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Japanese Foreign Investment and the "Land Bubble"*

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Abstract

The aim of this paper is to examine the determinants of Japanese net long-term capital flows in the 1980s and early 1990s. A basic framework is proposed which takes account of Japan's so-called land bubble by incorporating the interaction of land with the banking sector in a macroeconomic portfolio model of capital flows. Empirical evidence is supportive of the hypothesis that land-related bank loans have been a major determinant of Japanese net long-term foreign investment. The hypothesis of substitution between direct and indirect foreign investment also receives support, and areas of future research are mentioned.

1. Japanese Foreign Investment in the 1980s and Early 1990s

The aim of this paper is to examine the determinants of Japanese net long-term capital flows in the 1980s and early 1990s. While capital flows are determined independently of the current account, balance-of-payment equilibrium implies that capital outflows equal current account surpluses. Figure 1 shows that during the 1970s net long-term capital flows seemed to reflect this "textbook" relationship: the long-term capital account followed the current account with a time lag and roughly matched it in size. In the 1980s, however, net long-term capital outflows expanded faster than the current account surplus, by far exceeding it in size and preceding it in timing. Thus the basic balance was almost persistently negative.[1]

During that decade, Japanese indirect and direct foreign investment reached vast proportions. Indeed, Japanese capital exports appeared to all but dominate world financial markets: Japan's share of net long-term capital outflows among the G7 countries plus traditional capital exporters Denmark, the Netherlands, Switzerland, and Saudi Arabia rose from a quarter in 1982 to nearly 90% in 1987. In 1989, more than half of all foreign direct investment by these countries came from Japan. By that time Japan had become the biggest net creditor nation on record, easily surpassing previous US or OPEC surpluses at their peak.

This historical expansion of Japanese capital exports was, however, followed by an historical collapse: virtually within the short period of one quarter, Japan became a sizeable net importer of long-term capital in 1991. By 1993, as the current account was still heading for record highs, Japan's surpluses were not fully "recycled" through the long-term capital account.[2]

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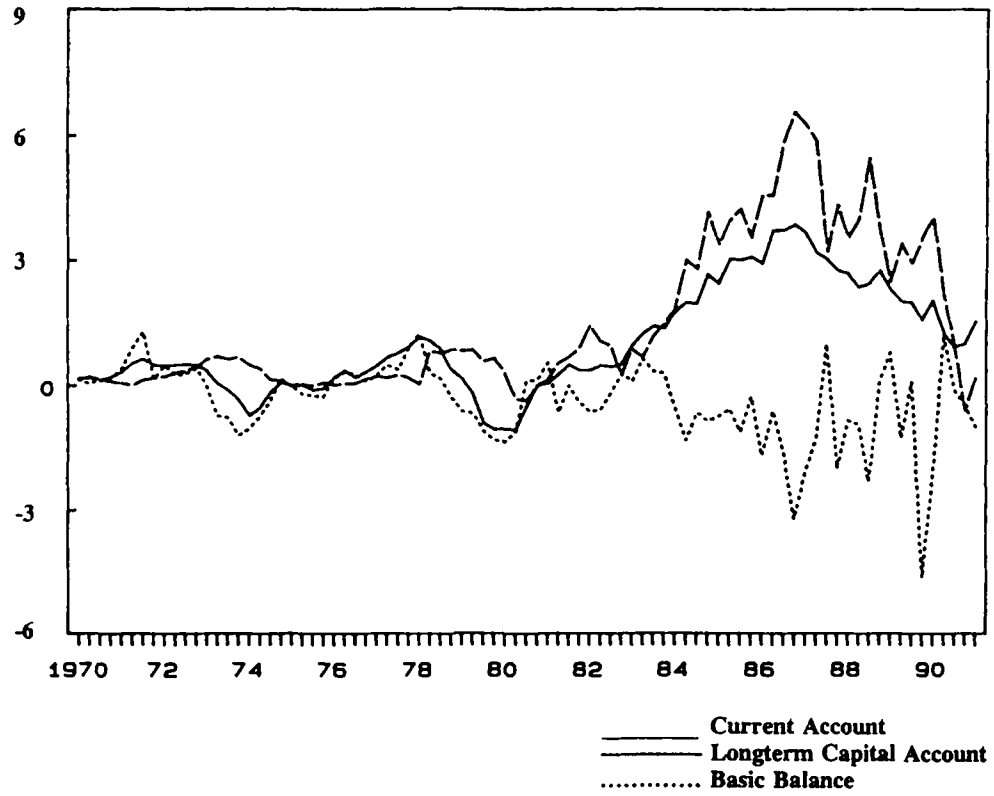

Figure 1. The Japanese Basic Balance (Trillion Yen)

It would seem that the dramatic events in Japan's capital account should merit a closer examination, in particular since Japanese investments have had a non-negligible impact on many receiver countries. Surprisingly, however, virtually no study has tackled the determinants of the Japanese net long-term capital account over this volatile period. The few earlier studies which have focused on aspects of the Japanese capital account (Ueda, 1990) did not find great empirical support.

2. Problems with the Traditional Capital-Flow Analysis

Traditional capital-flow studies can be criticized on theoretical grounds.

