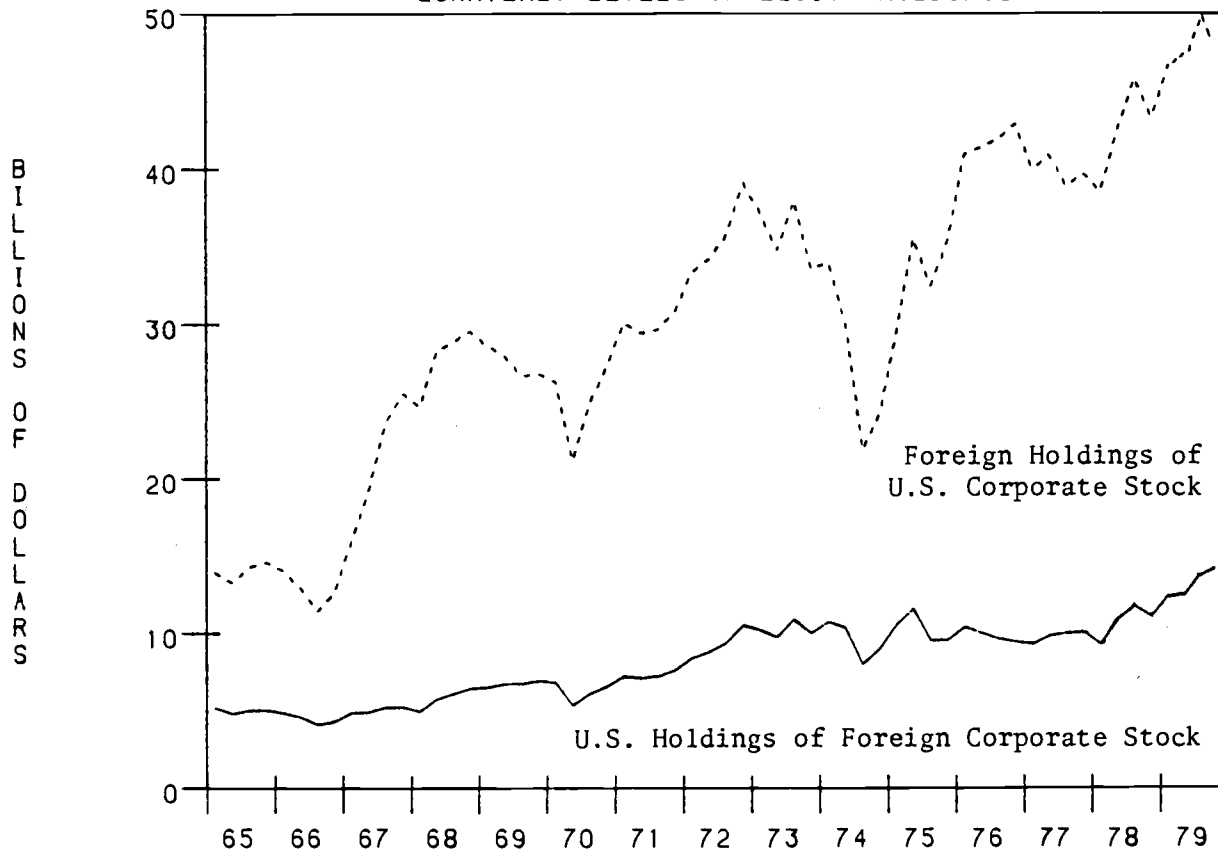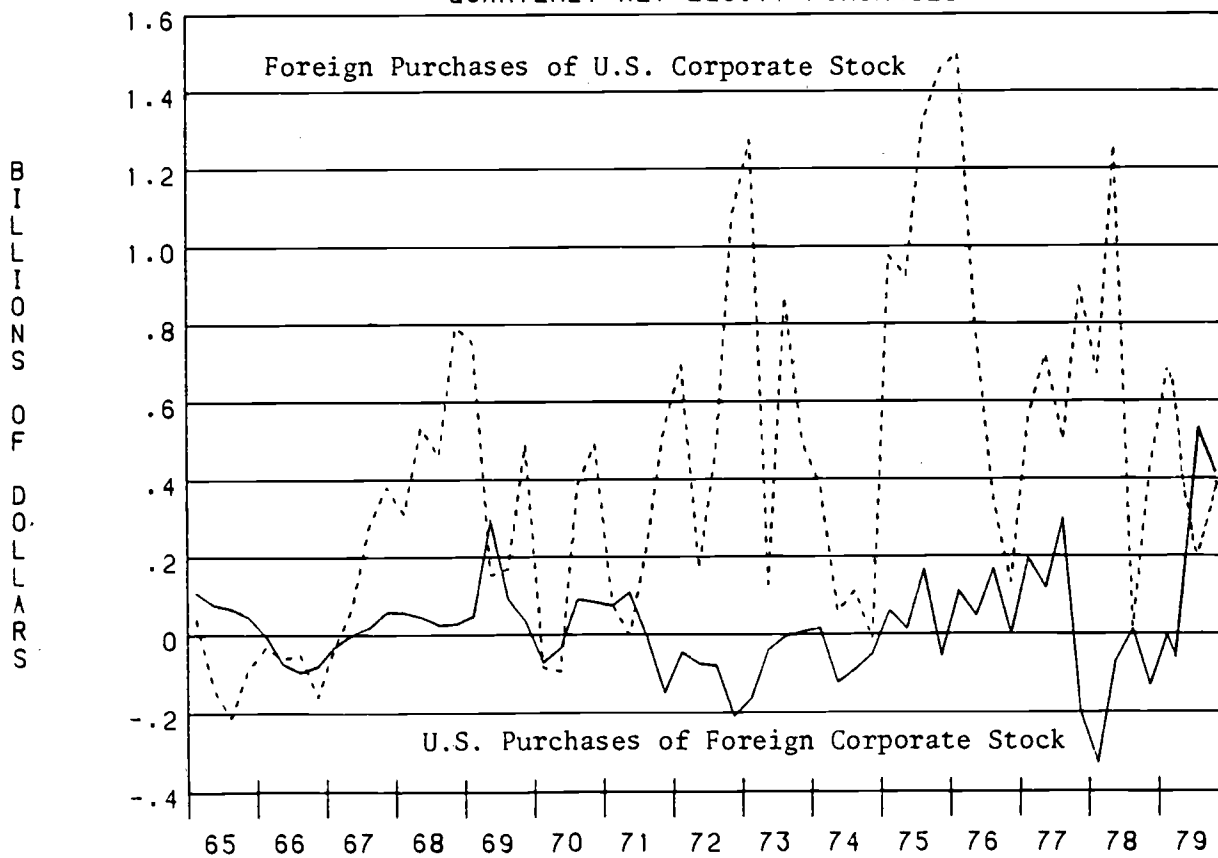
FIGURE 3
QUARTERLY LEVELS OF EQUITY HOLDINGS

