89-F-11

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October 1989

PREPARED UNDER
THE PROJECT ON APPLIED MACROECONOMICS
RESEARCH INSTITUTE FOR THE JAPANESE ECONOMY

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ABSTRACT

This paper investigates the causes of large Japanese long-term capital outflows in the 1980s. It is found that exchange rate expectations and international interest rate differentials explain part of the capital outflows until the mid 1980s, but not all. More significant were relaxation of capital controls and the rapid growth of institutional investors. Since the mid 1980s exchange rate expectations have exerted negative impacts on capital outflows. These have been more than offset by further relaxation of capital controls in 1986. However, the effects of deregulation are now close to over. Throughout the period increases in domestic wealth have been an important cause of capital outflows.

* The author would like to thank Akihiro Amano, Mariko Fujii, Masahiro Kawai, Hirohiko Okumura and Jerome L. Stein for helpful comments on earlier versions of the paper. Financial support from the Matsushita International Foundation is gratefully acknowledged.

I. INTRODUCTION

The Japanese current account surplus has attracted the continued attention of economists and policymakers over the last few years. A large current account surplus corresponds, of course, to a large capital account deficit, or capital outflow. Figure 1 shows movements in the Japanese current and capital accounts over the last 20 years. The current account started to record surpluses at the end of the 1960s; the size of the surplus has shown an increasing trend since then. Long-term capital outflows have shown similar movements, although they lagged behind movements in the current account in the 1970s.

There is a large literature on the Japanese current account, most of which focuses on periods of huge surpluses, such as 1971-72, 77-78 and 83-present. However, surprisingly few analyses have been carried out on the causes of capital outflows. This has perhaps reflected the judgment of researchers that movements in (especially long-term) capital accounts have seldom been a major driving force of Japanese macroeconomic fluctuations. This view was especially dominant in the 1970s.

Unlike in earlier periods, the current account surplus in the 1980s is preceeded in timing, and surpassed in size by capital outflows. Some recent work on the Japanese capital account argue that in the 1980s there was an autonomous increase in capital outflows leading to a depreciation of the yen, which in turn created an increase in the current account surplus. Views concerning the causes of such autonomous capital outflows, however, are divided. Most writers point out the importance of the increase in the U.S. interest rate, but some (Daiwa (1985), Amano (1986)) focus on the impact of the relaxation of capital controls such as the revision of the

foreign exchange law. However, these studies cover data only up to the early 1980s and their treatment of capital controls is inevitably simplistic.

The purpose of this paper is to carry out a detailed analysis of the Japanese (long-term) capital account[1)], especially the causes of large capital outflows in the 1980s and to then consider the implications of the analysis for the causes of macroeconomic fluctuations in the Japanese economy. The period of analysis includes the 1970s as well as 1980s. The inclusion of the 1970s reflects a judgment that a comparison of movements in the capital account in the 1970s and 1980s would facilitate the interpretation of events in the 1980s.

In the second section, we give an overview of the trends in capital flows, examining carefully the behavior of foreign securities investment by domestic residents in the 1980s. In the third section, we first postulate a simple model of the capital account and then, using the model, carry out a qualitative analysis of the importance of various determinants of the capital account. We examine not only the effects of economic variables such as interest rate differentials and exchange rate expectations, but also those of institutional factors, including changes in domestic money flows and capital controls.

In the fourth section, we supplement the analysis with an econometric estimation of a capital flow equation. The final section contains the summary of our findings and a discussion of the implications of the analysis for the comparison of the causes of macroeconomic fluctuations in the 1970s and 1980s.

II. AN OVERVIEW

1. Trends in Capital Outflows

Let us first examine broad trends in the Japanese balance of payments. Over the last 20 years, we have seen three periods of huge current account surpluses; 1970-72, 77-78, and 83 to present (Figure 1). The breakdown of the corresponding capital account deficits is different depending on the period. In 1971 and 77, the current account was already in sizable surplus, while the long-term capital account was not yet recording a large deficit. The difference was mostly absorbed by central bank purchases of dollars.(Figure 1.) In 1972, central bank intervention decreased and the outflow of long-term capital increased. In 1978, there were both intervention and large long-term capital outflows.

The period 1983-85 is different from the above two in that there were no large interventions and that outflows of long-term capital had been larger than the current account surplus since the beginning of the period. (The difference was financed by a worsening of the foreign exchange positions of Japanese banks.) Since mid 1985, the outflow of long-term capital has become even larger, and there have occasionally been large central bank interventions.

In passing, let us note that the current account surpluses in the 1971-72 and 1977-78 periods were accompanied by exchange rate appreciation, while that in the 1980s, by depreciation until the mid 1980s

and by sharp appreciation since then. This suggests that the factors behind fluctuations in the current account and the exchange rate were not the same between the periods.

Turning to the behavior of components of the long-term capital account, we find in Figure 2 that direct investment, loans extended, securities investments by domestic residents(the assets side), all have shown an increasing trend in the last decade and a half. Direct investment have increased steadily, while loans and, especially, securities have shown more fluctuations. Since the late 1970s, most of the fluctuations in the long-term capital account are accounted for by those in securities investments.The figure also presents movements of the long-term capital accounts by nonresidents (the liability side). Clearly, movements on the assets side, with the exceptions of 1980 and 1982, dominate those of the entire long-term capital account in the 1970s and 1980s.

Let us next look more carefully at foreign securities investment by domestic residents. Table 1 shows ratios of foreign securities to total assets for representative investors. With the exception of securities investment trust, all investors have, especially in the last few years, increased the ratio. Such a finding suggests that not only increases in wealth but also those in the share of foreign securities in total wealth have been an important cause of recent capital outflows.

Despite the common trend of increase in the ratio of foreign securities to total assets, we notice some differences in the levels of the ratio among investors. Note from Table 1 that the ratio is especially high for institutional investors such as insurance companies, mutual funds and trust accounts.This seems to point to the importance of the analysis of the

distribution of funds among investors.

III. A SIMPLE MODEL OF CAPITAL OUTFLOW AND THE ANALYSIS OF ITS DETERMINANTS

The overview of the capital account in the last section suggests that it is important to analyze the behavior of securities investment by domestic residents for the explanation of the capital account, especially in the 1980s. In this section we first postulate a simple model of investment in foreign assets. We then turn to the examination of the correlation between the capital account and each of its determinants as suggested by the model.

1. A Model of Capital Outflows

Our modeling of the capital account is based on the familiar idea of partial adjustment whereby the actual stock of foreign assets is adjusted slowly toward an optimal level because of the existence of a variety of adjustment costs such as costs of obtaining information, transactions costs, and capital controls by monetary authorities.[2)]

Let us consider a world where the movements in the capital account are dominated by purchases and sales of foreign assets by domestic residents. Domestic residents hold domestic and, if allowed, foreign bonds. The rate of return on the domestic asset is the domestic interest rate r, and that of the foreign asset, the foreign interest rate r* plus the expected rate of change in the value of foreign currency in terms of domestic currency, E*.

For simplicity, we assume that those who are allowed to purchase

foreign assets carry out mean-variance optimization in deciding their optimal (long-run) portfolio. For investor i with the stock of wealth W_i and the degree of relative risk aversion a_i, the optimal stock of foreign assets B^*_i is written as

$$B^*_i = (C_o + d/(a_i.V)\ )\ W_i \qquad (1)$$

where d is the return differential (= r* + E* - r), V is the variance of the return differential (conditional on information at the point of optimization), and C_o is a minimum variance portfolio. (See, for example, Frankel [1983].)

By adding equation (1) over all investors who can participate in foreign bonds trading (the set of which is denoted as N), we obtain:

$$B^* = \sum_{i\ N} B^*_i = (C_o + d/AV)\ W, \text{with } 1/A = \sum_{i\ N} a_i\ W_i/W$$

$$\&\quad W = \sum_{i\ N} W_i : \qquad (2)$$

where we have assumed that d and V are the same for all investors.

We assume that,because of the presence of adjustment costs,the actual stock of foreign assets B* is adjusted slowly toward B*. There are various ways of formulating a partial adjustment scheme. We assume specifically that adjustment is slow in terms of the ratio of foreign stocks to total assets,x.To anticipate, this resulted in a better fit to the data than other adjustment schemes.Then,

$$x - x(-1) = s\ (\ x^* - x(-1)) \qquad (3)$$

where x* is B*/W and s is the speed of adjustment.Changes in x are related to capital flows by

$$-CF/W = (x-x(-1))+x(-1)*(W-W(-1))/W-B(-1)*(e-e(-1))/(e(-1)*W) \qquad (4)$$

where -CF is the net capital outflow. The second term on the right hand

side of (4) represents the amount of capital flows necessary to keep x unchanged when the stock of wealth changes. In a similar way an exchange rate change will cause a change in the yen value of and hence the share of foreign assets in total wealth. The amount of capital outflows required to keep x unchanged is shown in the third term.