Empirical Nonstarters

National accounting identities tell us that net capital outflows result from domestic savings in excess of domestic investments. But accounting identities do not necessarily imply behaviorial relationships. They are true by definition. Apart from the many definitional problems,[3] it is difficult to establish a strong empirical link between actual savings-investment balances and observed capital flows.

Another popular explanation of rising capital flows from Japan in the 1980s has

been the deregulation of capital controls and the liberalization and "globalization" of Japanese capital markets. Indeed, exchange controls were gradually relaxed, starting with a major revision of the foreign-exchange law in December 1980 and proceeding with continuing relaxations of the foreign-asset ceilings which the authorities have granted institutional investors. While this development has certainly played a role, easing foreign-asset ceilings say little about the underlying cause of observed capital flows—especially since the large institutional investors frequently seemed to have remained significantly below their maximum ceilings of permitted foreign investment (Koo, 1991). Moreover, it could be argued that policy changes about capital controls are endogenous to pressures arising from the increasing desire of investors to acquire foreign assets. It is the latter that needs to be explained.

Interest Rate Endogeneity

Kouri and Porter (1974), among others, have argued that a major theoretical flaw of conventional partial-equilibrium portfolio models is that they treat domestic interest rates as exogenous. In these models, which include Branson's (1968) and Ueda's (1990), the behavior of one individual investor, for whom interest rates are exogenous, is aggregated to obtain the total macroeconomic investment behavior. However, what is true for a "representative agent" cannot be true for all agents taken together. Since on aggregate investors' behavior affects interest rates—as well as capital flows—both are endogenous and one cannot directly be used to explain the other. Theoretical work by Floyd (1969) and Niehans (1984) has therefore argued that most empirical work on capital flows has exaggerated the role of the interest-rate differential.

Stock and Flow Adjustment

In the 1980s, portfolio investment by far dominated Japanese net long-term capital flows. Consequently, portfolio adjustment models have been the most relevant to the analysis. Two main adjustment effects of the national portfolio W (wealth) can be discerned in such models: the stock and the flow adjustment. Simplified, they can be separated as follows (assuming that investors are home-currency based and expressing foreign assets in domestic-currency terms):

$$\Delta F = \Delta(F/W)W + \Delta W(F/W). \tag{1}$$

The change in the stock of foreign assets F is composed of the change in the foreign-asset share $\Delta F/W$ (the stock adjustment) and the change in wealth (the flow adjustment). Most empirical studies of capital flows, including those on Japan, are concerned with the stock-adjustment effect.[4] However, it proves empirically impossible to explain the surge in capital exports in the 1980s and their sudden collapse in the 1990s with portfolio diversification arguments of this kind, in particular in the aftermath of the Plaza agreement. Despite heavy and continuing foreign-exchange losses due to the strongly appreciating yen, Japanese investors increased their dollar exposure by stepping up foreign investment, mainly in US Treasury bonds. But if the flow-adjustment effect is more important, an increase in the total stock of wealth ΔW may result in capital outflows even with a fairly constant foreign-asset share. Thus it seems that an analysis is called for which allows for a greater and more explicit role to be played by the flow adjustment.

"Portfolio" and "Foreign Direct" Investment

Traditionally, "foreign direct investment" is distinguished from "portfolio investment." Most studies of international capital flows argue that this distinction is necessary, because foreign assets are acquired for different reasons by different investors. Portfolio investment is supposedly due to rational portfolio diversification, whereas foreign direct investment derives from decisions made on the firm level. Accordingly, Japanese direct and portfolio investment are usually analyzed separately as distinct phenomena. In the Japanese case it could be observed that until 1989 portfolio investment dominated the capital account. Since then, direct investment has outpaced portfolio investment.

However, this distinction may be unhelpful, if not misleading. Firstly, the definitions are arbitrary: at present, purchases of more than 10% of equity in a foreign company are considered "direct," of less than 10%, "portfolio" investment. More importantly, on a macroeconomic level both forms of investment are substitutes, conditioned by the same underlying factors: while the decision of whether to build a plant in Thailand or the UK is microeconomic, company-specific, and likely to have a motivation different from financial investments, the separate decision of *how to finance* this plant, i.e., where to procure the funds, concerns international monetary economics (Kindleberger, 1969). If "foreign direct investment" is locally funded, it does not even enter the balance-of-payments statistics in the capital account, since no capital flows occur. If it is funded from the investor country, it must displace portfolio investment by a similar amount. Ruffin (1984) has even called "foreign direct investment" a misnomer. Indeed, Ruffin and Rassekh (1986) could provide empirical support for the hypothesis of perfect substitution between direct and indirect investment with US data.

3. Land and the Wealth Definition

Most students of Japanese asset markets have focused on a restricted set of financial assets, usually money and bonds. They have failed to take account of Japan's most important asset, land. Especially in the 1980s, Japanese land prices have increased dramatically. In 20 years, total private-sector land wealth multiplied by a factor of 14, rising from 14.216 trillion yen in 1969 to 200.0 trillion in 1989, according to official statistics (which are known to be an understatement of market values). This meant that in 1989 all of Japan's land was valued at four times the property of the entire United States of America—despite the fact that Japan is only a twenty-sixth of its size. A plot of land of the size of the Imperial Palace garden in central Tokyo was rated at the same value as all the property of the state of California.

