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GETTING INTERVENTIONS RIGHT: HOW SOUTH KOREA AND TAIWAN GREW RICH

Dani Rodrik

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ABSTRACT

Most explanations of Korea's and Taiwan's economic growth since the early 1960s place heavy emphasis on export orientation. However, it is difficult to see how export orientation could have played a significant causal role in these countries' growth. The measured increase in the relative profitability of exports during the 1960s is too insignificant to account for the phenomenal export boom that ensued. Moreover, exports were initially too small to have a significant effect on aggregate economic performance. A more plausible story focuses on the investment boom that took place in both countries. In the early 1960s both economies had an extremely well-educated labor force relative to their physical capital stock, rendering the latent return to capital quite high. By subsidizing and coordinating investment decisions, government policy managed to engineer a significant increase in the private return to capital. An exceptional degree of equality in income and wealth helped by rendering government intervention effective and keeping it free of rent seeking. The outward orientation of the economy was the result of the increase in demand for imported capital goods.

Dani Rodrik
Department of Economics
Columbia University
420 West 118th Street, Room 1312
New York, NY 10027
and NBER

1. Introduction

To any economist interested in growth, the East Asian experience since the early 1960s poses enduring challenges. In 1960, South Korea was poorer than many sub-Saharan African countries, and Taiwan not all that much richer (Table 1). Since then, these two countries have experienced average increases in per-capita income of 6.8 and 6.2 percent, respectively, with the result that they have left far behind not only these African countries but also others like Mexico and Argentina which had been much richer. How these two countries managed to transform themselves from economic basket cases into economic powerhouses remains something of an enigma.

The standard story to which most orthodox economists subscribe is one of export-led growth.[1] During the 1950s, the story goes, both of these countries engaged in traditional import-substitution policies, with multiple exchange rates, high levels of trade protection, and repressed financial markets. By the late 1950s, each country had exhausted the "easy stage" of import substitution. This, together with the impending reduction in US aid--which had been the main source of foreign exchange for both economies--led policy-makers in the two countries to alter their economic strategy and adopt export-oriented policies. These policies included the unification of exchange rates accompanied by devaluations, various other measures to stimulate exports (including most significantly duty-free access for exporters to imported inputs), higher interest rates, and some liberalization of the import regime. As a consequence of these measures, as well as a broadly supportive policy environment (encompassing macroeconomic stability and public investment in infrastructure and in human capital), exports took off in the mid-1960s. Export orientation led both economies to specialize according to comparative advantage, resulting in rising incomes, investment, savings, and productivity.

This orthodox account has been criticized for downplaying the active role of governments

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[1]For representative samples, see Tsiang (1984), Krueger (1985), World Bank (1993), and Little (1994).

Table 1: Comparative Growth Experience

Country	Per capita GDP, 1960 (1985 dollars)	Per capita GDP, 1989 (1985 dollars)	Per capita GDP growth, 1960-89 (%)
South Korea	883	6206	6.82
Taiwan	1359	8207	6.17
Ghana	873	815	-0.54
Senegal	1017	1082	0.16
Mozambique	1128	756	-2.29
Brazil	1745	4138	3.58
Mexico	2798	5163	2.36
Argentina	3294	3608	0.63

Source: Penn World Table 5.5

in Taiwan and South Korea in shaping the allocation of resources. Observers like Amsden (1989) and Wade (1990) have argued that the reforms of the 1960s went considerably beyond giving markets and comparative advantage free rein. According to these authors, governments in both countries had clear industrial priorities and they did not hesitate to intervene (through subsidies, trade restrictions, administrative guidance, public enterprises, or credit allocation) to reshape comparative advantage in the desired direction. Interestingly, however, the orthodox and revisionist accounts converge on the importance of the export-oriented strategy in having disciplined firms and enhanced productivity growth. The World Bank's detailed recent study, The East Asian Miracle (1993), has attempted to incorporate some of the revisionist objections (particularly on the role of directed credit) into the standard account.

I will argue in this paper that the standard story, as sketched above, is incomplete and quite misleading on the importance it attaches to the role of export-orientation in the growth performance. It also has backward the causal relationship between exports, on the one hand, and investment and growth on the other. As I will show, the increase in the relative profitability of exports around the mid-1960s was modest in both countries, and can account fully for neither the initial jump in the export-GDP ratio at that time nor for the subsequent steady increase in this ratio.

A much more plausible explanation for the economic take-off is the sharp increase in investment demand that took place in the early 1960s. The reason for this investment boom is the key issue addressed in this paper. I will argue that in the early 1960s and thereafter the Korean and Taiwanese governments managed to engineer a significant increase in the private return to capital. They did so not only by removing a number of impediments to investment and establishing a sound investment climate, but more importantly by alleviating a coordination failure which had blocked economic take-off. The latter required a range of strategic interventions--including investment subsidies, administrative guidance, and the use of public enterprise--which

went considerably beyond those discussed in the standard account. That government intervention could play such a productive role was conditioned in turn by a set of advantageous initial conditions, namely a favorable human capital endowment and relatively equal distribution of income and wealth.

I will elaborate on these arguments below. It is useful to set the stage first by reviewing some of the key elements of the Taiwanese and Korean miracles (section 2). Next, I discuss the shortcomings of the export-based explanations to these miracles (section 3). I then turn to some of the distinctive initial conditions--relative abundance of human capital and equitable income and wealth distribution--which appear to have played a role in both countries' economic performance (section 4). Section 5 lays out the paper's central arguments on coordination failure and the governments' role in removing it. Section 6 discusses the investment-stimulating policies followed by the two governments in light of the preceding analytical framework. Section 7 asks how it became possible for detailed interventions to be carried out efficiently and with little rent-seeking. In section 8, I discuss a number of objections to the arguments. Section 9 closes the paper by offering some concluding remarks. The formal model providing the foundation for the central argument is presented in the appendix.

2. The contours of a miracle

We begin by reviewing some of the key facts about the two countries' economic performance over the last three decades. Figure 1 shows their spectacular growth performance since the early 1960s. We note that economic growth has fluctuated widely around a high mean. Both economies were particularly hard hit by the two oil shocks of the 1970s, but in each case output recovered remarkably quickly.

Figure 2 is the chief exhibit for the export-led growth hypothesis. The export-GDP ratio has risen from virtually zero in Korea to more than 30 percent by the early 1980s, and from