Equations (3) & (4) imply that there are three major reasons for capital outflows: an increase in W, an exchange rate appreciation and an increase in x*. Increases in x* may come from a number of sources, including a change in expected return differential in favor of foreign assets, a change in the expected risk of foreign assets, and a change in the degree of risk aversion. In addition, there could be relaxations of capital controls, leading to increased number of investors in foreign assets.

2, Significance of Each of the Determinants of Capital Outflows

Wealth Effects

Equation (4) can be used to determine the importance of each of the three terms appearing on the right hand side of the equation. Table 2 shows the results of such a calculation. Since the terms are non-linear in their components, the results depend much on the time unit of calculation. We, therefore, present the results for both annual capital outflows and those over four years. The wealth variable is constructed as the sum of high powered money, government bonds outstanding, the market value of stocks with adjustment for cross share holdings[3)] among corporations and net private foreign assets.The results imply that changes in x are the most

important, explaining about one third to one half of total outflows. The contribution of changes in wealth is lower, but non-negligible, coming close to one third of outflows. That of exchange rate changes is much smaller.[4)]

Over time, wealth changes have exerted fairly steady impacts on capital flows, while the effects of changes in x are smaller in 1986 and 1987 than in other years. On the other hand, the effects of exchange rate changes are large for 1986 and 1987 as can be easily expected from the sharp appreciation of the yen during the period.

The large wealth effect comes from the high growth of the stock of wealth. Figure 3 shows the ratio of wealth to GNP, which exhibits a clear upward trend since the mid 1970s. Such a high growth of wealth relative to GNP is explained by sharp appreciation of Japanese stock prices. The analysis of the factors behind this is beyond the scope of the present paper. However, it is fair to say that high stock prices have been an important cause of capital outflows.

Rate of Return Differential

We now turn to the analysis of each of the determinants of the optimal share of foreign assets in total wealth, beginning with the international rate of return differential, that is, d of equation (1).

Figures 4 shows movements in the long-term capital outflow (relative to net private wealth), the U.S.-Japan long-term nominal interest rate differential,[5)6)] and a measure of exchange rate expectations. Note first that capital outflows in the 1980s are not large compared with those in the 1970s when measured relative to wealth. This accords well with what we have just found--the importance of wealth effects .

There is some positive correlation between the nominal interest rate differential and the long-term capital outflow for the period between the late 1970s to 1984. The correlation is weaker for most of the 1970s and is almost negative for the period since 1984.

The exchange rate expectation series in the figure is one period ahead forecasts of one year changes in the yen-dollar rate from a rolling AR(4) regression of exchange rate changes using 16 observations each time. The series exhibits a stronger correlation with capital outflows than does the interest rate differential. Thus, the outflows in 1973-74 seems to match with an emergence of expectations of exchange rate dpreciation. The same applies to the outflows in 1979, 1982 and 1984. However, expectations of exchange rate appreciation dominates during the 1985-88 period. Consequently, the rise in capital outflows in 1986 cannot be explained by the interest rate differential or exchange rate expectations.

A measure of exchange rate risk--the estimate of the standard error of the above rolling regression-- is shown in Figure 5.There is some negative correlation between the risk and capital outflows from the late 1970s to the mid 1980s. A rise in exchange rate risk in the late to early 1980s corresponds with a decline in capital outflows. A decrease in the risk is associated with a significant growth of capital outflows in the early to mid 1980s.

Capital Controls

a) Changes in Controls Directly Affecting International Capital Transactions[7)]

In the past, the Japanese authority adopted numerous measures to affect international capital flows. Some of these have often influenced

the difficulty of obtaining a permission to carry out transactions which are in principle not prohibited. Others were regulations on the net position of foreign assets held by institutional investors. These will be discussed in b) below. Let us first summarize the intent of the first type of controls, i.e. whether they were meant to encourage or discourage outflows, and then make casual observations about their effects on capital flows.

i) Period I (1970 to early 1973)

This period is characterized by the extensive adoption of measures to increase capital outflows. Such a move was initially adopted in response to the strong performance of the balance of payments and a resulting increase in foreign exchange reserves. Later in the period 1971-1972, the purpose of the measures shifted toward the containment of the appreciation of the yen.

By looking at Figure 1, we find fairly large increases in long-term capital outflows in 1972 and 1973, which might have been a result of the policy of encouraging capital outflows.

ii) Period II (Late 1973 to 1975)

Measures to restrict outflows and encourage inflows were adopted in response to the worsening of the balance of payments after the first oil shock.

During this period, especially 1974 to 76, there were almost no net purchases of foreign securities and the amounts of loans extended were also very low. On the other hand, there were large increases in capital inflows reflecting probably the relaxation of controls on portfolio investment in Japan by non-residents.

iii) Period III (1977 to 1978)

Large current account surpluses and the strengthening of the yen prompted the authority to adopt measures to increase capital outflows and limit inflows, resulting, for example, in large issues of yen-denominated bonds.

iv) Period IV (1979 to 1980)

In response to the second round increase in oil prices which created a wosening of the current account, capital inflows were encouraged. Correspondingly, we observe a rather sharp fall in net capital outflows.

v) Period V (1981 to present)

A new Foreign Exchange and Foreign Trade Control Law was enacted in December 1980 which established the presumption that there were no restrictions on international flows in principle, [8] in comparison to the period before, when transactions were prohibited in principle. In addition, further measures to liberalize capital flows were adopted in 1984,[9] including, for example, the abolition of the real demand principle for forward exchange transactions.

In this sense the change in controls in this period was motivated by the intention of the authority to liberalize Japanese financial markets, and was different from those in earlier periods when they responded to movements in the balance of payments and the exchange rage.

b. Relaxation of Controls on the Holdings of Foreign Assets

Apart form the controls discussed above, there have been restrictions on investors' stock of foreign assets. These have been relaxed almost

steadily in the last decade and a half. This might have been an important factor behind increases in the ratio of foreign securities to wealth by many investors as pointed out in II. 2. above. For example, pension funds were permitted in 1981 to hold foreign securities up to 10% of their assets, which was probably one of the reasons for the increase in their holdings of foreign securities in the 1980s. Similarly, Kampo (postal life insurance) was allowed to purchase foreign securities in 1983, resulting in rapid increases in its holdings of foreign securities in subsequent years. In 1984 controls on holdings of foreign securities by special money and fund trusts have been relaxed, which led to dramatic increase in their purchases of foreign securities. In terms of equation (1), these relaxations of controls have expanded the set of investors N, resulting in larger capital outflows in the aggregate.

An important development along these lines took place in 1986. In response to the sharp appreciation of the yen the authority relaxed the ceiling for life & non-life insurance companies from 10% to 25% in March and to 30% of their assets in August. Similar relaxation took place for pension funds. That the regulation before the relaxation had been effective can be seen from Table 1.Unlike earlier deregulation, that of 1986 had a clear intention of affecting the cource of the exchange rate.

Changing Pattern of Money flows

Figure 6 shows the ratio of the assets of insurance companies and trust accounts of banks to the total assets of banking and trust accounts at all banks and insurance companies. There has been a clear upward trend in this ratio over the last 10 years. The upward trend in the late 1970s came from the growth in pension trusts, while that in recent years has been

a result of increases in money and non-money trust accounts. Although the analysis of the reason for such growth of institutional investors is beyond the scope of the present paper, we may point out the importance of declines in the rate of return on real assets and the impact of the aging of the population, which increased the demand for insurance and pensions.[10)]

The growth of institutional investors led to higher foreign securities holdings in the aggregate, because the propensities of these institutions to hold foreign securities are higher than those of other institutions as we saw in Table 1 above. In other words, this has decreased the average degree of risk aversion (assuming that the a_i s of institutional investors are lower than those of other investors), and increased aggregate capital outflows.