Due to its extraordinary appreciation, land now occupies an immensely large portion of the private-sector net worth. According to the statistics in the National Accounts, land wealth made up 70% of Japan's total net worth (see Figure 2) in 1989, while it accounted for only about 25% of US net worth (Bradford, 1990). Figure 2 also shows that the Japanese land value was twice as large as the GNP in 1977 and five times as large by 1989 (while this ratio was below 1 for the US at the end of the 1980s).

Land prices have appreciated to an extent which seems to defy economic reasoning. Indeed, Noguchi (1990) argues that land prices were detached from their theoretical value in the 1980s. Asako (1991) estimated that Japan's land price rise was too large to even qualify as a "rational bubble." Moreover, the argument that

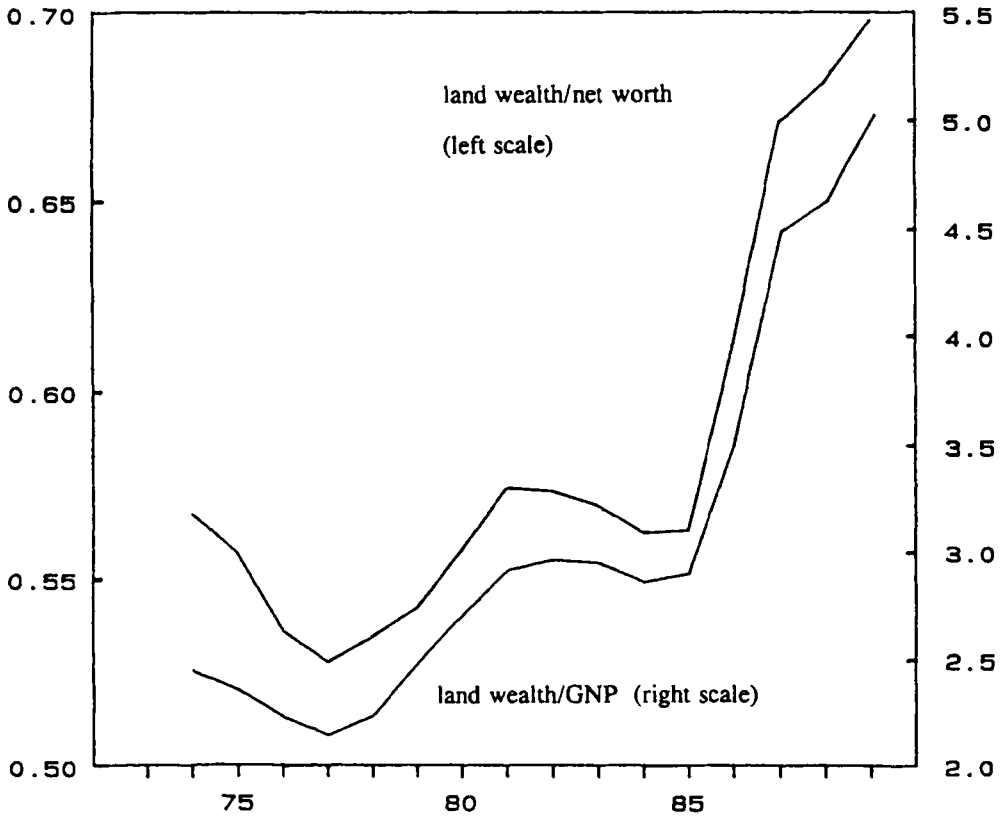

Figure 2. Land Wealth as Fraction of Private Net Worth and GNP

potentially higher Japanese "land productivity" may explain land prices is contradicted by the fact that land was not mainly traded as a factor of production, but was treated as an asset and traded for speculative purposes (National Land Agency, 1990).

It is likely that Japan's uniquely high and explosively rising land prices, constituting the largest part of Japan's total portfolio, should also have had some impact on foreign investment behavior. This has been verbally hinted at by Koo (1988), the Bank for International Settlements (1990), and the Bank of Japan (1990). However, such a link has never been made explicit, nor has it ever been demonstrated empirically. Moreover, the link is being disputed by others, who argue that high and rising land prices could not have affected Japanese capital flows. Simplified, the argument runs as follows: If Japanese land-owners decide to sell their highly priced land, money is transfered from the buyer. As long as the buyer is Japanese—and indeed foreigners made few inroads into the Japanese property market—the macroeconomic impact on the world is zero, as domestic resources are merely reallocated (for a more sophisticated argument see Noguchi, 1992, p. 225ff).

However, previous analysis may have neglected the macroeconomic implications of land being used explicitly or implicitly to collateralise loans. It is known that Japanese financial institutions rely heavily on land collateral as security for loans.[5] Thus one way to model the importance of land in its role as collateral is by

introducing land-related loans in a macroeconomic portfolio model. Rising land loans could then affect capital flows via the flow adjustment effect, as they increase the total portfolio size.[6] This is tested below.

