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External Shocks and Adjustment in Four Asian Economies—1978–87

Ramon Moreno

Economist, Federal Reserve Bank of San Francisco.

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This paper presents a small open-economy model that illustrates the possible equilibrium real exchange rate and current account responses to changes in the world rate of interest and the terms of trade. The model provides a simple framework for assessing whether the adjustment to external shocks in four Asian economies in 1978–87 was roughly consistent with equilibrium, and the implications for economic performance.

Overall, the ability of these four economies to prevent real exchange rate overvaluation in the face of adverse external shock appears to have contributed to their very successful economic performance in 1978–87. However, the discussion provides some support for the view that real exchange rates may have become undervalued in some Asian economies, particularly after 1985, and that opportunities for increasing investment and consumption in these economies may have been missed.

Since the second half of the 1970s, the developing economies of eastern Asia have experienced faster growth and lower inflation than other developing countries as a group have. This economic performance is remarkable in light of the significant disturbances to the world economy during this period—a run up in oil prices and in world rates of interest starting in the late 1970s, a slump in commodity prices and a slowdown in the growth of industrial economies in the early 1980s, sharp changes in the value of the U.S. dollar, and the LDC debt crisis.

The success of Asian economies generally is attributed to sound economic management. One often cited theme is that these Asian economies responded more appropriately to external disturbances than did other developing economies,[1] thereby successfully preventing overvaluation in their real exchange rates. However, not everyone believes that the policy responses of Asian countries have been appropriate. Critics argue that Asian economies have carried their adjustment efforts too far, and that as a result, their exchange rates have become *under*valued.

This paper attempts to examine the appropriateness of economic policies in Asian economies in greater detail by addressing two questions. The first is whether adjustment in Asian economies in response to external shocks appears to be broadly consistent with long-run equilibrium. The second question is how shocks and the response to them may have influenced economic performance in the economies of the region. The four Asian economies examined here may be loosely divided into two groups following roughly comparable economic policies: Korea and Thailand, and Malaysia and Singapore.

This paper is organized as follows. Section I develops a theoretical framework for assessing whether adjustment in Asian economies was consistent with equilibrium. Section II describes the equilibrium response to external shocks and provides definitions of real exchange rate misalignment. Section III describes the experiences of Asian economies in the periods from 1978 to 1982 and from 1983 to 1987. External shocks and their impact on the region are described, and the possible role of policy responses in explaining variations in economic performance is discussed. Some conclusions on the appropriateness of policy responses in each of the four Asian economies are also offered.

I. External Shocks and Equilibrium Adjustment

Two main types of external shocks affected Asian economies in the ten years from 1978 to 1987: sharp fluctuations in world rates of interest, and changes in the terms of trade. External shocks during the 1978–82 period generally had adverse effects on the Asian economies. After declining sharply from 1974 to 1977, the world rate of interest, as represented by the 3-month London Interbank Offer Rate, rose between two and three percentage points every year between 1978 and 1981, to peak at a level of over 18 percent in 1981. The run-up in interest rates tended to reduce the disposable income of the debtor countries in the region, although the vulnerability of each of the four countries varied considerably. Over the period 1978–82, Korea and Thailand averaged higher ratios of external debt to GNP (respectively, 45 and 28 percent), and consequently were more vulnerable to increases in world interest rates than were Singapore and Malaysia (with external debt-to-GNP ratios, respectively, averaging 18 and 23 percent).

Other major shocks affected the terms of trade of these Asian economies. Double-digit increases in oil prices each year between 1979 and 1981 adversely affected the terms of trade of three of the four Asian economies, with only Singapore the exception since it exports petroleum products. And although oil prices declined to still-high levels in 1982, the favorable impact on the terms of trade was offset by a slowdown in the growth of industrial countries. Among other things, the slowdown in growth contributed to a decline in non-oil commodity prices, which particularly affected Thailand and Malaysia.

Finally, the dollar began a steady appreciation against the currencies of other industrial countries after 1979. This increased the competitiveness of industrial countries in U.S. markets, potentially at the expense of the four Asian economies, particularly those pegging to the U.S. dollar.

The world economic environment changed significantly in the second period, 1983–1987. The nominal world interest rate declined an average of 1.3 percentage points a year, and by 1986 interest rates were close to their lows of ten years earlier.[2] Earlier shocks affecting the terms of trade of Asian economies also were reversed. Oil prices declined further, and the growth of industrial economies recovered, producing an erratic recovery in world commodity prices and a moderate and sustained expansion not seen since the 1960s. After 1985, the dollar's depreciation apparently increased the competitiveness of Asian economies in the U.S. market as the cost of Japanese and European goods rose. Against this largely favorable background was the interruption in voluntary lending to heavily indebted developing countries after 1982, which had a relatively small direct impact on the economies discussed in this paper, but may have encouraged them to seek to limit the growth in their external debt.

To examine how these interest-rate and terms-of-trade disturbances may have affected the equilibrium real exchange rates and external balances of Asian economies, a theoretical model of a small, open economy is developed below.

Aggregate Supply and Demand

Consider an economy with three goods, non-tradable, exportable, and importable, that are all produced and demanded by domestic residents. The full-employment aggregate supply of goods (S) in the economy is given exogenously by endowments. Domestic prices are assumed to be flexible, the nominal exchange rate is fixed by the government, and world prices of importable and exportable goods are determined in world markets. Total supply can be expressed as the sum of the supply of each of the three types of goods produced in the economy:

$$S = P_N S_N + P_M S_M + P_X S_X$$
$$= P_N s_N S + P_M s_M S + P_X s_X S \quad (1)$$

where P_N, P_M, and P_X, respectively, refer to the domestic currency prices of non-tradable, importable, and exportable goods, S_i (i = N, M, and X) is the supply of each good, and s_i is the share of each good in total supply. The Appendix provides a full list of variable definitions.

Aggregate demand, D, is the sum of the demand for non-tradable, exportable, and importable goods:

$$D = P_N D_N + P_M D_M + P_X D_X$$
$$= P_N d_N D + P_M d_M D + P_X d_X D \quad (2)$$

where D_i is total demand for each good and d_i is the share of each good in aggregate demand.

Aggregate demand is the sum of equilibrium private demand, D^e, and government demand, D^g. Equilibrium private demand, in turn, is a function of consumer demand and investment demand. Equilibrium consumer demand is the result of intertemporal utility maximization subject to the economy's intertemporal budget constraint, while investment demand is determined by the optimizing condition that the world cost of funds (i^*) should equal the marginal product of capital (MPK). The solution to these two conditions yields the equilibrium demand of the private sector.[3]

The equilibrium private demand D^e is increasing in the

private sector's disposable permanent income, PI. Permanent income, in turn, depends on world interest rates and the terms of trade. If the country is a net debtor, a permanent increase in world interest rates increases the volume of exports needed to service a given stock of debt outstanding, thus reducing the permanent income available for domestic consumption. A permanent decline in the terms of trade also reduces permanent income by increasing the volume of exports needed to purchase a given volume of imports.

