



FEDERAL RESERVE BANK
OF SAN FRANCISCO

**ECONOMIC
REVIEW**

MONEY, INFLATION
AND TRADE
IN THE PACIFIC BASIN

SUMMER 1978

Alternative Balance-of-Payments Adjustment Experiences: Korea and Taiwan, 1973-77

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In 1974 and 1975, both Korea and Taiwan sustained unusually large current-account deficits and borrowed heavily abroad. As their debts mounted, the world banking community became concerned over the risk of continued heavy lending to those countries. Yet by 1977, barely two years later, both countries' balance of payments showed dramatic improvements and the earlier fears evaporated—indeed, international bankers began to worry instead that these countries would make early debt prepayments or refinance on more favorable terms. This study examines the factors accounting for Korea and Taiwan's success in achieving such rapid adjustments in their balance of payments.

During the two crucial years, 1974 and 1975, the two countries apparently followed different approaches toward balance-of-payments adjustment. Taiwan, on the one hand, pursued what may be characterized as a classical "gold standard" approach. It maintained a fixed exchange rate of its currency against the U.S. dollar, and adjusted primarily through domestic deflation and restrained growth of imports. Korea, on the other hand, did not deflate; indeed, it achieved a remarkably high economic growth rate in the midst of a severe world-wide economic recession. It devalued its currency in the face of domestic price increases, and reduced its payments deficit mainly through export expansion. Both countries achieved payments adjustment, but the paths were different.

These alternative paths of adjustment represent alternative policy responses to external disturbances. During recent years, the oil shock and the world stagflation have brought about very large trade deficits for many oil-importing countries. External borrowings have provided deficit

countries with the needed time to adjust their production and consumption patterns, and thereby reduce their trade deficits. But each deficit country that failed to make the necessary adjustment has had to face mounting external debts, eroding international credit standing, and an impending financial crisis. Therefore, Korea's and Taiwan's different experiences in achieving payments adjustment can provide valuable insights for other countries in responding to future external shocks.

In Section I, we briefly survey the developments in the two countries' balance of payments from 1973 to 1977. For both countries, the fluctuations can be attributed almost entirely to changes in merchandise-trade balances; the latter, therefore, constitute the focus of this study. In this analysis, the year-to-year change in each country's trade balance is divided into a part due to *price* changes and another due to changes in the *volume* of exports and imports. By making this distinction, we are able to isolate the "price shock"—including the oil shock—and further narrow the focus of this study to concentrate on changes in export and import volumes.

Section II presents a simple framework for analyzing trade-volume fluctuations in terms of changes in income and relative prices. It calls attention to the similarities between the two countries' growth experiences during the 1963-73 decade. The two countries, as close competitors in international trade, both depended on rapid export expansion for sustaining their high economic growth. Under these circumstances, relative price changes—including exchange-rate adjustments—can be expected to significantly affect each country's export demand and thereby its income-growth rate. Changes in income will, in turn, affect the country's import demand in the adjustment process.

Section III presents the results of regressions

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for testing these relationships. The results indicate remarkably stable relationships over the 1952-76 period between export and import volumes on the one hand, and income and relative-price changes on the other hand. This stability was maintained despite the rapid growth and economic transformation of the Korean and Taiwanese domestic economies, and despite unusually large disturbances in the world economy. Preliminary data indicate that the relationships continued to hold in 1977.

The regression results confirm the important role of relative prices in determining the two countries' export and import volumes. They suggest that the different adjustment paths followed by the two countries largely reflected the difference in their exchange-rate policies. Taiwan experienced plummeting exports and stagnating output in 1974, when it maintained a stable exchange rate in the face of large domestic price increases and Korea's sharp exchange devaluation. Until 1976, when economic recovery from the world recession became widespread, it managed to reduce its payments deficit only by sharply curtailing its imports. Korea, in contrast, through the exchange devaluation, was able to maintain a steady export expansion and output growth in 1975 in spite of the severe world recession. Thus, different exchange-rate policies made Korea's export expansion possible and Taiwan's import contraction inevitable.

The regression results also suggest that the income elasticities of world demand for Korea's and Taiwan's exports are substantially higher than the elasticities of the two countries' demand

for imports. These differentials help explain the rapid improvement in their trade balances from 1975 to 1977, as well as their long-run trend of steadily disappearing trade deficits. But as a corollary, our finding implies that as world income continues to expand, both Korea and Taiwan will find it increasingly difficult to reconcile domestic economic-stabilization objectives with policies of fixed exchange rates and restrictive exchange and trade controls.

The high income elasticities of world demand for Korea's and Taiwan's exports reflect the degree to which the two countries have successfully adapted their output to world demand. Given a steady growth in world income, both countries' balance-of-payments prospects are reasonably assured. This finding has significant implications for the growth strategies of other developing nations, but has rather limited relevance for other LDC's *short-run* balance-of-payments adjustment policies.

As for short-run lessons, Korea's and Taiwan's experiences during the 1974-1975 period suggest the critical role of a nation's exchange-rate policy. Exchange-rate flexibility enabled Korea to achieve adjustment through export expansion; exchange-rate rigidity compelled Taiwan to undergo income stagnation and import reduction. However, exchange depreciation aggravated Korea's domestic inflation, while income deflation helped Taiwan maintain domestic price stability. Thus, the two adjustment paths reflected alternative choices with a short-run trade-off between income growth and price stability.

