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Revisiting Japan's External Adjustment Since 1985

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Abstract

The factors that explain Japan's external performance since the mid-1980s are controversial. While the current account surplus eventually declined following exchange rate changes in 1985-86, a widening since 1990 has led to renewed scepticism about the role of relative price movements in bringing about external adjustment. This paper revisits the post-1985 experience to determine whether it can be explained by traditional factors. The results indicate that, over the period as a whole, the behavior of trade volumes and prices was similar to that predicted by traditional relationships. In particular, relative price movements played an important role in reducing the surplus: in their absence, it would have widened further.

JEL Classification Numbers:

F11; F14; F47

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### Summary

After peaking at over 4 percent of GDP in the mid-1980s, Japan's external surplus declined sharply in the second half of the decade. Since 1990, however, part of this adjustment has been reversed, leading to renewed interest in the factors that underlie movements in Japan's external balance. Traditional models explain movements in trade flows as resulting from changes in relative prices and levels of demand across countries. Some observers, in contrast, have maintained that Japan's import performance is determined primarily by explicit and implicit barriers to market access and shifts in preferences, while export performance reflects the desire of Japanese firms to maintain foreign market shares.

This paper examines how well conventional determinants of trade flows--specifically, changes in relative prices and aggregate demand--explain the adjustment in Japan's external balance after 1985. The results indicate that the evolution of trade flows has been consistent with conventional determinants. Adjustment was initially slow following exchange rate changes in 1985-86 because of the lagged response of import volumes to relative prices, causing the surplus to "overshoot" its underlying level. Similarly, in 1990, adjustment in the external balance was distorted by the terms of trade deterioration that resulted from a temporary weakening of the yen. A decomposition of the causes of the external adjustment indicates that relative price changes played a major role in reducing the surplus. In the absence of price changes, the surplus would have widened owing to both a high demand elasticity for Japanese exports by trading partners and rising investment income on foreign assets.

At a more fundamental level, external balances are determined by underlying patterns of savings and investment; over the medium term, changes in the savings-investment balance are manifested in the external balance via movements in relative prices. This transmission mechanism will function smoothly only as long as the response of trade flows to price changes is sufficiently large and systematic. Japan's experience with external adjustment since 1985 suggests that these conditions are likely to be satisfied.



## I. Introduction

The 1980s and early 1990s have witnessed large swings in Japan's external balance. As shown in Chart 1, the current account rose from a deficit at the beginning of the 1980s, in the wake of the 1979-80 oil price shock, to a surplus of over 4 percent of GDP by the middle of the decade. This episode culminated in a sharp rise in the value of the yen vis-à-vis the U.S. dollar starting in early 1985. By 1987, the yen had appreciated by over 30 percent in real effective terms, and the external surplus had begun a process of downward adjustment that resulted in its narrowing to only 1 percent of GDP by 1990. This adjustment has been partially reversed since 1991, with the current account balance rising to over 3 percent of GDP in 1992 and early 1993.

The issue of the factors that explain the evolution of Japan's external balance since the mid-1980s is controversial. Traditional models explain movements in external balances as resulting from changes in relative prices and levels of demand across countries. Some observers, in contrast, have maintained that Japan's exports and imports are insensitive to traditional determinants of the external balance. This "revisionist" view holds that Japanese imports are determined by explicit and implicit barriers to market access and exogenous shifts in preferences for imported goods. Export performance is believed to reflect the desire of Japanese firms to maintain shares in foreign markets regardless of exchange rate movements. The revisionist position appeared to be supported by the experience immediately following the Plaza Accord in September 1985, which was characterized by a lack of adjustment in U.S. and Japanese imbalances in spite of large exchange rate movements. In this view, the decline in the Japanese surplus toward the end of the 1980s was due to factors such as quantitative restraints on exports and the removal of impediments to imports, as opposed to relative price movements.

The issue of whether Japan's external adjustment has been consistent with conventional determinants of trade flows has important policy implications. If the conventional view is correct, then changes in underlying saving and investment patterns will be reflected in the external balance via their impact on relative prices and aggregate demand. The size of the external balance is then not of policy significance except insofar as it reflects distortions to the underlying determinants of saving or investment. If, in contrast, the revisionist view is correct, the external surplus reflects distortions that originate in the trade sector, such as explicit or implicit barriers to entry in Japanese markets. In this case, the level of domestic output must adjust so that the savings-investment balance is consistent with the external balance; only measures such as ensuring greater market access for foreign firms are likely to permanently reduce the surplus.

This paper focuses on the ability of conventional determinants of trade flows--in particular, changes in relative prices and aggregate demand--to explain the adjustment in Japan's external balance in the post-1985 period.

The results support the traditional view that this process has been consistent with conventional determinants of trade flows: it is not necessary to rely on changes in structural impediments to explain this episode. Adjustment was initially slow following exchange rate changes in 1985-86 because of the lagged response of import volumes to changes in relative prices; this caused the surplus to "overshoot" the level consistent with its underlying determinants. Similarly, in 1990 the underlying adjustment in the external balance was distorted by the terms of trade deterioration that resulted from the temporary weakening in the yen. A decomposition of the factors explaining the post-1985 external adjustment indicates that relative price changes played a major role in reducing the surplus. In the absence of price changes, the surplus would have widened due to two factors: a high demand elasticity for Japanese exports by trading partners, and rising investment income on foreign assets.

## II. Other Studies of Post-1985 External Adjustment

Following the decline in the U.S. dollar in 1985, a large literature emerged on the apparently slow adjustment of external balances--particularly those of the United States and Japan--to exchange rate movements. Part of the answer appeared to involve J-curve effects: the short-run response of real trade flows to relative price movements was not large enough to offset changes in the terms of trade. Beyond the J-curve, however, it appeared that factors were at work that hindered the adjustment of the real trade balance. For instance, Loopesko and Johnson (1987) found that "an econometric model of Japanese trade that tracks moderately well through 1984 veers off track in forecasting both imports and exports over the 1985-86 period" (page 41). They attribute this both to a squeezing of profit margins by Japanese exporters and a slow pass-through of import prices to consumer prices in Japan.