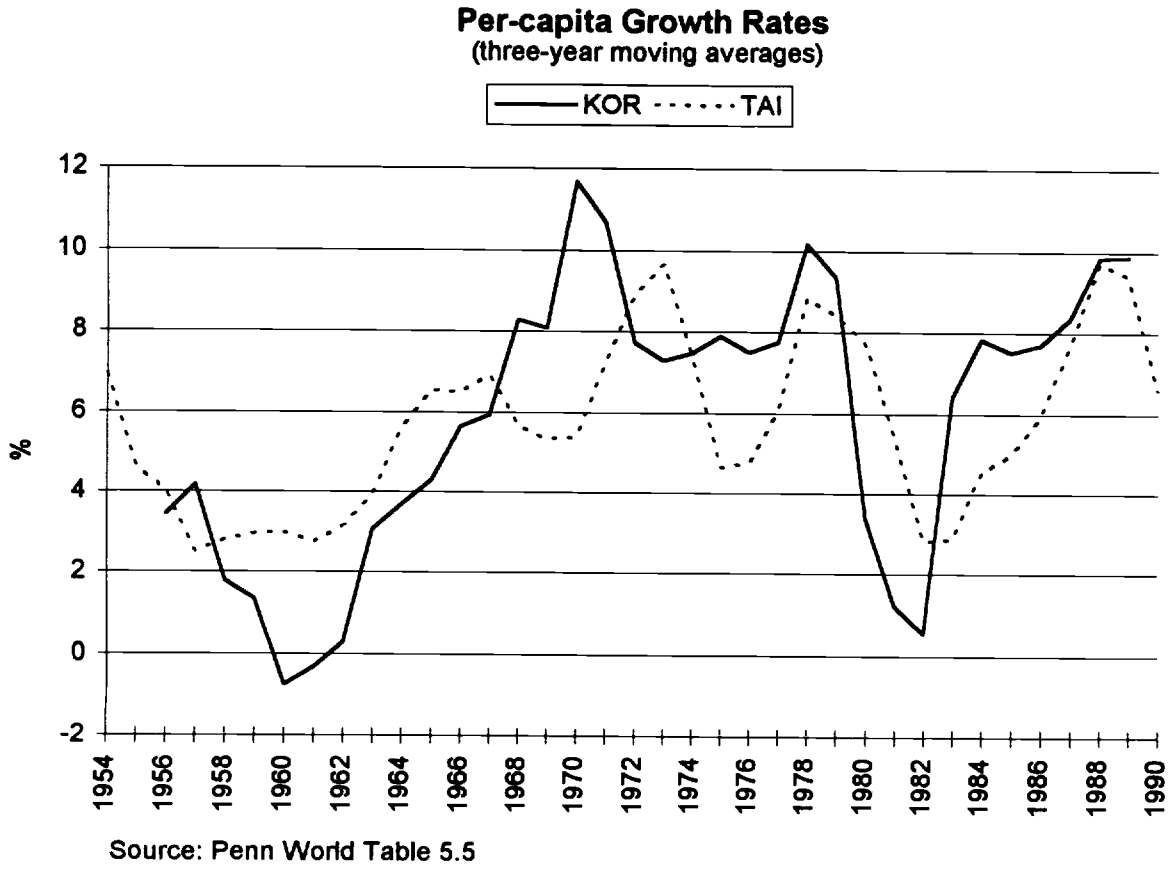
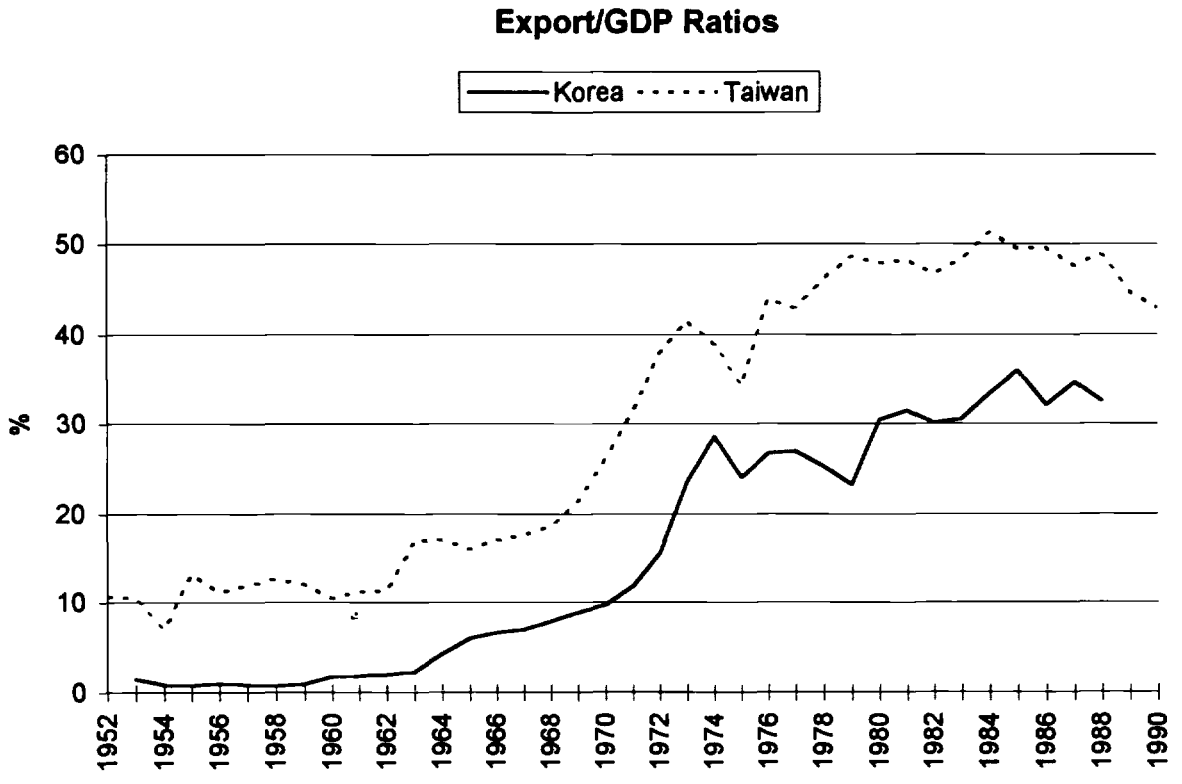

Per-capita Growth Rates
(three-year moving averages)
KOR
TAI
12
10
8
6
4
2
0
-2
%
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
Source: Penn World Table 5.5

Figure 1



Sources: Council for Economic Planning and Development, Taiwan Statistical Data Book 1982 and 1991; Economic Planning Board, Major Statistics of the Korean Economy, various issues; IMF, International Financial Statistics.

Figure 2

around 10 percent in Taiwan to over 40 percent. In both countries, the increase in export orientation was particularly rapid in the decade from the mid-1960s to the mid-1970s, and has abated somewhat since then.

Less discussed but certainly more important is the spectacular increase in the investment effort, shown in Figure 3. Investment has risen from around 10 percent of GDP in the late 1950s in both countries to 30 percent in 1980. Since 1980, investment has continued its upward trend in Korea, but has declined somewhat in Taiwan. This investment effort has been matched by a roughly equivalent increase in savings. Consequently, the net resource transfer from abroad has been either small (Taiwan) or moderate but manageable (Korea).

Finally, to round out our discussion of the main outlines of the Korean and Taiwanese experience, productivity performance has been respectable in both countries, but hardly spectacular. Table 2 shows the results of Young's (1994) careful calculations of changes in total factor productivity (TFP) for Korea and Taiwan, along with similar numbers for Latin American countries. The East Asian TFP figures do not stand out in comparison with those for Latin American countries. A paper by Kim and Lau (1992), based on an econometric estimation of a "meta-production function" across countries, presents an even more dramatic finding: the rate of technical progress in South Korea and Taiwan has been essentially nil.[2] Surprising as these results may seem, they reflect the simple fact that once the phenomenal rate of factor accumulation (primarily in capital) is taken into account, there is very little growth "residual" left over to explain. The inescapable conclusion is that the proximate determinant of the East Asian miracle is capital accumulation rather than an increase in industrial factor productivity.[3]

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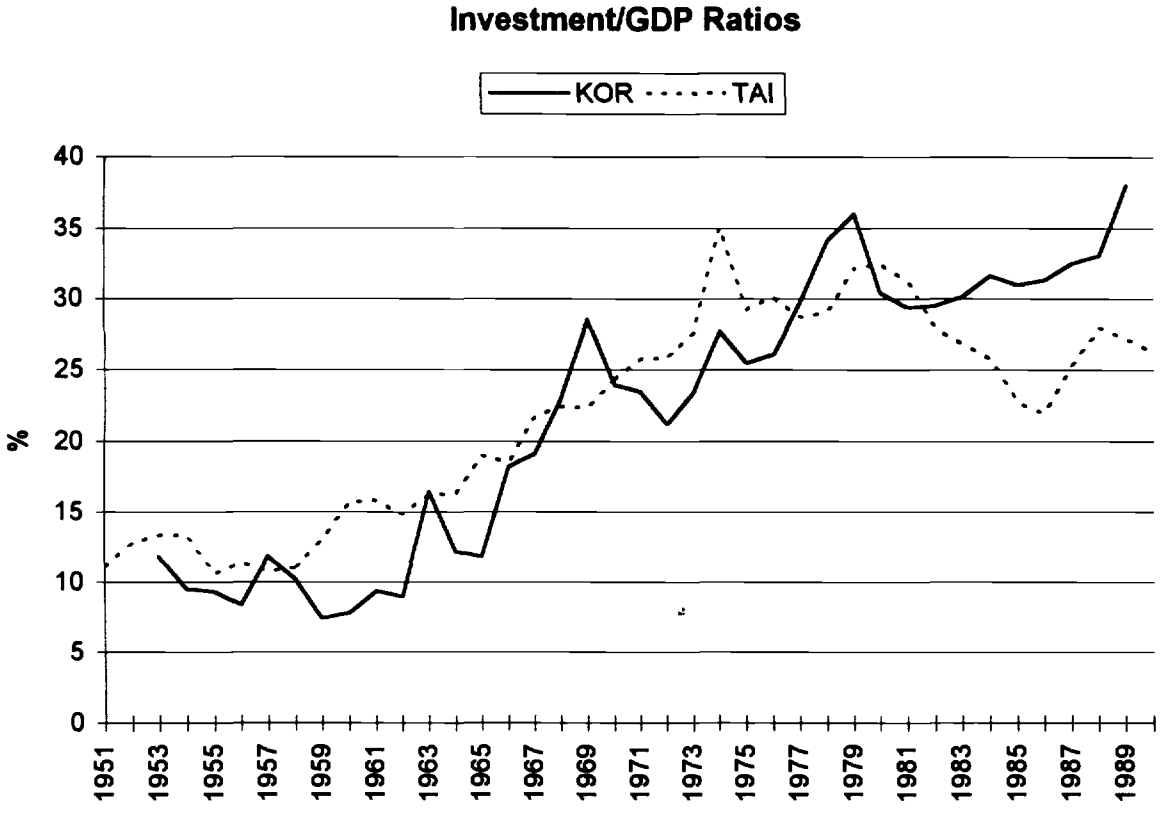
[2]The World Bank (1993) study mentioned above reports high TFP growth in these countries, but its analysis has been seriously challenged by Young (personal communication) and Little (1994).