I. Balance of Payments Developments, 1952-77

For both Korea and Taiwan, the current-account deficits in 1974 and 1975 were large by historical standards (Chart 1).¹ Equally dramatic were the subsequent improvements, so that by 1976 both countries had regained the average current-account balances that prevailed in 1972-73. This V-shaped pattern in their current accounts was repeated in their trade balances, and in fact was dominated by the latter. The rest of this article, therefore, will focus on the trade balance alone.²

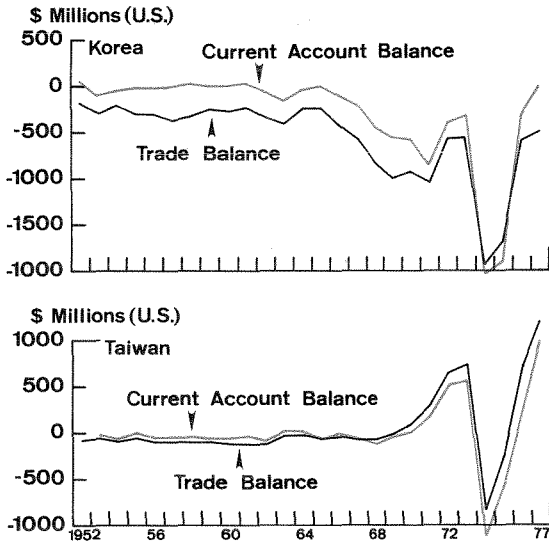
During the adjustment period of 1974-75, both

countries' foreign borrowings rose substantially (Table 1). Korea continued to borrow heavily in 1976 and 1977, but was not a large net borrower because its increase in official reserves largely offset its net capital inflows. Taiwan meanwhile reduced its borrowings, and in 1977 was a net lender of more than \$1 billion. For the 1974-77 period as a whole, both countries recorded substantial increases in external public debt outstanding, including liabilities to U.S. banks.

The large trade deficits of 1974 and 1975 have been generally attributed to the "oil shock", i.e.,

Chart 1

Current Account Balance and Trade Balance
Taiwan and Korea, 1952-1977



the quadrupling of oil prices in December 1973. However, the oil shock was a part of a worldwide price inflation, with wide fluctuations occurring in individual countries' terms of trade. For analytical purposes, it would be desirable to find a way to isolate the external shocks various countries received from the large price fluctuations in the world economy.

A simple formula is used here for that purpose. Since value equals price times quantity, a change in the value of exports or imports from one year to another can be split into two parts: one due to *price change* at the base-year quantity, and the other due to *quantity change* valued at the current-year price. Algebraically, the formula is derived as follows:

$$V = PQ \quad (1)$$

$$\text{Hence, } \Delta V = Q_0 \Delta P + P_0 \Delta Q + \Delta P \Delta Q \\ = Q_0 \Delta P + P_1 \Delta Q, \quad (2)$$

where V , P , and Q designate value, price, and quantity respectively; the subscripts 0 designate the base year and 1 the current year; and Δ preceding a symbol designates the year-to-year change in that variable.

Consider the case of an oil-price increase. For a

small importing country, the supply of imported oil may be assumed to be perfectly elastic with respect to price; hence, in Chart 2, the supply curve S is horizontal. The oil-exporting countries' decision to raise the oil price from OP_0 to OP_1 is depicted as a rise of the supply curve from S to S' . Equation (2) shows the resultant change in the value of the country's oil imports as a sum of two terms. The first term, $Q_0 \Delta P$, shows the change in import value when the elasticity of demand for imported oil is zero (D_0 in Chart 2), so that the country imports the same quantity of oil, OQ_0 , as before the price increase. The resultant rise in the value of imported oil is shown by the rectangle $AP_1P_0E_0$. The second term, $P_1 \Delta Q$, introduces the decline in the value of imported oil when the country's demand for oil is price-elastic (D in Chart 2). At the new price OP_1 , the resultant reduction in oil-import quantity, Q_0Q_1 , implies a decline in oil-import value, depicted by the rectangle $AE_0Q_0Q_1$, from what the import value would be if the demand were zero-elastic. The first term, $Q_0 \Delta P$, measures the extent of the "oil shock" to the country, which is proportional to the quantity of its imported oil in the base year Q_0 . The second term, $P_1 \Delta Q$, measures the effect on import value of the quantity change ΔQ valued at current-year prices P_1 .

From 1973 to 1975, both Korea's and Taiwan's trade balances deteriorated by about \$1 billion in nominal terms (Table 2, Part A).³ In both cases, the deterioration was attributable to a much

Chart 2

Price and Quantity Changes

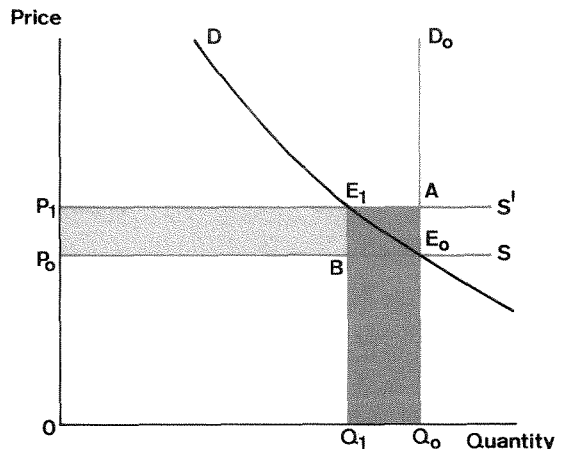


Table 1
Net External Borrowings, Reserve Changes and External Debts, 1971-77
(Millions of U.S. Dollars)