Aggregate demand in the economy also can be directly influenced by government policy (D^g), which can help or hinder the private sector in achieving an optimal spending path.[4] These relationships may be summarized as follows:

$$D = \underset{+\ -}{D^e}[PI(i^*, \underset{+}{P_x/P_m}), \underset{-}{i^* - MPK}] + \underset{+}{D^g} \qquad (3)$$

Equilibrium in Non-Traded Goods

It is assumed that the respective shares of non-traded goods in total supply and demand depend on the relative price of traded and non-traded goods, e, here defined as[5]

$$e = \frac{P_N}{E(P_T^*)} \qquad (4)$$

where E is the nominal exchange rate (in units of domestic currency per unit of foreign currency), P_T is the price of tradable goods, defined as a suitably weighted average of exportable and importable goods prices,[6] and the * refers to prices expressed in foreign currency. The relative price, e, is often called the "real exchange rate" in the literature, since it reflects the country's profitability, or competitiveness, of production in the traded goods sector. (Moreover, when non-traded goods and world prices adjust sluggishly, changes in e reflect changes in the nominal exchange rate.[7])

Thus, a rise in e increases the share, s_N, of non-traded goods in total supply (s_N is rising in e) because the increased profitability of non-traded goods production shifts resources to the non-traded goods sector. At the same time, a rise in e lowers the share, d_N, of non-traded goods in total demand (d_N is falling in e).

Given the above assumptions, the equilibrium in the non-traded goods sector is determined by the requirement:

$$\underset{+}{P_N s_N(e)S} = \underset{-}{P_N d_N(e)D} \qquad (5)$$

In equation (5), aggregate domestic supply S is determined exogenously by endowments, while aggregate domestic demand D is determined in equation (3) by

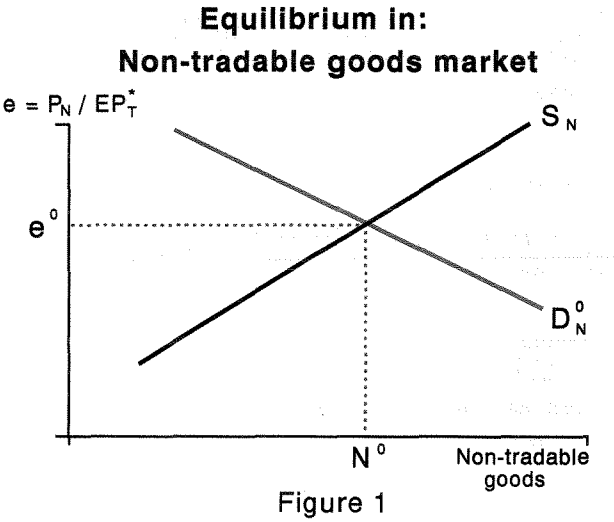

Figure 1

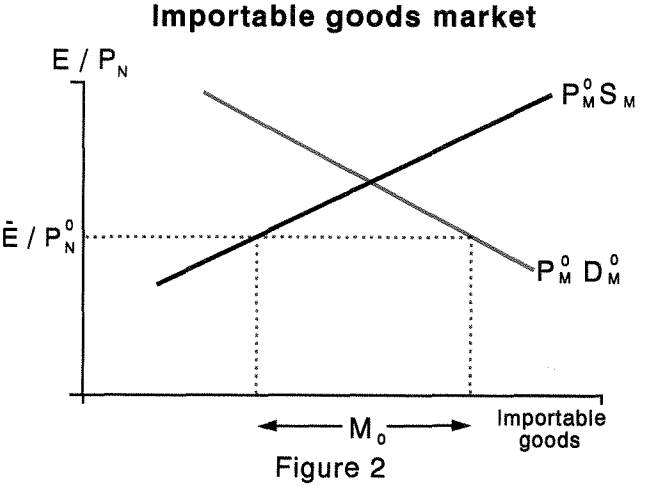

Figure 2

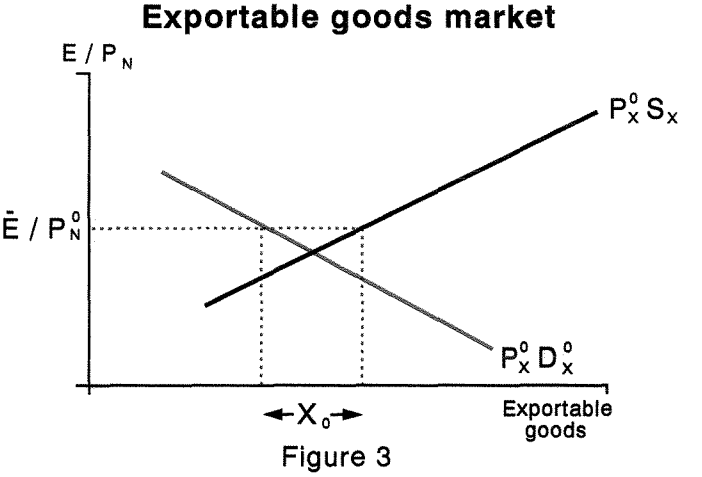

Figure 3

variables that also are exogenous to the model. Since nominal exchange rates (E) and the world prices of exports and imports are exogenously determined, the price of non-traded goods will adjust to satisfy equation (5), resulting in an equilibrium real exchange rate that clears the non-traded goods market. The short-run equilibrium real exchange rate is represented as e^0 in Figure 1.

External Sector

To see the relationship between the equilibrium real exchange rate and the external sector, consider the market for imports of goods and services. The shares of importable goods in total domestic supply and demand are functions of the real exchange rate as well as of the relative price of exportable and importable goods. Thus, a rise in the real exchange rate or in the price of exportable versus importable goods (the terms of trade) will reduce the domestic supply of importable goods, while increasing the domestic demand for such goods. That is,

$$P_M S_M = P_M s_M(e, P_x/P_M)S \qquad (6)$$
$$\qquad\qquad\quad - \quad -$$

and

$$P_M D_M = P_M d_M(e, P_x/P_M)D \qquad (7)$$
$$\qquad\qquad\quad + \quad +$$

Figure 2 illustrates the domestic supply and demand schedules for importable goods in the economy. Since the schedules are defined in value terms, changes in export or import prices are reflected in shifts in the supply and demand curves. On the other hand, changes in the nominal exchange rate, or in the price of non-traded goods (shown in the vertical axis) will be reflected in movements along the curves. Given a nominal exchange rate set by the government, the price of non-traded goods P_N^0 that clears the non-traded goods market (which corresponds to the real exchange rate e^0 in Figure 1), is associated with an excess demand for importable goods, resulting in total imports M^0.

The level of exports can be determined in a similar fashion, that is,

$$P_X S_X = P_X s_X(e, P_x/P_M)S \qquad (8)$$
$$\qquad\quad - \quad +$$

and

$$P_X D_X = P_X d_X(e, P_x/P_M)D \qquad (9)$$
$$\qquad\quad + \quad -$$

In this case, the price of non-traded goods, P_N^0, is associated with an excess domestic supply of exportable goods, corresponding to the equilibrium level of exports X^0 (Figure 3).