Before concluding the section, let us summarize what we have found as explanations for movements in capital flows in three periods of large current account surpluses.

i) For the large capital outflow in 1972, expectation of an exchange rate depreciation and the effect of capital control relaxation might have been important. ii) For the outflow in 1978, the nominal interest rate differential, exchange rate expectations, and encouragement of capital outflows by monetary authorities all may have been important factors. iii) The rate of return differential is important but not sufficient for explaining the outflow in the 1980s, especially the enormous increase in foreign securities investment since 1983. Many institutional factors such as the relaxation of capital controls, controls on foreign securities holdings, and the growth of institutional investors have decreased the average degree of risk aversion directly or by increasing the share of

those with relatively lower risk aversion and have led to increased purchases of foreign assets. iv)Throughout the period wealth accumulation has been an important cause of capital outflows.

IV. THE ESTIMATION OF A CAPITAL FLOW EQUATION

1. Specification and Data

Following the analysis in previous sections we estimate an equation for the long-term capital account. More precisely, we estimate an equation for the change in the share of foreign assets in total wealth, i.e. equation (3). The period of estimation is from 1973, the beginning of the current float system, to 1988 on a quarterly basis.

For convenience, let us reproduce the estimating equation below:

$$x - x(-1) = s(C_0 + d/AV) \qquad (5)$$

The left hand side of the above equation is calculated by (4), i.e.,

$$x-x(-1)= -CF/W + B(-1)*(e-e(-1))/(e(-1)*W) + x(-1)(W(-1)-W)/W. \qquad (6)$$

In the estimation we use the long-term interest rate differential plus the expected change in the exchange rate divided by exchange risk (as constructed in the previous section) for d/V, the stock of net private long-term foreign assets for B and the stock of net private wealth for W.

Among the institutional factors discussed in the last section, we focus on the effects of capital controls and the growth of institutional investors with allowance for the existence of controls on the stock of net foreign assets held by these investors. This decision was made because other variables are hard to quantify. The effects of capital controls in the 1970s and the early 1980s are captured by the inclusion of dummies.

Changes in controls in the 1980s were more in the form of those in the ceilings on the stock of foreign assets held by institutional investors. Thus they will be treated jointly with changes in money flows which have increased the assets of these investors.

In order to study the impact of a change in domestic money flows, we need to know the stock of wealth and the degree of risk aversion of each investor. Since this is almost impossible, we assume that the group of institutional investors studied here possess the same degree of risk aversion and hypothesize that this is lower than other investors. More specifically, we have chosen life and non-life insurance companies, securities investment trust, pension trust, money and non-money trust as representatives of institutional investors with a low degree of risk aversion.

The assets of these investors were added one after another at the point when each investor was allowed (or permitted with less tight regulations) to hold foreign securities in proportion to the ceilings on the share of foreign assets as determined by the authority and then was divided by total financial assets, resulting in the variable f to be used below[11]. Thus, between 1971 & 1985 only 10%, after 1986:III 30% of the total asset of life insurance companies appear in the numerator of f. This is admittedly a very crude way of addressing the effect of the regulation[12]. However, there being no obvious alternative, we assume that f represents both the effect of increased concentration of funds into institutional investors and that of the relaxation of controls on the portfolio of them.

2. Estimation Results

Estimation of (5) with OLS using a sample of 1973:I-1988:IV gives the following results:

$$
\begin{aligned}
x - x(-1) \quad = \; & .0114 \;\; +.00497*D1 \; -.00415*D2 - .00741*D3 \\
& (3.55) \quad (1.23) \quad\;\; (-.963) \quad (-1.78) \\
& .00411*D4 \; -.0000534*d/V \; +.00279*f*d/V \\
& (1.45) \quad\;\; (-1.84) \quad\;\; (2.16) \\
& +.212*f \; - \; .229*x(-1) \qquad\qquad (7) \\
& (3.51) \quad (-3.61) \\
& R^2 = .335, \; D.W. = 1.78
\end{aligned}
$$

where D1-D4 are dummies designed to capture the effects of capital controls in the 1970s and early 1980s. Specifically, D1=1 for 1974:I-75:II,d2=1 for 1978:I-78:IV, D3=1 for 1980:I-IV,D4=1 for 1981:I-88:IV. Estimation of (7) with correction for serial correlation in the error term resulted in an insiginificant estimate of the serial correlation coefficient. The inclusion of the f variable directly in the specification reflects the following consideration. Theoretically, the W variable in (7) ought to be the wealth of those who are allowed to purchase foreign assets. Since the construction of such a variable is very difficult, we use total wealth instead. This necessitates a correction of the right hand side of (7) for the difference between the wealth of those who can buy foreign assets and total wealth. We assume that this is done, if imperfectly, by the inclusion of the f variable.

The D3 variable is significant with the right sign, but the other capital control dummies are insignificant. In particular, the effect of the revision of the foreign exchange law is insignificant. However, when the D4

dummy is moved to a later period, it does turn significant and the coefficient on f declines. It is conceivable that there were important lags in the effects of the new law and that the massive increase in foreign investment by institutional investors would not have materialized without the new law. It may also be noted that the size of the coefficient estimate is fairly large as we shall see in the next section.

The term d*f/V is significant with a positive sign, indicating that the response of capital flows to return differential after allowance for exchange risk has increased over time because f has increased. Although the coefficient on d/V is of the wrong sign, the total response of capital flow to d/V is positive for most of the sample because the sample average of f is about .038.[13] However, it is negative for years 1973-75. Hence, we confine most of the discussions of regression results to the period after 1976. In any case there is evidence of the important effect on capital flows of a decline in risk aversion and relaxation of controls on the portfolios of institutional investors.

Some variants of (7) were also estimated. Taiyo-Kobe Bank (1989), among others, points out that the average holding period of foreign securities by Japanese investors declined sharply in the mid 1980s. To take account of such a possibility, we constructed ARMA type forecasts of 3-month holding period yield of U.S. bonds relative to Japanese bonds along with its variance and used this for d/V. But it was not significant.[14]

Without doubt the way exchange rate expectations are constructed would exert significant effects on the estimation result. To explore this possibility, we tried using exchange rate surveys published by the Japan Centre for International Finance for the period after 1985. 6-month ahead

forecasts of the yen-dollar rate were used from this survey to partially replace the exchange rate expectation series in the d variable; however, this did not change the estimation results very much.[15)]

Increasing portion of long-term foreign investment is financed by short-term foreign borrowing. The relative rate of return relevant for such investment strategy is the difference between U.S. long and short rates, which was included in the specification. This turned out to be insignificant when the entire sample was used, while it was significant when only the mid- to late 1980s were included in the sample. But in the latter case coefficients of other variables were only very imprecisely estimated. Thus, we have decided to drop the variable from the specification.

3. Some Simulations

In order to see the effects of some key variables on capital flows more clearly, let us carry out in-sample simulations using the estimation result.

Figure 7 presents the estimates of the optimal foreign asset-total asset ratio(x*) with and without the capital control dummies along with the actual level of the ratio. The optimal ratio (without the effects of controls) has been rising almost monotonically since 1979, and at an increasing rate since 1984 with interruptions taking place in the latter half of 1985 and 1987. Clearly, this consistent rise in the ratio has been one of the key reasons for large capital outflows in the 1980s. The figure also reveals that the capital control in 1980 and the revision of the foreign exchange law exerted siginificant impacts on the optimal share of

foreign assets.

Figure 8 shows the effects of exchange rate expectations and the U.S.-Japan interest rate differential on x*. These are calculated by using the estimated coefficients, the actual movements of the interest rate differential and exchange rate expectations, and the average of V for the sample period.The interest rate differential exerted positive effects on x* for 1981-84 and 1986-88. But the size of the effects is estimated to be quite low. In the 1981-85 period the interest rate effects explain only about 10-15% of the rise in x*. The corresponding figure for 1986-88 is higher at about 30%.

The effects of exchange rate expectations is slightly more important. Expectations of yen depreciation explains about 50% of the rise in x during 1979. In the early to mid 1980s the effects are a bit smaller but are nonnegligible. In the 1985-88 period, expectations of yen appreciation created a very large negative impact on x*.

As pointed out in the last section there is a possibility that movements in exchange risk intensified the effects of return differentials on capital outflows. Between 1981 and 1985 the rate of return differential itself explains about 30% of the rise in x, but when this is combined with the effect of the decrease in exchange rate risk, the contribution rises to about 45%. The total effects of the return differential is summarized in Figure 9. It may be seen that the return differential exerted significant positive effects on capital flows in 1979 and 1984-85, while since 1985 its contribution has been negative.

The remainder of the movements in x is explained by the behavior of f. It explains about 50% of the rise in x* in the early to mid 1980s and more

than 100% in the 1985-88 period. In order to analyze the impact of the deregulation in 1986, we may calculate the levels of x* which would have obtained had there not been the relaxation of the ceilings on the portfolios of insurance companies and pension funds in 1986. The figure also shows the time path of x* under such an assumption. There is some downward adjustment in x*. Though the size of the impact seems modest, it translates into about 50% reductions in capital outflows (because the latter responds to the difference between x* and x).