[3]This statement does not contradict the fact that both countries have managed to increase greatly the sophistication of the manufactured goods they produce, from toys and apparel to consumer electronics to semiconductors. What it suggests is that this transformation has been

(continued...)



Source: Penn World Table 5.5.

Figure 3

Table 2: Comparative Productivity Growth Statistics

Country	Period	Total Factor Productivity Growth (% per year)	
		Economy	Manufacturing
South Korea	1966-90	1.2*	2.7
Taiwan	1966-90	1.8	1.4
Argentina	1940-80	1.0	n.a.
Brazil	1950-80	2.0	n.a.
	1960-80	n.a.	1.0
Chile	1940-80	1.2	n.a.
Colombia	1940-80	0.9	n.a.
Mexico	1940-80	1.7	n.a.
	1940-70	n.a.	1.3
Venezuela	1950-70	n.a.	2.6

Note: * Non-agricultural economy.

Source: Young (1994). Latin American statistics are originally from Elias (1990).

3. What is wrong with the export-led growth hypothesis?

As pointed out in the introduction, the standard account gives priority to the role of export orientation in explaining the economic performance summarized in the previous section. A particularly clear statement comes from Ian Little (1994, 21):

> the outstanding success of Korea and Taiwan from the early 1960s to the mid-1970s was based on a phenomenal growth of labour-intensive manufactures. This branch of manufacturing took off because exports were highly profitable once the bias against manufacturing for export was removed. The high profitability also depended on a relatively well-educated hard working docile labour force which was, apart from the natural rate of increase, fed by a large movement out of agriculture .... High profits and increased earnings for recruits to the industrial labour force led to a very rapid rise in savings. There was thus a virtuous circle.

Upon a closer look, however, this account is not quite convincing for a number of reasons discussed below.

3.1 The switch in relative incentives towards exports in the early 1960s was not significant enough to account for the export boom.

Countries that have experienced sustained export growth outside of East Asia have almost always done so as a consequence of a sharp increase in the relative profitability of exports. What is striking about the experience of South Korea and Taiwan is how stable the relative price of their exportables has been around the time of export take-off. In both countries, most of the important export incentives had already been in place for several years before the export boom started. Once the boom got under way, it picked up speed even though the measured

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[3](...continued)
fully paid for by investments in physical and human capital.

profitability of exports did not increase further. Moreover, exports continued their inexorable rise often in the context of deteriorating incentives for exporting activities. The following paragraphs elaborate on these points in greater detail.

3.1.1 Korea. Under the Rhee government of the 1950s, Korean policy was preoccupied by largely political considerations, and the government attached no particular importance to either economic growth or exports (Jones and Sakong, 1980, 272-273). There were multiple exchange rates and a haphazard, ineffective programme of export subsidies (Frank et al., 1975, 38-39). However, exporters could retain a share of their export earnings to import certain items for home consumption, a system which translated into a large export subsidy whenever the free-market exchange diverged greatly from the official rate. After 1958, export incentives were increased. Exporters were given tariff exemption on imports of raw materials and spare parts in 1959. Subsidized credit was made available to exporters for up to 75 percent of their production costs also in 1959. And a devaluation of the currency in 1961 brought the official exchange rate close to the free-market rate.

Later, after President Park took over in a military coup on May 16, 1961, the scope of export subsidization was greatly enlarged. The subsidy on export credits was increased and exporters were exempted from the commodity tax and the business activity tax. The income tax on export earnings was reduced. There were also direct cash grants on exports, but these were phased out by 1965 (Frank et al., 1975, 46). However, the incentive effects of the devaluations and the cash grants were eroded by expansionary macroeconomic policies that led to rising inflation in 1962-63 and a renewed gap between official and parallel exchange rates in 1963. A large devaluation in May 1964 served once again to unify the currency. After 1965, export subsidy programmes were expanded further. In that year, the existing practice of giving priority to exporters in acquiring import licenses was formalized and expanded. Exporters were allowed

automatic access to duty-free imports of raw materials and intermediate inputs up to a limit. This limit was determined administratively, on the basis of firms' and industries' input-output coefficients plus a margin of "wastage allowance" (Frank et al, 50). Since the imports acquired under the wastage allowance could be sold in the domestic market, this was a significant subsidy and was consciously used as such.[4] Subsidized credit to exporters became particularly important after 1966.

There is no doubt that these measures increased the relative profitability of exporting compared to the situation that had prevailed during most of the 1950s. However, it also seems clear that the greatest impact of the incentives was felt around 1959-60, rather than in the mid-1960s when the export boom began. This is largely due to two reasons: (i) the export subsidy implicit in the export-import link system was particularly significant in 1959-60 when the gap between the official and parallel exchange rates was large[5]; and (ii) inflation eroded many of the export incentives between 1961 and 1964. The devaluation of 1964 and the widening scope of export subsidies could offset the deterioration of incentives since 1960 only partially.

This can be seen in Figure 4, which plots the real effective exchange rate for Korean exports. This is a measure of the real exchange rate which includes the monetary equivalent of all the subsidies on exports (export premia through the import link, cash grants, tax incentives, duty-free imports, export credits and the like), and is therefore an appropriate index of the profitability of exporting relative to other activities in the Korean economy.[6,7] We note that, even

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[4]Frank et al. (1975, 66) estimate that the wastage allowance alone provided an export subsidy of 4.6 percent in 1968 on average, and up to 17-21 percent in certain fabrics and footwear. Bureaucrats had virtually unrestricted discretion in setting wastage allowances, and their generosity varied from time to time (Frank et al., 50).

[5]At first sight it may seem strange that a multiple exchange rate system, with an overvalued official exchange rate, would act as an export subsidy. But the import-export-link (i.e., the ability of exporters to retain some of their dollar earnings to import for the home market) meant that exporters received some of the scarcity rents created by the system.

[6]The subsidy equivalent of the export incentives are taken from Kim (1988). This, and the

(continued...)