Since the non-traded goods market always clears ($S_N = D_N$), the difference between the aggregate supply and demand in the economy equals the current account balance (CA), or the excess supply of goods and services in the traded-goods sector:

$$\begin{aligned} S - D = CA &= P_X(S_X - D_X) - P_M(D_M - S_M) \\ &= P_X X - P_M M \end{aligned} \qquad (10)$$

Suppose there is no government, so D in equation (10) equals the equilibrium demand of the private sector, D^e, in equation (3). Given e^0, equation (10) then defines an equilibrium current account, or level of external lending or borrowing, that is consistent with private intertemporal utility maximization.

In equilibrium, current account deficits (and borrowing) are expected in a developing country for two reasons. First, per capita incomes are lower than they are expected to be in the future, so it is welfare-enhancing to borrow in order to smooth consumption. Second, due to the relative scarcity of installed capital, the marginal product of capital is likely to be higher than that of industrial countries, making borrowing to finance investment profitable.[8]

II. External Shocks and Misalignment

This model can be used to determine how an economy would adjust to two kinds of external shocks. First, an interest-rate shock is considered, and then a terms-of-trade shock is evaluated. Assume that a country is initially at an equilibrium e^0 that clears the non-traded goods market and that corresponds to an equilibrium current account deficit. A permanent rise in the cost of funds (world rate of interest) reduces permanent disposable income for countries that are net debtors and raises the cost of funds above the existing marginal product of capital. The reduction in permanent income leads to a fall in consumer demand, and the rise in the cost of funds reduces investment demand. The result is a fall in aggregate demand D in equation (3), shifting the demand schedule for non-tradable goods to the left, as illustrated in Figure 4. In order to clear the non-traded goods market, the real exchange rate must depreciate to e^1. If nominal exchange rates are fixed and prices are flexible, the depreciation will be accomplished through a reduction in the price of non-traded goods.

As can be seen in Figure 5, the reduction in permanent

An adverse external shock reduces aggregate demand and leads to:

A reduction in the demand for non-tradables and real exchange depreciation

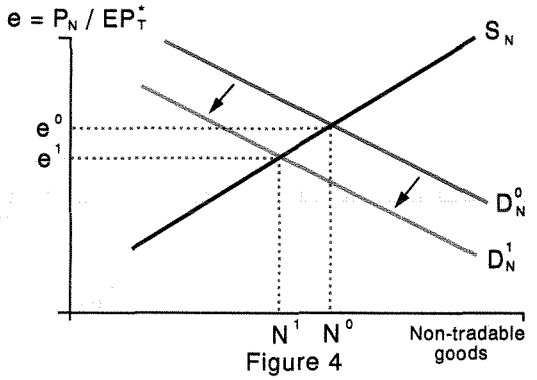

Figure 4

A fall in the equilibrium level of imports

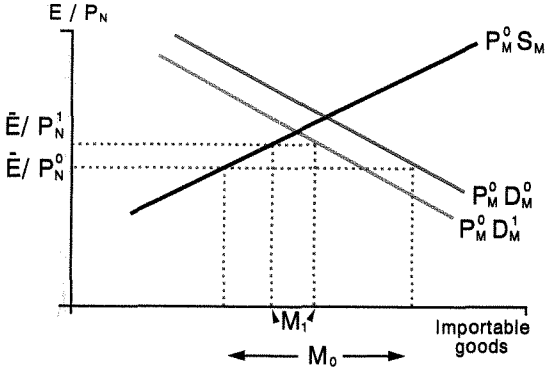

Figure 5

and an increase in the equilibrium level of exports

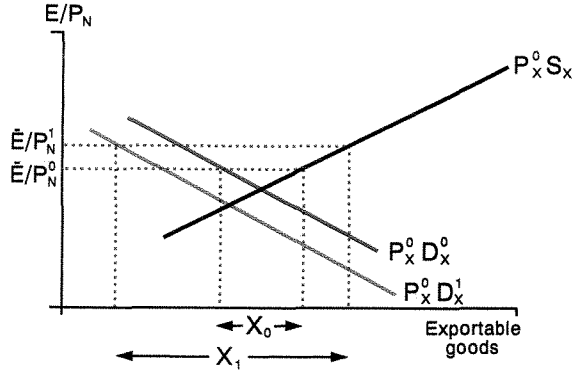

Figure 6

income and aggregate demand shift the domestic demand schedule for importables to the left, which, in combination with the decline in the equilibrium price of non-traded goods, results in a reduction in the equilibrium amount of imports. The corresponding fall in the domestic demand for exportable goods leads to an increase in the level of exports (Figure 6), and a decline in the equilibrium current account deficit.[9]

The analysis of terms-of-trade shocks is very similar to that of interest-rate shocks. Suppose a supply-side disturbance, such as a rise in imported oil prices, leads to a worsening in the terms of trade. The resultant decline in permanent income lowers the demand for non-tradable goods, the real exchange rate depreciates, imports fall, and exports and the current account balance tend to rise, as illustrated in Figures 4 to 6.[10] In the present discussion, shifts in supply have been ignored to simplify the illustration, but they can be incorporated by assuming that factor productivity depends on imported inputs. In this case, a rise in import prices may lead to a reduction in aggregate supply which is associated with a real exchange rate appreciation, and a deterioration in the current account balance in the short-run.[11] These effects will tend to be reversed as domestic demand contracts in response to the reduction in permanent income.

In addition to being subject to supply-side disturbances, the terms of trade may be affected by changes in foreign demand and in third country exchange rates. The terms of trade may tend to improve if foreign trading partners grow faster, as demand abroad rises.[12] On the other hand, the impact of changes in third country exchange rates on the terms of trade is ambiguous. For example, if Korea exports mainly to the U.S. and imports from Japan, a dollar appreciation against the yen can lower the price of imports relative to exports, thus improving the terms of trade.[13] However, the appreciation also can induce a substitution in U.S. demand away from Korean exports in favor of cheaper Japanese exports, which may adversely affect Korea's terms of trade. The appropriate policy response will depend on which effect appears to be dominant. In particular, if the substitution effect is stronger, it is appropriate for Korea to weaken its currency against the U.S. dollar, in order to offset the incipient substitution toward Japanese goods.