	<u>Average</u>				
	<u>1971-73</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977¹</u>
<u>Korea</u>					
Net External Borrowings	570	1,603	2,267	1,691	1,449
(Private and public)					
Changes in Official Reserves	160	-172	368	1,314	1,468
(Increase: +)					
External Public Debt Outstanding	4,556	6,178	6,912	10,210	n.a.
(end of period)					
U.S. banks	n.a.	n.a.	2,604	3,252	3,948
<u>Taiwan</u>					
Net External Borrowings	-226	1,018	528	108	-1,088
(Private and public)					
Changes in Official Reserves	178	42	12	410	-236
(Increase: +)					
External Public Debt Outstanding	1,820	2,612	3,103	3,158	n.a.
(end of period)					
U.S. Banks	n.a.	n.a.	1,810	2,578	3,458

¹Data are for the first three quarters at annual rates for net capital inflows and changes in reserves, and end of year for debts to U.S. banks.

Sources: International Monetary Fund, *International Financial Statistics*, April 1978; World Bank, *World Debt Tables*, Vol. 1, September, 1977; U.S. Treasury, *Treasury Bulletin*, February 1978; Federal Reserve Board, *Statistical Release E. 11*, various dates.

Table 2
Changes in Trade Balance
1973-75 and 1975-77¹
(Millions of U.S. Dollars)

	<u>1973-75</u>			<u>1975-77</u>		
	<u>Exports</u>	<u>Imports</u>	<u>Trade Balance</u>	<u>Exports</u>	<u>Imports</u>	<u>Trade Balance</u>
<u>A. Value</u>						
Korea	+1,719	+2,825	-1,106	+5,039	+3,812	+1,227
Taiwan	+ 825	+1,816	- 991	+4,440	+2,875	+1,565
<u>B. Prices</u>						
Korea	+ 547	+2,323	-1,776	+1,148	+ 44	+1,104
(Oil Shock)		(+739)			(+205)	
Taiwan	+1,093	+1,523	- 430	+ 775	+ 647	+ 128
(Oil Shock)		(+269)			(+131)	
<u>C. Volumes</u>						
Korea	+1,172	+ 502	+ 670	+3,891	+3,768	+ 123
Taiwan	- 268	+ 293	- 561	+3,665	+2,228	+1,437

¹The data are cumulative year-to-year changes during the respective periods derived by using Equation (2) in the text.

Sources: Based on data in International Monetary Fund, *International Financial Statistics*, April 1978; except for "oil shock" data on the price of crude petroleum (Arabian Light, 34 gravity) which are from American Petroleum Institute, *Basic Petroleum Data Book*, April 1978, updated by data supplied by the API.

larger rise in imports (\$2.8 billion and \$1.8 billion, respectively) than in exports (\$1.7 billion and \$0.8 billion). By applying Equation (2), we can break down these nominal-value changes into two parts -- one due to price changes (Table 2, Part B) and the other due to volume changes (Table 2, Part C).

For both countries, nearly all the import increases during 1973-1975 were due to steep rises in import prices (Part B). In terms of U.S. dollars, import prices rose 59 percent for Korea and 41 percent for Taiwan.⁴ These price increases accounted for 82 percent of Korea's 1973-75 import increase and for 84 percent of Taiwan's increase. The oil shock accounted for 26 percent of Korea's, and 15 percent of Taiwan's total import increase.

Abstracting from price changes, changes in import volume (Part C) accounted for 18 percent of Korea's \$2.8-billion rise in imports, and for 16 percent of Taiwan's \$1.8-billion rise in imports. In real terms, the rise in import volume was 8 percent and 10 percent, respectively. For Taiwan, the cumulative change in import volume over the two-year period masks wide annual fluctuations, as will be discussed below.

During the 1975-77 period, both countries' trade balances improved dramatically -- \$1.2 billion for Korea and \$1.6 billion for Taiwan, compared to the actual deterioration both suffered in the preceding two-year period. Price changes accounted for 23 percent of Korea's export increase

and for 17 percent of Taiwan's increase (Table 2). Import-price increases accounted for 23 percent of Taiwan's import growth but for hardly any of Korea's increase.

In real terms, Korea's exports increased 56 percent and Taiwan's 64 percent, while their imports rose 43 percent and 32 percent, respectively. In other words, Taiwan was much more successful than Korea in holding its import-growth rate below its export-growth rate. Thus, Taiwan's \$1.6-billion trade-balance improvement resulted mainly from its trade-volume-adjustment, while Korea's \$1.2-billion improvement resulted mainly from improved terms of trade. Put differently, Korea benefitted substantially more than Taiwan did from terms-of-trade improvements during the 1975-77 recovery phase.