To summarize, movements in x* in 1978 were largely caused by the expectation of exchange rate depreciation which emerged after a period of sharp appreciation. Capital controls in 1980 seem to have exerted strong impacts on the long-term capital account. The rise in x* in the early to mid 1980s were created by the combination of the existence of interest rate differentials, expectations of exchange rate depreciation, the growth of institutional investors and the relaxation of portfolio restrictions. Decreases in exchange rate risk may have played some role during 1983-85. During the 1985-88 period, most of the rise in x* is explained by the continued growth of institutional investors and the relaxation of controls on their portfolios, nmost of which took place in 1986. Throughout the 1980s the revision of the foreign exchange law has exerted a positive impact on capital outflows.

V. CONCLUDING REMARKS

In this paper we have analyzed the pattern of movements in the long-term capital account during the 1970s and 1980s using a simple capital flow equation. By summarizing the analyses in sections III and IV, we obtain

the following conclusions. Important economic determinants of the long-term capital account are international interest rate differentials, exchange rate expectations, exchange rate risk and changes in the stock of private wealth. We also discovered the importance of the partial adjustment mechanism in which the actual stock of foreign assets is adjusted slowly toward its optimal level.

Many authors have pointed out the importance, especially for the 1970s, of the effects of various controls on the capital account. We have, in section III, pointed out the possibility of these effects in a qualitative manner. In section IV, we carried out a formal test of the presence of such effects, which revealed that some of the controls in the 1970s and early 1980s exerted strong impacts on the capital account.

One of the major goals of our analysis has been to explain the large increases in capital outflows in the 1980s. Our results suggest that the effect of high U.S. interest rates and the expectation of exchange rate depreciation were important, but that these alone do not explain the whole story because the U.S.-Japan interest rate differential and exchange rate expectations moved in the direction of decreasing capital outflows after 1984 or 1985.

Sharp increases in the stock of wealth have exerted siginificant positive effects on capital outflows throughout the 1980s and explain about one third of total outflows. Other important factors have been the very rapid growth of institutional investors with (potentially) high propensities to hold foreign assets, on the one hand, and the relaxation of controls on their holdings of foreign assets, on the other. These have meant that increased wealth has become available for purchase of foreign

assets and, moreover, that the average degree of risk aversion has declined and increased the demand for risky foreign assets in the mid to late 1980s even without further increases in yield differentials. In addition, the revision of foreign exchange law, by decreasing transactions costs, provided a background for these mechanisms to work and also encouraged the demand for foreign assets by smaller investors as well.

One of the important implications of the above results is that the responsiveness of capital flows to interest rate changes has increased recently. In other words, the substitutability between domestic and foreign assets has increased. Such a result is consistent with findings in the literature that the elasticity of exchange rates to interest rate changes has increased in the 1980s[16].

Let us next summarize the behavior of the capital account in periods of large current account surpluses and discuss macroeconomic mechanisms working behind them. It is unlikely that autonomous movements in the capital account were a major cause of large current account surpluses in the 1970s. For one thing, the increase in capital outflows lagged behind those of the current account. For another, capital outflows in these periods were caused by the emergence of an exchange rate expectation of depreciation resulting from the appreciation of the spot rate, and to some extent (though we did not find econometric evidence of it), by capital controls which encouraged outflows. The former is a typical mechanism by which an autonomous increase in the current account causes capital outflows. Capital controls may also have been a response to large current account surpluses and exchange rage appreciation. These considerations suggest that movements in the current account were the cause of those in

the capital account in the 1970s, although one still needs to know where the current account surpluses had come from, whether from shocks to the current account itself or from those to net domestic savings.

On the other hand, capital outflows in the 1980s preceded current account surpluses. As summarized above, the major causes of the outflows were the rate of return differentials,increases in wealth, changes in domestic money flows and relaxation of capital controls. Going back to the question of the macroeconomic interpretation of capital outflows, we may argue that the first two are the results of shocks to the net savings in Japan and the rest of the world.

However, the remaining two causes of the outflows can perhaps be regarded as autonomous movements in the capital account. This is consistent with the absence of sharp appreciation of the yen until mid 1985 in the midst of large current account surpluses. Consequently, we might conclude that there were shocks to the capital account, changing money flows and relaxation of capital controls, which enlarged the imbalances in the capital and current accounts. It is important to note, however, that the stimulus to capital outflow created by financial liberalization does not last forever. For example, relaxation of portfolio regulations will not create capital outflows once the actual stock of foreign assets catches up with the optimal stock. In this regard Figure 9 reveals that the effect of the f variable has been almost constant since 1987, indicating that the above two mechanisms are close to over barring further deregulation or increased money flows into institutional investors.

Finally, let us discuss more carefully the interpretation of the events since the fall of 1985. Despite the sharp appreciation of the yen,

capital outflows (relative to wealth) continued to increase in 1986. Although they declined somewhat in 1987 and 1988, they are still at high levels. Our analysis suggests that the major cause of the rise in capital outflows in 1986 and in subsequent years was the relaxation of controls on the portfolio of institutional investors, which took place in 1986. Without the relaxation capital outflows would have been much lower, and the appreciation of the yen, much larger.

Footnotes:

1. The behavior of the short-term capital account, or its relation to the intervention policy of the central bank is a very interesting topic of study. (See, for example, Komiya & Suda [1983].) However, we shall focus on the long-term capital account, which dominated the movements in the capital account in the 1980s-- the period in which we are most interested.

2. Such modeling of the capital account has a long tradition in the literature. See, for example, Branson [1970].

3, With cross share holdings among corpoations total market value of stocks overestimates the value of the assets held by the corporate sector.See Ueda(1989).

4, Let us note that under a different partial adjustment scheme, we obtain different decomposition in Table 2. For example,with nominal assets adjusting slowly, we must multiply the second and third terms of the right hand side of (4) by the adjustment speed s. Overestimation of the effects of wealth and exchange rate changes in the table, however, is not very serious in the discussion of a long-run impacts, say over a few years, of them.

5. In the following we shall assume that foreign assets are represented by bonds denominated in U.S. dollars.

6. We use yields to maturity on government bonds for the two countries. However, the secondary market on government bonds were virtually non-existent in Japan before 1977. Thus we used the yield on NTT bonds instead -- for years prior to 1977.

7. For details, see Ueda & Fujii [1986].

8. However, the policy of discouraging capital outflows of certain investors was adopted in the period between the spring to the fall of 1982 and the period from the fall of 1983 to Sep. 1985. These controls took a very weak form in that they discouraged purchases of foreign securities by some institutional investors such as insurance companies and pension funds.

9. The real demand principle for forward transactions was abolished in the April of 1984 and the regulation on the spot position of foreign exchanges was also abolished in the June of 1984. In addition, various regulations on transactions in the Euro market were relaxed.

10.See,for example, Bank of Japan [1985] or Ueda, Shimizu & Negishi [1986].

11, More careful description of the data can be found in the data Appendix.

12, For example, to the extent that a ceiling is not binding its change would have little effect on the demand for foreign assets. Incidentally, constructing f with total assets of an investor after he is allowed to purchase foreign assets and using it in place of the f in the text resulted in a similar equation to (7). However, such a specification does not allow us to analyze the impact of the 1986 deregulation.

We may also note that when a ceiling is binding for an investor, changes in d/V will have no effects on his purchases of foreign assets. At the aggregate level, however,there would be some effects, as assumed in the specification, because not all investors are constrained by the regulation.

13, It may be interesting to include E* and r*-r separately in the specification. The estimation result of such a specification was largely the same as (7); however, some of the variables were insignificant.

14, We also tried estimation of a partial adjustment equation in nominal foreign assets. The pattern of coefficient estimates were similar to (7)

but a large number of them were insiginificant.

15, Another appealing way of constructing the exchange rate expectation series would be to find a proxy of a long-run equilibrium exchange rate and use the difference between the actual and long-run rates as being proportional to the expected rate of change in the exchange rate. Several estimates of the long-run rate were tried including various versions of the PPP rate and the rate that would equilibrate the current account. However, in many cases the coefficient on the exchange rate expectations were of the wrong sign, reflecting perhaps the impact of large capital outflows in the midst of large current account surpluses (and hence expectations of a sharp yen appreciation under such an assumption) in the mid 1980s.

16, See, for example, Ishii, Mckibbin and Sachs (1985).