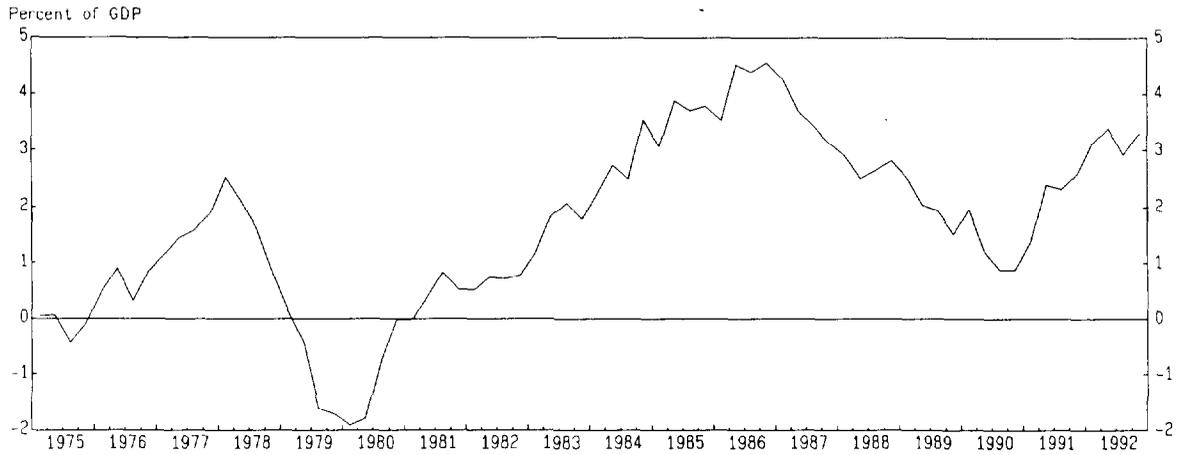
In analyzing the U.S. experience, Hooper and Mann (1987) and Helkie and Hooper (1987) found evidence that adjustment was slow because Japanese producers cut profit margins on exports to the United States following the dollar depreciation. Hooper and Mann (1989) found further indication of pricing-to-market behavior by Japanese exporters to the United States, but also observed that there appeared to be increases in profit margins on Japanese exports to other regions during 1985-88 that had an offsetting effect on the external surplus. Krugman and Baldwin (1987) attributed part of the slower-than-expected adjustment of real trade flows to biased technical progress in favor of exporting industries in Japan, which may have overstated the change in real exchange rates that occurred in the mid-1980s.

Other studies, however, suggest that the Japanese real external balance responded as expected in 1985 and 1986 to the appreciation of the yen. Corker (1989), in a model-based study of the Japanese external balance, found that developments in 1986 and 1987 were broadly consistent with estimated relationships, and that the slow adjustment of the nominal balance was due to J-curve effects. A study by the Bank of Japan (1989) indicated

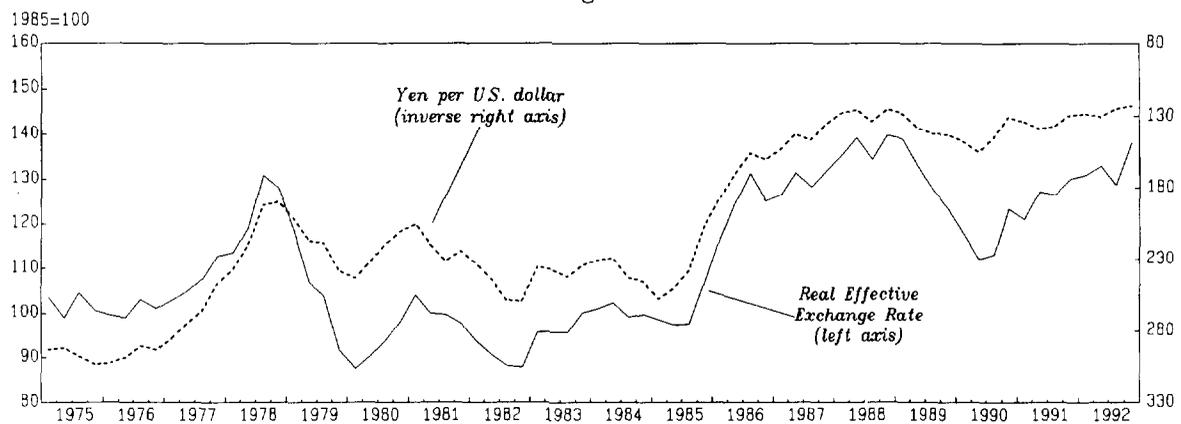
Chart 1  
JAPAN

External Balance and Explanatory Factors: 1975-92

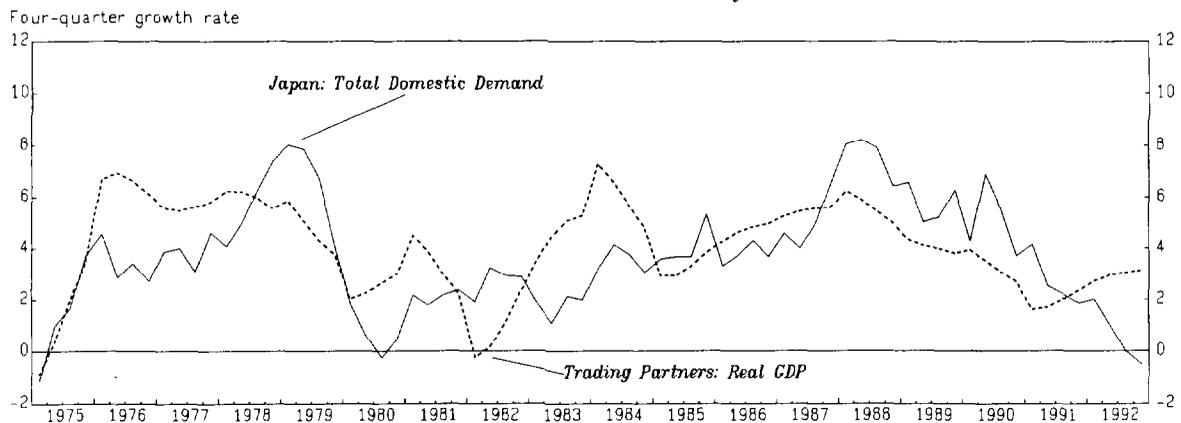
Current Account Balance Relative to GDP



Exchange Rates



Growth in Real Activity



Sources: Economic Planning Agency, National Income Accounts; Bank of Japan, Balance of Payments Monthly; and staff estimates.



that Japanese exports had behaved as expected following the yen appreciation, while imports had risen by considerably more than predicted through 1988 because of structural changes. Ueda (1988) found a large response of the real trade balance during 1986-87 to exchange rate movements, while emphasizing the role that lower oil prices and J-curve effects had in boosting the (nominal) surplus in the initial stages of the adjustment process. In a study of external adjustment during the late 1980s in the G-3, Krugman (1991) also concluded that oil prices and the J-curve played important roles in the initial stages; on the whole, "Japan's experience . . . appears in retrospect to be far more in line with the standard view of international adjustment than initial reports suggested." (page 40).