Foreign Holdings of U.S. Corporate Stock

U.S. Holdings of Foreign Corporate Stock

BILLIONS OF DOLLARS

65 66 67 68 69 70 71 72 73 74 75 76 77 78 79

FIGURE 4
QUARTERLY NET EQUITY PURCHASES

Foreign Purchases of U.S. Corporate Stock

U.S. Purchases of Foreign Corporate Stock

BILLIONS OF DOLLARS

65 66 67 68 69 70 71 72 73 74 75 76 77 78 79

major cause of this growth. But even when net purchases are examined in isolation (Figure 4), large annual variations are present. For example, annual net purchases during the period 1974-1976 were: $.539 billion, $4.667 billion, and $2.753 billion.

The popular literature is quick to credit foreign investors with causing major market movements, and detecting the presence of foreign buyers in the market is a popular pastime of market analysts. One reason for believing that foreign holdings of less than five percent of the equity market could have a significant impact is the volatility of foreign purchases and sales. Also, foreign purchases cannot be easily compared to total transactions or holdings to determine their impact, since a fluctuation in the foreign demand for securities, unlike a domestic change, is likely to represent a change in overall U.S. asset demand. It is important, therefore, that more formal empirical investigations be pursued.

2. Bonds

U.S. holdings of foreign bonds reached about $48 billion at the end of 1979, after twenty years of growth from a level of just over $3 billion. As Figure 5 shows, this growth has been far from uniform, accelerating greatly in the past five years. Specifically, U.S. holdings of foreign bonds grew at about a five percent annual rate from 1965 through 1969, an eleven percent annual rate from 1970 through 1973, and an eighteen percent annual rate from 1974 through 1979.

The most obvious explanation of the recent acceleration in U.S. purchases is the ending of the interest equaliztion tax (IET) in early 1974. The tax was collected as an excise on purchases of foreign securities, with the tax on bonds ranging from about one to fifteen percent (depending on the time to maturity) at the beginning of the program. The rates were changed by Executive Order

FIGURE 5
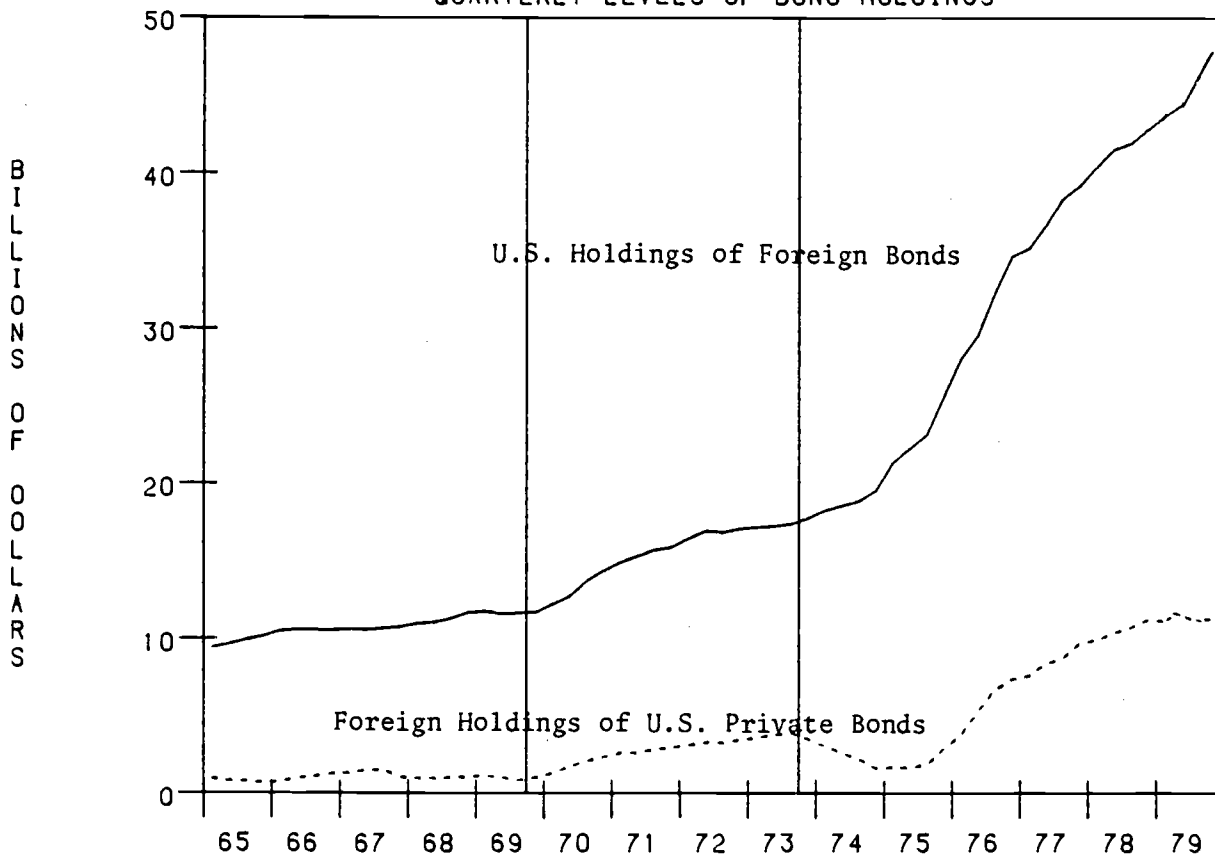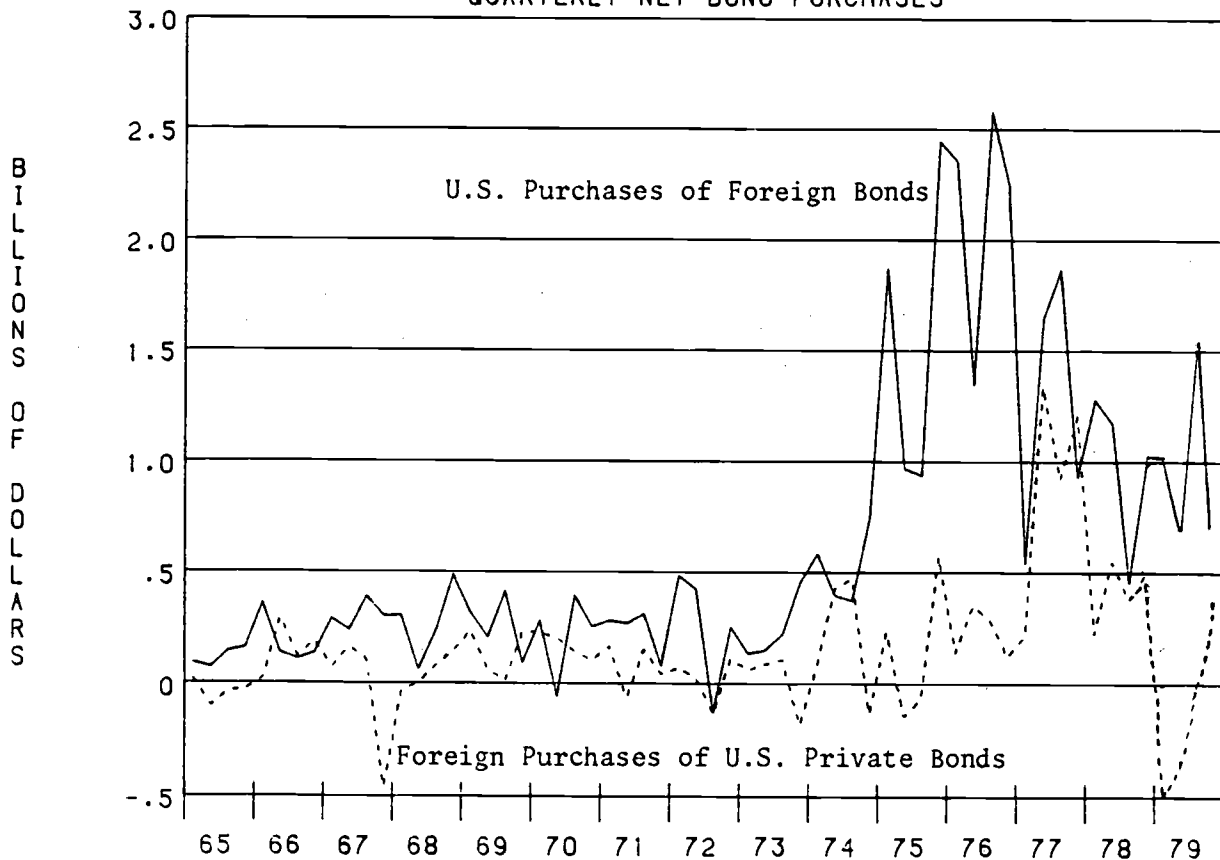QUARTERLY LEVELS OF BONO HOLOINGS