4. A Macroeconomic Model of Japanese Capital Flows

Following Kouri and Porter (1974) and Ruffin and Rassekh's (1986) generalization, a basic reduced-form macroeconomic model of capital flows is developed. This model has the advantage that the domestic interest rate is endogenized, greater importance is attached to the flow adjustment effect, and net long-term capital flows are considered. The implicit treatment of "portfolio" and "direct" foreign investment as substitutes in a macroeconomic sense is explicitly tested later.

The model focuses entirely on the financial sector. All variables are in nominal, domestic-currency terms. Foreign assets are assumed to be unlimited and foreign interest rates are given, while domestic interest rates are endogenous.

First, the control model is formulated. It does not include a land-loan variable. The aggregate financial portfolio W consists of high-powered money M, domestic bonds B and net foreign assets F. R is the domestic interest rate (long bond rate) and R' the foreign one (rate of US Treasury bonds, as they were a main target for Japanese investment). Formally, we have:

$$W = M + B + F. \tag{2}$$

In equilibrium, with the usual assumptions of gross substitutability and positive wealth effects (Tobin, 1969), we get (with A summarizing other factors, such as risk aversion):

$$M^S = M^D = M(R, R^*, Y, W, A) \quad M_R, M_{R^*} < 0; M_Y, M_W > 0, \tag{3}$$

$$B^S = B^D = B(R, R^*, Y, W, A) \quad B_R, B_W > 0; B_{R^*} < 0; B_Y > < 0, \tag{4}$$

$$F^D = F(R, R^*, Y, W, A) \quad F_{R^*}, F_W > 0; F_R < 0; F_Y > < 0, \tag{5}$$

$$R^* = R' + \Delta s^e, \tag{6}$$

with Δs^e = expected change in exchange rate as fraction of current spot rate.

Substituting and solving (3) for R determines the domestic interest rate in reduced form:

$$R = R(R^*, M, B, Y, A); \quad R_{R^*}, R_B > 0; R_M < 0; R_Y > < 0. \tag{7}$$

Solving for F, assuming that it is a negligible portion of W, we obtain:

$$F = F(R^*, M, B, Y, A); \quad F_{R^*}, F_M > 0; F_Y, F_B > < 0. \tag{8}$$

The second version of the model redefines the total portfolio (now V) in order to take account of land loans L.[7] We get:

$$V = M + L + B + F. \tag{2'}$$

L is assumed to be exogenous and supply-determined by central bank supervision (Werner, 1993). Solving for F we obtain in reduced form:

$$F' = F'(R^*, M, L, B, Y, A); \quad F'_{R^*}, F'_M, F'_L > 0; F'_Y, F_B > < 0. \tag{8'}$$

5. Empirical Evidence

Testing the Net Capital-Flow Models

Since the focus of the study is on flows, first differences are taken. Abstracting from A, we initially estimate the control model (without land loans L), using GNP data for Y, US Treasury bond rates for R', the total outstanding government bond stock for B, and high-powered money $M0$ for M. The yen/dollar forward premium adjusted for one year was used as a proxy for expected exchange-rate changes (Obstfeld, 1983). The focus was on the time period 1979Q1 to 1991Q1. A one-period lag structure was applied in order to take account of partial adjustment dynamics. Thus we estimated, using quarterly seasonally adjusted data and OLS:

$$\Delta F = a_0 + a_1\Delta F_{-1} + a_2\Delta R^* + a_3\Delta R^*_{-1} + a_4\Delta M + a_5\Delta M_{-1} + a_6\Delta B + a_7\Delta B_{-1} + a_8\Delta Y + a_9\Delta Y_{-1} + u. \quad \text{(I)}$$

Then we added ΔL to estimate

$$\Delta F = a_0 + a_1\Delta F_{-1} + a_2\Delta R^* + a_3\Delta R^*_{-1} + a_4\Delta M + a_5\Delta M_{-1} + a_6\Delta B + a_7\Delta B_{-1} + a_8\Delta Y + a_9\Delta Y_{-1} + a_{10}\Delta L + a_{11}\Delta L_{-1} + u. \quad \text{(II)}$$

Land-related loans can be represented by bank loans to real-estate companies and nonbank financial institutions (since the latter served largely to channel loans to real-estate companies, as Yoshino (1991) and others have documented). Following our institutional analysis, loans to real-estate companies and leasing nonbank financial