A number of questions emerge from this analysis. First, what might account for Korea's much stronger real-export growth in the 1973-75 period? Second, why did the two countries, with supposedly similar production and trade patterns, react so differently in their trade adjustment during that period (stronger export growth for Korea, and stronger import restraints for Taiwan)? Third, how did the two countries achieve such spectacular real export growth during the 1975-77 recovery? Lastly, why did exports grow considerably faster than imports for both countries between 1973 and 1977?

II. Analysis of Trade-Volume Fluctuations

In seeking answers to these questions, we assume changes in prices and income as given, and examine how Korea and Taiwan's export and import volumes reacted to these changes (see the above description of Chart 2). Our basic premise is that certain stable systematic relationships existed during the 1973-77 period, between the changes in the two countries' trade volume on the one hand, and income and price changes on the other.

More specifically, we assume that the demand for each country's exports depends on world real income, and on the price competitiveness of each country's exports relative to competing goods in importing countries and to exports of close com-

petitor countries. We further assume that Korea and Taiwan are each other's closest export competitors, and that their exports are sufficiently differentiated from each other and from goods in the importing countries as to allow different price movements, adjusted for exchange-rate changes. Similarly, we assume that each country's demand for imports depends on its real income, and on the price competitiveness of imported goods relative to its domestic products, again adjusted for exchange-rate changes.

The two countries exhibited different patterns of real output and prices during the 1973-77 period. Korea maintained a surprisingly high output-growth rate of 8.8 percent in both 1974 and

1975 -- close to the 10.3-percent average rate of the preceding decade. However, this was attained only at the cost of a high domestic consumer-inflation rate, averaging 25 percent a year. Taiwan took a somewhat different course. Its output-growth rate dropped precipitously from an annual average of 10.4 percent during the 1963-73 decade to 0.6 percent in 1974 and 2.4 percent in 1975. Meanwhile, its domestic inflation rate jumped abruptly by 48 percent in 1974 and then dropped to an average rate of only 3.8 percent in 1975-76 -- about the same as in the 1963-73 decade.

Contrasts also showed up in the two countries' exchange-rate policies. Taiwan abandoned a system of multiple exchange rates in 1963, and thereafter maintained a fixed exchange-rate policy except for one revaluation in February 1973. At that time, it revalued by 5.3 percent, from 40 to 38 New Taiwan dollars (NT) per U.S. dollar, in order to curb domestic inflationary pressures arising from mounting trade surpluses. Subsequently, it kept the exchange rate un-

changed despite large domestic price increases in 1974 and trade deficits in 1974 and 1975. Korea, on the other hand, devalued by 67 percent between 1963 and 1973 -- from 130 to 398 won (W) per U.S. dollar, and then devalued another 18 percent to W484 in December 1974. Since then, it too has maintained a fixed exchange rate against the dollar.

Although Korea's domestic inflation rate was considerably higher than Taiwan's for most years, the inflation-rate differentials were largely offset by exchange-rate adjustments. Thus, between 1963 and 1973, consumer prices increased at a 12.4-percent average rate for Korea and at only a 3.5-percent average rate for Taiwan, but Korea's cost of living (in terms of U.S. dollars) fell at a 3.4-percent average rate against Taiwan's. In 1974, this cost-of-living ratio fell another 18.2 percent because of Taiwan's sharp price rise in that year, but the ratio rose steadily thereafter as Korea's exchange devaluation failed to offset that nation's higher rise in consumer prices.

III. Regression Results

The regression equations derived in this study postulate the following relationships:

$$X_i = f(Y_w, P_{xi}/P_w, P_{xi}/P_{xj}) \quad (3)$$

$$M_i = f(Y_i, P_{mi}/P_i, X_{i,-1}) \quad (4)$$

Equation (3) states that the demand for country *i*'s real exports (X_i) is positively related to world real income (Y_w), and negatively related to the ratio of its own export price to the world price level (P_{xi}/P_w) and to the ratio of its own export price relative to the export price of its close-competitor country *j* (P_{xi}/P_{xj}). Equation (4) states that the demand for country *i*'s real imports (M_i) is positively related to its real income (Y_i) and to its volume of exports during the preceding year ($X_{i,-1}$), and negatively dependent on the ratio of its import price to the domestic price (P_{mi}/P_i).

The lagged export volume is included in the import equation as a proxy for the market's expectation of the current year's volume of exports. It

is based on the fact that both Korea and Taiwan import large amounts of materials, parts and components for processing and assembling for exports. Because of the time lag between placement of import orders and import arrivals, importers when anticipating future export demand must rely upon such indicators as the current level of exports. Thus, the higher the current level of exports, the larger will be the import orders for future import arrivals. For simplicity, we postulate that the average lag is one year.⁵

Because the regressions are designed to explain the year-to-year percent changes in the two countries' export and import volumes, rather than their absolute levels, the demand functions (3) and (4) are assumed to be of a constant-elasticity type:

$$D = a_0 Z_1^{a_1} Z_2^{a_2} \quad (5)$$

where D designates the dependent variable X_i or M_i , Z_1 and Z_2 are the explanatory variables, and the a 's are parameters. Equation (5) can be rewritten in percent-change terms:

$$\Delta D/D = a_1 \Delta Z_1/Z_1 + a_2 \Delta Z_2/Z_2 \quad (6)$$

or alternatively, in logarithms:

$$\log D = \log a_0 + a_1 \log Z_1 + a_2 \log Z_2 \quad (7)$$

In either case, the parameters a_1 and a_2 designate demand elasticities with respect to Z_1 and Z_2 , respectively.