Misalignment and Nominal Exchange Rates

An increase in world interest rates or adverse movements in the terms of trade may produce two different kinds of real exchange rate misalignment, which may be illustrated by reference to Figure 4. First, price rigidity in

non-traded goods may prevent an adjustment in the real exchange rate from e^0 to e^1 in Figure 4. The real exchange rate will be *over*valued in the sense that there is an excess supply of non-traded goods in the short-run. Equilibrium in the non-traded goods sector can only be achieved by contracting output, resulting in unemployment, which over time deflates the price of non-traded goods and eliminates the misalignment. One way of avoiding unemployment under these conditions is to depreciate the nominal exchange rate, speeding the adjustment to e^1.[14]

A second kind of misalignment results when the government seeks to offset the contractionary impact of external shocks by adopting expansionary fiscal and monetary policies to prevent unemployment, thus maintaining the short run equilibrium at e^0. In this case, the demand schedule will not shift to the left (demand will still be represented by the schedule D_N^0) in Figure 4, and the levels of imports and exports will remain at M^0 and X^0 in Figures 5 and 6, respectively. The current account balance will also remain unchanged. Since a domestic demand contraction is the equilibrium response, the real exchange rate at e^0 will now be *over*valued in the sense that a country is borrowing more than is optimal, or perhaps sustainable, in the long-run.[15]

In this model, nominal exchange rate policy cannot prevent the real exchange rate overvaluation that results from expansionary domestic demand policies. If the nominal exchange rate depreciates, e may temporarily fall below the equilibrium e^0 in Figure 1. Over time, however, the resulting excess demand for non-traded goods leads to inflation, and a real appreciation back to e^0.

By the same token, an increase in permanent income due to a decline in world interest rates or an improvement in the terms of trade can lead to misalignment if prices adjust slowly and the real exchange rate fails to appreciate, resulting in excess demand in the non-traded goods sector and inflationary pressures. Alternatively, misalignment can arise if domestic demand fails to expand in response to the increase in permanent income. In this case, the country is borrowing less than is optimal, at the cost of missed opportunities for increasing present consumption or investment in a manner that will maximize intertemporal utility. In both of these examples, the real exchange rate is *under*valued.

Qualifications

Adjustment to external shocks in developing economies frequently differs from the preceding description of the equilibrium, at least initially. Three factors may account for the discrepancy.

First, adjustment takes time. A rise in the world rate of interest, or adverse movements in the terms of trade, initially may be associated with an increase (rather than a decrease) in the current account deficit, because interest payments to foreigners rise or export revenues fall. In addition, if adverse terms-of-trade shocks lead to a contraction in domestic supply, domestic prices may rise more than the prices of traded goods, leading to real exchange rate appreciation, rather than depreciation. However, initial increases in the current account deficit and real exchange rate appreciation may not be inconsistent with adjustment to the long-run equilibrium suggested by the model if they are reversed over time.

Second, the equilibrium pattern of adjustment depends on whether external shocks are permanent or temporary. In the preceding discussion, and in what follows, it is assumed that shocks are perceived as permanent at the time that they occur. (This is plausible, as the shocks were large and generally were not reversed for several years.) However, if an adverse terms-of-trade shock is perceived as temporary, an increase in external borrowing to smooth consumption will enhance welfare, and expansionary policies (or government guarantees for private external borrowing) may be consistent with equilibrium adjustment if domestic residents are unable to borrow abroad.

Third, the equilibrium pattern of adjustment is influenced by a country's previous borrowing. A country that has borrowed little in the past may adopt expansionary policies that offset the contractionary impact of external shocks without producing disequilibrium. On the other hand, a country whose exchange rate has been systematically overvalued in the past, and has been borrowing more than the optimal amount probably will have to respond more vigorously to depreciate the exchange rate and reduce current account deficits. In cases where past borrowing has been excessive, countries may even seek to generate current account surpluses to reduce external debt to manageable levels. This may be a deliberate choice on the part of policy makers, or may be compelled by the interruption of voluntary lending by creditors.

Equilibrium Responses

To sum up, in equilibrium, a permanent increase in the world rate of interest or a permanent decline in the terms of trade is likely to be associated with a depreciation in the equilibrium real exchange rate (or an initial appreciation in the real exchange rate that is later reversed) and a decline in domestic demand and in the equilibrium current account deficit. Policies to facilitate this type of adjustment (a currency devaluation if domestic prices are rigid, or pol-

icies to reduce domestic demand and external borrowing) would tend to prevent real exchange rate misalignment. On the other hand, policies that hinder adjustment to the external shock may lead to an overvalued real exchange rate, resulting in declining growth or in unemployment, or alternatively in higher than optimal external borrowing. Conversely, when a country experiences favorable external shocks, policies that facilitate the equilibrium real appreciation and increases in external borrowing would prevent misalignment. A number of factors, notably adjustment lags and debt management considerations, may influence the observed pattern of adjustment.

III. External Shocks and Their Impact

The responses of the four east Asian economies to external shocks in the ten years from 1978 to 1987 can be evaluated against the equilibrium suggested by the model presented in the preceding section. Since the external shocks in the first half of this period largely were adverse and the shocks in the second half generally were favorable, the analysis proceeds by evaluating the four economies' adjustment first in the 1978–82 period and then in the 1983–87 period.

Table 1 illustrates the impact of changes in world interest rates and in the terms of trade in the four Asian economies during the 1978–82 period. To represent the impact of changes in world interest rates on income, the product of the change in the U.S. dollar London Interbank Offer Rate and the ratio of gross external debt to nominal GNP was multiplied by -1 for each country. The impact of changes in the terms of trade was calculated as the product of the percentage change in the commodity terms of trade in each country and the corresponding ratios of real imports to real GNP.

Korea was most adversely affected by external shocks. The rise in Korea's estimated interest burden, as measured by the ratio of estimated interest liabilities to GNP,[16] reduced disposable income by an average of 0.5 percentage points a year in the period 1978–82, while adverse movements in the terms of trade had an average annual impact of 1.2 percent of GNP over the period.[17] Due to their status as commodity exporters, both Thailand and Malaysia experienced declines in the terms of trade somewhat later than did Korea, although the average impact of external shocks appeared to be smaller, especially in Malaysia.

In contrast, Singapore appears to have *benefited* from external shocks over the period, as improvements in the terms of trade, magnified by the openness of Singapore's economy, had a very strong impact, 6.6 percentage points a year. Moreover, the increase in Singapore's estimated interest burden was relatively small (about 0.2 percentage points a year). Although the reasons Singapore's terms of trade improved over this period are not clear from the aggregate data,[18] it appears that Singapore was less vulnerable to external interest rate shocks because historically very large current account deficits were financed by private direct investment rather than external borrowing. This meant that any capital losses from a rise in world interest rates would be borne by foreign investors, rather than by Singapore residents.[19]

Given the estimated effects of the external shocks during the period 1978–82, the earlier discussion suggests that Korea, Thailand, and to a lesser degree, Malaysia should have adjusted by reducing current account deficits and allowing their real exchange rates to depreciate. Moreover, the adjustment should have been more pronounced in Korea, which suffered the largest external shocks, and relatively moderate in Malaysia. In contrast, Singapore appears to have benefited from the external environment

Table 1

Impact of External Shocks 1978-82

(as percent of GNP)

	1978	1979	1980	1981	1982	Average
Korea						
Interest Rate[1]	-1.0	-1.0	-0.9	-1.4	1.7	-0.5
Terms of Trade[2]	1.5	-0.8	-6.8	-0.3	0.4	-1.2
Thailand						
Interest Rate	-0.6	-0.7	-0.5	-0.8	1.1	-0.3
Terms of Trade	-0.1	0.8	-1.7	-2.8	-3.2	-1.4
Malaysia						
Interest Rate	-0.6	-0.6	-0.3	-0.6	1	-0.2
Terms of Trade	-0.1	9.7	-0.7	-7.1	-3.0	-0.2
Singapore						
Interest Rate	-0.5	-0.5	-0.3	-0.5	0.6	-0.2
Terms of Trade			12.1	4.7	2.9	6.6

[1] Impact of change in interest rate = −(change in LIBOR)*(Debt)/GNP.