FIGURE 6
QUARTERLY NET BONO PURCHASES

several times. The maximum rate was 18.75 percent from August 1967 to April 1969, then 11.25 percent until January 1974. The effects of the 1969 and 1974 tax changes seem very obvious from Figure 5. However, the figures on U.S. holdings of foreign bonds partially reflect changes in the U.S. dollar value of bonds held as well as purchases and sales. When only net purchases are considered (Figure 6), a dramatic effect on U.S. investor behavior is apparent only after the IET elimination.

Some idea of the potential effects of these transactions can be obtained from comparing U.S. purchases of foreign bonds with figures on domestic bonds. The level of U.S. holdings of foreign bonds stood, at the end of 1979, at nearly twelve percent of the value of U.S. private domestic bonds outstanding. Net purchases of foreign bonds are even more significant compared to net new issues of U.S. corporate bonds, being nearly 17 percent as large in the 1976-1979 period. In summary, transactions in foreign bonds would seem to neither dominate the U.S. market nor be sufficiently small that their effects could safely be ignored.

Foreign investment in U.S. private bonds is only about a quarter as large as either U.S. holdings of foreign private bonds or foreign holdings of U.S. stock. Figure 6 demonstrates, however, that foreign purchases of U.S. bonds have, in the last year, reached an unprecedented magnitude and volatility. The major reason seems to be OPEC purchases of U.S. bonds. Total OPEC purchases of bonds, other than U.S. Treasury issues, reached $1.61 B in 1977, from a level of $1.18 B in 1976 and $1.57 B in 1975.[6] The Commerce Department noted a growing trend in OPEC nations' purchases toward bonds privately placed by U.S. corporations.

The recent growth in foreign transactions in private U.S. bonds has increased the possibility of a significant impact on the U.S. economy. The 1977

foreign purchases of over $3.7 billion in private U.S. bonds, for example, amounted to over ten percent of U.S. firms' net bond issues. Therefore, it is difficult to argue without further evidence either that foreign purchases dominate the U.S. market or are inconsequential.

II. Analyzing the Effects of International Capital Flows

The international capital holdings discussed in the previous section would seem to be neither so large that they dominate the U.S. capital market, nor so small that they can be ignored in models of the U.S. capital market. While this evidence is of the most casual sort, it would seem to rule out application of both the simplest open economy models and closed economy models. In the former, capital flows across national boundaries to equalize rates of return, while in the latter, capital does not flow at all.

Instead, we recognize the apparent overriding importance of special risks embodied in and the special institutional factors of importance in international investments. Assets available in the U.S. will be viewed as imperfect substitutes for foreign assets, in terms of both domestic and foreign asset demands. In addition, because international flows of different assets seem to respond very differently to market conditions, the asset categories we examined will be viewed as indicating assets which are imperfect substitutes. This view is consistent with recent research on the U.S. domestic capital market which emphasizes the imperfect substitutability of assets.[7]

This previous research on closed economy capital markets will be utilized in specifying domestic asset demand and supply relationships. The portfolio theory of asset demands implies that the allocation of the portfolio among assets will depend on the rates of return to all assets and the variances and covariances of asset returns. Anticipating the empirical implementation of the model in a time series context, the second moments of asset returns will be suppressed here, under the assumption that mean return changes play the major role in altering portfolio decisions over time. Demands for government bonds, money, private bonds, and equities can, therefore be written:

$$\underline{A}^D = A(\underline{r}, W_F, \underline{Z})$$

where $\underline{A}^D = \begin{bmatrix} GB^D \\ M^D \\ B^D \\ E^D \end{bmatrix}$ and $\underline{r} = \begin{bmatrix} r_{GB} \\ r_M \\ r_B \\ r_E \end{bmatrix}$ (1)

W_F = net financial wealth

$\underline{Z}$ is a vector of other factors affecting asset demands

Again following previous work, such as Friedman (1980), we write the market clearing condition as:

$$\underline{A}^D = \underline{A}^S$$ (2)

where $\underline{A}^S$ is a vector of asset supplies. $\underline{A}^S$ includes, in a closed economy model, zero values for inside assets, and the exogenously given values for outside assets. That is, the asset demands are taken as net demands by the domestic private sector. (2) is, therefore, a complete partial equilibrium model of asset markets. Similar systems have been subjected to empirical analysis in a variety of ways.