Regression equations of the percent-change form (Equation 6) and the logarithmic form (Equation 7) are estimated on the basis of annual data for the years 1952-76. In the export equations, OECD real output is used to stand for world real income (Y_w), and a weighted average OECD consumer-price index for world price level (P_w).⁶ In the import equations, each country's consumer price index is used for P_i . In all the regression equations, consumer prices rather than wholesale prices are used, as the latter are more likely to be influenced by changes in the prices of internationally traded goods, and thus are more reflective of world-market conditions than domestic-inflation conditions.

The regression results, presented in Table 4, show that the best export equations for both countries were of the percent-change form and the best import equations of the logarithmic form. Because of problems of multicollinearity with P_{xi}/P_{xj} , the relative-price term P_{xi}/P_w had to be dropped from the export equations. The squared simple-correlation coefficient between the two relative-price terms was 0.90. The regression coefficients of all the other variables were of the correct signs and statistically signifi-

cant. The regression equations accounted for varying portions of the variances of the dependent variables, with little or no evidence of significant serial correlation in the error terms.⁷

The regression results suggest stable relationships over the 1952-76 period (Charts 3-4)—a period in which both countries became transformed from slow-growing agricultural economies to fast-growing manufacturing economies. Moreover, the relationships continued to hold for the 1973-76 period and for (projected) 1977, with the unexplained variations falling well within one standard error of the respective regression equations. Thus, the two countries' trade adjustments to the oil shock and the severe world inflation and recession of the 1973-77 period differed from their experiences of the preceding twenty years only in magnitude, not in kind.

What light can these regression results throw on the central questions raised earlier? First, there is the question of Korea's much stronger export performance during the 1973-75 period. Over that period, Korea's export volume rose by 33 percent, while Taiwan's fell by 6 percent. Our regression equations relate changes in export volumes to changes in world real income and in the two countries' relative export prices. Since both countries' exports faced the same changes in world real income, any explanation based on the regression equations must come from the relative price term.

Chart 3
Korea and Taiwan Exports, Actual and Predicted Values

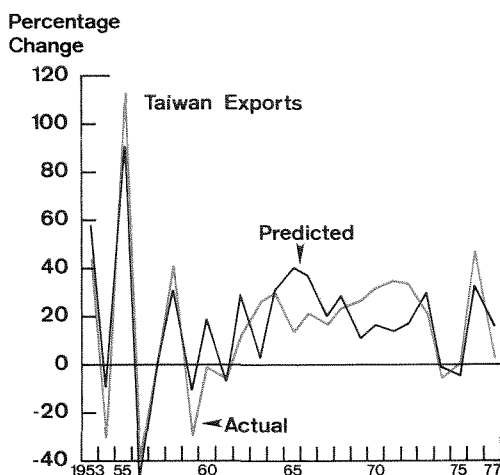
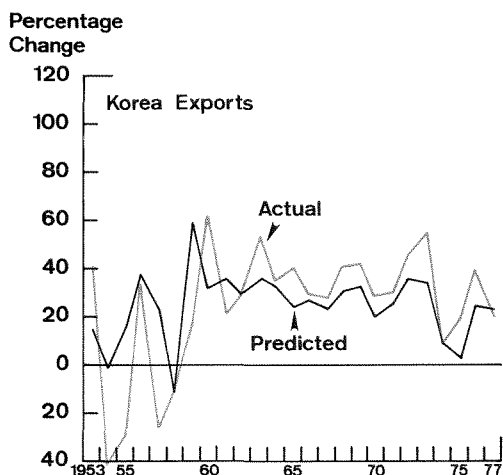


Table 3
Economic Profiles of Korea and Taiwan, 1963-73 and 1973-77
(Percent Changes)

	Average 1963-73	1973-74	1974-75	1975-76	1976-1977
Real-Output Growth					
Korea	10.3	8.8	8.8	15.0	9.8
Taiwan	10.4	0.6	2.4	11.8	8.1
Consumer-Price Inflation					
Korea	12.4	23.7	26.3	15.3	10.3
Taiwan	3.5	47.5	5.2	2.5	6.2
Export Prices in National Currency					
Korea	16.9	29.0	10.5	11.7	7.1
Taiwan	2.9	30.8	-5.7	2.4	8.1
Exchange-Rate Adjustment¹					
Korea	-67.4 ²	-1.8	-16.2	-0-	-0-
Taiwan	4.6 ²	0.8	-0-	-0-	-0-
Relative Consumer Prices in U.S. Dollars³					
Korea/Taiwan	-3.4	-18.2	0.7	12.5	3.9
Relative Export Prices in U.S. Dollars³					
Korea/Taiwan	1.2	-3.9	-1.4	8.9	-0.9

¹Percent change in the value of the national currency against the U.S. dollar.

²Total change from 1963 to 1973, not average annual rate of change.

³Ratio of consumer-inflation rates or export prices in national currencies adjusted for exchange-rate changes.

Source: International Monetary Fund, *International Financial Statistics*, May 1978.