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Table 1 Share of Foreign Securities in Total Wealth

	78	79	80	81	82	83	84	85	86	87	88
Banking Accounts of Banks	0.40	0.43	0.46	0.57	0.78	0.91	1.33	1.95	2.24	2.23	2.10
Trust Accounts of Banks	0.33	0.45	0.48	0.95	1.36	2.01	2.65	5.40	7.53	7.94	7.14
Agricul. Cooperatives	0.20	1.40	2.00	2.20	2.00	1.50	1.90	4.40	6.30	5.59	6.61
Life Insurance	1.10	2.60	2.70	3.90	5.70	7.70	8.80	9.30	11.70	13.73	14.15
Non-life Insurance	1.70	2.40	2.80	3.00	3.90	6.00	7.80	8.70	11.20	10.38	10.42
Mutual Funds	1.60	4.10	1.90	2.80	1.90	1.70	4.70	8.30	12.50	9.25	9.08
Sogo Banks	0.04	0.06	0.07	0.16	0.22	0.27	0.40	1.25	1.92	1.76	1.60
Shinkin Banks	0.18	0.26	0.46	0.65	0.61	0.71	0.89	1.22	1.23	1.06	0.96
Kampo	0.00	0.00	0.00	0.01	0.02	0.87	2.24	3.38	4.68	5.57	5.61

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Table 2 Decomposing Capital Outflows

	-CF/W	x-x(-1)	exchange rate effect	wealth effect
1978	.024	-.002	.007	.011
1979	.027	.026	-.009	.005
1980	-.004	-.025	.009	.012
1981	.013	.007	-.003	.007
1982	.020	.023	-.003	.004
1983	.020	-.007	.001	.011
1984	.051	.041	-.005	.011
1985	.046	.012	.019	.014
1986	.062	.006	.021	.020
1987	.046	.001	.028	.010
1988	.037	.017	-.002	.022
81-88 sum	.295	.100	.056	.099
		(33.9%)	(19.0%)	(33.6%)
1981-84	.094	.064	-.006	.020
1985-88	.132	.037	.049	.031
81-88 sum	.226	.111	.025	.069
		(49.1%)	(11.1%)	(30.5%)

Note: Calculations are based on equation (4).

Data Appendix:

CF: Long-Term Capital Account (100million yen, the same below).

W: High-powered Money+Government Bonds Outstanding+Market Value of Stocks*(1- CR)+F

F: Net Private Foreign Assets, Annual Series is obtained from the Ministry of Finance. Quarterly Series estimated using the Current Account.

CR: The Degree of Cross Share Holdings (From Ueda (1989).)

B: Net Private Long-term Foreign Assets. Annual Series is obtained from the Ministry of Finance. Quarterly Series estimated using the Long-term Capital Account.

f: Mutual Funds*50%+Insurance Companies*(10% until 1986:1,25% until 1986:2, 30% thenafter)+ Pension Trust*(10% after 1981:1 until 1986:1, 25% until 1986:2,30% thenafter)+Money & Nonmoney Trust*(100% after 1984:2) divided by a proxy of total financial assets (=Banking & Trust acccounts of all Banks+Life & Nonlife Insurance companies+ Aggricultural Cooperatives+Kampo+Postal Pensions+Shoko Chukin Banks).

d: r*-r+E*

r*: interest rate on 10-year (20-year before 1978) U.S. government bonds

r: interest rate on 10 year Japanese government bonds (NTT bonds rate before 1977).

E*: one period ahead forecast of E=one year rate of change in the yen dollar rate from a rolling regression of E onto four lags of E using 16 observations each time.

V: Variance of the error term of the rolling regression for E*.

Figure 1 Current account, Long-Term
Capital Outflows & Intervention (/GNP)