This paper takes a longer view than earlier studies of Japanese external adjustment by including data through the late 1980s and early 1990s. Given the long lags that are often found to exist between relative price movements and the full response of trade volumes, this makes it easier to look beyond temporary distortions caused by adjustment lags. The analysis is also broader in scope than in most previous studies in that it encompasses trade in both goods and nonfactor services, as opposed to being limited to specific components of traded goods such as manufactures. Broadening the coverage makes the results more applicable to the overall measures of the external balance referred to in policy discussions.

### III. Estimates of Japanese Trade Elasticities

To judge whether the post-1985 Japanese experience can be explained by conventional determinants of trade flows, this section first reviews the literature on the conventional responses of Japanese exports and imports to changes in economic activity and prices. Regression results are then presented for the 1975-85 sample period to shed further light on Japanese trade behavior prior to 1986-92. Based on this evidence, representative elasticities are used in the fourth section to examine the consistency of the post-1985 adjustment with past experience.

#### 1. Evidence from other studies

Table 1 summarizes the results of several studies that report trade elasticities for Japan. Most of the estimates are based on sample periods that predate the yen appreciation in 1985, although some extend to the end of 1988. Seven of the ten studies report estimates for trade in goods only; the others also cover trade in nonfactor services (i.e., excluding investment income). In several cases elasticities for sub-components of imports and exports have been aggregated; the weights used equaled the average share during the 1980s of each component in total trade. The

Table 1. Japan--Estimates of Long-Run Elasticities of Trade Flows

	<u>Merchandise Trade</u>		<u>Total Nonfactor Trade</u>	
	<u>Relative Price</u>	<u>Activity</u>	<u>Relative Price</u>	<u>Activity</u>
1. Corker (1989): 75Q1-87Q4				
- Exports . . . . .	-1.10	2.00	-1.02	1.86
- Imports . . . . .	-0.55	1.38	-0.72	1.24
2. Corker (1990): 75Q1-85Q4				
- Exports . . . . .	-0.67 <u>1/</u>	1.03 <u>2/</u>	...	...
- Imports . . . . .	-0.48	0.96	...	...
3. EPA (1986): 71Q1-81Q4				
- Exports . . . . .	-1.18	1.50	-1.14	1.46
- Imports . . . . .	-0.85	1.10	-0.89	1.16
4. EPA (1989): 80Q1-88Q4				
- Exports . . . . .	-0.68	1.52	...	...
- Imports . . . . .	-0.60	1.28	...	...
5. Masson and others (1990): 65Y1-87Y1				
- Exports . . . . .	...	...	-0.71	1.00
- Imports . . . . .	...	...	-0.77	1.00
6. Ueda (1988): 70Y1-87Y1				
- Exports . . . . .	-1.19	1.87	...	...
- Imports . . . . .	-0.41	1.04	...	...
7. Goldstein and Khan (1985): (survey)				
- Exports . . . . .	-1.40	2.60	...	...
- Imports . . . . .	-1.00	1.20	...	...
8. Bank of Japan (1989): 75Q3-85Q3				
- Exports . . . . .	-0.76	1.03 <u>2/</u>	...	...
- Imports . . . . .	-0.21	0.64	...	...
9. Krugman (1989): 71Y1-86Y1				
- Exports . . . . .	-0.85	1.65	...	...
- Imports . . . . .	-0.42	0.80	...	...
10. Chouraqui and others (1988): (survey)				
- Exports . . . . .	-1.37	2.20	...	...
- Imports . . . . .	-0.93	1.31	...	...
<u>Unweighted Average of Estimates</u>				
- Exports . . . . .	-1.02	1.90 <u>3/</u>	-0.96	1.44
(Range: minimum, maximum)	(-0.67, -1.40)	(1.50, 2.60)	(-0.71, -1.14)	(1.00, 1.86)
- Imports . . . . .	-0.61	1.08	-0.79	1.13
(Range: minimum, maximum)	(-0.21, -1.00)	(0.64, 1.38)	(-0.72, -0.77)	(1.00, 1.24)

1/ Effect based on a reduced-form profitability term.

2/ Activity variable is a weighted average of the import volumes of trading partners using Japanese export weights.

3/ Excluding estimates based on the import volumes of trading partners.

results of all of the studies are summarized in terms of unweighted average elasticities, as well as minimum and maximum values. 1/

The estimates shown in Table 1 indicate that the typical price elasticity of demand for exports exceeds that for imports. 2/ Looking at merchandise exports, the mean price elasticity is about 1, with a range of 0.67-1.40. This compares with the price elasticity of merchandise imports, with a mean of 0.61 and a range of 0.21-1.00. Activity elasticities of demand are also much higher for exports than for imports, with mean values of 1.90 and 1.08 respectively. The size of the activity elasticity for exports, however, depends on the definition of the activity variable. When activity is defined as either real GDP or domestic demand in trading partners, the historical upward trend in imports as a share of GDP in most partners generates an activity elasticity for Japanese exports in the range of 1.50-2.60. In contrast, when the activity variable is defined in terms of the import volumes of trading partners, the upward trend in their import-to-GDP ratios is embodied in movements in the activity variable. The estimated elasticity of demand for Japanese exports is thus lower--the two studies that take this approach produce demand elasticities of close to 1. Three studies provide elasticity estimates for total trade, defined to include both goods and nonfactor services. These results are generally similar to those for merchandise trade only, although the average activity elasticity of exports is somewhat lower (1.44 versus 1.90), while the price elasticity of imports is higher (0.79 versus 0.61).