[2] Impact of change in terms of trade = (percent change in terms of trade)*(Real Imports)/(Real GNP)

over this period, so real exchange rate appreciation and domestic demand expansion would be consistent with equilibrium.

Details of the actual pattern of adjustment and economic performance in these Asian economies are provided in Table 2. The table reviews trends in the current account (as an indicator of relative domestic demand stimulus), the trade-weighted real and nominal exchange rates,[20] inflation, and real GNP. To evaluate the possible role of debt-management considerations in influencing policy responses, the debt-to-GNP ratio also is included.

In the case of Korea, current account deficits quadrupled to nearly nine percent of GNP in 1980, and the real exchange rate also appreciated over this period. Korea's expansionary policies contributed to rising inflation, while failing to prevent a slowdown in GNP growth. Real exchange rate appreciation exacerbated adverse external and domestic shocks, culminating in a recession in 1980.

Table 2

Responses to Shocks and Economic Performance

	1978	1979	1980	1981	1982
Korea					
Current Account[1]	-2.2	-6.5	-9.0	-7.1	-3.9
Real Exchange Rate[2]	99.3	109.8	100.0	106.3	106.6
Nominal Exchange Rate[2]	125.3	126.5	100.0	94.9	94.0
Inflation[3]	14.4	18.3	28.7	21.3	7.3
Real GNP Growth[3]	10.9	7.4	-3.0	7.4	5.7
External Debt[1]	35	36	49	50	54
Thailand					
Current Account	-5.1	-7.8	-6.3	-7.4	-2.8
Real Exchange Rate	91.6	92.0	100.0	105.5	106.4
Nominal Exchange Rate	100.1	99.0	100.0	102.0	104.4
Inflation	7.9	9.9	19.8	12.6	5.3
Real GNP Growth	10.4	5.3	4.8	6.3	4.1
External Debt	21	24	26	32	35
Malaysia					
Current Account	0.7	4.6	-1.2	-10.3	-14.2
Real Exchange Rate	101.9	103.7	100.0	104.1	108.7
Nominal Exchange Rate	94.1	99.6	100.0	103.2	108.3
Inflation	5.0	3.6	6.7	9.7	5.8
Real GNP Growth	6.7	9.4	7.4	6.9	5.9
External Debt	21	20	17	24	32
Singapore					
Current Account	-5.8	-7.8	-13.9	-10.9	-8.8
Real Exchange Rate	101.3	100.6	100.0	110.0	111.8
Nominal Exchange Rate	94.7	97.9	100.0	111.0	115.9
Inflation	4.9	4.0	8.4	8.3	3.8
Real GNP Growth	8.6	9.3	9.7	9.6	6.9
External Debt	18	18	18	17	18

[1] As percent of GNP
[2] Index levels, 1980 = 100
[3] In percent

Efforts to correct the economic difficulties of Korea began in earnest in 1980–82, when Korea adjusted in textbook fashion. Domestic demand restraint produced a more than 50 percent drop in current account deficits as a proportion of GNP, and real exchange rate appreciation virtually ceased as inflation dropped sharply. As the rate of real exchange rate appreciation slowed, GNP growth rebounded (from a rate of decline of three percent in 1980 to increases of 7.4 and 5.7 percent in 1981 and 1982, respectively), in spite of slower growth in industrial economies and contractionary domestic demand policies in Korea.[21] The rate of increase in the debt-to-GNP ratio slowed after 1980, although at 54 percent, it was still above the average for the four Asian economies.

It is worth highlighting that contractionary demand management policies in Korea were consistent with rapid growth and, as suggested by the discussion in the preceding section, appeared to be crucial in ensuring the effectiveness of nominal exchange rate depreciation. Korea's nominal exchange rate depreciated sharply in 1980 and 1981, but this was not fully reflected in real exchange rate depreciation, due to high inflation associated partly with past expansionary domestic demand policies. The appreciation of Korea's real exchange rate was interrupted only after contractionary demand management policies took effect and inflation fell.[22]

In Thailand, as in Korea, sharp increases in the current account deficit were reversed, and real exchange rate appreciation slowed late in the 1978–82 period. In contrast to Korea, however, Thailand's nominal exchange rate drifted upward over the period due to its link to an appreciating U.S. dollar.[23] While nominal appreciation apparently led to more moderate inflation in Thailand, it may also have contributed to the declining (and somewhat erratic) trend in Thailand's GNP growth over the 1978–82 period. In particular, Thailand's GNP growth fell significantly below the average for the three other Asian economies in 1982, because of the contractionary combination of declining terms of trade, domestic demand restraint (as reflected in the decline in the current account deficit) and nominal exchange rate appreciation. Over the period, Thailand's debt-to-GNP ratio rose 14 points to 35 percent.

In Malaysia and Singapore, current account deficits increased and the real exchange rate appreciated strongly, and, in contrast to Korea and Thailand, there was no significant reversal in these trends over the period. To an even greater degree than in Thailand, the appreciation in

Malaysia's and Singapore's real exchange rate was largely attributable to rapid nominal exchange rate appreciation.

Given the relatively benign external environment facing both Malaysia and Singapore, the combination of expansionary domestic demand and nominal exchange rate appreciation appears to have been quite effective; inflation was relatively moderate in both economies over the entire period, while real GNP growth rates were consistently high. Malaysia's expansionary policies were associated with large increases in its external debt over the period, from 21 percent to 32 percent of GNP. In contrast, because Singapore's large current account deficits were to a significant extent financed by foreign direct investment, Singapore's debt-to-GNP ratio did not increase over the period.

Our review indicates that Korea and Thailand, which were more adversely affected by external shocks, experienced slower real exchange rate appreciation and a reduction in current account deficits late in the period 1978–82. On the other hand, Malaysia and Singapore, which were less adversely affected or benefited from external developments, and were less indebted, experienced sustained real exchange rate appreciation and increases in current account deficits. The pattern of adjustment is thus roughly consistent with equilibrium as described by the model and may partly explain the impressive economic performance of the four Asian economies in 1978–82.[24]

Nevertheless, the adjustment over this period in some cases had adverse effects. Thailand's policy of linking its currency to an appreciating U.S. dollar was probably too deflationary, while in Malaysia and Singapore, the steep real exchange rate appreciation posed the risk of a contraction when domestic demand stimulus ended.[25] Furthermore, in Korea, Thailand, and Malaysia, external debt grew significantly over the period (in spite of eventual reductions in current account deficits in the first two economies), increasing the importance of debt management considerations in future adjustment.