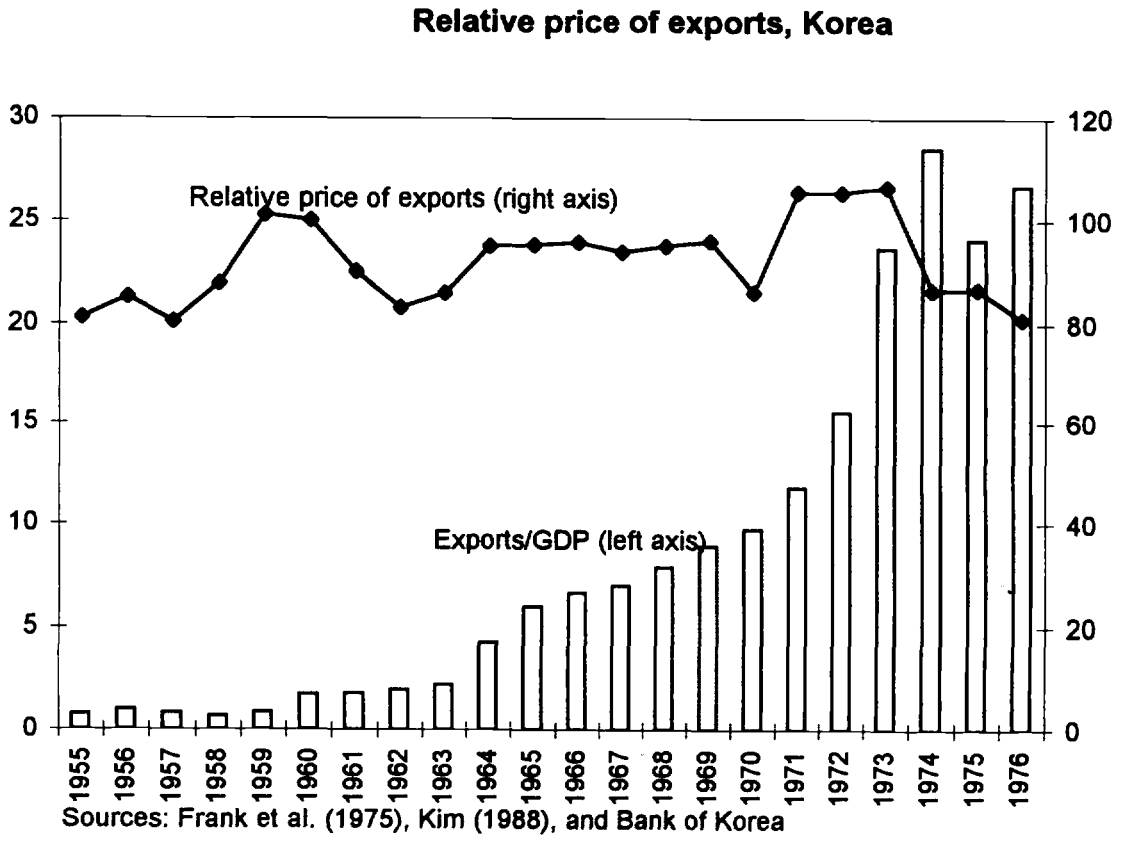
Relative price of exports, Korea
Relative price of exports (right axis)
Exports/GDP (left axis)
30
25
20
15
10
5
0
120
100
80
60
40
20
0
1955
1956
1957
1958
1959
1960
1961
1962
1963
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
Sources: Frank et al. (1975), Kim (1988), and Bank of Korea

Figure 4

with the devaluation of 1964, the level of export incentives in 1964-65 was no more than 10 percent higher than in the preceding couple of years, and actually below the level attained in 1959-60. Even though exports rose very fast from 1964 onward, they were not to regain their 1959-60 level of profitability until the early 1970s, and then again only briefly. By the mid-1970s, the export-GDP ratio was nearly ten times larger than in the early 1960s, yet the relative profitability of exports was lower![8]

Hence the export spurt was not associated with a significant increase in the relative profitability of exports. This has been noted by others. In their authoritative study of Korean development, Mason et al. explicitly state that "the industrial policy changes that took place in the first half of the 1960s did not clearly result in a significant increase in the measurable incentive to export" (1980, 135). Frank et al. (1975) attempt to estimate the sensitivity of Korean exports to exchange rates and export subsidies and note that "the main difficulty [in doing so is] that from 1955 to 1970 the effective exchange rate for exports remained remarkably steady" (pp. 84-85). The same point is noted by Jones and Sakong (1980) as well.

In resolving the apparent paradox, these authors resort to arguments that are not entirely satisfactory. Mason et al. suggest that it was the stability of incentives that was responsible for

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[6](...continued)
earlier Frank et al. (1975) study on which these estimates are based, are the most authoritative and widely cited sources on the quantitative aspects of Korea's trade regime.

[7]We note that the denominator of this index is the domestic price level. Hence subsidies or protection of non-export activities is captured to the extent that such policies raise the domestic price level relative to prices of export activities.

[8]The argument that export-oriented policies were responsible for the increase in exports is often made in a different guise, by pointing out that trade and exchange rate policies in the 1960s were not overtly discriminatory against exports (as they commonly have been in other developing countries). See for example Page (1994). The evidence for this comes from taking the ratio of the effective exchange rate for exports to the effective exchange rate to imports (both calculated by Frank et al. 1975), and noticing that the resulting number is around one or somewhat larger during the 1960s. However, it turns out that the comparable number for the second half of the 1950s is much larger, suggesting (if the numbers are to be believed) a much greater export bias in the earlier period (see Frank et al. 1975, Tables 5-10, 8-10D, 8-10E, 8-10C).

the export boom (see also Frank et al., 1975, 85-86). But since the incentive in question is the profitability of exports relative to other activities, there is no clear reason why enhanced stability should have favored exports over other activities.[9] Jones and Sakong resort to a range of explanations, including greater stability, reduction in rent-seeking opportunities, simpler input acquisition, clear political leadership, a more favorable "business climate", and non-pecuniary incentives such as presidential awards for successful exporters (1980, 96). Once again, the more compelling among these factors are not specific to exporting activities, and therefore cannot account for why exports increased faster than other activities.[10]

With regard to the import regime, there was no significant import liberalization until 1967 when the switch from a positive list to the negative list was implemented. Under the new regime, the regulations began to specify only those items that were prohibited, rather than those that could be imported subject to restrictions (as in the past). In the period 1961-63, the number of items positively listed as importables subject to government licensing, quotas, foreign-currency allocation and other regulations ranged between 1,000 and 1,600. Under pressure from the balance of payments, the government actually reduced the number of importable items to less than 500 in late 1964. The 1961-63 level was restored in 1965, and further increased later, until 1967 when the switch occurred (Hong, 1993, 426).

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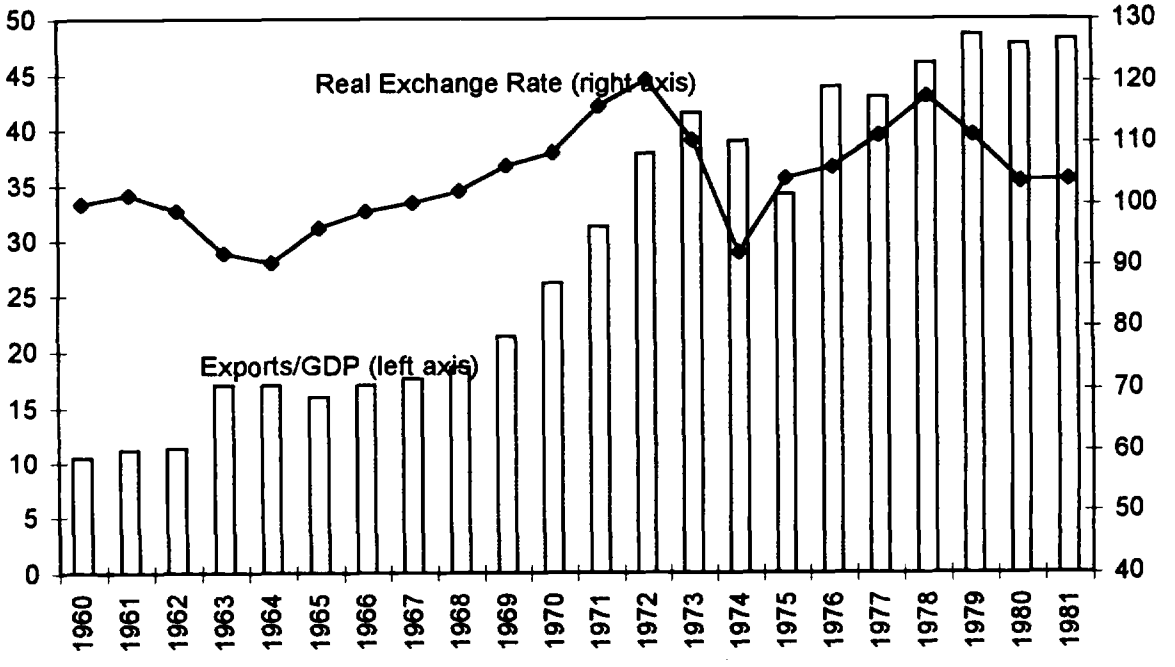
[9]It is true that, in the presence of sunk costs associated with exporting, uncertainty in the pre-1964 period may have prevented entrepreneurs from switching existing production from the home market to world markets. However, the export boom that took place was not a matter of switching production: it entailed the establishment of new capacity specifically oriented towards foreign markets. With greater stability in relative incentives, the first-order effect should have been to enhance the profitability of investing in new capacity both for foreign and home markets.