Table 4
Regression Results, Export and Import Functions
(Annual Data: 1952-76)

1. Exports, Korea

$$\Delta X_k = 6.74 + 4.63\Delta Y_w - 0.507\Delta(P_{Xk}/P_{Xt}),$$

$$(0.75) \quad (2.50) \quad (2.14)$$

$$R^2 = 0.231, S = 23.5, DW = 1.90, N = 24.$$

2. Exports, Taiwan

$$\Delta X_t = 3.29 + 4.13\Delta Y_w - 1.18\Delta(P_{Xt}/P_{Xk}),$$

$$(0.003) \quad (3.35) \quad (6.89)$$

$$R^2 = 0.730, S = 16.0, DW = 1.52, N = 24.$$

3. Imports, Korea

$$\ln M_k = -3.80 + 1.19 \ln Y_k - 0.987 \ln(P_{mk}/P_k) + 0.311 \ln(X_k)_{-1},$$

$$(1.46) \quad (2.57) \quad (3.12) \quad (2.16)$$

$$R^2 = 0.962, S = 0.235, DW = 1.97, N = 24.$$

4. Imports, Taiwan

$$\ln M_t = 0.323 + 0.550 \ln Y_t - 0.970 \ln(P_{mt}/P_t) + 0.567 \ln(X_t)_{-1},$$

$$(1.33) \quad (5.06) \quad (4.56) \quad (8.95)$$

$$R^2 = 0.982, S = 0.110, DW = 2.27, N = 24.$$

Notes: (a) For explanations, see the text.

(b) The t-statistics are shown in parentheses under the regression coefficients.

From 1973 to 1975, the ratio of Korea to Taiwan's export prices in U.S. dollars declined by 5.3 percent (Table 3); alternatively stated, the ratio of Taiwan to Korea's export prices rose by 5.6 percent. When these relative price changes are multiplied by the price elasticities obtained from the respective export equations—0.507 for Korea and 1.180 for Taiwan (Table 4)—the results indicate that relative price changes accounted for less than 10 percent of the rise in Korea's export volume,⁸ but for more than the total decline in Taiwan's export volume.

In terms of national currencies, Korea's export prices actually increased by 15.6 percent more than Taiwan's export prices during the 1973–75 period (Table 3). Yet, Korea was able to more than offset the higher price rise by an 18-percent currency devaluation in 1974 on top of Taiwan's 5.3-percent currency appreciation in 1973. Thus, different exchange-rate policies helped account for much of the difference in the two countries' export performance in this period.

The second question refers to the apparently different adjustment paths followed by Korea and Taiwan for reducing payment deficits. On the export side, the difference could be attributed largely to different exchange-rate policies, as we have just seen. On the import side, most of the change in import volume could be attributed to income, relative prices, and to lagged exports (Table 4). A notable exception, however, was the

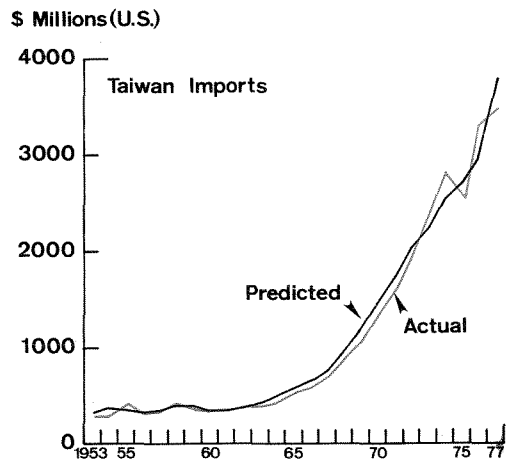
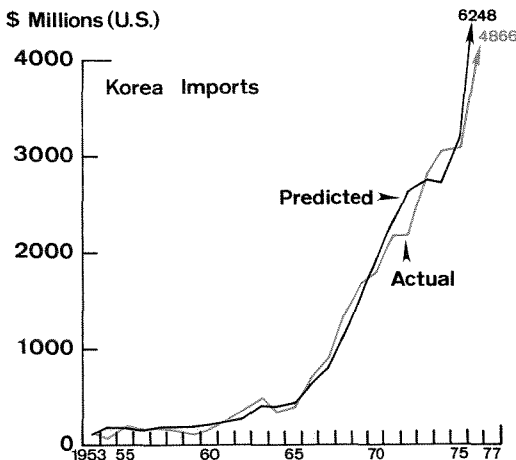
sharp 12-percent decline in Taiwan's import volume in 1975, which was opposite to what would be expected on the basis of our regression equation (Chart 4). A detailed examination of this episode may help explain the paradox.

Taiwan's economic growth during the last fifteen years has been featured by an increasing dependence on export demand. The export share of total output jumped from 13 percent in 1963 to 46 percent in 1973, partly on the basis of a 62-percent export increase in 1971-73 alone. But then exports actually declined 6 percent over the ensuing two-year period, representing a severe setback to Taiwan's economy. In 1974, Taiwan recorded a 0.6-percent increase in real output, but only because of a sixfold increase in inventory accumulation.¹⁰ Then, in 1975, while exports remained weak, real output rose by 2.4 percent, primarily on account of an unprecedented 12.1-percent increase in real government consumption expenditures and a 52.2-percent increase in fixed capital formation by public corporations and government enterprises.¹¹ But for the extra spending, on inventories in 1974 and on government projects in 1975, real output would have declined about 6 percent in both years.