Fewer studies have estimated the response of Japanese trade prices to changes in domestic and foreign prices. Econometric models of Japanese trade (see, e.g., Corker (1989) and EPA (1986)) indicate that export prices respond to both domestic costs and foreign prices in the short run. In the long run, export prices are assumed to move one-for-one with domestic prices, indicating that the supply curve of exports is perfectly elastic at the domestic price level. In contrast, Citrin (1985) found that export prices for selected products depended on foreign prices in both the short and the long run, with weights ranging from 0.20 to 0.85. Import prices in models for Japan are generally assumed to depend only on foreign export prices, implying that foreign producers do not price to market when exporting to Japan.

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1/ It should be noted that there is some overlap in the coverage of the surveys by Goldstein and Khan (1985) and Chouraqui and others (1988). The summary measures from these studies reflect unweighted averages of the correctly-signed coefficients.

2/ This is consistent with the relatively high share of raw materials in Japan's imports, the demand for which tends to be both less price and income elastic than the demand for manufactures.

2. Estimation results: 1975-85

To provide further evidence on Japanese trade elasticities, time-series regressions were run using quarterly data on trade volumes and prices from 1975 to 1985. Import and export volumes were defined on a national accounts basis, including all external transactions except investment income and purchases of gold for investment purposes. Investment income was excluded because it reflects the cumulated past behavior of the external balance as opposed to its current response to prices and activity; gold investment transactions were excluded because they are fundamentally capital as opposed to current account transactions. 1/ For the prices of traded goods, the associated national accounts deflators were used.

The specifications of the volume and price equations were kept as simple as possible to highlight the role of aggregate activity and relative prices in determining trade flows. Export volumes were regressed on foreign GDP, the Japanese export price relative to foreign export prices, and lagged export volumes. Import volumes depended on total domestic demand, import prices relative to Japanese wholesale prices, and lagged import volumes. Export and import prices were modeled as functions of domestic wholesale prices, foreign export prices, a lagged dependent variable, and a time trend. 2/

Table 2 shows the estimation results for these equations. They generally support the view that Japanese trade volumes and prices are stable functions of traditional explanatory variables. The parameters are all statistically significant, have the correct signs, and are of a magnitude consistent with the typical results of other studies shown in Table 1. The long-run price elasticity of export volumes of 0.92 is slightly lower than the typical value in the other studies of about unity, while the activity elasticity of 1.72 lies between the values found in studies based on merchandise trade of 1.90 and total nonfactor trade of 1.44. For import volumes, the long-run price elasticity of 0.61 is typical of that found in studies of merchandise trade, while the activity elasticity of 0.91 is slightly lower than the average values shown in Table 2 of 1.08 for merchandise imports and 1.13 for total imports.

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1/ Purchases of overseas gold for investment purposes have been treated as merchandise imports in the Japanese balance of payments data, in spite of the fact that the gold is not shipped across borders. No official data are available on these transactions: their magnitude has been estimated by comparing movements in merchandise imports on a customs-clearance basis (which exclude gold investment transactions) to those on a balance of payments basis.

2/ Time trends were included to capture the possible effect of different rates of productivity growth in traded-goods industries compared with the economy as a whole.

Table 2. Estimation Results for Japan: Trade Prices and Volumes, 1975-85

(t-statistics in parentheses)

1. <u>Export volumes:</u>	$x = -0.920 + 0.719 x_{-1} + 0.258 (p_{xx}^* - px) + 0.484 y^*$ <p style="text-align: center;">(3.0)      (10.7)      (3.2)      (3.8)</p>
	$\bar{R}^2 = 0.990$ Std. Error = 0.0266      Durbin h = 2.17      Durbin-Watson = 1.23
	Long-run elasticities:      Relative price = 0.92;      Activity = 1.72
2. <u>Import volumes:</u>	$m = 0.077 + 0.790 m_{-1} + 0.128 (p_{wpi} - pm) + 0.192 tdd$ <p style="text-align: center;">(0.3)      (10.3)      (3.6)      (2.7)</p>
	$\bar{R}^2 = 0.909$ Std. Error = 0.0256      Durbin h = -0.24      Durbin-Watson = 2.01
	Long-run elasticities:      Relative price = 0.61;      Activity = 0.91
3. <u>Export prices:</u>	$\Delta px = 0.015 + \Delta p_{wpi} + 0.318 (\Delta p_{xx}^* - \Delta p_{wpi}) + 0.105 (p_{wpi}_{-1} - px_{-1}) - 0.0004 T$ <p style="text-align: center;">(1.2)      (9.1)      (2.3)      (1.5)</p>
	$\bar{R}^2 = 0.697$ Std. Error = 0.0111      Durbin-Watson = 1.91
	Long-run elasticities:      Domestic prices = 1.00;      Foreign export prices = 0.00
4. <u>Import prices:</u>	$\Delta pm = -0.041 + \Delta p_{xm}^* + 0.253 (\Delta p_{wpi} - \Delta p_{xm}^*) + 0.241 (p_{xm}^*_{-1} - pm_{-1}) + 0.0009 T$ <p style="text-align: center;">(2.3)      (4.6)      (2.9)      (2.4)</p>
	$\bar{R}^2 = 0.431$ Std. Error = 0.0191      Durbin-Watson = 1.23
	Long-run elasticities:      Domestic prices = 0.00;      Foreign export prices = 1.00

Data definitions (indexed to equal 100 in 1985, expressed in natural logarithms):

x	≡ national accounts real exports excluding factor income.
m	≡ national accounts real imports excluding factor payments and gold investment transactions.
y*	≡ average of partners' real GDP weighted using Japanese export shares.
tdd	≡ real total domestic demand.
px	≡ national accounts deflator for nonfactor exports in U.S. dollars.
pm	≡ national accounts deflator for nonfactor imports in U.S. dollars.
p <sub>wpi</sub>	≡ domestic wholesale price index for Japan in U.S. dollars.
p <sub>xx</sub> *	≡ average of partners' export prices weighted using Japanese export shares, U.S. dollars.
p <sub>xm</sub> *	≡ average of partners' export prices weighted using Japanese import shares, U.S. dollars.
T	≡ linear time trend (1970Q1 = 1)

In addition to being consistent with the results for other studies on Japan, the above price elasticities of exports and imports are similar to those estimated for other industrial countries. For instance, Masson and others (1990) estimated typical export and import price elasticities of about 0.7 using a pooled sample of industrial countries. Similar values are found in cross-country surveys of elasticities, such as Goldstein and Khan (1985); looking at several models for the U.S., Krugman (1991) found an average price elasticity for imports of 1.1 and for exports of 0.8. Thus the historical data do not support the view that Japanese trade flows are less responsive to relative price movements than in other countries.