1983–87

The period 1983–87 reversed many of the shocks experienced in 1978–82. As a result, Korea, Thailand, and Malaysia, which had been adversely affected by external shocks in the earlier period, benefited from changes in the external environment in 1983–87. In contrast, Singapore, which had been favored in 1978–82, was adversely affected by external shocks.

Table 3 shows that the decline in world rates of interest was associated with an average annual decline in the estimated interest burden of Korea of about 0.7 percent of GNP from 1983 to 1987. In Thailand and Malaysia, respectively, the decline in the interest burden averaged 0.5 and 0.6 percent annually, while in Singapore, the annual decline averaged only 0.2 percent.

Table 3 also shows that in this period, Korea, Thailand, and Malaysia on average benefited from improvements in the terms of trade, although only in Korea was there a consistent improvement. In Thailand and Malaysia, the terms of trade declined up to about 1985, before rising sharply in 1985–87. In the case of Singapore, the terms of trade declined over most of the period.

The model suggests that in 1983–87, declines in interest rates and improvements in the terms of trade would be consistent with larger current account deficits and real exchange rate appreciation in Korea, and somewhat later, in Thailand and Malaysia. On the other hand, the equilibrium response for Singapore would be a reduction in current account deficits and real exchange rate depreciation. Table 4 suggests that in all Asian economies, the actual paths of real exchange rates and of current account balances over this period differed from the equilibrium paths predicted by the model.

In the cases of Korea and Thailand, current account deficits fell sharply over the 1983–87 period, turning to

Table 3

Impact of External Shocks 1983-87

(as percent of GNP)

	1983	1984	1985	1986	1987	Average
Korea						
Interest Rate[1]	1.9	-0.7	1.4	0.9	-0.2	0.7
Terms of Trade[2]	0.6	0.7	0.7	3.6	-2.6	0.6
Thailand						
Interest Rate	1.3	-0.5	1.2	0.8	-0.2	0.5
Terms of Trade	4.0	-0.9	-1.2	2.3	0.0	0.9
Malaysia						
Interest Rate	1.5	-0.6	1.3	1.2	-0.3	0.6
Terms of Trade	0.6	2.8	-4.1	-5.4	8.7	0.5
Singapore						
Interest Rate	0.6	-0.2	0.5	0.4	-0.1	0.2
Terms of Trade	-4.4	-6.3	1.5	-5.7	-9.5	-4.9

[1] Impact of change in interest rate = −(change in LIBOR)*(Debt)/GNP.

[2] Impact of change in terms of trade = (percent change in terms of trade)*(Real Imports)/(Real GNP)

large surpluses in Korea by the end of the period. At the same time, there was largely uninterrupted, and accelerating, real exchange rate depreciation in both economies, reinforced by sharp nominal exchange rate depreciation starting in 1984–85. Partly as a result of the domestic demand restraint reflected in rising current account balances, inflation rates were moderate. However, inflation rose after 1985 and recent reports of accelerating wage demands in Korea and of supply-side bottlenecks in Thailand, as well as the sharp acceleration in growth in both economies, suggest that the inflation rates in Table 4 may understate underlying inflationary pressures. Rising current account balances also contributed to a decline in the external debt-to-GNP ratio from 53 percent to 34 percent in Korea, and moderated the rise in the debt-to-GNP ratio in Thailand (the latter rose from 35 to 44 percent).

Table 4

Responses to Shocks and Economic Performance

	1983	1984	1985	1986	1987
Korea					
Current Account[1]	-2.1	-1.7	-1.1	4.8	8.2
Real Exchange Rate[2]	99.5	97.4	87.2	72.0	70.9
Nominal Exchange Rate[2]	88.2	88.0	79.6	65.4	63.6
Inflation[3]	3.4	2.3	2.5	2.8	3.0
Real GNP Growth[3]	10.9	8.7	5.4	11.7	11.1
External Debt[1]	53	51	56	49	34
Thailand					
Current Account	-7.4	-5.3	-4.2	0.6	-0.8
Real Exchange Rate	105.8	103.0	87.8	71.4	64.3
Nominal Exchange Rate	104.8	105.9	91.7	74.8	67.2
Inflation	3.8	0.8	2.5	1.8	2.6
Real GNP Growth	7.3	7.1	3.5	4.7	7.1
External Debt	35	37	48	45	44
Malaysia					
Current Account	-12.5	-5.3	-2.1	-0.3	8.1
Real Exchange Rate	108.6	111.9	100.5	74.8	67.6
Nominal Exchange Rate	109.0	113.0	104.9	79.0	72.0
Inflation	3.7	4.0	0.3	0.7	0.9
Real GNP Growth	6.3	7.8	-1.0	1.2	5.2
External Debt	42	42	52	67	65
Singapore					
Current Account	-3.5	-2.0	-0.0	3.0	2.6
Real Exchange Rate	109.8	111.9	104.3	81.0	73.6
Nominal Exchange Rate	117.7	122.4	118.0	94.9	87.8
Inflation	1.3	2.6	0.5	-1.4	0.5
Real GNP Growth	8.2	8.3	-1.6	1.8	8.8
External Debt	16	17	19	21	22

[1] As percent of GNP
[2] Index levels, 1980 = 100
[3] As percent

Adjustment in Malaysia and Singapore in 1983–87 may be divided into two distinct phases. In the first phase, from 1983 to early 1985, current account deficits fell sharply as a result of reductions in investment spending to apparently more sustainable levels.[26] At the same time real exchange rates continued to appreciate or at the very least, did not fall, partly because nominal exchange rates were still appreciating. These contractionary policies, during a period when Singapore in particular experienced declines in terms of trade, produced strong reductions in inflation and growth, culminating in recessions in both economies in 1985.

In the second phase, from 1985 to 1987, current account deficits in Singapore and Malaysia turned to surpluses, and real exchange rates depreciated sharply, due to strong nominal exchange rate depreciation. This was associated with a recovery in growth and a gradual increase in inflation in both economies. In spite of the turnaround in current account balances, Malaysia's external debt-to-GNP ratio rose from 42 to 65 percent over the period 1983–87. The rapid growth in external debt in Malaysia was a major source of concern for domestic policy makers and external creditors, and increases in current balances reflected efforts to limit this growth.

To sum up, in spite of recessions in Malaysia and Singapore that were quickly reversed, economic performance in all four Asian economies in 1983–87 was again better than the average for all developing countries as a whole. Nevertheless, the earlier discussion suggests that the real exchange rate depreciation and the associated tendency toward current account surpluses may have been carried too far, given the decline in world interest rates and the improvement in the terms of trade in most of these economies.

In terms of the model, exchange rate undervaluation is suggested by large current account surpluses in Korea and Malaysia, and by the indications of excess demand in Korea and Thailand cited earlier. It could also be argued that current account surpluses indicate that Singapore exceeded the depreciation required to respond to adverse movements in terms of trade and to correct an apparent currency overvaluation. In addition to fostering resentment abroad, current account surpluses suggest that opportunities for consumption and investment in these rapidly growing economies are not being fully exploited.