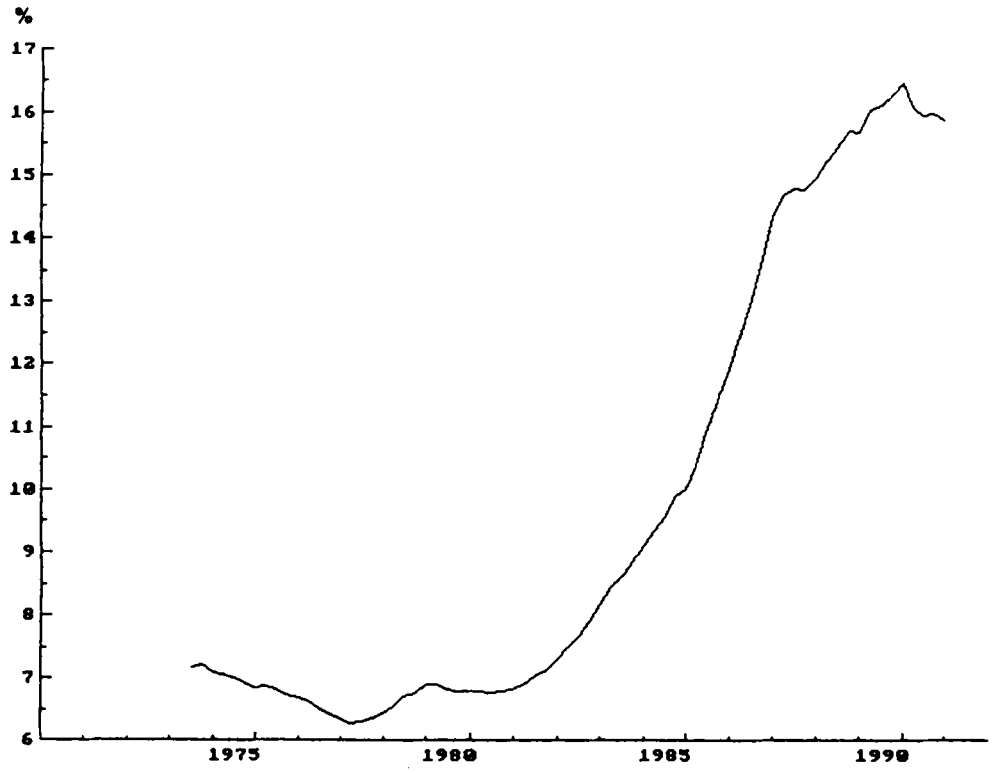

Figure 3. Bank Loan Share of L (percent)

institutions were selected to proxy L. Figure 3 shows the share of such loans as a proportion of total lending. As can be seen, this share rose significantly from below 7% in the late 1970s to peak at almost 17% in 1990. It appears that a large part of these loans were of a speculative nature. Since money is fungible, "excessive" money creation also ended up in domestic and foreign financial investment and thus should be introduced in a macroeconomic portfolio model.

It can be seen that the control model (I), without L, is dominated by the lagged dependent variable, which contributes most of the explanatory power (see Table 1).[8] There are some stability problems. Nevertheless, signs are as expected and high-powered money M, lagged by one period, is significant. Model (II), with the added land-loan variable, has a better fit and superior diagnostical statistics (see Table 2). The equation relies much less on the lagged dependent variable for its explanatory power. Indeed, most variables lose significance, as most of the explanatory power derives from ΔL and its lag (as can be seen from Figure 4, which depicts the actual values of ΔF and ΔL, demonstrating an obvious correlation). Both models are also run for a longer time period (1974Q4 to 1991Q1) for comparative purposes. The result is the same: ΔL (and its lag) is significant, improving fit and test statistics over equation (I). This result is in conflict with the argument that land and its interaction with the banking system has no economic impact on Japanese capital flows.

Testing the Substitution Hypothesis

The above model has followed Ruffin's (1984) and Ruffin and Rassekh's (1986) argument that portfolio ("indirect") investment and "direct" investment are sub-

Table 1. Estimating Japanese Capital Flows, without Land Variable L (Equation I)

Variable	*Coefficient*	*Std. Error*	t-*value*	*HCSE*	*Part*R^2	*Instab*
Constant	−4067.8	5128.3	−0.793	4818.4	0.0159	0.13
ΔF_1	0.80947	0.077101	10.499	0.069069	0.7386	0.09
ΔR^*	−961.11	594.51	−1.617	413.67	0.0628	0.03
ΔR^*_1	46.463	573.63	0.081	368.78	0.0002	0.06
ΔM	0.37846	0.35327	1.071	0.22644	0.0286	0.11
ΔM_1	1.0605	0.40025	2.649	0.41434	0.1525	0.05
Δbond	0.083407	0.045523	1.832	0.043073	0.0793	0.24
Δbond_1	0.079937	0.050840	1.572	0.053029	0.0596	0.07
Δgnp	−21.398	47.924	−0.446	54.594	0.0051	0.10
Δgnp_1	8.5470	51.959	0.164	66.175	0.0007	0.14

Note: OLS, sample period 1979 (1) to 1991 (1); GNP scaled.
R^2 = 0.861419 F(9, 39) = 26.936 [0.0000] σ = 7976.75 DW = 2.19
Variance instability test: 0.4939*; joint instability test: 1.71945
Testing for residual autocorrelation from lags 1 to 4
$CHI^2(4)$ = 10.471 and F-Form(4, 35) = 2.378 [0.0706]
Testing for ARCH from lags 1 to 4 (residuals scaled by 7.976754e+003)
$CHI^2(4)$ = 3.1551 and F-Form(4, 31) = 0.58434 [0.6763]
Normality test RESET test for adding Yhat^2
Normality $Chi^2(2)$ = 0.19527 RESET F(1, 38) = 1.9645 [0.1691]
Testing for heteroscedastic errors
$CHI^2(18)$ = 16.795 and F-Form(18, 20) = 0.57946 [0.8752]

Table 2. Estimating Japanese Capital Flows, with Land Variable L (Equation II)