Concerning the effect of exchange rate movements on the nominal external balance, the key issue is whether the effects of relative prices on volumes are large enough to offset their direct impact on the terms of trade. The impact of relative price movements is often summarized in terms of the Marshall-Lerner condition--that the sum of the long-run export and import price elasticities of demand exceed unity. Satisfying this condition ensures (under certain circumstances) that the nominal external balance will fall when the exchange rate appreciates. 1/ In the event, the sum of the estimated relative price elasticities of demand for Japanese exports and imports is about 1.5, easily satisfying the Marshall-Lerner condition.

Turning to the price equations, an error-correction framework was used to identify the short- and long-run responses of trade prices to changes in domestic and foreign prices. Initially, the constraints were tested--and not rejected--that export and import prices were homogeneous of degree one in domestic wholesale prices and foreign export prices. Imposing these constraints, the short-run elasticity of export prices with respect to foreign prices was estimated at 0.32. 2/ In the long run, hypothesis tests indicated that foreign prices were not statistically significant, and only domestic prices affected export prices. The role of foreign prices in the short run indicates an element of "pricing to market" by Japanese exporters, while the absence of a long-run effect suggests that the supply curve of exports is perfectly elastic at the level of domestic prices. The import price equation yielded a short-run coefficient on average foreign export prices of 0.75, while that on domestic wholesale prices was 0.25; in the long run, domestic prices were insignificant and thus import prices depended only on foreign export prices. As in the case of Japanese export prices, the short-run significance of domestic prices suggests an element of pricing to market by foreign exporters. Similarly, the absence of a long-run effect

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1/ This condition is only holds exactly when trade is initially balanced. The role of relative price movements in reducing the Japanese trade surplus in the post-1985 period is discussed in detail in the next section.

2/ Domestic wholesale prices were expressed in U.S. dollars. The equation was also estimated with wholesale prices expressed in terms of yen and the yen/dollar exchange rate entered separately. The two variables had very similar coefficients, and formal tests indicated that the constraint that they were identical could not be rejected.

of domestic prices suggests that foreign producers--at the margin--do not discriminate in terms of pricing their exports to Japan versus other markets.

These price equations, then, show a similar degree of pricing to market by Japanese exporters to partner countries as for foreign exporters to Japan. In both cases, pricing to market appears to be only a short-run phenomenon: export prices are unaffected by competitors' prices in the long run. Thus these results provide no support for the view that the prices of Japanese exports are determined differently from those of other countries. They do suggest that Japanese export prices will be strongly affected over time by exchange rate movements when the domestic cost structure, as represented by the level of wholesale prices, is held constant.

#### IV. Decomposing Japanese External Adjustment, 1986-92

Some commentators, notably Loopesko and Johnson (1987), have argued that there were significant shifts in Japanese trade relationships following the yen appreciation during 1985-86. Here two approaches are taken to examining this hypothesis. The first involves performing formal tests for the stability of the parameters in regressions shown in Table 2 when the sample is extended to include the 1986-92 period. Secondly, to give a broader and more visual perspective on the stability of trade relationships in the post-1985 period, long-run predicted values were calculated for trade prices and volumes using representative values for trade elasticities; these long-run predictions were then compared to actual data for the pre- and post-1985 periods.

Formal tests of parameter stability were performed by estimating the above equations over three sample periods: 1975-85, 1986-92, and 1975-92. F-tests comparing the length of the residual vector in the common sample with those in the two sub-samples then indicated whether there were structural changes in the parameters in the post-1985 period. 1/ The results are shown below. For all four equations, the test statistics are well below the critical value at the 95 percent significance level, providing no evidence of shifts in the structural relationships following the exchange rate movements in 1985-86.

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1/ This test is a modified version of that originally proposed by Chow (1960) because there are sufficient degrees of freedom to run the regression over both sub-sample periods. This eliminates the sensitivity of the conventional Chow test to the assumption of homoscedasticity of the disturbance term between the two sample periods.

Test Statistic  
(Critical F(4,64) value, 95% significance level = 2.53)

1. Export volume	1.34
2. Import volume	0.64
3. Export price	0.95
4. Import price	2.19

A different perspective on the consistency of post-1985 developments with the earlier experience is given by comparing the actual data with predicted values based on long-run relationships. These predictions were based on both the survey of elasticities shown in Table 1 and the quarterly estimation results for the 1975-85 period. For export volumes, an activity elasticity of 1.5 was used, lying between the average value found for total nonfactor trade in other studies and the estimated long-run response in Table 2; the relative price elasticity was one, close to both the estimated value and the survey average. For import volumes, the activity elasticity was one while the relative price elasticity was 0.66--both lie between the values estimated above and those found in other studies. The predicted values for export prices were equal to domestic wholesale prices (adjusted for secular differences in growth, as reflected in the time trend), while those for import prices were set equal to foreign export prices. This yielded the following long-run relationships (where the variable definitions are as in Table 2):