One possible justification for current account surpluses in Asian economies is external debt management. Current surpluses or declining current deficits have significantly

reduced the external debt of Korea, while slowing the growth of external debt in Thailand, and to a lesser degree, Malaysia. Prudent debt management permitted the Asian region to escape largely unscathed from the debt crisis of the early 1980s and reduces the vulnerability of these economies to external shocks in the future. Nevertheless, debt-to-GNP ratios are low in the four Asian economies in comparison to other developing countries, and debt-management does not appear to be a consideration in the case of Singapore. Furthermore, given the decline in world rates of interest, it can be argued that Korea in particular might have earned a higher return by stepping up investment spending rather than reducing its gross external debt through current account surpluses in 1985–87.

Even if it were desirable to prevent further increases in debt-to-GNP ratios in Asian economies, it can be argued that current account surpluses (and the sacrifice of present investment and consumption opportunities) may not be required to accomplish this. The experience of Singapore suggests that foreign private direct investment can finance increased consumption and investment with little or no accumulation of external debt.[27] Given the outstanding economic performance of the region, debt reduction could also be achieved easily by converting foreign debt into foreign equity.

In conclusion, the ability of the four economies of the region to prevent real exchange rate overvaluation in the face of adverse external shocks appears to have contributed to their very successful economic performance in 1978–87. However, the discussion provides some support for the view that real exchange rates may have become undervalued in some Asian economies, particularly after 1985, and that opportunities for increasing investment and consumption in some of these economies may have been missed.

NOTES

1. Notably Latin America and Africa. For discussions of economic performance and policy responses to external shocks, see Dornbusch (1985), Balassa (1986), Balassa and Williamson (1987), Edwards (1988), Khan (1986), and Sachs and Sundberg (1988).

2. Because of disinflation, however, real rates in the 1980s still were higher than they were in the mid-1970s.

3. For a rigorous discussion of this type of optimization problem with a focus on private consumption demand, see Ostry (1988). For an example of this type of analysis applied to Asian economies, with a discussion of investment demand, see Alesina (1987). Sen and Turnovsky (1989) also analyze investment demand in an intertemporal framework.

4. If capital markets are imperfect, so that the private sector cannot borrow abroad while the government can, government policy can be designed to create a spending and borrowing path that is consistent with intertemporal utility maximization. For a discussion, see Alesina (1987). On the other hand, government policy often ignores such intertemporal concerns, leading to suboptimal spending paths.

5. For convenience, the definition of the real exchange rate that follows is the reciprocal of the standard definition.

6. A proxy for the traded goods price is described in note 20.

7. See Dornbusch (1980).

8. To correspond to an equilibrium, equation (10) must satisfy certain constraints. In particular, in the absence of government intervention, we know that D^e is given in equation (3), S is given by endowments and that the elasticities of supply of each good are given by technology. The price elasticities of demand between non-tradable, importable, and exportable goods must then be such that, given the overall demand and supply, the equilibrium real exchange rate that clears the non-traded goods market is also consistent with achieving an equilibrium current account and rate of external borrowing.

9. It is implicitly assumed here that the reduction in permanent income in the long-run reduces the current account deficit by more than the increased interest payments initially increase the current account deficit. The reason is that the reduction in permanent income, as well as the higher cost of current consumption reflected in the increase in world interest rates, reduces the equilibrium level of external borrowing.

10. It is implicitly assumed that the contraction in demand more than fully offsets the tendency for the higher import price to decrease the current account balance. The prediction that a worsening of the terms of trade tends to increase the equilibrium current account balance would contradict the so-called Laursen-Metzler effect. In Laursen and Metzler's 1950 framework, adverse movements in the terms of trade cause a rise in the export value of expenditure, a decline in saving, and a current account deficit. Obstfeld (1982) notes that this prediction results from Laursen and Metzler's assumption that individuals reduce their saving when experiencing a decline in real income, and shows that this assumption may be invalid if individuals maximize intertemporal utility, and the rate of discount is increasing in utility. (The latter condition is required for stability in the stationary state. See Svensson and Razin, 1983.) In an expanded optimizing framework

which includes investment, Sen and Turnovsky (1989) cite conditions under which an adverse terms of trade shock leads to a decline in the steady-state equilibrium capital stock, so that current investment spending and the current account deficit fall, contradicting the Laursen-Metzler hypothesis.

A related literature focuses on the proposition adopted in the text that adverse movements in the terms of trade, due, say, to a rise in import prices, are associated with a depreciation of the equilibrium real exchange rate. Edwards and Van Wijnbergen (1988) note that this standard proposition may be questioned, because it implies that income effects (which lead to a reduction in the demand for non-traded goods and a tendency toward real exchange rate depreciation) dominate substitution effects (which lead to an increase in the demand for non-traded goods due to the rise in import prices, and a corresponding tendency toward real exchange rate appreciation). Although they concede that it is quite possible for income effects to dominate substitution effects, they note that such a result is generally considered an anomaly (presumably because it contradicts traditional assumptions made in the literature). One way of addressing this objection is to note that in many small open economies imported goods are often not good substitutes for non-traded goods, so that income effects may dominate substitution effects. (In certain important cases, such as oil imports, imports and non-traded goods may be *complements*.) In the discussion in the text, the ambiguity between income and substitution effects does not arise because it is implicitly assumed that changes in relative prices that are not accompanied by shifts in the sectoral demand or supply schedules lead to excess demand or supply in the short-run but do not affect the long-run equilibrium real exchange rate.

11. A rise in (oil) import prices will tend to shift the supply schedule in Figure 4 to the left, producing a real exchange rate appreciation and an associated increase in the price of non-traded goods. In Figure 5, the import supply schedule also will shift to the left, increasing the total level of imports. Similarly, the level of exports will fall, as will the current account balance.

12. For the terms of trade to improve, the expansion in world economic activity must increase export prices more than import prices. This will occur, for example, if the world supply of exportable goods is less elastic than the supply of importable goods. Thus we might expect commodity exporters to be more affected by fluctuations in the growth of industrial countries.

13. See Lipschitz (1979). This effect does *not* depend on whether a country pegs its currency to the dollar or the yen.

14. Alternatively, a mix of commercial policies may be used. See Edwards (1988). Note that in theoretical discussions it is generally assumed that a nominal exchange rate depreciation has adverse effects on the terms of trade, which may further reduce demand. This assumes that importers and exporters pass-through the full impact of exchange rate changes to their respective markets, so that import prices rise and export prices remain unchanged in domestic currency. However, the terms of trade may not worsen in response to a nominal depreciation if exporters price-to-market (which some argue is the case for Asian exporters), as export prices in domestic currency can then rise with a nominal depreciation, without adversely affecting export volume. Such nominal exchange rate effects do not change the direction of equilibrium adjustment and should not prevent the attainment of a new equilibrium.