The most direct method would be to estimate the parameters of each equation in the system. In a series of papers, Friedman has explored structural estimation of asset demand systems. From these estimates, market-clearing rates of return can be derived for given levels of asset supplies.

Alternatively, the system can, with the standard assumptions, be written as:

$$\underline{r} = r(\underline{A}^S, W_F, \underline{Z})$$ (3)

to emphasize the determination of rates of return.[8] That is, for instance, the long-term corporate bond yield depends on supplies of outside assets and other demand determinants. In this initial attempt to incorporate the effects of international capital transactions, we will emphasize the determination of the long-term corporate bond rate which is viewed as crucial in familiar neoclassical investment models. The other determinants, $\underline{Z}$, consist of inflation expectations and expectations of income (or output).[9]

So, ignoring international transactions, we can write the individual yield equation of interest as:

$$r_B = r_B(GB, M, Y^e, \pi^e) \tag{4}$$

where the outside assets are government bonds (GB) and money (M).[10]

The inclusion of foreign holdings of domestic assets in this model can be accomplished by viewing $\underline{A}^S$ as the assets available to the domestic market. Therefore:

$$A^S = \begin{bmatrix} GB^S \\ M^S \\ B^S \\ E^S \end{bmatrix} = \begin{bmatrix} GB - GB^i \\ M \\ -B^i \\ -E^i \end{bmatrix} \tag{5}$$

Domestic holdings of foreign assets could be included by simply expanding the menu of assets available. However, since the returns to these assets are not established entirely in the domestic market and since the holdings of these assets are often restricted by government policies, it seems more reasonable to include holdings of foreign assets as influences on domestic asset demands. Equation (4) therefore becomes, in an open economy context:[11]

$$r_B = r_B(GB - GB^i, M, Y^e, \pi^e, B^i, B^o, E^i, E^o, DI^i, DI^o) \qquad (6)$$

Of course, the foreign holdings of government bonds (GB^i), private bonds (B^i), portfolio equity (E^i) and direct investment capital (D^i) as well as U.S. holdings of foreign bonds (B^o), portfolio equity (E^o) and direct investment capital (DI^o) are in general functions of r_B. So, (6) should not be taken as a closed form relation, but only as a particular way of writing the asset market equilibrium condition, which is convenient because the international asset holdings are incorporated explicitly. Similarly, W, Y^e, and π^e are clearly functions of r_B.

III. Empirical Implementation

The empirical estimation will use quarterly data from 1954 through 1979. During that period, the levels of international asset holdings have experienced tremendous changes due to changes in government policies, fluctuations in the world's distribution of wealth, and structural changes in the world economy. It might not be too implausible to assume these holdings exogenous in empirical work. If so, we can estimate (6) directly, using distributed lags of past values to represent Y^e, and π^e.[12]

Using the data described in the Appendix, we obtain the following:

$$r_B = -129.41 + 2.76 \ (GB - GB^i) + 6.28 \ DI^o - 2.31 \ DI^i$$
$$ (35.43) \quad (1.72) \quad (2.86) \qquad (1.19)$$

$$+ \ 1.28 \ E^o - 1.40 \ E^i - .237 \ B^o + .446 \ B^i$$
$$ (.67) \qquad (.58) \qquad (1.42) \qquad (.38)$$

$$+ \ \text{seasonal dummies} + \text{logarithmic trend}$$

$$+ \ 61.33 \sum_{t=0}^{-16} \alpha_t Y_t \ - \ 28.29 \sum_{t=0}^{-16} \beta_t M_t \ + \ .172 \sum_{t=0}^{-16} \theta_t \pi_t$$
$$ (11.57) \phantom{\sum_{t=0}^{-16}} \quad (6.58) \phantom{\sum_{t=0}^{-16}} \quad (.175)$$

$$\tag{7}$$

$$\bar{R}^2 = .978$$
$$DW = 1.33$$
$$SER = .31$$

(Standard errors are shown in parentheses.)

All variables which are levels are included as the logs of the deflated values (deflated by the GNP deflator). In order to minimize problems of endogeneity of the money supply, the monetary base is used here. A distributed lag is employed

both to better represent influences on the current money supply and to represent possible effects on expectations of other asset market influences. All distributed lags are estimated as third degree polynomials.

An attempt to expand, somewhat, the purely financial focus of the model by incorporating a broader definition of wealth as an influence on asset demands and supplies met with no success. As Feldstein and Chamberlain (1973) pointed out, over a period of estimation non-financial components of wealth can vary and should be included in the model. The inclusion of a logarithmic trend (to roughly account for structural changes in asset markets over the twenty-six year period) proxies for wealth sufficiently well that the several measures we tried were highly insignificant in all cases.

In general, the results are supportive of the view that changes in international asset holdings have important impacts on the U.S. capital market. Although predictions of coefficient signs depend on the nature of asset substitution, it was expected that capital outflows would usually tend to increase the bond yield while capital inflows would have the opposite effect. Except for the coefficients of bond holdings, this expectation is realized. The coefficients of the largest private holdings, DI^o and E^i are highly significant. The coefficients of DI^i and E^o are nearly significant at the .05 level, while the coefficient of the net government bond supply is nearly significant at the .1 level. The result with respect to bond holdings is, however, disturbing. The effect of B^i should be unambiguously negative. Since foreign bonds purchased by U.S. citizens are largely dollar-denominated and issued in the U.S., and thus are presumably close substitutes for domestic bonds, the effect of B^o should almost certainly be positive. This result points to the possibility of bias due to simultaneity. Of course, it would be anticipated that simultaneity would be a particular difficulty in the case of bonds.

To reduce any simultaneity bias, lagged values of asset holdings are used as instruments in reestimating (7).[13] The results of a number of experiments (see Table 3) are indicative of reduction in simultaneity bias. U.S. holdings of foreign bonds now obtains the correct positive sign and the coefficients of U.S. holdings of foreign equity are greater. However, foreign holdings of U.S. bonds (B^i) continues to have insignificant coefficients with the wrong sign. Since the simple correlation of B^o with B^i equals .984, it is not surprising that separate coefficients for B^o and B^i are difficult to estimate. However, most foreign bonds held by U.S. residents are so similar in nature to domestic bonds that it is sensible to consider the outside supply of bonds to be the net value $B^o - B^i$.