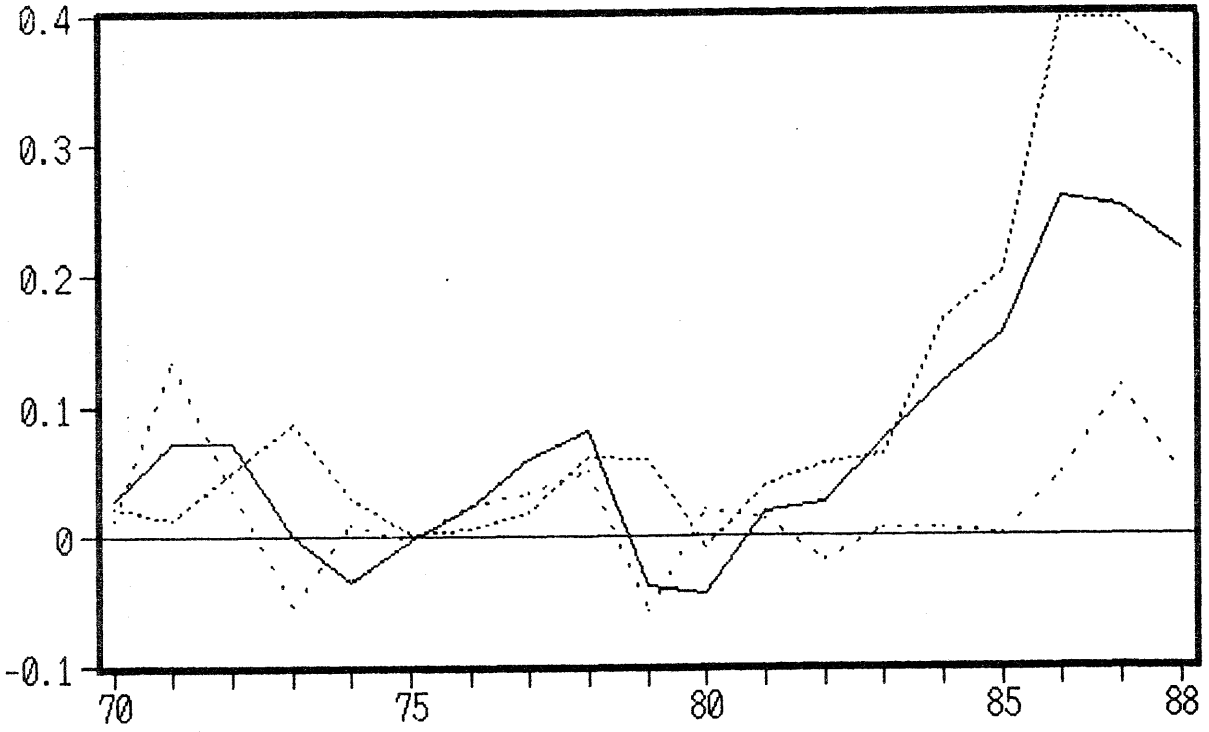


Figure 2 Components of the Long-term Capital Account

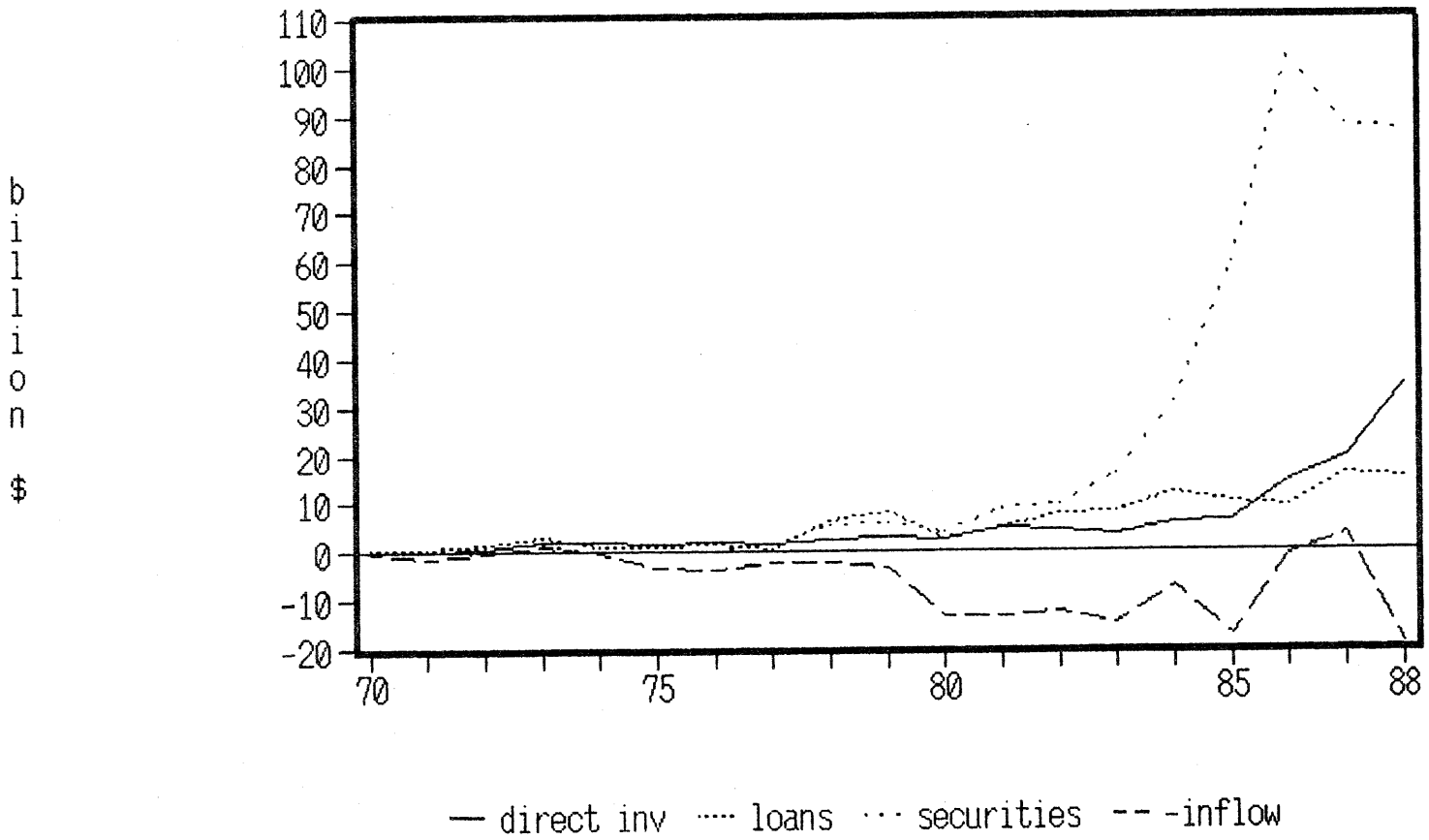


Figure 3 Wealth GNP ratio

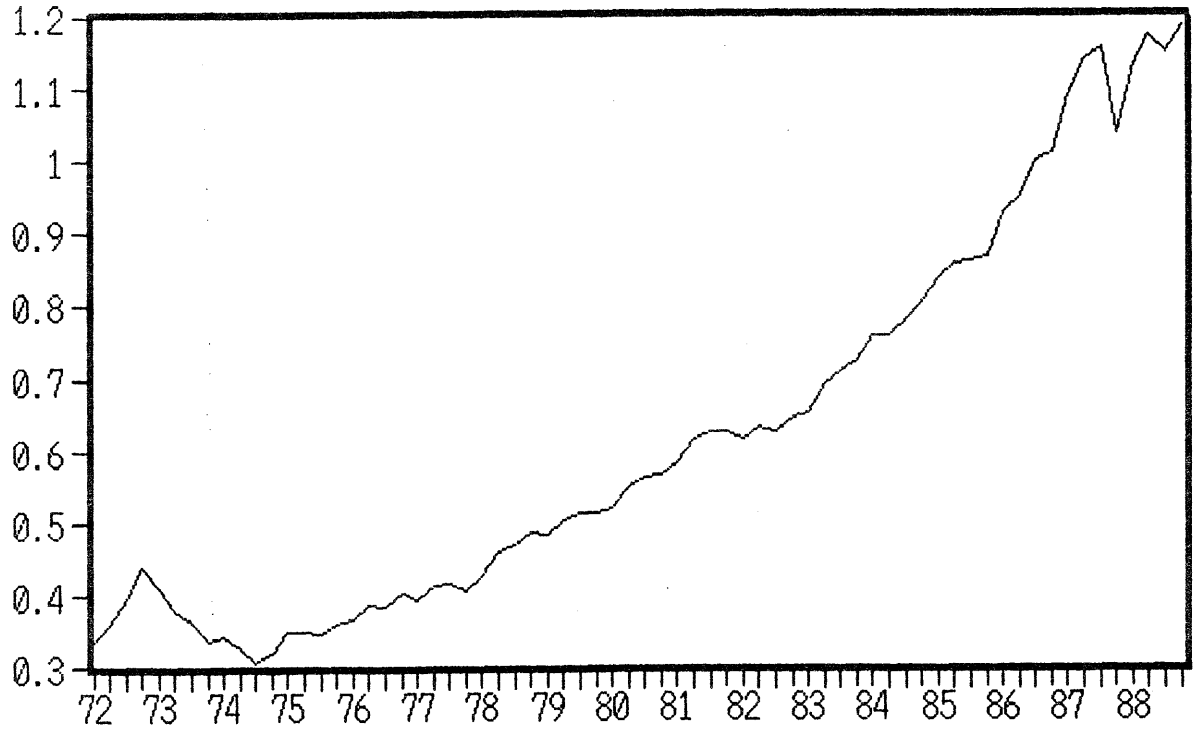


FIGURE 4 RETURN DIFFERENTIAL &
CAPITAL OUTFLOW