15. For definitions of real exchange rate misalignment, see Edwards (1988, 1989).

16. Note that the estimate does not reflect actual interest payments, which in some cases were deferred into the future. Furthermore, the use of gross, rather than net, external debt statistics tends to overstate the debt burden of the Asian economies. This is likely to be true of Singapore for most of the period, and for Korea after 1985. Nevertheless, the figure presented in the table gives a fair picture of the burden faced by these economies during a period when world rates were rising.

The extent to which a change in world interest rates affects demand and the real exchange rate also depends on the gap between the marginal product of capital and the cost of funds produced by the change in interest rates. Due to lack of available data, no attempt was made to estimate this effect.

17. The estimates show the impact of terms-of-trade changes in all Asian economies in 1978–82, except for Singapore, where the data correspond to 1979–1982. For a more precise specification of the effect of changes in the terms of trade on disposable income, as a function of the share of imports, see Ostry (1988).

18. One possibility is that the sharp rise in crude oil prices starting in 1979 contributed to the improvement in the terms of trade, since Singapore was a net exporter of petroleum products. The assumption is that Singapore's profit margins from processing petroleum products increased with the rise in oil prices. However, the relationship between oil prices and profit margins is quite unstable. Furthermore, a case can be made that profit margins may rise more strongly when crude oil prices fall, if refiners do not fully pass on the savings to consumers.

19. The analysis in Section II assumed that external deficits are financed through borrowing, so that changes in interest rates affect the permanent income of domestic residents. Since Singapore financed its current account deficits by foreign direct investment, the rise in world interest rates did not automatically lead to an increase in the flow of payments to owners of foreign capital (as it would to foreign creditors). Instead, through arbitrage, the market value of the Singapore capital owned by foreigners may have fallen. In contrast to the case where current account deficits are financed by external borrowing, the rise in world interest rates meant that foreigners, rather than domestic residents, took a loss. Although the rise in interest rates still would tend to lower equilibrium

investment spending in Singapore, the effect on domestic permanent income and consumption would be smaller.

20. The weighted average CPIs of major industrial countries, adjusted for bilateral exchange rates, were taken to represent traded goods prices (or factors that would heavily influence such prices), while the domestic CPI was taken to represent non-traded goods prices for each Asian economy. In an effort to focus on those economies whose prices and currencies are most likely to influence the world prices of traded goods, the U.S., Japanese, and EC CPIs, adjusted for bilateral exchange rates, were used to derive a measure of traded goods prices for the Asian economies (the German deutschemark served as a proxy for the European currencies). Weights were based on the 1980 bilateral trade of each Asian economy with the U.S., Japan, and the EC.

With the exception of Malaysia, these indices give similar results to broader real exchange rate indices that include the currencies of a larger number of industrial country trading partners as well as newly-industrializing economies. In the case of Malaysia, the fact that Singapore is one of its larger trading partners affects the results. Both the Singapore dollar and the Malaysian Ringgit strongly appreciated on a trade-weighted basis against the currencies of the major industrial countries in 1978–80. However, since the Singapore dollar appreciated by more, Malaysia's real exchange rate appears to appreciate more strongly in the three-currency basket, because the Singapore dollar is excluded.

21. Two points are worth making here. First, the sharp contraction in output and the sharp rebound that followed were partly the result of the 1980 contraction in agricultural output in Korea, and are thus not entirely attributable to economic policies. Second, the decline in oil prices after 1980 contributed to disinflation in the more indebted economies. Nevertheless, this was not the only factor. The rapid increases in inflation in other economies after 1980 (notably Latin America) suggests that declining oil prices are not sufficient to guarantee a decline in inflation.

22. In the absence of more detailed empirical analysis, it is difficult to determine the "equilibrium" real exchange rate (for a description of an attempt, see Edwards, 1988) and to make precise statements about whether real exchange rate adjustment was sufficient to correct overvaluation. One reason is that, aside from the magnitude of the shocks, the extent of equilibrium real exchange rate adjustment to contractionary external shocks depends on additional factors that are not easily measured, such as the price elasticities of demand and supply between traded and non-traded goods sectors. The smaller these elasticities, the larger is the required depreciation.

23. The peg to a rising dollar nullified the impact of a 10 percent depreciation of the Thai Baht against the U.S. dollar in 1981.

24. Although Malaysia responded to adverse shocks with expansionary policies, its relatively low external debt at the time suggests that there was scope for increasing domestic spending. See discussion in Section II.

25. The composition of domestic demand also posed potential problems. In both Singapore and Malaysia, stimulus to domestic demand was reflected in increases of the investment to GNP ratio of up to 10 percentage points over the period. It is not clear whether it was appropriate to stimulate investment demand sharply at a time when world rates of interest rates were rising. In particular, such stimulus may have prevented these two economies from increasing investment to exploit the decline in world interest rates in 1983–87.

26. In Malaysia, a desire to limit increases in external debt appears to have been an additional motivation. See below.

27. There is some evidence that this strategy is now being pursued by Thailand and, to a lesser degree, by Malaysia. In 1988 Thailand's current account deficit increased sharply, while in Malaysia the current surplus declined. A five-fold increase in foreign direct investment partly financed Thailand's growing current account deficit, while foreign direct investment in Malaysia increased 54 percent. In the case of Korea, foreign direct investment increased 72 percent in 1988, but this was accompanied by an *increase* in the current account surplus.

Appendix

Variable Definitions and Data Sources

Variables

D	=	total demand
D^e	=	equilibrium demand by private sector in the absence of government intervention, based on intertemporal utility maximization
D^g	=	(exogenous) aggregate demand resulting from government intervention
D_i	=	the total demand for each good, i = N, M, and X
d_i	=	the share of each good in aggregate demand
e	=	real exchange rate
E	=	nominal exchange rate (units of domestic currency per unit of foreign currency), set by the government
i*	=	world rate of interest, set abroad
M	=	importable goods
MPK	=	marginal product of capital
N	=	non-tradable goods
PI	=	permanent income = the discounted present value of disposable income
P^*_M	=	(exogenous) foreign currency price of importable goods
P^*_X	=	(exogenous) foreign currency price of exportable goods
P^*_T	=	(exogenous) weighted average foreign currency price of importable and exportable goods
P_M	=	domestic currency price of importable goods = EP^*_M
P_N	=	the price of non-tradable goods, set endogenously
P_X	=	domestic currency price of exportable goods = EP^*_X
$P_X P_M$	=	commodity terms of trade
S	=	the (exogenous) total supply of goods in the economy
s_i	=	the share of each good in aggregate supply, i = N, M, and X
S_i	=	the total supply of each good
X	=	exportable goods

Data sources.

Three-month LIBOR, export and import unit values, nominal exchange rates, current account, GNP and CPI series are from the IMF, *International Financial Statistics,* various issues. Trade weights were constructed using IMF Direction of Trade statistics. Debt/GNP ratios are from World Bank, *World Debt Tables 1988-89.*

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