$$x = 1.5 \text{ gdp}^* + 1.0 (\text{pxx}^* - \text{px})$$

$$m = 1.0 \text{ tdd} + 0.66 (\text{pwpi} - \text{pm})$$

$$\text{px} = 1.0 \text{ pwpi} - 0.021 \text{ T}$$

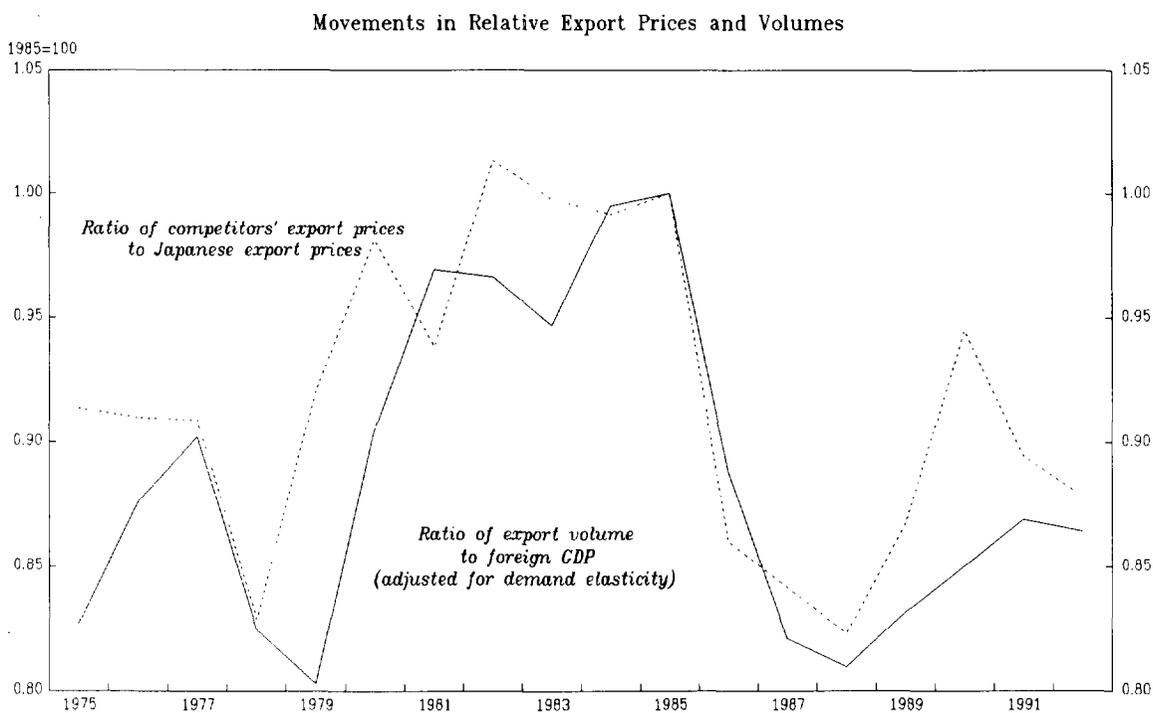
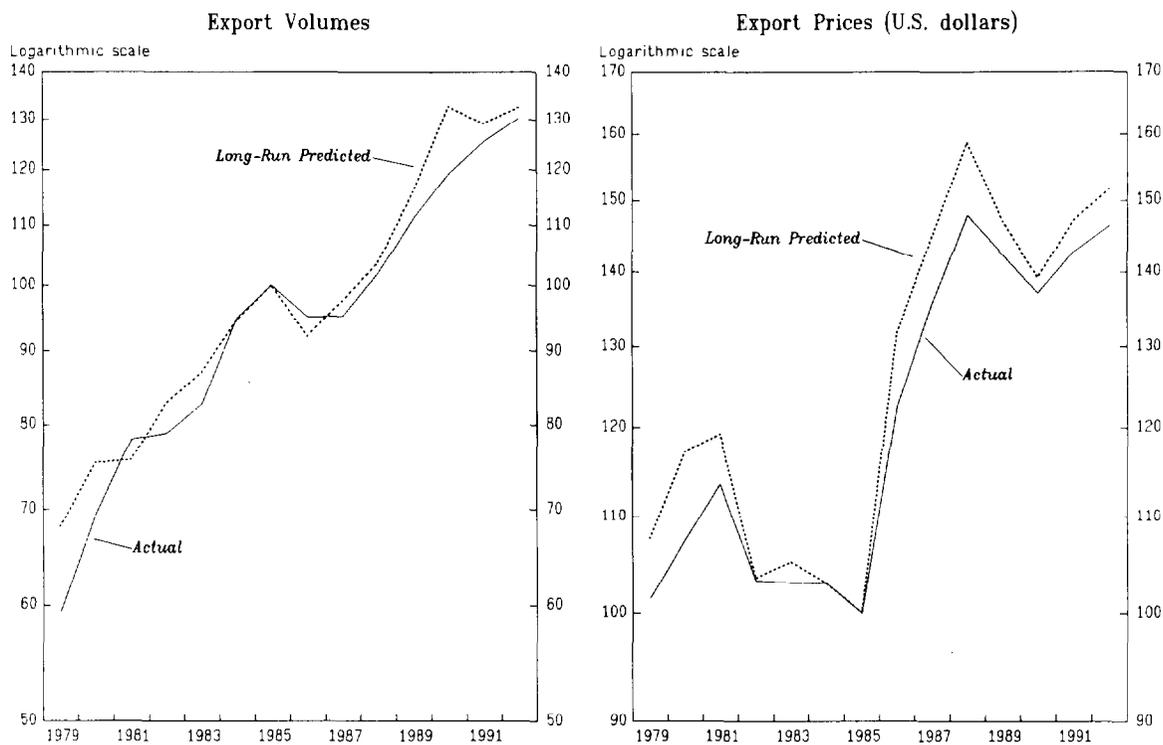
$$\text{pm} = 1.0 \text{ pxm}^* .$$

For exports, the evolution since 1980 of both actual and predicted volumes and prices are shown in the upper panels of Chart 2. 1/ Actual export volumes grew by 30 percent during 1986-92, almost identical to the 32 percent rise in the long-run predicted series. The latter reflects growth of 31 percent in the GDP of trading partners; adjusted for the activity elasticity of 1.5, this would imply a rise of 50 percent in export volumes in the absence of relative price movements. In the event, Japanese export prices increased by 46 percent from 1985-92, while those of competitors rose by only 29 percent, leading to a sharp loss of export competitiveness. The

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1/ The predictions for trade volumes have been constructed using actual export and import prices, as opposed to the fitted values from the price equations. The errors then reflect shocks specific to the volume equations.

Export Performance: Actual Versus Long-Run Predicted Values



Sources: Economic Planning Agency, National Income Accounts; Bank of Japan, Balance of Payments Monthly; and staff estimates.



46 percent rise in export prices over the post-1985 period was broadly consistent with the 52 percent increase in its long-run predicted value, which in turn was similar to the rise in the yen/dollar exchange rate over this period. An element of pricing to market was apparent, however, during both the 1986-88 and 1991-92 periods when the yen was appreciating against the dollar. These responses are consistent with the short-run dynamics implied by the equation in Table 2, providing no evidence of "hysteresis" in the adjustment of Japanese export prices following the yen appreciation.

The lower panel of Chart 2 shows the ratio of Japan's export volume to the (elasticity adjusted) GDP of trading partners, along with the relative price of competitors' exports to Japanese exports. <sup>1/</sup> This measure of Japan's share of foreign markets fell sharply as competitiveness declined during 1986-88; indeed, the increase in Japan's market share in the early 1980s was almost fully reversed. There do not appear to have been unusually long adjustment lags in the response of export volumes following the yen appreciation--if anything, the lags seem to have been shorter, on average, than during the earlier experience of rising competitiveness.