Variable	*Coefficient*	*Std. Error*	t-*value*	*HCSE*	*Part*R^2	*Instab*
Constant	−2366.7	4353.1	−0.544	3391.0	0.0079	0.12
ΔF_1	0.41697	0.11542	3.613	0.10501	0.2608	0.15
ΔR^*	−96.241	543.91	−0.177	420.12	0.0008	0.05
ΔR^*_1	69.210	484.79	0.143	391.12	0.0006	0.06
ΔM	−0.052555	0.32001	−0.164	0.23544	0.0007	0.12
ΔM_1	−0.24681	0.47180	−0.523	0.44604	0.0073	0.16
Δbond	−0.0032752	0.043805	−0.075	0.028883	0.0002	0.15
Δbond_1	−0.0065395	0.047918	−0.136	0.047582	0.0005	0.04
Δgnp	−42.061	41.830	−1.006	34.311	0.0266	0.13
Δgnp_1	72.177	46.580	1.550	46.312	0.0609	0.20
ΔL	0.82255	0.26037	3.159	0.23569	0.2124	0.13
ΔL_1	0.74756	0.24709	3.025	0.19250	0.1983	0.10

Note: OLS, sample period 1979 (1) to 1991 (1); GNP scaled.
R^2 = 0.906129 F(11, 37) = 32.469 [0.0000] σ = 6740.19 DW = 1.95
Variance instability test: 0.258841; joint instability test: 1.59352
Testing for residual autocorrelation from lags 1 to 4
$CHI^2(4)$ = 8.4558 and F-Form(4, 33) = 1.7206 [0.1689]
Testing for ARCH from lags 1 to 4 (residuals scaled by 6.740190e+003)
$CHI^2(4)$ = 3.7686 and F-Form(4, 29) = 0.66265 [0.6230]
Normality test RESET test for adding Yhat^2
Normality $Chi^2(2)$ = 0.55954 RESET F(1, 36) = 0.21407 [0.6464]
Testing for heteroscedastic errors
$CHI^2(22)$ = 22.896 and F-Form(22, 14) = 0.55815 [0.8930]

stitutes, thus focusing only on net long-term capital flows. This hypothesis is now explicitly tested, using the procedure suggested by Ruffin and Rassekh (1986). We employ the previously developed specification (II) of the Japanese capital-flow function. While net capital flows overwhelmingly consist of foreign direct investment (*FDI*) and portfolio investment (*EPI*), there is a small residual of other flows, such as long-term lending. For the purpose of the test we divide capital flows into direct (*FDI*) and indirect investment (*FII*), the latter consisting of portfolio investment and lending. Following Ruffin and Rassekh, we estimate *FII* by including *FDI* among the explanatory variables:

$$\begin{aligned}\Delta FII = {} & a_0 + a_1\Delta FII_{-1} + a_2\Delta R^* + a_3\Delta R^*_{-1} + a_4\Delta M + a_5\Delta M_{-1} \\ & + a_6\Delta B + a_7\Delta B_{-1} + a_8\Delta Y + a_9\Delta Y_{-1} + a_{10}\Delta L \\ & + a_{11}\Delta L_{-1} + a_{12}\Delta FDI + u. \end{aligned} \quad \text{(III)}$$

The expected sign for a_{11} is −1 if indirect and direct investment are perfect contemporaneous substitutes. The empirical results are reported in Table 3. As can be seen, the coefficient for ΔFDI is significant and approaches −1. Again, most explanatory variables are insignificant. However, the proxy for loans with land as collateral is highly significant. The result is suprisingly robust even over longer time periods (shortening the test sample quarter by quarter, starting from 1976Q1 to