[10]In discussing the same issue, Frank et al. (1975) draw what is in my judgement the correct conclusion: "it is plausible to hypothesize that South Korean exports were constrained more by the capacity to produce goods than by the relative profitability of producing for export instead of domestic markets" (p. 85). To extend this to its logical conclusion, we must therefore search for explanations for why it became profitable to invest and expand productive capacity.

3.1.2. Taiwan. In Taiwan most of the export incentives were put in place in the mid- to late-1950s, even earlier than in Korea, and the currency was unified during 1958-61. By 1954-55, the system of import duty and commodity tax rebates for exportable production had already been implemented. In 1956, manufacturers were allowed to retain up to 80 percent of foreign exchange they earned from exports and use it for their own import needs. (This ratio was raised to 100 percent of export earnings for most items after the exchange-rate reform of 1958.) In 1957 a relatively generous export credit programme was started. Finally, the multiple exchange rate system was unified during 1958-61 in several stages: (i) in April 1958, the multiple buying rates were consolidated into two buying rates, in parallel with two selling rates; (ii) in November 1958, exports and imports under the lower rate were brought up to the higher rate; (iii) and further minor devaluations and simplifications were undertaken during the following two years (Hong, 1993, 345-46; Lin, 1973, 74-78 and 97 ff.). By July 1960, the difference between the official exchange rate and the market price of foreign currency had become insignificant.

Unlike in Korea, we do not have a synthetic measure of an effective exchange rate for exporters. So we have to content ourselves with a simple real exchange rate index (not inclusive of export subsidies), which is plotted in Figure 5. However, as discussed above, we know that all the significant export subsidies had already been deployed by the late 1950s. Therefore Figure 5 should give us a fairly accurate idea of the trend in the relative profitability of exports since 1960. The figure shows that the initial export spurt (in 1963-64) was actually associated with a <u>decrease</u> in export incentives, indicated by a real appreciation of around 10 percent (the product of a fixed exchange rate). After 1964, the relative profitability of exports increased steadily until 1973. But it was not until 1969 that the export-GDP ratio resumed its climb. By the early 1980s, the relative profitability of exports stood roughly at its level of 1961, yet the export-GDP ratio was more than four times as large. It is a safe guess that no international economist, presented with a real-exchange rate chart as the one in Figure 5, would have predicted a four-fold increase in

Real Exchange Rates and Exports, Taiwan



Sources: Kuo (1983, Table 14.4) and Council for Economic Planning and Development, Taiwan Statistical Data Book 1982 and 1991.

Figure 5

the exports-GDP ratio.[11]

With regard to import liberalization, the Taiwanese pattern is again similar to Korea's. There is a trend towards liberalization after 1964, but this is very much the consequence of the increase in exports and the improvement of the balance-of-payments position (Lin, 1973, 87ff.). In any case, the opening up is hardly drastic. As in Korea, one could not possibly ascribe the export boom to import liberalization.

Could the boom of the mid-1960s have been a delayed response to the shift in incentives towards exports during the late 1950s in both countries? Comparative evidence indicates that exports tend to react quite quickly to changes in incentives. The examples of Turkey and Chile will be discussed briefly below. Moreoever, this comparative experience is instructive in another respect as well: in cases like Turkey and Chile, sustained export booms generated by export-oriented policies have been associated with real exchange rate depreciations that are much larger than any experienced in Korea or Taiwan. The stability of relative prices in the latter is particularly striking in comparative context, and does suggest that much more than export incentives was involved in boosting exports.

Of course, export incentives (and in particular a relatively free-trade regime for exporters) must have been a necessary condition for exports to take off in Korea and Taiwan: it is hard to imagine the export performance of these countries taking place in the presence of grossly overvalued currencies or high barriers to trade in imported inputs used in exportables. Nonetheless, the delay suggests that the export incentives were not sufficient in themselves.

3.2. It is not clear why export orientation (or the increase in exports) should have led to an

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[11]The reader may need to be reminded that the way to think about the real exchange rate in question is as the domestic price of tradables (or exportables, more specifically) relative to the price of non-tradables. This ratio can change considerably even in a "small" country with no market power in international trade.

investment boom.

The standard account rarely confronts the question of why either the export incentives or the export boom should have led to an investment boom. We have many cases where even more sizable increases in the profitability of exports have either not led to increases in investment or have done so only after considerable lag. This is obviously important, insofar as exports (unlike investment) do not directly lead to economic growth.

Consider two important examples, Turkey and Chile. In Turkey, there was a massive increase in the profitability of exports in the early 1980s (of more than 50 percent) with considerable import liberalization as well. These reforms were accompanied by an impressive increase in the export-GDP ratio (Figure 6). Yet, as Figure 6 shows, private investment actually fell in this period, and did not recover until the second half of the 1980s. In Chile, a fall in the relative profitability of exports in the late 1970s was accompanied by an investment boom. Investment collapsed in 1982-83 as a result of a major financial crisis. Export incentives increased significantly after 1982, but private investment responded sluggishly until 1989 (Figure 7).

We should not be surprised to find that export incentives and investment can co-vary in different ways. In theory, there is no reason to suppose that export orientation should be associated with an increase in investment demand. Export orientation makes some sectors more profitable and others (import-competing activities and non-tradables) less so. The same is true of import liberalization.[12] The net effect on investment demand is indeterminate. If anything, the logic of relative factor endowments and the Stolper-Samuelson theorem suggests an opposing presumption: In capital-poor countries like Taiwan and South Korea during the 1950s and 1960s, an increase in the relative price of exports should have been associated with a

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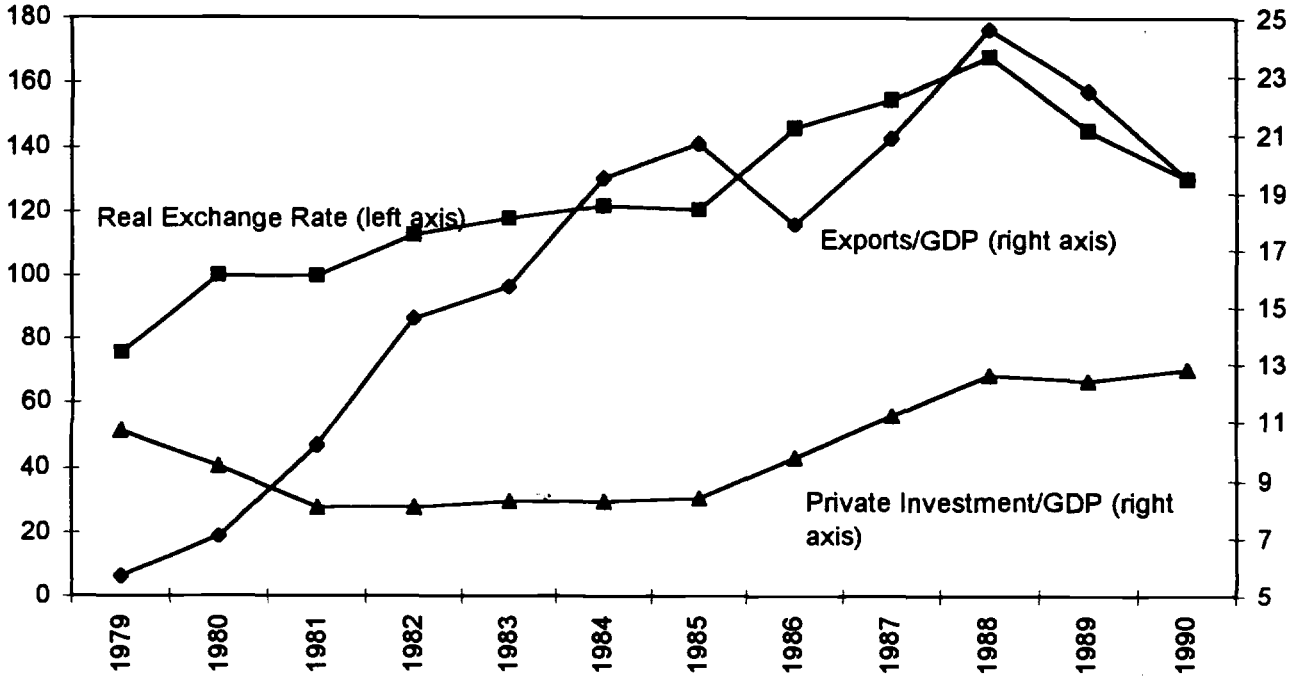
[12]Reducing restrictions on imports of capital goods, however, can be expected to boost investment demand. As will be discussed later, both countries encouraged imports of capital goods and managed to hold the relative price of capital down.