The depreciation of the yen from 1988 to 1990 reversed about one half of the decline in competitiveness that had occurred when the yen was appreciating. In spite of the decline in relative export prices, export volumes rose only moderately in relation to foreign GDP. This divergence explains the over-prediction of export volumes in 1989 and 1990 apparent in the upper panel. The prediction error narrowed in 1991-92, as Japanese competitiveness fell, while export volumes rose in relation to foreign GDP. This recent narrowing in the error suggests that it was not due to structural changes, such as voluntary export restraints or an outsourcing of production to low-cost countries. More plausibly, suppliers and demanders reacted cautiously to the (temporary) improvement in competitiveness in 1989-90, as it proved to be inconsistent with longer-term fundamentals. In the event, the temporary deterioration in the terms of trade caused by falling export prices, combined with the lack of response of export volumes, explain much of the decline of the current account surplus from 1988 to 1990. If, for example, the nominal share of Japanese exports in foreign GDP had not dipped temporarily over this period, the surplus would have only dropped to about 2 percent of GDP, as opposed to the actual decline to 1.2 percent.

Similar graphs for import prices and volumes are provided in the upper panels of Chart 3. Movements in import prices were, on average, similar to those predicted during 1986-92. For volumes, the predicted level rose sharply immediately following the yen appreciation of 1985-86. Actual volumes took almost three years to catch up, however. As indicated by the lower panel of Chart 3, the divergences for import volumes were associated with a lagged response to relative price movements. In particular, there

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<sup>1/</sup> Changes in the GDP of trading partners were scaled by the demand elasticity of 1.5 used to construct the long-run predicted series.

was a sharp fall in relative import prices in 1986, as domestic wholesale prices rose by 28 percent (in U.S. dollars) while import prices fell by 5 percent. The lag in the response of import volumes to relative price movements appears to have been more pronounced than in the early 1980s, when relative import prices were rising. The principal explanation for the slow response is the fact that about one-half of the drop in relative import prices reflected lower world oil prices: the response of oil demand to relative price movements is typically slower than for other goods, as oil requirements tend to be embodied in capital goods, the stock of which turns over gradually. This explanation is consistent with the studies mentioned above that found that the initial overshooting of the current account surplus after 1985 was due to the temporary effects of changes in the terms of trade.

Having observed that the behavior of trade volumes and prices was, on the whole, consistent with traditional determinants during 1986-92, we turn to the question of the role played by relative prices versus growth in activity in the external adjustment process. A "no-adjustment" scenario was first calculated where domestic and foreign demand grew at the same rate from 1986 to 1992 and relative prices were held constant at their 1985 level. Specifically, foreign real GDP growth--adjusted for the foreign demand elasticity of 1.5--was set equal to growth in Japanese domestic demand of 4.3 percent per year. This implied a no-adjustment assumption for foreign real GDP growth of 2.8 percent. Growth in the export prices of partner countries and Japanese domestic wholesale prices were set equal to average growth in the Japanese GDP deflator (all expressed in U.S. dollars).

Taken together, these assumptions would have generated no change in Japan's external surplus from the 1985 level of 3 1/2 percent of GDP. Replacing them sequentially by the actual paths of activity and prices indicated the importance of each factor in the adjustment process. This yielded the following decomposition:

	<u>External surplus 1/</u> <u>(percent of GDP)</u>
Change: 1985 to 1992	-1.7
Contribution of:	
1. Differential rates of growth in activity	+1.1
2. Relative price movements	-2.7
3. Unexplained by long-run relationships	-0.1

It is apparent that the simple long-run relationships described above explain almost all of the change in Japan's external balance over this

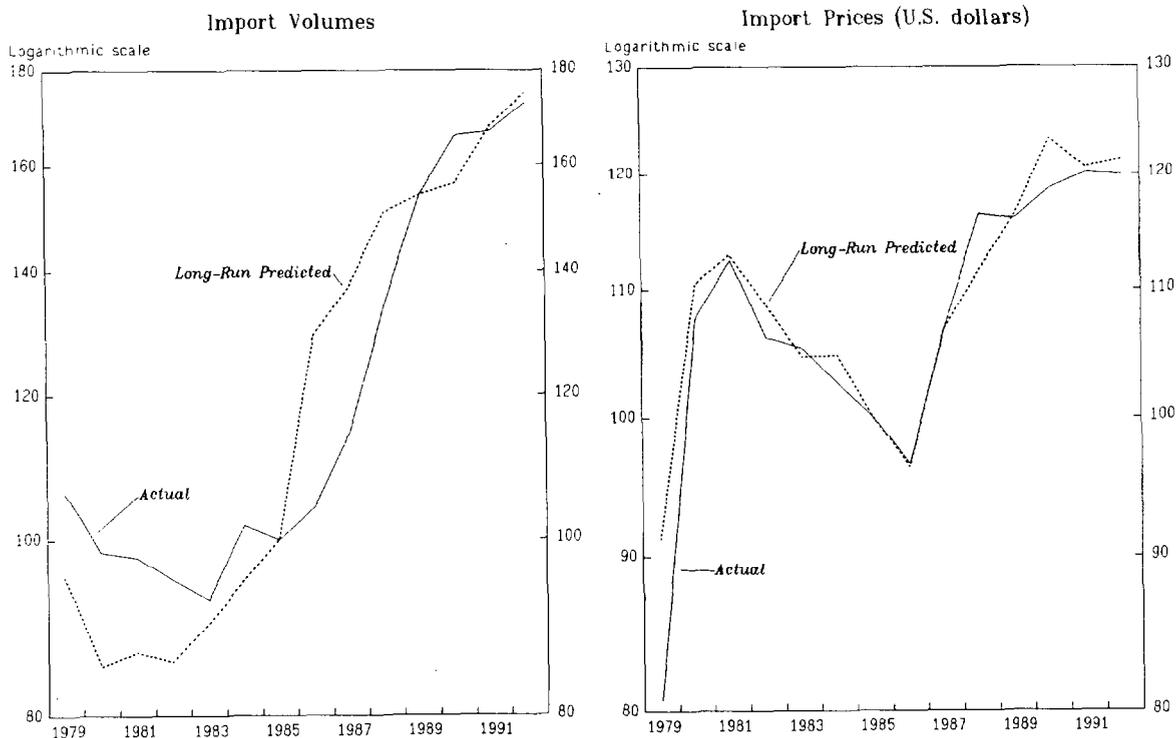
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1/ Current account balance excluding transfers, factor services, and estimated gold transactions for investment purposes.