Under these circumstances, Taiwan still managed to reduce its volume of imports. First, in order to maximize the intended output-expansion impact, the government allocated its extra purchases mostly to domestic products rather than

Chart 4

Korea and Taiwan Imports, Actual and Predicted Values



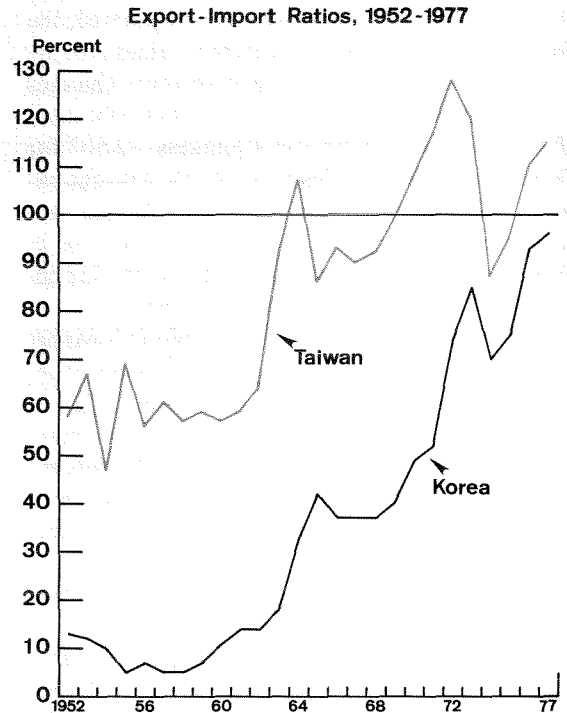
imports. Second, as exports declined, it imposed additional import restrictions (including surcharges and cutbacks in permits), partly as a trade-adjustment measure and partly as a means of diverting demand to domestic products. Neither of these two developments would have been reflected in our import equation.

In short, Taiwan's adjustment through income deflation was not a result of deliberate economic policy, but rather was imposed on the economy by the unexpected export decline, which in turn was caused by Taiwan's 1973 currency appreciation and Korea's 1974 currency devaluation. Thus, underlying the difference in balance-of-payments adjustment was a different approach to exchange-rate adjustment: Korea's readiness to adjust its exchange rate when needed, and Taiwan's strict adherence to a fixed exchange rate in the face of sharp domestic price increases and a sharp currency devaluation by its close trade competitor.

The third question to be examined has to do with the spectacular export growth of the 1975-77 period, amounting to 56 percent for Korea and 64 percent for Taiwan, in real terms. During that period, world real income rose by 8.5 percent, while Korea's export prices in U.S. dollars rose by 7.9 percent relative to Taiwan's. When these changes are multiplied by the respective elasticities derived from the two export equations, the results indicate that world income growth accounted for 40 percentage points of Korea's export growth and 35 percentage points of Taiwan's; and that the change in relative export prices reduced Korea's export growth by 4 percentage points and increased Taiwan's by 9 percentage points. Thus, our regression results indicate that the two countries' remarkably strong export growth was largely due to world economic recovery, combined with the world's high income elasticities of demand for the two countries' exports. Relative export prices played a minor, though not insignificant, role during that period.⁹

Finally, there is the question of why both countries have experienced faster growth of exports than of imports over time. Export-import ratios for both countries showed an unmistakable upward trend after 1960, except for a flattening-off

Chart 5



in the second half of the 1960's and a sharp dip in 1974. Both ratios resumed their rise after 1974 (Chart 5). The upward trends imply that both countries were paying for an increasing portion of their imports through exporting. In Taiwan's case, exports have exceeded imports almost every year since 1969.

Our regression results suggest that the world's income elasticities of demand for Korea's and Taiwan's exports (larger than four) were much higher than these countries' income elasticities of demand for imports (roughly one). Unless offset by higher economic growth rates, the differences in income elasticities would lead Korea and Taiwan to show faster export growth than import growth. From 1960 to 1973, OECD real output grew at a 4.9-percent annual average rate, while Korea's and Taiwan's output grew by 9.2 and 9.7 percent a year, respectively. In neither case was the growth-rate differential sufficient to offset completely the income-elasticity differential.

The income elasticities have been derived on the basis of stable relationships extending over a

quarter-century. Thus, the upward trend in Korea's and Taiwan's export-import ratios is likely to continue, in the absence of basic structural or policy changes which reduce the world's income elasticity of demand for their exports or increase their own elasticity of demand for imports. For international bankers, this suggests that both countries will remain good credit risks. But at the same time, the upward trends could portend difficult policy choices for these countries.

Given the limited scope of monetary-policy instruments in Korea and Taiwan, the authorities might encounter difficulty reconciling domestic

stabilization objectives with policies of fixed exchange rates and restrictive exchange and trade controls. In order to relieve the increasing inflation pressures arising from growing trade surpluses and mounting foreign reserves, the two countries might be forced to revalue their currencies and/or liberalize the exchange and trade controls which were imposed during an earlier era of foreign-exchange shortage. The policy choice might be complicated by their traditional reliance on export expansion for economic growth, as well as the strength of the domestic interests arrayed against trade liberalization.