Equations (3.2) and (3.3) show the result of this aggregation. The net bond holdings variable has the correct sign and is significant or nearly significant at the .05 level. The difference between (3.2) and (3.3) is in the treatment of government bonds. If, as we have been assuming, a decrease in foreign holdings is exactly equivalent to an increase in the level of government bonds outstanding, (3.3) is appropriate. Since the public's perception of government bonds as an asset is controversial and since foreign holdings of these bonds are an actual outside obligation, treating foreign holdings separately, as in (3.2), may be justifiable. Since the right-hand variables in each equation are in logs, no direct test of these specifications is possible, but estimating separate coefficients does improve the fit. The level of government bonds outstanding is insignificant, while the level of foreign holdings is significant; the impact of a change in the level of foreign holdings is more than twice as great as a change in the level of bonds outstanding (since foreign holdings represent about twenty percent of the total).[14] The explanatory power of each specification is nearly identical. It appears, then, that we can be confident that changes in

Table 3

Instrumental Variables Regression Results – Dependent Variable r_B

(All outside asset levels are expressed in logs)

	GB	$\hat{GB}^1$	$\hat{DI}^o$	$\hat{E}^o$	$\hat{DI}^1$	$\hat{E}^1$	$\hat{B}^o$	$\hat{B}^1$	$-\sum_{t=0}^{16}\beta_t M_t$	$-\sum_{t=0}^{16}\alpha_t Y_t$	$-\sum_{t=0}^{16}\theta_t \pi_t$	$\bar{R}^2$	DW	SER
(3.1)	.766 (1.356)	-.293 (1.87)	4.361 (2.699)	3.554 (.829)	-2.053 (1.039)	-1.365 (.567)	3.244 (.986)	.362 (.292)	-16.75 (6.50)	46.98 (10.30)	.244 (.149)	.981	1.57	.289
(3.2)	1.081 (1.381)	-.417 (.192)	5.453 (2.762)	2.963 (.824)	-2.826 (1.032)	-1.279 (.555)	1.704 (.833) $(\hat{B}^o-\hat{B}^1)$		-18.391 (6.96)	45.13 (9.73)	.160 (.152)	.980	1.42	.300
(3.3)	2.285 (1.380) $(\hat{GB}-\hat{GB}^1)$		6.164 (2.737)	3.147 (.834)	-2.996 (1.054)	-1.570 (.564)	1.721 (.907) $(\hat{B}^o-\hat{B}^1)$		-17.61 (6.35)	51.12 (10.81)	.169 (.144)	.980	1.38	.301
(3.4)	-.668 (1.091) $(\hat{GB}-\hat{GB}^1)$		9.258 (3.016) $(\hat{DI}^o+\hat{E}^o)$		-.693 (.650) $(\hat{DI}^1+\hat{E}^1)$		1.275 (.840) $(\hat{B}^o-\hat{B}^1)$		-18.97 (6.99)	46.03 (10.00)	.059 (.115)	.977	1.32	.318
(3.5)	.650 (.646)		1.678 (.911) $(\hat{DI}^o+\hat{E}^o+\hat{PB}) - (\hat{DI}^1+\hat{E}^1+\hat{PB}^1)$						-26.51 (4.42)	57.46 (8.20)	.026 (.112)	.975	1.11	.333
(3.6)	—					—			-26.99 (7.34)	49.48 (9.69)	.067 (.100)	.974	1.01	.339

All equations also include seasonal dummies and a logarithmic trend.

foreign holdings of government bonds affect the U.S. corporate bond rate, but can say little about the overall level of such bonds outstanding.

Other specifications were tried to determine the impact of further aggregations. For example, equation (3.5) includes international holdings only as a net aggregate value, which fails to obtain significance in the equation.[15] In fact, the two international asset variables taken together are not significant.

The rest of the specifications have sets of international asset coefficients significantly different from zero at the .01 level, with the equation (3.4) coefficients barely exceeding that level of significance and the other equations' coefficients exceeding the .01 level by wide margins.

As indicated by equation (3.6) which contains no international asset variables, the purely domestic factors of money supply, income, and inflation provide the major explanation of the corporate bond yield.[16] In addition, the inclusion of the international asset variables does very little to change the coefficients of the domestic variables, since the correlations between these sets of variables tend to be rather low.

To summarize, then, U.S. holdings of foreign assets and foreign holdings of U.S. assets have been shown to have significant effects on the U.S. corporate bond rate. Disaggregation of these assets holdings by asset type also appears to be quite important in isolating their effects. In particular, aggregation into a net private asset holdings variable completely masks the important impacts these asset holdings have on the U.S. capital market. When these holdings are disaggregated, as in specification (3.2) all are individually significant at the .05 level and have plausible signs. Capital outflows have positive impacts on the corporate bond rate, whether the outflows result from U.S. purchases of foreign assets or foreign sales of U.S. assets.

To put these effects in the context of historical patterns of inter-
national capital transactions, several simulations are performed, using the
estimated coefficients from equation (3.2). First, we test the effect of an
exogenous change which would have eliminated net foreign purchases of U.S.
government bonds after the end of 1977. Because this alternative eliminates
the very heavy foreign purchases through 1978, the increase in bond yields
which results (see Figure 7) is quite discernible, reaching 13 basis points by
the first quarter of 1979. Figure 8 shows the impact of keeping foreign hold-
ings at the 1973 level in real terms. For the three years following 1973 actual
foreign holdings declined in real terms, so under the alternative, interest
rates would actually have been lower. Then, the situation is reversed and the
yield on bonds would have risen somewhat higher than the increase which
actually occurred. However, similar changes in holdings of other assets would
have more significant effects.

As an example of an alternative direct investment scenario, we examine the
impact of exogenously holding direct investment at the 1975 level in real terms.
As Figure 9 shows, the yield on corporate bonds would have been as much as 98
basis points lower. Finally, Figure 10 shows the effect of not allowing net
foreign portfolio purchases of U.S. stock after the end of 1977.

These exercises must be considered as illustrative only, since they are
the product of one asset market equation from a full economic system. In partic-
ular, both government policy responses and lagged responses from the real side
of the economy are not considered.