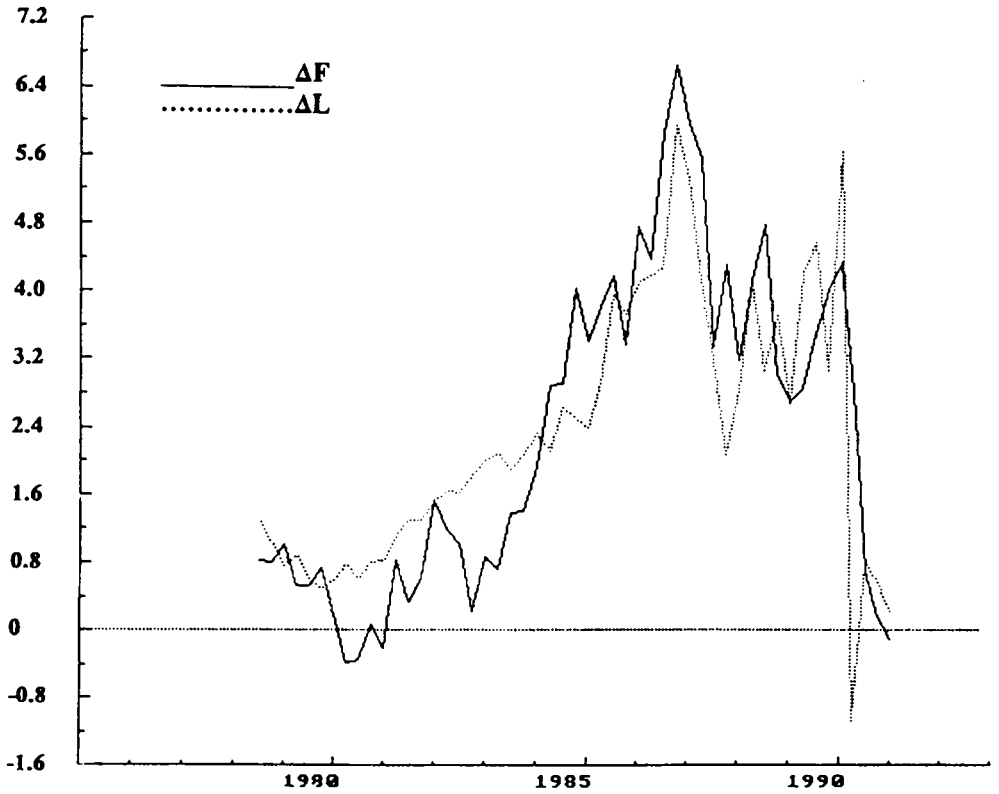

Figure 4. Japanese Net Foreign Investment and Changes in L (Trillion Yen, Matched Means and Ranges)

1991Q1 until 1979Q4 to 1991Q1, it was found that among those 16 regressions the *FDI* coefficient varied only between −0.97 and −1.05). We thus fail to reject the hypothesis of perfect substitution of foreign direct investment and indirect investment within the proposed empirical model of the Japanese case.

6. Further Research

Through its interaction with the banking system, Japan's "land bubble" appears to have been a major factor contributing to the movement of Japanese net long-term capital flows. This phenomenon deserves closer scrutiny, in particular in terms of its implications for exchange rates and the international neutrality—or lack thereof—of domestic money creation. Since empirically the banking sector appears to play an important role in Japanese financial markets, future research should model its behavior and its interaction with real asset markets more explicitly. Moreover, credit aggregates, such as L in our model, deserve further theoretical attention.[8] Finally, Ruffin's (1984) hypothesis of substitution between foreign direct and indirect investment has received support and seems to merit further study.

Table 3. Estimating Foreign Indirect Investment (Equation III)

Variable	*Coefficient*	*Std. Error*	t-*value*	*HCSE*	*Part*R^2	*Instab*
Constant	−2788.5	4237.0	−0.658	3373.4	0.0119	0.06
*FII*_1	0.46068	0.11493	4.008	0.11290	0.3086	0.07
ΔR^*	−79.062	528.09	−0.150	462.58	0.0006	0.05
ΔR^*_1	172.25	468.62	0.368	425.52	0.0037	0.09
ΔM	−0.047110	0.31135	−0.151	0.21209	0.0006	0.06
ΔM_1	−0.21985	0.45801	−0.480	0.42933	0.0064	0.10
Δbond	−0.029611	0.045370	−0.653	0.031536	0.0117	0.21
Δbond_1	−0.031307	0.048674	−0.643	0.048051	0.0114	0.04
Δgnp	−14.953	44.942	−0.333	37.828	0.0031	0.06
Δgnp_1	109.81	54.262	2.024	57.937	0.1021	0.10
ΔL	0.78791	0.25724	3.063	0.22155	0.2067	0.08
ΔL_1	0.78097	0.24416	3.199	0.18443	0.2213	0.05
FDI	−1.0309	0.33370	−3.089	0.28813	0.2096	0.06

Note: OLS, sample period 1979 (1) to 1991 (1); GNP scaled.
R^2 = 0.904156 F(12, 36) = 28.301 [0.0000] σ = 6488.41 DW = 2.22
Variance instability test: 0.216029; joint instability test: 1.69512
Testing for residual autocorrelation from lags 1 to 4
$CHI^2(4)$ = 11.004 and F-Form(4, 32) = 2.3169 [0.0785]
Testing for ARCH from lags 1 to 4 (residuals scaled by 6.488407e+003)
$CHI^2(4)$ = 4.8779 and F-Form(4, 28) = 0.85104 [0.5051]
Normality test RESET test for adding Yhat^2
Normality $Chi^2(2)$ = 0.18692 RESET F(1, 35) = 0.008726 [0.9261]
Testing for heteroscedastic errors
$CHI^2(24)$ = 24.083 and F-Form(24, 11) = 0.443 [0.9537]

Notes

1. The basic balance is the difference between the current account and negative long-term capital flows. Capital outflows are a negative item in the balance of payments, but are represented as positive for expositional purposes. This study focuses on net long-term capital flows. This is common in the literature on Japan (Ueda, 1990) and is plausible, since they dominated the Japanese capital account and are of greater analytical interest than short-term capital flows, because they more closely resemble Meade's (1951) definition of "autonomous" capital flows.
2. The difference is, of course, made up by short-term and inter-office movements of capital. Since this short-term capital export largely seems to reflect repayments of borrowing in the Euro-markets, it is likely to have a contractionary impact on the world money supply, despite its appearance as capital outflow in the balance of payments. This demonstrates the importance of the distinction between short-term and long-term capital flows. Unfortunately, the new IMF balance of payments "manual" of 1993 neglects this distinction.
3. Bradford (1990) and Dekle and Summers (1991) argue that savings should include unrealized capital gains on land. As seen below, these are substantial in the case of Japan.
4. Pain (1990) on the UK and Ueda (1990) on Japan mention the importance of the wealth effect (i.e., the flow adjustment), but the mechanism by which this is meant to influence capital flows is unclear. Ueda includes domestic stock prices as part of the wealth definition in his partial-equilibrium model. Presumably the wealth effect is supposed to work by way of sales of shares to buy foreign assets. But on a macroeconomic level *net* capital flows would not arise from such transactions, as net domestic-asset stocks remain unchanged as long as the shares are not sold to foreigners.