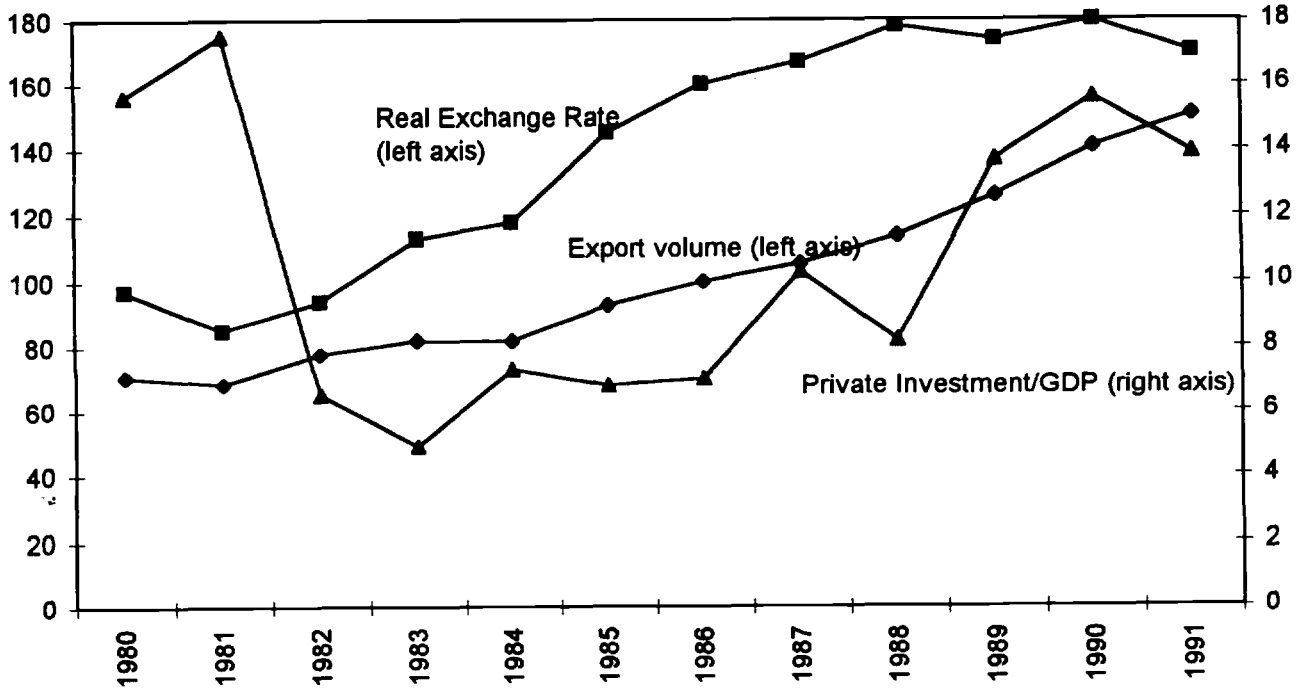
Turkey



Source: OECD, Economic Surveys: Turkey, various issues.

Figure 6

Chile



Source: Bosworth et al. (1993)

Figure 7

decline in the return to capital and hence reduced investment!

3.3. Since the export base was so small early on (especially in Korea), the contribution of exports to GDP growth could not have been very high until the mid-1970s at least. Exports were less than 5 percent of GDP in Korea around 1960, and barely over 10 percent in Taiwan. In a purely accounting sense, exports could have been responsible for only a small fraction of the initial growth spurt in both countries, in view of the small base from which they sprang. This comes out clearly in demand-side decompositions of output growth (which break down growth into increases in domestic demand, import substitution, exports, and changes in input-output coefficients). For example, Hong (1976, 51-56) calculates that export expansion could not have accounted for more than 10 percent of Korea's growth in 1966-70. Kuo (1983, chap. 7) reports a higher contribution of exports to Taiwan's growth (but still below that of domestic demand until the 1970s), in large part because the Taiwanese economy was more open at the beginning of the transition.

Such demand-side decompositions of the "sources of growth" are in themselves unsatisfactory because the methodology is vague as to the mechanism, if any, that relates exports growth to GDP growth. In a fully-employed small open economy with marginal products of productive factors equalized among different activities, an increase in exports cannot raise output.[13] During much of the 1960s Korea and Taiwan had some unemployment as well as a productivity gap between the modern and traditional sectors of their economies. Under such conditions, an increase in exports can be expansionary, but the question is how much.

A useful first approximation is provided by a computable general equilibrium (CGE) model constructed by Trela and Whalley (1992) for Korea. These authors treat the agricultural sector

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[13]An increase in exports caused by an external terms of trade improvement could be associated with an increase in real income. However, terms of trade movements cannot account for any significant part of Korea's and Taiwan's success.

differently from the other sectors of the economy in that they assume labour is paid its average (rather than marginal) product in the agricultural sector. Consequently, as labour is drawn into the modern sectors of the economy (including exportables), total output rises. Even so, they find that export-oriented policies can explain in their model only a very small fraction of Korean growth during 1962-82. In their words, "the results seem to imply that outward-oriented policies in Korea have little significance in driving growth" (1992, 204). This is a consequence of the facts already discussed: exportables were a small part of the economy and there was only a relatively small change in measured incentives towards exportables.

3.4. It is not clear that export growth was, or should have been, associated with cumulative productivity spillovers to the rest of the economy.

The previous arguments can be countered by claiming that the contribution of exports to growth came not from the demand side or through investment, but from widespread technological spillovers and cumulative productivity benefits deriving from export performance. This is indeed a common presumption. The World Bank's (1993) East Asian report gives it top billing in its exposition of the "dynamic" benefits of outward orientation.[14]

The trouble is there is virtually no evidence that exports or outward orientation were associated with technological externalities. The World Bank's report does not provide any. It bases its arguments on a number of a priori reasons, which are in themselves quite problematic (see Rodrik, 1994, for a critique of the report, and Rodrik, 1992, for a general discussion of the ambiguous theoretical case in favor of productivity spillovers from exports).[15] Perhaps most

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[14]See also de Melo and Robinson (1992). These authors use a CGE model with export externalities to account for those stylized features of East Asian development that standard CGEs are unable to "explain".

[15]It is common in this literature to point out to correlations between export growth and TFP performance across firms or industries as evidence for technological spillovers. Such

(continued...)

telling on this score is that, as we have seen, overall productivity growth in industry has not been spectacular in either country, and can explain only a small part of total growth. As Young (1994, 34) puts it, "it is not particularly difficult to find either developed or less developed economies whose productivity performance, over time periods spanning two decades or more, has matched or rivaled that of the NICs [including Korea and Taiwan]" (see also Young 1993). Hence, we should be suspicious of any argument that gives pride of place to the (assumed) presence of technological spillovers from exports.