IV. Summary and Conclusions

Like other oil-importing developing countries, Korea and Taiwan sustained unprecedentedly large payments deficits in 1974 and 1975. Yet, barely two years later, both had succeeded in eliminating the deficits. The two appear to have followed different adjustment paths—Korea through export expansion and output growth, at the cost of severe domestic inflation, and Taiwan through import contraction and relative price stability, at the cost of temporarily reduced output growth. Each country was successful in its own way, but the approaches to success were different.

This study has sought to develop some explanation for these contrasting success stories. By isolating the impact of price changes, we were able to concentrate on trade-volume changes. On the basis of regression equations, we found that the wide and divergent fluctuations in trade volumes largely reflected several key explanatory factors.

1. During the 1973–75 period, Korea sustained a much more severe oil shock and terms-of-trade deterioration than Taiwan. Yet, Korea was able to reduce the resultant trade deficit through export expansion and restrained import growth. In contrast, Taiwan's imports increased and exports decreased, worsening its trade balance.

2. After the initial shock in 1974, both countries reduced their trade deficit in 1975: Korea primarily by continued export expansion, and Taiwan by drastic reduction in imports. The difference in their adjustment paths largely reflected their exchange-rate policies: in particular,

Korea's 18-percent devaluation in 1974 on top of Taiwan's 5.3-percent appreciation in 1973. The exchange-rate changes made Korea's export expansion possible and Taiwan's import contraction inevitable. The different adjustment paths meant, for Korea, sustained output growth at the expense of domestic price stability, and for Taiwan, income stagnation coupled with a low rate of domestic inflation. The former reflected a deliberate demand-management policy aimed at rapid income growth, and the latter reflected an adherence to fixed exchange rates and a policy focused on the maintenance of domestic price stability.

3. During the 1975–77 period, both countries' trade balances improved rapidly, primarily because of world economic recovery coupled with high world-income elasticities of demand for the two countries' exports. In addition, Korea was particularly helped by improved terms of trade.

4. The world's income elasticities of demand for Korea's and Taiwan's exports are substantially larger than these countries' income elasticities of demand for imports. The differences help account for a long-run rising trend in both countries' export-import ratios. This suggests small credit risks for these countries, but it could also portend difficult policy choices—between domestic stabilization on the one hand, and continued restrictive foreign-exchange and foreign-trade policies on the other. How the two countries resolve this policy dilemma will be fascinating to watch.

FOOTNOTES

1. The current account balance is defined here as the sum of the balance on the goods-and-services account and the net private and government unrequited transfers (i.e., remittances, donations and grants) in a country's international balance of payments.
2. However, a few remarks on the service transactions, unrequited transfers, and foreign borrowings are in order. For most years, Korea had large net receipts from U.S. Government grants, services provided by Korea to U.S. military forces stationed there, and remittances from overseas Koreans. Taiwan did not have such receipts to any significant extent. Its service-account balance ran a steadily increasing deficit since 1967, reflecting mainly rising shipping and transportation costs for Taiwan's growing volume of foreign trade—a development which was also evident in Korea's service transactions. Moreover, in recent years, especially since 1974, both countries have been making large and increasing amounts of interest and dividend payments to foreigners.
3. In actual calculation, ΔP in Equation (2) is converted to percent-change terms by rewriting the formula as
$$\Delta V = V_0 \Delta P / P_0 + P_1 \Delta Q$$
where ΔV , V_0 , and $\Delta P / P_0$ are all readily obtainable from published data, and $P_1 \Delta Q$ is derived as a residual.
4. Data cited in this and the following paragraphs, but not shown in Table 2, are from IMF, **International Financial Statistics**, April, 1978.
5. Some statistical complications may be introduced by the use of a lagged variable. The relationship between the export volume and the import volume may in fact be contemporaneous, so that the lagged exports may be a proxy for lagged imports, rather than for export expectation. In that case, certain statistical tests, such as the t-test and the Durbin-Watson test, would not be applicable.
6. Both sets of data are published in OECD, **Main Economic Indicators**, various issues, for 1960-76 only. For the years 1952-59 the U.S. real GNP series was spliced to the OECD output series, and the U.S. consumer-price series to the OECD price series, through simple regressions. In both cases, the squared correlation coefficient was about 0.90.
7. The only exception is the Taiwan export equation, which has a Durbin-Watson statistic within the critical range at the 5 percent significance level, indicating a probable positive serial correlation of a fairly low magnitude (about 0.24).
8. That the relative-price term accounts for so small a portion of Korea's export growth is disappointing. It reflects the relatively poor fit of the Korea export equation, as shown in Chart 3, indicating the presence of some powerful factors—e.g. technology and marketing improvements, export-promotion measures—that are not captured by our regression equation. Nevertheless, the Durbin-Watson statistic (1.90) is so close to 2 that there appears to be little **systematic** error in the specification.
9. Why the world's income elasticities of demand for the two countries' exports are so high is an interesting question not pursued in this article. It would be useful to compare these with the world's income elasticities of demand for other countries' exports, to see whether those for Korea's and Taiwan's product are indeed significantly higher; and if so, why.
10. The data cited in this paragraph are based on Directorate-General of Budget, Accounting and Statistics, Executive Yuan, **National Income of the Republic of China**, December 1976, especially pp. 83 and 123.
11. All capital-formation data are in nominal values, as data on capital formation according to purchasers are not available in real terms.