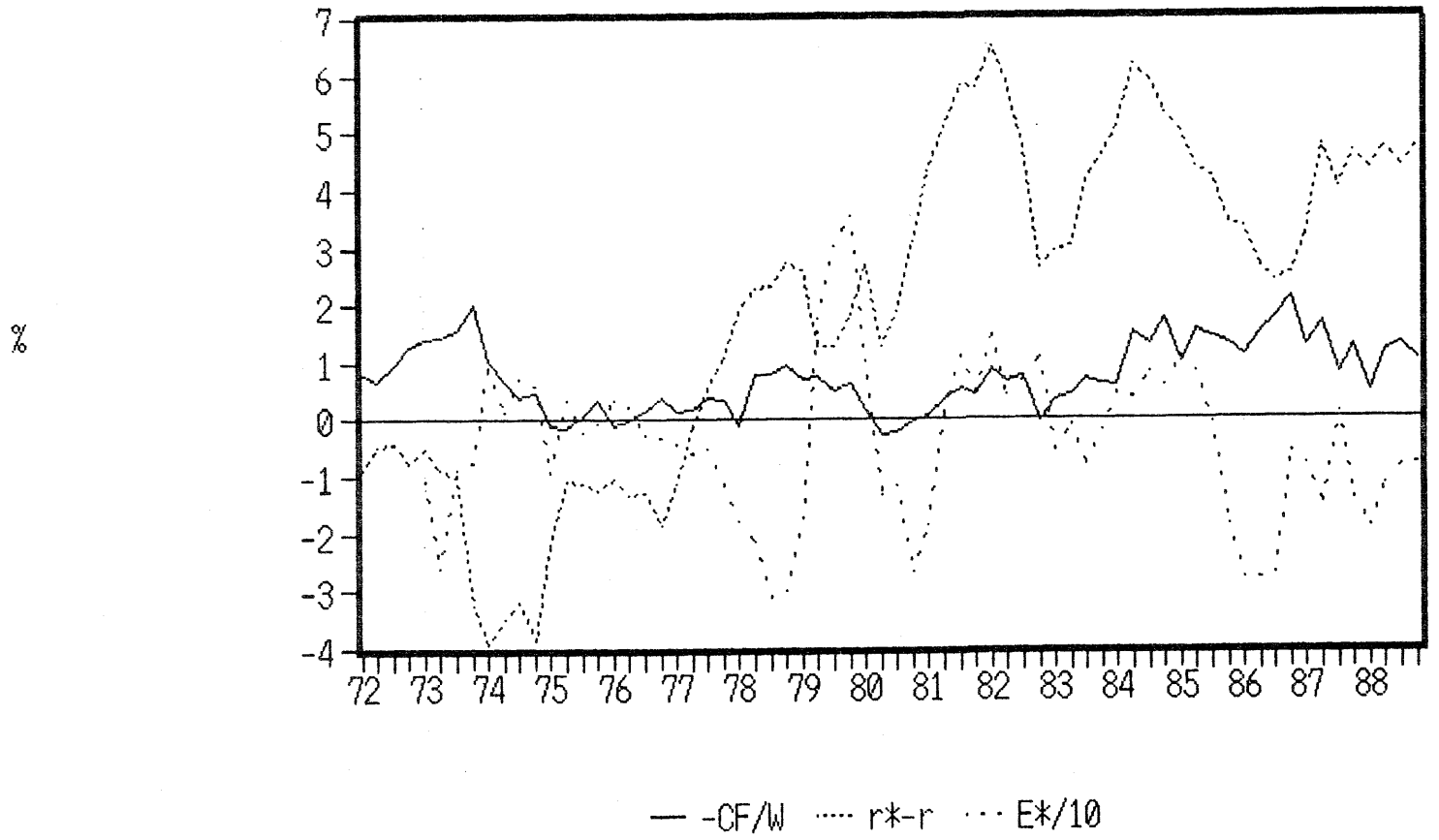


FIGURE 5 EXCHANGE RATE RISK
& CAPITAL OUTFLOW

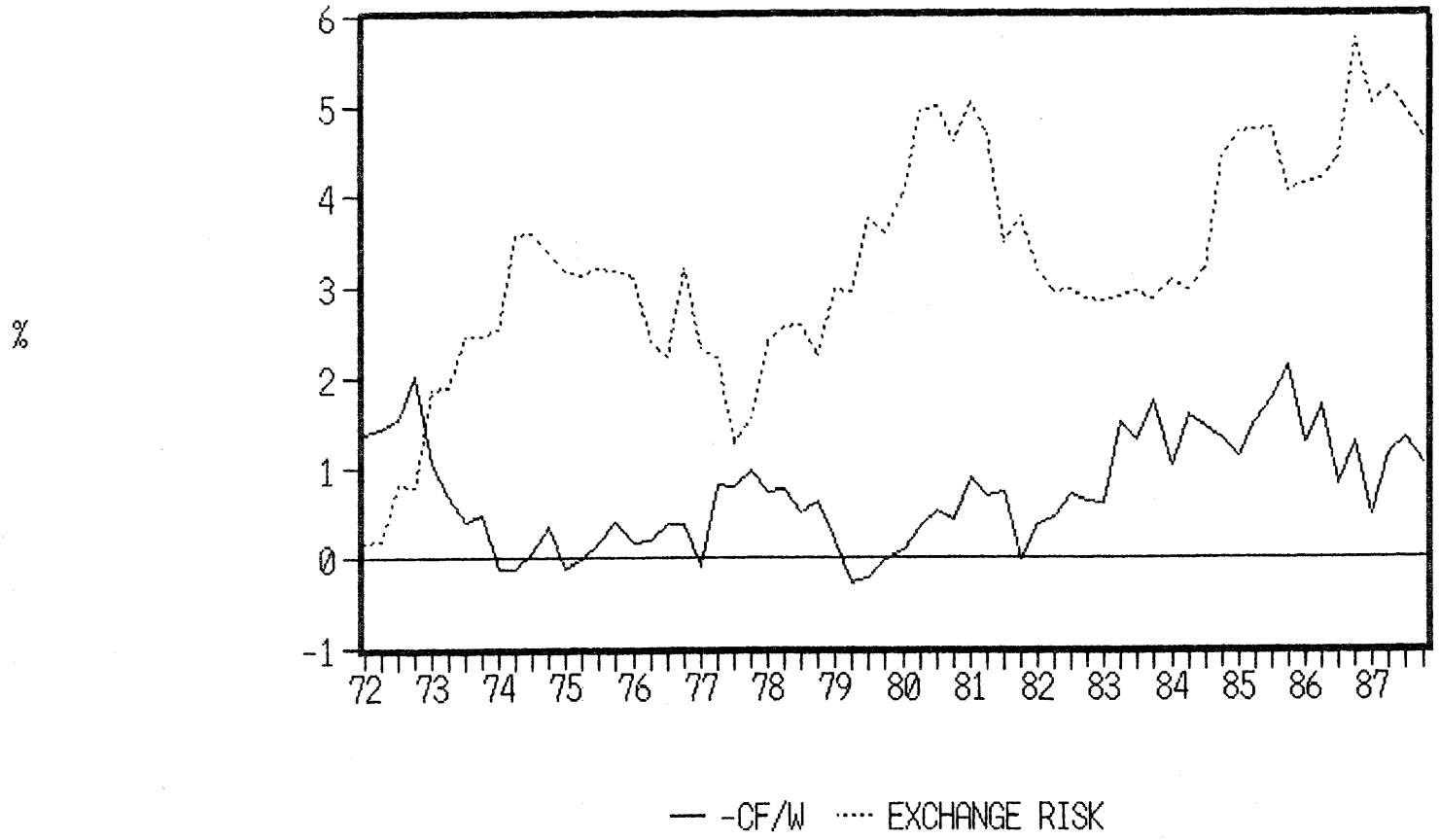


Figure 6 Growth of Institutional Investors

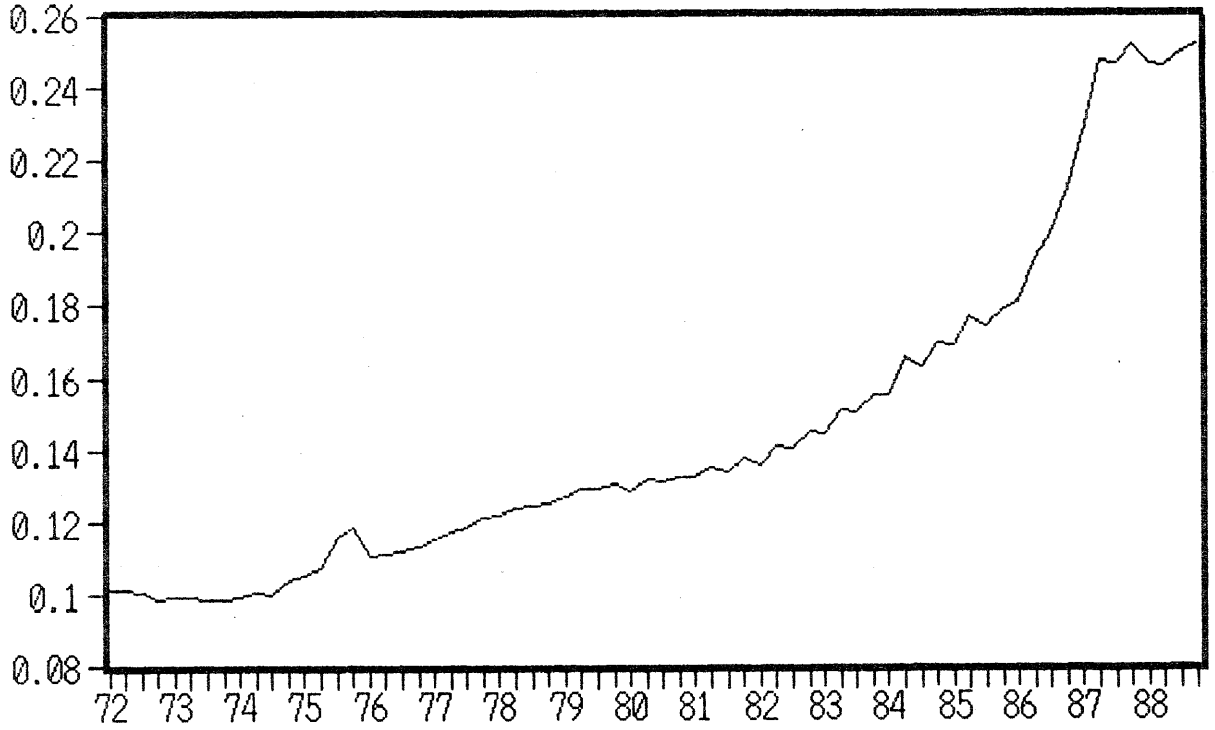


FIGURE7 OPTIMAL & ACTUAL
FOREIGN ASSET/TOTAL ASSET