Moreover, the argument about technological spillovers from exports is usually made in the context of manufactured, rather than aggregate, exports (World Bank 1993; Page 1994). That constitutes another problem, in view of the meager base from which the externalities in question are presumed to have come. In both countries, manufactured exports accounted for a quarter or less of total exports around 1960, and consequently they were an even smaller share of national income. It is not easy to see how the spillovers from such a puny source could be so strong as to set off a process of aggregate economic growth into motion.

3.5. The rising share of exports in GDP is consistent with investment-led growth.

As mentioned previously, the apparent clincher for the export-led growth hypothesis is the steady increase in the exports-GDP ratio that both countries have experienced. If, as argued above, exports are unlikely to have played much of a causal role in growth, why did this ratio increase so much? The answer is provided by thinking in general-equilibrium terms.

Consider an (exogenous) increase in the profitability of investment, followed by an increase in the share of investment in GDP. Suppose that the country in question (like Korea

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[15](...continued)
correlations obviously say nothing about the direction of causality, if any. Perhaps the most plausible way to intrepret such findings is that firms and industries which are successful in improving their productivity are better able to compete in world markets.

and Taiwan during the 1960s) has a comparative disadvantage in producing capital goods. The investment boom will require a commensurate increase in imports (also as a share of GDP). And if international borrowing is not unlimited, exports must rise (as a share of GDP) to pay for the imports. Hence, we will observe an increasing trade orientation alongside the boom in investment. This story reverses the causality between growth and exports. Export orientation enables growth (by allowing imports to increase), but it is not its ultimate determinant. Ultimately, the reasons for growth must be traced back to reasons why it became profitable to invest.

This scenario is illustrated in Figure 8. The initial levels of consumption and production are at C_0 and Q_0, respectively. We represent the increase in investment demand as a shift in preferences, which biases home demand towards the more capital-intensive importables. The relevant indifference surface now becomes U_1, with the associated consumption and production levels of C_1 and Q_1, respectively. (Note that the production mix remains the same, as the external terms of trade are taken to be fixed.) We notice that the economy's imports and export both expand. The impact effect of an increase in investment is to render the economy more open to trade. The longer-run effect is shown on the right panel. As the economy's capital stock expands, the transformation frontier moves outward in a fashion that is biased towards the capital-intensive importable. This has the effect of reducing trade over time, but, as drawn, the trade triangle remains larger than in the initial equilibrium.

The figure also clarifies how, under the maintained hypothesis of an increase in investment (and import) demand, an increase in exports can develop without any change in the relative price of the exportable. The mechanism that enables this is the switch in domestic expenditures away from the exportable, allowing in turn an increase in exports. In the absence of non-tradables (as in the diagram), the increase in exports exactly matches the increase in imports, with no change in relative prices. In the presence of non-tradables, some of the increased demand for the importables would come at the expense of non-tradables, calling for a

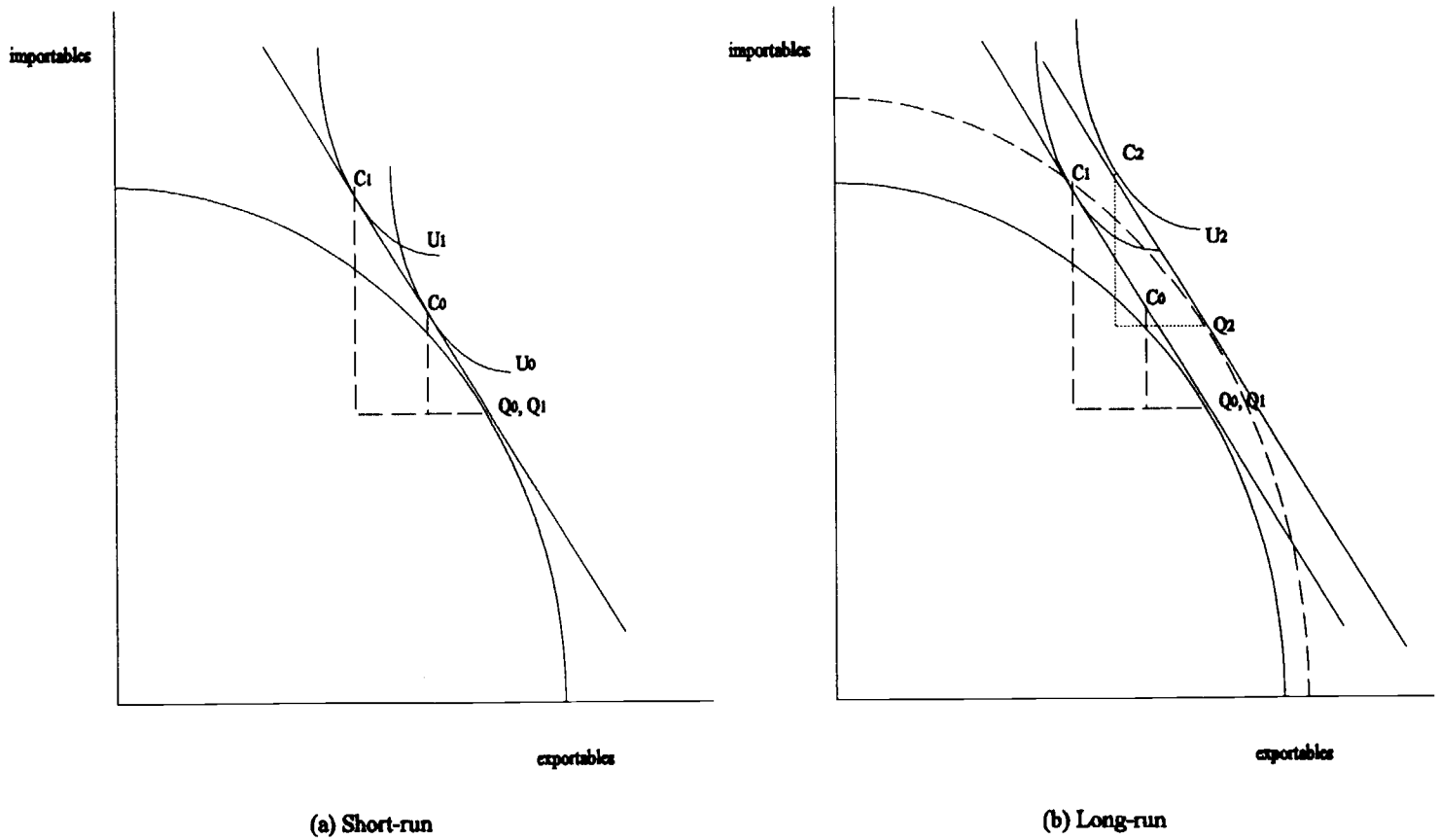

Figure 8: Consequences of an increase in investment demand

reduction in the price of non-tradables (relative to tradables) to equilibriate the market for non-tradables. The magnitude of the equilibrium real exchange rate depreciation would then depend on the parameters of the model.[16]

The story laid out above is quite consistent with the Korean and Taiwanese experiences. First, a casual look at the data shows that in both cases investment and imports are closely related. As Figures 9 and 10 make clear, the behaviour of imports tracks quite closely the behaviour of investment. In Korea, investment and imports both rise (as a share of GDP) until around 1980, and then stabilize somewhat. In Taiwan, investment and imports rise in tandem until the late 1970s, and then both decline somewhat. Figures 11 and 12, showing the composition of imports, make clear the connection. Since the mid-1960s the share of capital goods (machinery and transport equipment) in both countries' imports has risen sharply. In fact, it is mainly the increase in capital goods that accounts for the rise in the imports-GDP ratio.