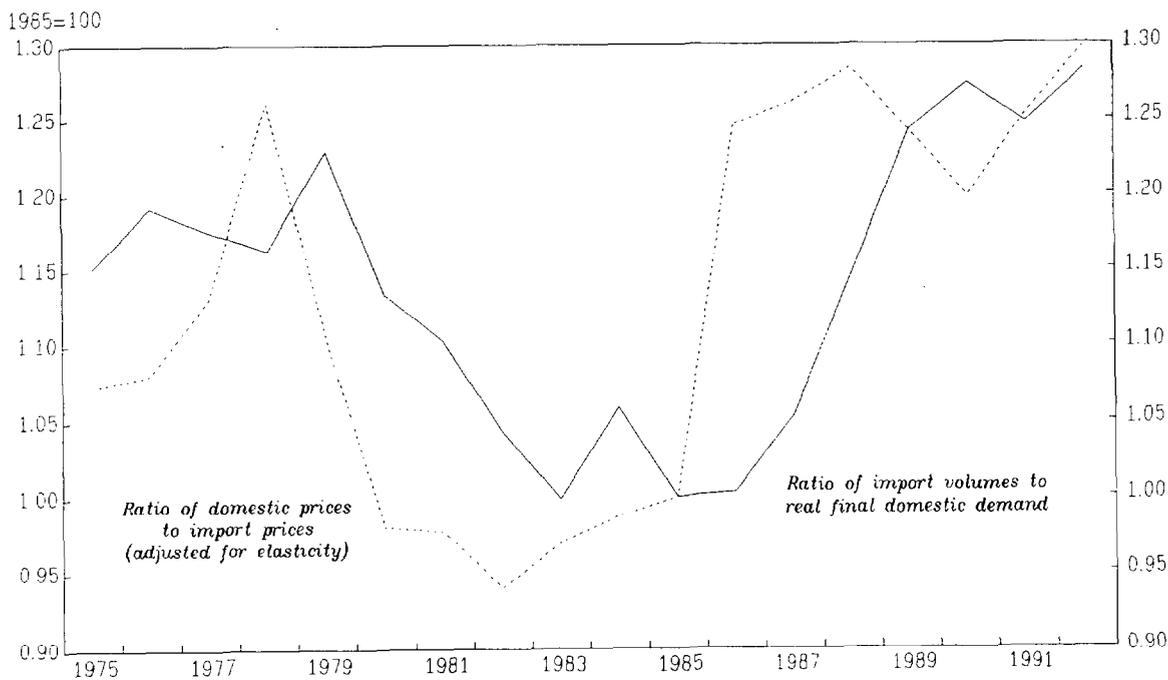
### Chart 3

JAPAN

## Import Performance: Actual Versus Long-Run Predicted Values



### Movements in Relative Import Prices and Volumes



Sources: Economic Planning Agency, National Income Accounts; Bank of Japan, Balance of Payments Monthly; and staff estimates.

as well as direct measures of trade prices.

trend appreciation of the yen of about 2 percent per year would be required to hold the surplus constant at its 1992 level. <sup>1/</sup>

Rising investment income also may have contributed to the perception that Japan's external adjustment is smaller than justified by relative price movements. Reflecting Japan's accumulation of net foreign assets, the investment income surplus widened by 1/2 percent of GDP during 1986-92. To offset this rise through a decline in the other components of the current account would require a real exchange rate appreciation of roughly 5 percent over the period as a whole. Prospective current account surpluses in coming years imply that the share of overseas investment income in GDP will continue to rise. Again, this suggests that a further real exchange rate appreciation would be required to hold the overall surplus constant.

#### V. Conclusions

The results support the view that movements in the Japanese external balance over the 1986-92 period can be explained by conventional determinants of trade flows. Using representative estimates for Japanese trade elasticities, long-run predicted values for trade volumes and prices were compared with their actual behavior. Movements in broad measures of export prices and volumes correspond well to changes in aggregate prices and foreign economic activity. In particular, no evidence is found that the reduction in Japan's external surplus was limited by an increase in the degree of pricing to market by Japanese exporters in the period following the 1985-86 yen appreciation. Neither is there evidence that other quantitative restrictions such as VERs significantly altered Japan's aggregate export performance during 1986-92.

At times, the underlying pattern of external adjustment since 1985 has been distorted by lags in the response of trade volumes to relative price movements. Two episodes stand out in this respect. In the period immediately following the yen appreciation in the mid-1980s, import volumes responded with a longer lag than export volumes to relative price movements. This lag, combined with the decline in world oil prices in 1986, contributed to an initial expansion in the surplus as the value of the yen rose. In 1990, there was a muted response of export volumes to the (temporary) weakness in the yen--the resulting J-curve effect caused to external surplus to overshoot relative to its underlying path.

Contrary to perceptions that Japan's trade is insensitive to changes in exchange rates, it was found that the post-1985 adjustment in the external surplus was due principally to relative price movements. Indeed, in the absence of the yen appreciation, the external surplus would have widened by over 1 percent of GDP during this period. This widening would have been due

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<sup>1/</sup> Of course, an activity elasticity in trading partners other than unity is inconsistent with a stable long-run share of imports in GDP and cannot continue indefinitely.

to two factors: a higher elasticity of import demand with respect to domestic activity in trading partners than in Japan; and a rising surplus on investment income.

We have examined the movements in Japan's external balance since 1985 in terms of its proximate determinants--relative price movements and changes in activity. At a more fundamental level, external balances are determined by patterns of savings and investment, reflecting demographic profiles, productivity growth, fiscal policies, and other factors. Over the medium term, changes in the proximate determinants that are inconsistent with these fundamentals cannot be sustained. Indeed, the underlying savings-investment balance will be reflected in the external balance via changes in relative prices and domestic activity. This transmission mechanism will only function smoothly when the response of trade flows to relative price changes is sufficiently large and systematic. The experience with Japanese external adjustment since 1985 suggests that these conditions are likely to be satisfied.

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