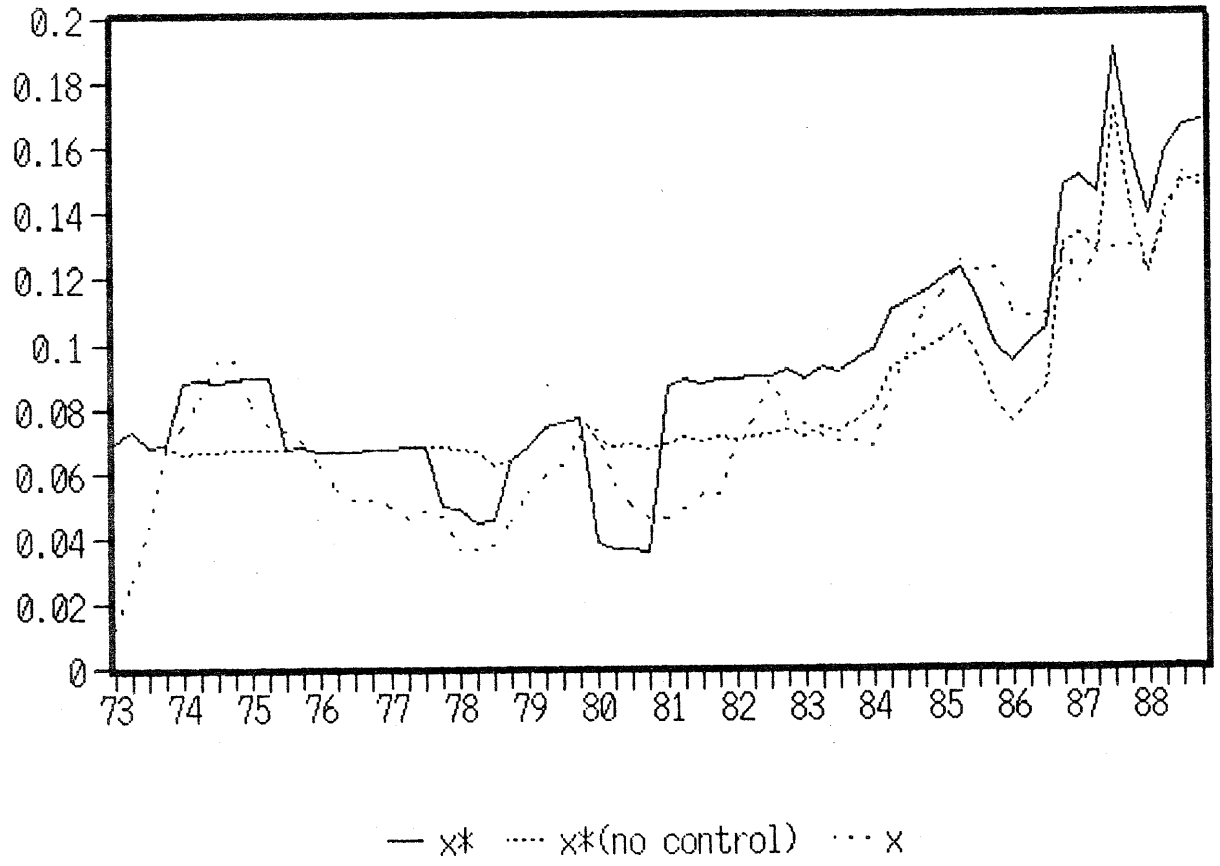


FIGURE 8 RETURN DIFFERENTIAL
& OPTIMAL SHARE OF FOREIGN ASSETS

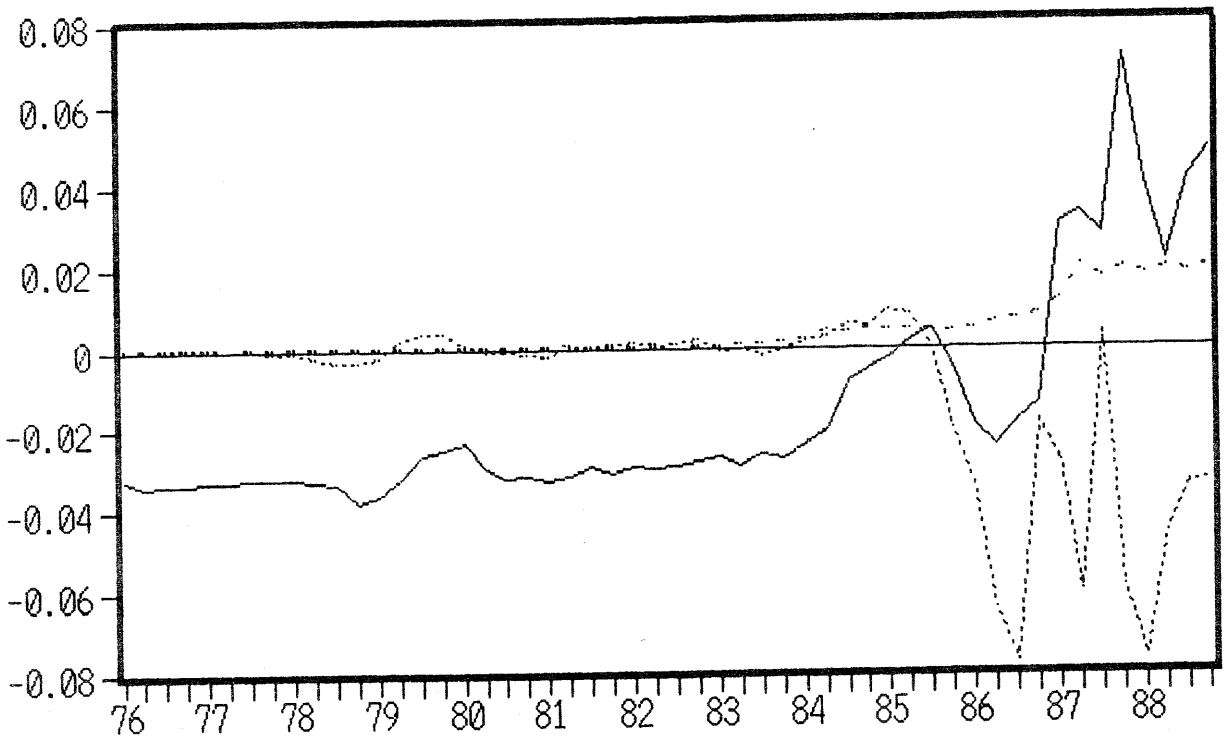
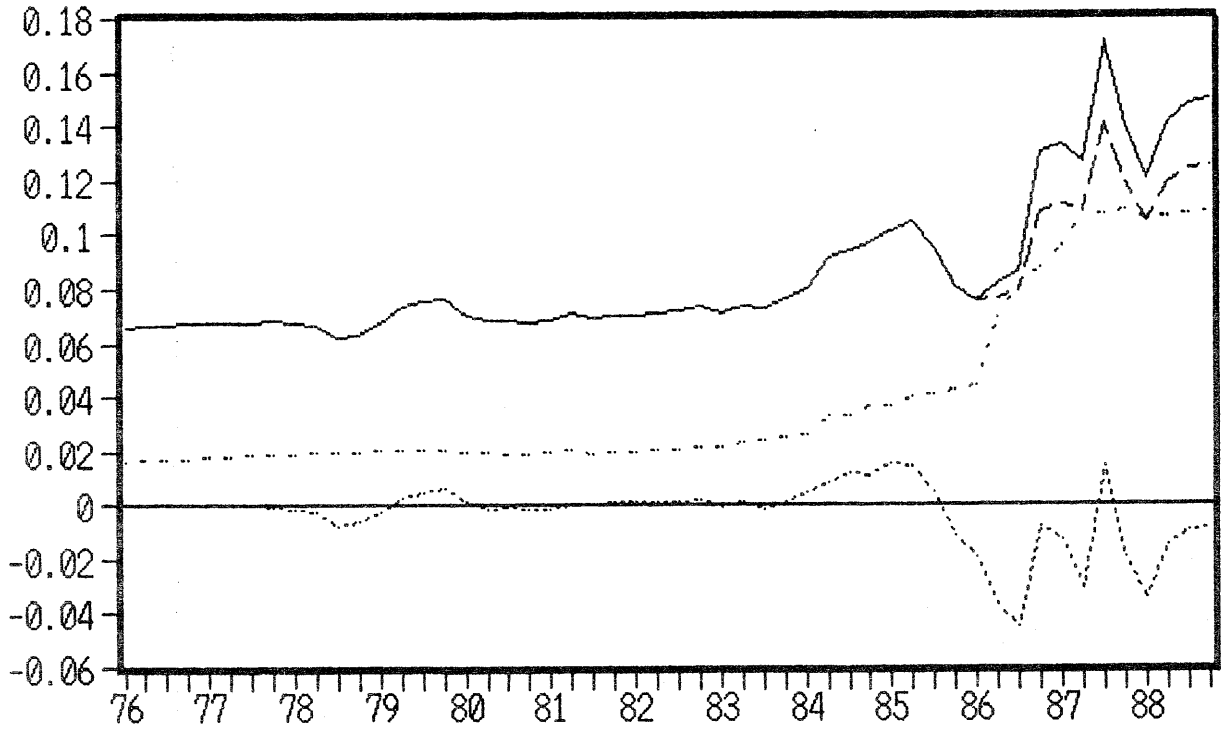


FIGURE 9 The Effects of f & d/v



— x*(no control) ····· effect of d/v ··· effect of f -- no dereg. in 86