FIGURE 7
THE IMPACT OF MAINTAINING FOREIGN HOLDINGS
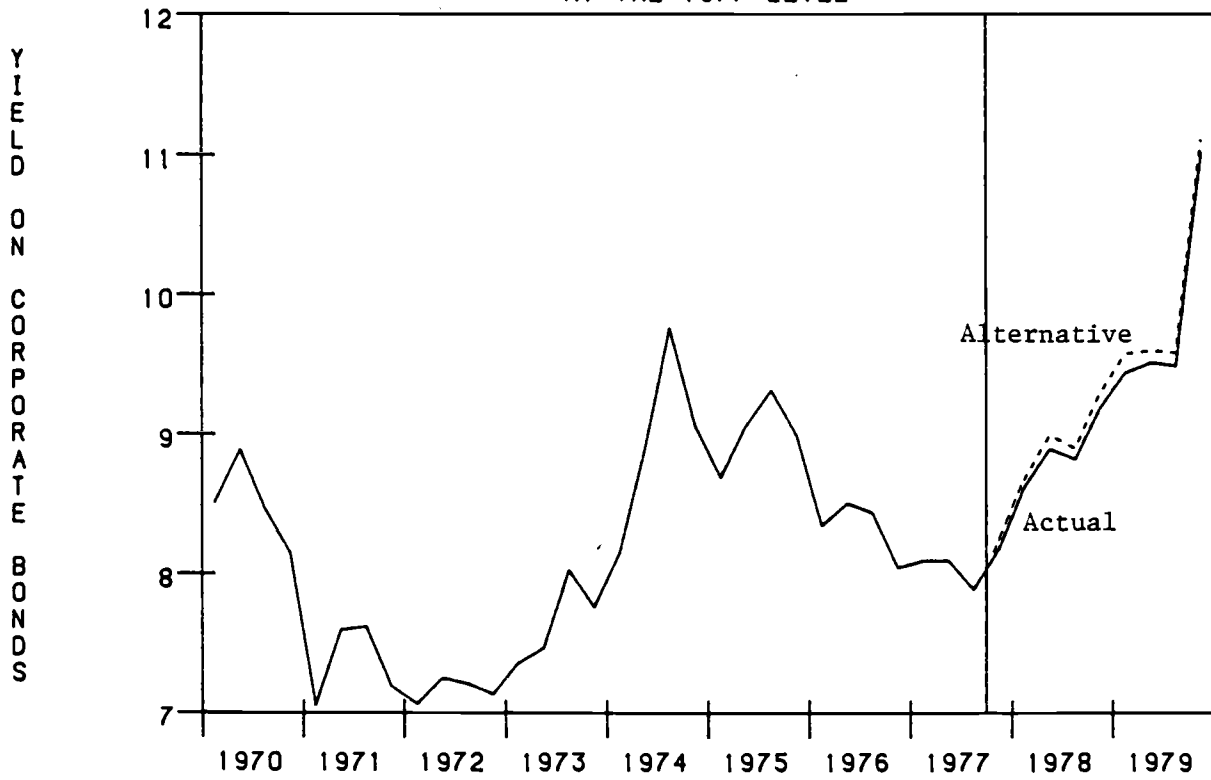OF GOVERNMENT BONDS
AT THE 1977 LEVEL

FIGURE 8
THE IMPACT OF MAINTAINING FOREIGN HOLDINGS
OF GOVERNMENT BONDS
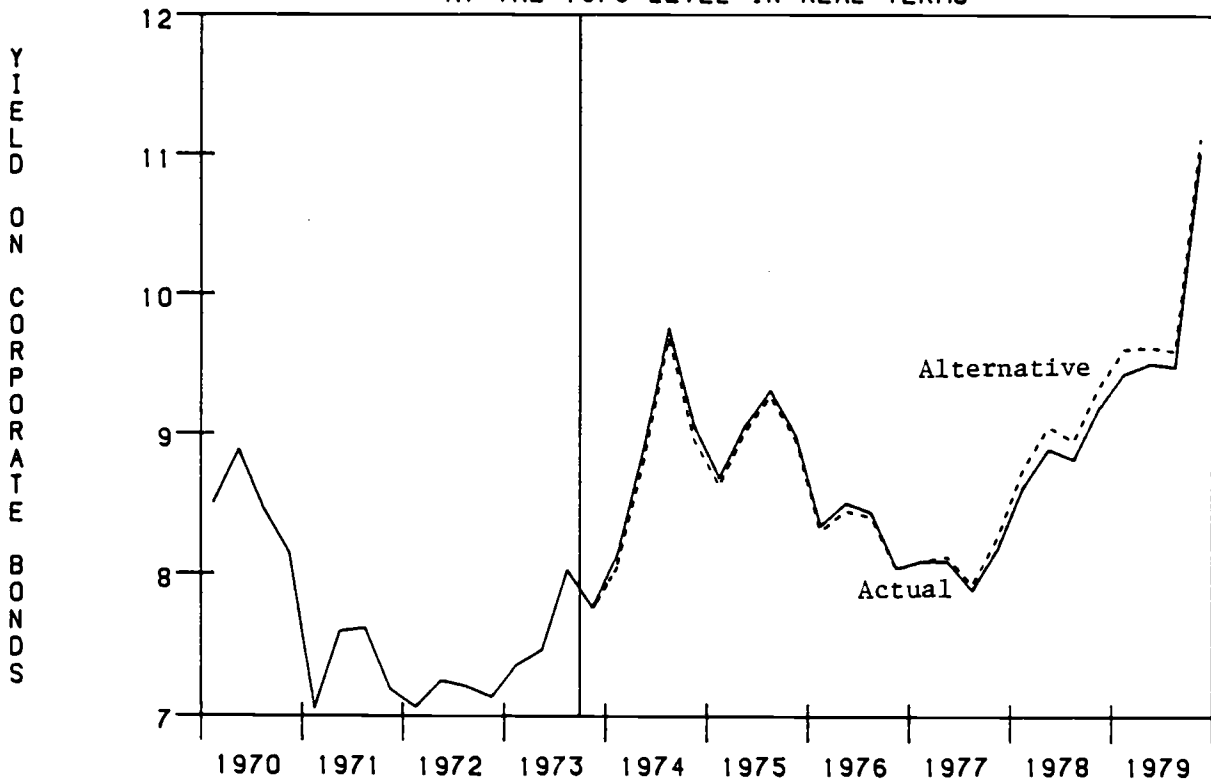AT THE 1973 LEVEL IN REAL TERMS