5. Due to institutional factors the land market has been highly illiquid in Japan. It was easier for land-owners to benefit from high and rising land prices by borrowing from banks and thus collateralizing the land, rather than selling the land outright. Such behavior, however, has had an impact on the monetary economy which needs to be accounted for.
6. The inclusion of loans in a portfolio model has a precedence: Kearney and MacDonald (1986) have inserted total bank loans as part of total UK wealth in their portfolio balance model of the sterling/dollar exchange rate.
7. A theoretical derivation starts with the broad money supply, BM, which is defined as consisting of cash M and deposits D: $BM = M + D$. Assume further that total bank loans TL equal total deposits D: $TL = D$. Then: $BM = M + TL$.

Subsequently, we divide total loans TL further in order to single out that part of the broad money supply (defined as above) that reflects the impact of Japan's "land bubble," namely land-related loans L. The remainder ($TL - L$) is assumed to have been invested in the domestic industrial sector without further affecting portfolio behavior. This is in line with the orientation of the proposed model, which abstracts from the "real economy."
8. Tests were conducted with the econometric software package PC GIVE.
9. See Werner (1993) for a first attempt.

References

Asako, Kazumi, "The land price bubble in Japan," *Ricerche Economiche* XLV 2–3 (1991): 451–68.

Bank for International Settlements, 60th Annual Report, Basle, 1990.

Bank of Japan, "Waga kuni ni okeru kinnen no chikajooshoo no haikei to eikyoo ni tsuite" (On the background and impact of the recent land price rise in our country), *Choosa Geppoo*, Bank of Japan (April 1990):34–85.

Bradford, David F., "What is national saving? Alternative measures in historical and international context," *NBER Working Paper Series* 3341, April 1990.

Branson, William F., *Financial Flows in the US Balance of Payments*, Amsterdam: North-Holland, 1968.

Dekle, Robert, and Lawrence Summers, "Japan's High Saving Rate Reaffirmed," *NBER Working Paper Series* 3690, April 1991.

Floyd, John E., "International capital movements and monetary equilibrium," *American Economic Review* (1969):472–92.

Kindleberger, Charles P., *American Business Abroad: Six Lectures on Direct Investment*, New Haven: Yale University Press, 1969.

Kearney, Colm, and Ronald MacDonald, "A structural portfolio balance model of the sterling-dollar exchange rate," *Weltwirtschaftliches Archiv* 122/3 (1986):478–96.

Koo, Richard, "Japan and international capital flows," Nomura Research Institute, Tokyo, 1988 and 1991.

Kouri, Pentti J. K., and Porter, Michael G., "International capital flows and portfolio equilibrium," *Journal of Political Economy* 82 (1974):443–67.

Meade, James E., *The Balance of Payments*, London: Oxford University Press, 1951.

National Land Agency, *Tochi Hakusho* (Land White Paper), Tokyo, 1990.

Niehans, Juerg, *International Monetary Economics*, Baltimore: Johns Hopkins University Press, 1984.

Noguchi, Yukio, "Japan's land problem," *Japanese Economic Studies* (1990):Summer.

—, *Baburu no Keizaigaku* (The Economics of the Bubble), Tokyo: Nihon Keizai Shinbunsha, 1992.

Obstfeld, Maurice, "Exchange rates, inflation and the sterilisation problem," *European Economic Review* 21 (1983):161–89.

Pain, Nigel, "Financial liberalisation and foreign portfolio investment in the United Kingdom," unpublished manuscript, National Institute of Economic and Social Research, London, 1990.

Ruffin, Roy J., "International factor movements," in Ronald W. Jones and Peter B. Kenen (eds.), *Handbook of International Economics*, vol. I, Amsterdam: North-Holland, 1984.

Ruffin, Roy J., and Farhad Rassekh, "The role of foreign direct investment in US capital outflows," *American Economic Review* 76 (1986):1126–30.

Tobin, James, "A general equilibrium approach to monetary theory," *Journal of Money, Credit and Banking* 1 (1969):15–29.

Ueda, Kazuo, "Japanese Capital Outflows," *Journal of Banking and Finance* 14 (1990): 1079–101.

Werner, Richard A., "Towards a 'quantity theorem' of disaggregated credit and international capital flows, with evidence from Japan," paper presented at the Royal Economic Society Annual Conference, April 1993.

Yoshino, Naoyuki, "Nonbank no yuushi to chika" (Nonbank financing and the land price), *Jutaku Tochi Keizai* (Summer 1991):10–18.