FIGURE 9
THE IMPACT OF MAINTAINING
NET U.S. DIRECT INVESTMENT ABROAD
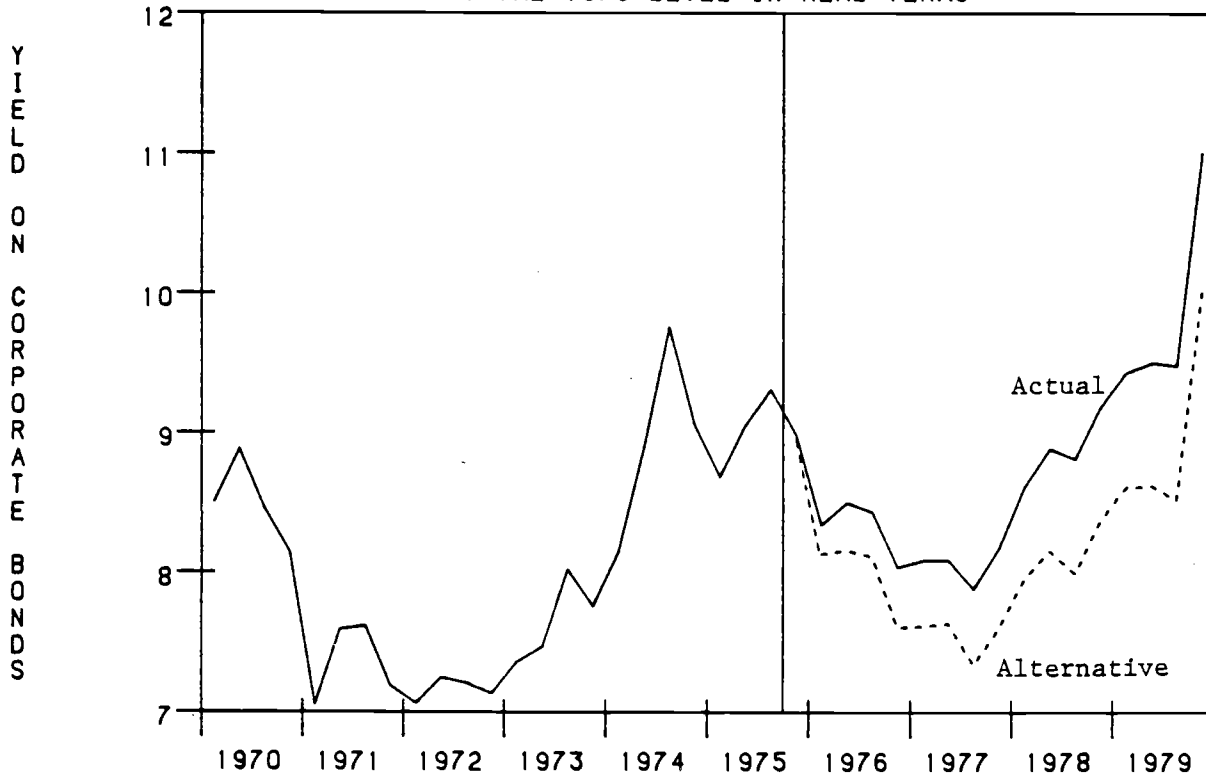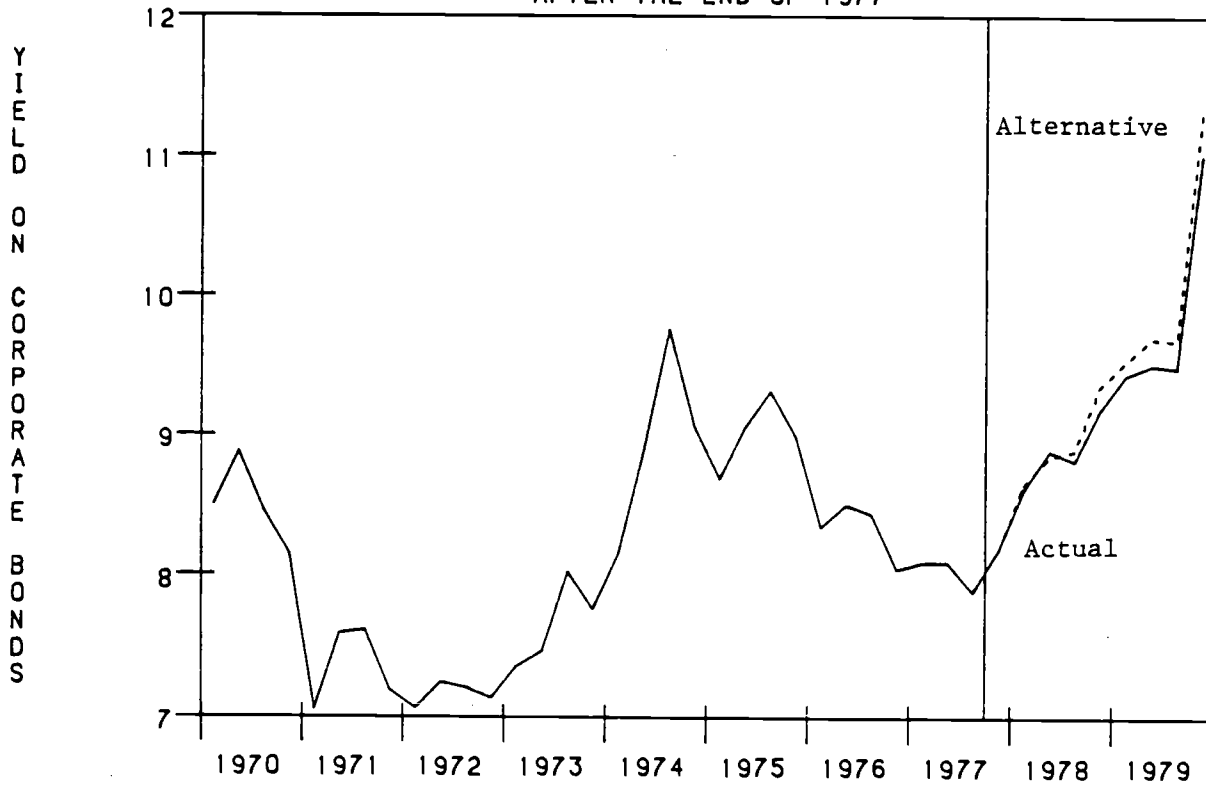AT THE 1975 LEVEL IN REAL TERMS

FIGURE 10
THE IMPACT OF ALLOWING NO NET FOREIGN PURCHASES
OF U.S. EQUITY
AFTER THE END OF 1977

IV. Conclusions

This paper has presented evidence bearing on the question of international influences on the U.S. capital market. Both the examination of relative magnitudes of international asset holdings and the estimation of a simple partial-equilibrium capital market model indicate that such influences are quite important. In particular, we have found that international effects on the long-term new-issue corporate bond rate in the U.S. are highly significant. Since this interest rate is often seen as crucial in domestic investment decisions, we have reason to believe that investment in the U.S. is significantly influenced by international capital movements.

Further research will be required before some highly important policy questions can be addressed. For example, knowledge of the elasticities of international capital holdings will be needed in order to determine whether government policies to influence savings result in changes in domestic or foreign investment. Such information will be difficult to discern in historical evidence, since international asset holdings have been so strongly influenced by government policies and by the changes in the world wealth distribution engendered by oil price increases. What the present study has hopefully done is to indicate that these questions are worth asking.

Footnotes

[1]See, for example, Branson (1968) and Kenen (1978).

[2]We are concerned here with the effects on the long-term capital market. This author has recently provided evidence (Hartman (1979)) which suggests that foreign events have a significant impact on U.S. money market rates.

[3]In the remainder of the paper this notation will be used to describe the asset holdings which are the result of these capital flows. Thus, a superscript "i" will indicate foreign holdings of a U.S. asset, while "o" will be used to indicate U.S. holdings of a foreign asset.

[4]All data utilized in this study are taken from the Flow of Funds Accounts of the Federal Reserve, and are collected from various original sources by the Federal Reserve. Stock and bond transactions are reported directly to the U.S. Treasury by banks, brokers, and dealers, and are published monthly in the Treasury Bulletin. The Commerce Department utilizes a survey to estimate direct investment flows which are then reported in the Survey of Current Business.

[5]An analysis of foreign activity in the U.S. government bond market in the early 1970's can be found in Adams (1973).

[6]Survey of Current Business, April, 1978.

[7]See Friedman (1977, 1979, 1980).

[8]Because of the wealth constraint, only n-1 of the n equations in the system are independent. Therefore, only relative rates of return can be determined. However, if one asset return is fixed then the other returns can be determined. Following this line of reasoning, we will consider equation (3) to be a description of how a truncated asset return vector is determined. Note that since net financial wealth is simply the aggregated value of outside asset supplies, it need not be included.

[9]The latter affects both liquidity preference and the willingness of net suppliers to provide inside assets.

[10]By utilizing a model of this form, we are not able to employ the restrictions implied by the underlying asset demand theory (see Friedman (1979)). However, since our interest is in the international transactions, we choose to estimate their impacts in the most straightforward manner.

[11]U.S. holdings of foreign government bonds and the international holdings of money are not included because of empirical not theoretical considerations.

Direct investment and portfolio equity investment are somewhat different phenomena and, hence, are treated as separate assets.

[12]There remains the issue of simultaneity of W, Y, and π with r_B. Since r_B is usually seen as having a lagged effect on these values, and because we are not particularly concerned about the coefficients of these variables, this problem will be ignored.

[13] Such a procedure is not, of course, guaranteed to eliminate simultaneity problems, particularly when there is some evidence of serial correlation as in (7). However, this method should reduce the severity of the problem. Without specifying a model of the world asset market, that is the most that can be hoped for.

[14] A similar specification, in which log $(GB-GB^i)$ from equation (3.3) is replaced by log $(GB-\delta GB^i)$, was tried with the result that $\hat{\delta}$ equaled approximately 1.7. The restriction $\delta=0$ was tested, and could not be rejected with any reasonable confidence.

[15] Across equations, significance tests are not possible because aggregation is not formally a coefficient restriction in a regression of this functional form. However, the difference in explanatory power between (3.5) and, for example, (3.3) is quite substantial. (If the difference in specification could be treated as approximately the same as four coefficient restrictions, the F-value for rejecting those restrictions would exceed 7).

[16] To be more specific, when we examine the beta coefficients of all variables in (3.2), we find that the major influences on r_B come from the domestic variables. The beta coefficients, including one for each component of the polynomial distributed lags, are:

GB	.055	$\sum\limits_{t=0}^{-16} \beta_t M_t$	-6.608
GB^i	-.151		13.214
			-6.999
DI^o	.959	$\sum\limits_{t=0}^{-16} \alpha_t Y_t$	6.496
DI^i	-.496		-10.566
			7.599
E^o	.458	$\sum\limits_{t=0}^{-16} \theta_t \pi_t$	1.845
E^i	-.297		-3.707
			2.054
$B^o - B^i$	.380		

APPENDIX

(Variable Descriptions and Data Sources)

B^i Foreign Holdings of U.S. Private Bonds, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

B^o U.S. Holdings of Foreign Bonds, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

DI^i Foreign Holdings of U.S. Equity - Direct Investment, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

DI^o U.S. Holdings of Foreign Equity - Direct Investment, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

E^i Foreign Holdings of U.S. Equity - Portfolio, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

E^o U.S. Holdings of Foreign Equity - Portfolio, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

GB Total U.S. Government Bonds Outstanding, Exclusive of U.S. Federal Holdings, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

GB^i Foreign Holdings of U.S. Government Bonds, "Flow of Funds Accounts," Board of Governors of the Federal Reserve.

M The Monetary Base, "U.S. Financial Data," Federal Reserve Bank of St. Louis.

r_B Average Yield on New Issues of High-Grade Corporate Bonds Adjusted to AAA Basis, Figures computed by Data Resources, Incorporated.

Y Real Disposable Personal Income, "National Income and Product Accounts of the United States," U.S. Department of Commerce, Bureau of Economic Analysis.

π Inflation Rate; Rate of Change in Implicit GNP Deflation, "National Income and Product Accounts of the United States," U.S. Department of Commerce, Bureau of Economic Analysis.

REFERENCES

Adams, Richard V., "Foreign Activity in United States Treasury Securities in Fiscal Years 1971-1973," in Issues in Federal Debt Management, Federal Reserve Bank of Boston Conference Series No. 10, June 1973.

Branson, W. H., Financial Capital Flows in the United States Balance of Payments, Amsterdam, North Holland, 1968.

Feldstein, Martin and Gary Chamberlain, "Multimarket Expectations and the Rate of Interest," Journal of Money, Credit, and Banking 5: 873-902, November 1973.

Friedman, Benjamin M., "Financial Flow Variables and the Short-Run Determination of Long-Term Interest Rates," Journal of Political Economy LXXXV: 661-689, August 1977.

Friedman, Benjamin M., "Substitution and Expectation Effects on Long-Term Borrowing Behavior and Long-Term Interest Rates," Journal of Money, Credit and Banking, XI: 131-150, May 1979.

Friedman, Benjamin M., "The Effect of Shifting Wealth Ownership on the Term Structure of Interest Rates: The Case of Pensions," Quarterly Journal of Economics, XCIV: 567-590, May 1980.

Hartman, D. G., "The International Financial Market and U.S. Short-Term Interest Rates," mimeo, April 1979.

Kenen, Peter B., A Model of the U.S. Balance of Payments, Lexington Books, Lexington, MA, 1978.