Hence, the increasing export orientation of the economy is quite consistent with investment-led growth, with causality running from investment to imports and from imports to exports.[17,18]

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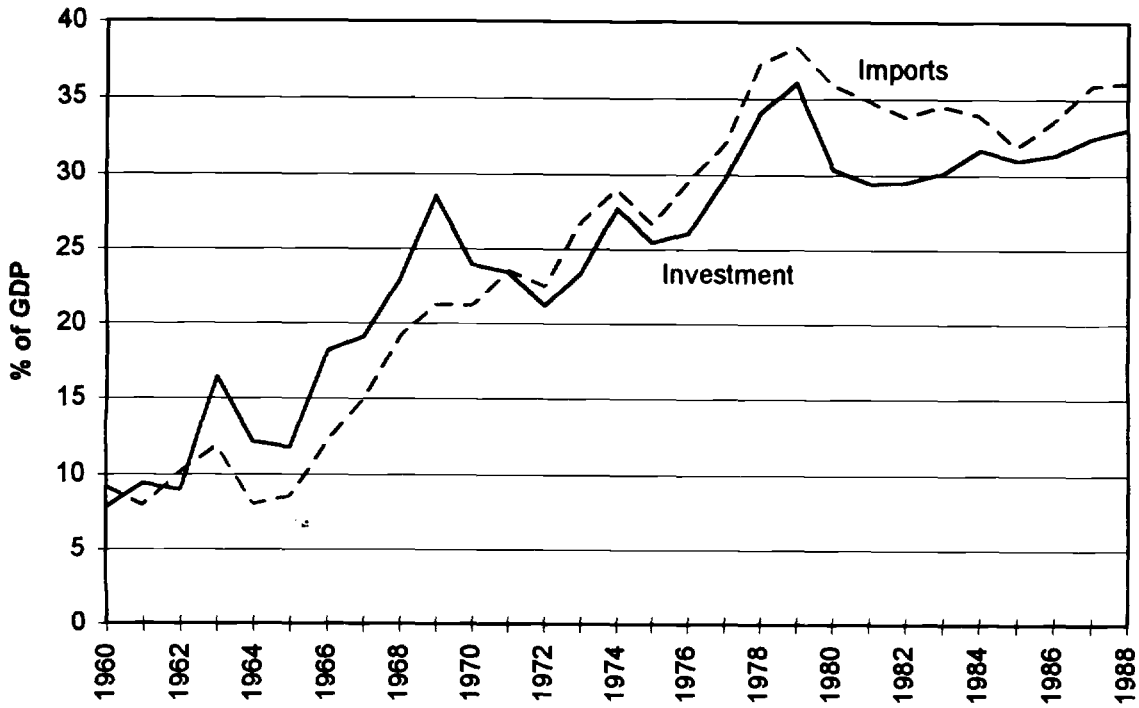
[16]The general case with non-tradables is analyzed formally in Rodrik (1995) in the context of an explicit intertemporal model. In such a model, there are two offsetting effects on the price of exportables relative to non-tradables. The substitution effect (as expenditure switches towards the importable) tends to depress the price of non-tradables and raise the relative price of exportables. The income effect (from the increase in the profitability of investment) goes in the opposite direction.

[17]According to Figure 8, the openness of the economy must necessarily decline once the investment ratio stabilizes. However, there are a number of confounding features in the Korean and Taiwanese experiences. Foremost among these is the large-scale import liberalization that has taken in both countries during the 1980s.

[18]As Robert Wade has reminded me, the argument about investment-led exports is not new. However, I have had difficulty locating sources in the published literature which place priority on investment demand <u>and</u> at the same time explain the rising export-GDP ratio. Bradford (1990, 37-38), for example, seems to suggest a causal role for investment, but is unclear as to why the investment was allocated disproportionately in export-oriented sectors.

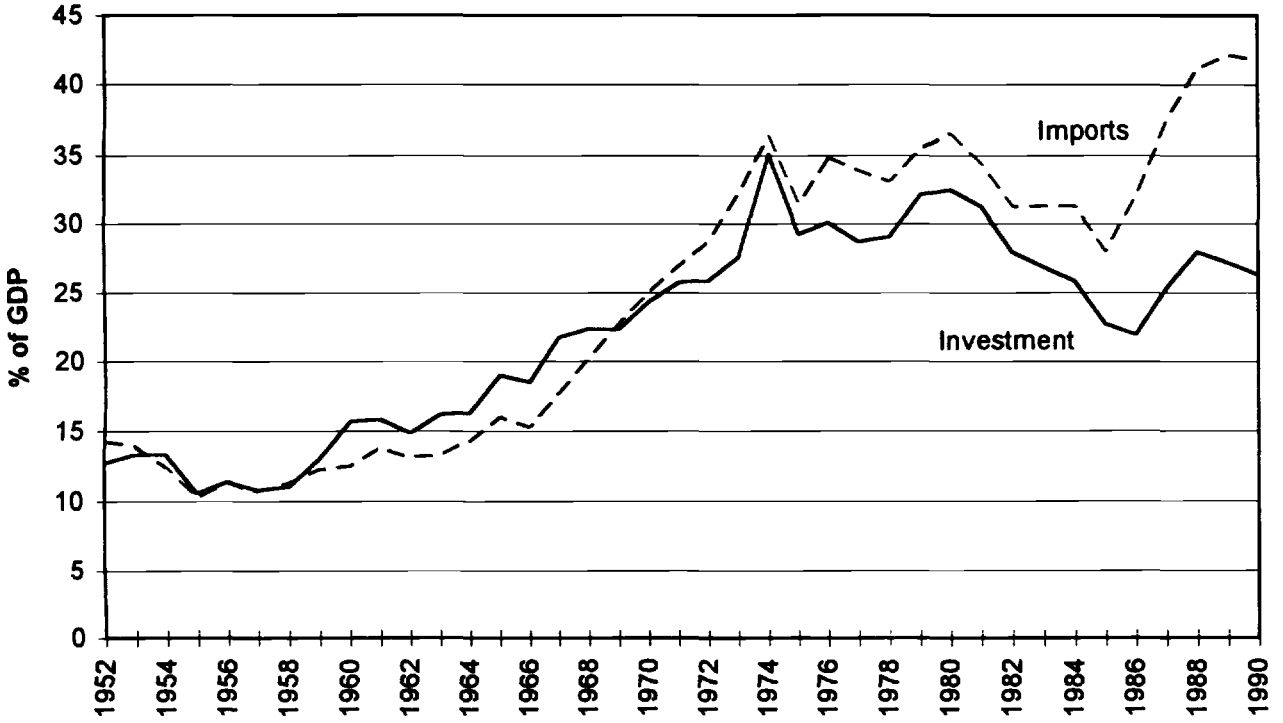
Imports and Investment, Korea



Source: Penn World Table 5.5 and Economic Planning Board, Major Statistics of the Korean Economy, various issues

Figure 9

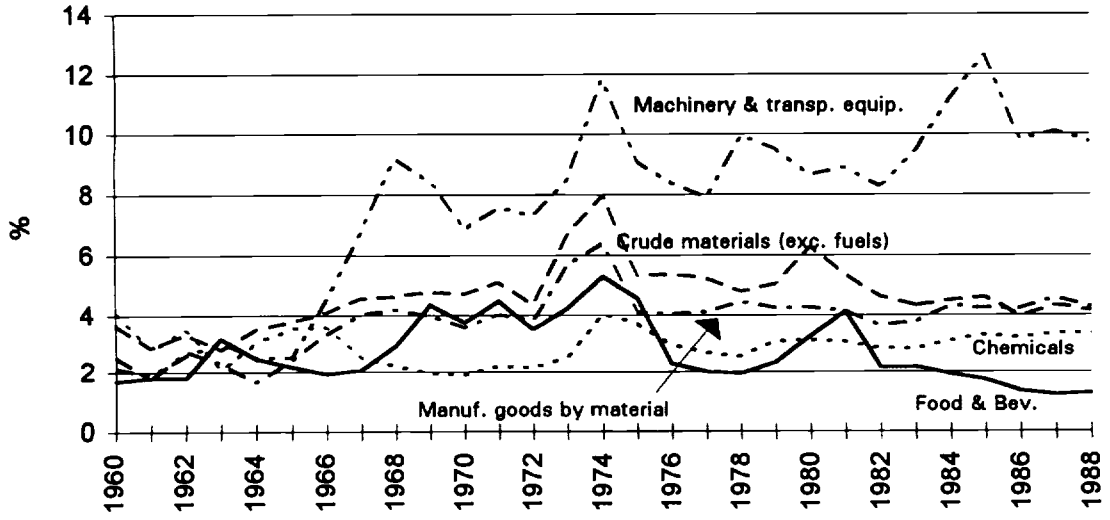
Imports and Investment, Taiwan



Source: Penn World Table 5.5 and National Income in Taiwan Area of the Republic of China (1993).

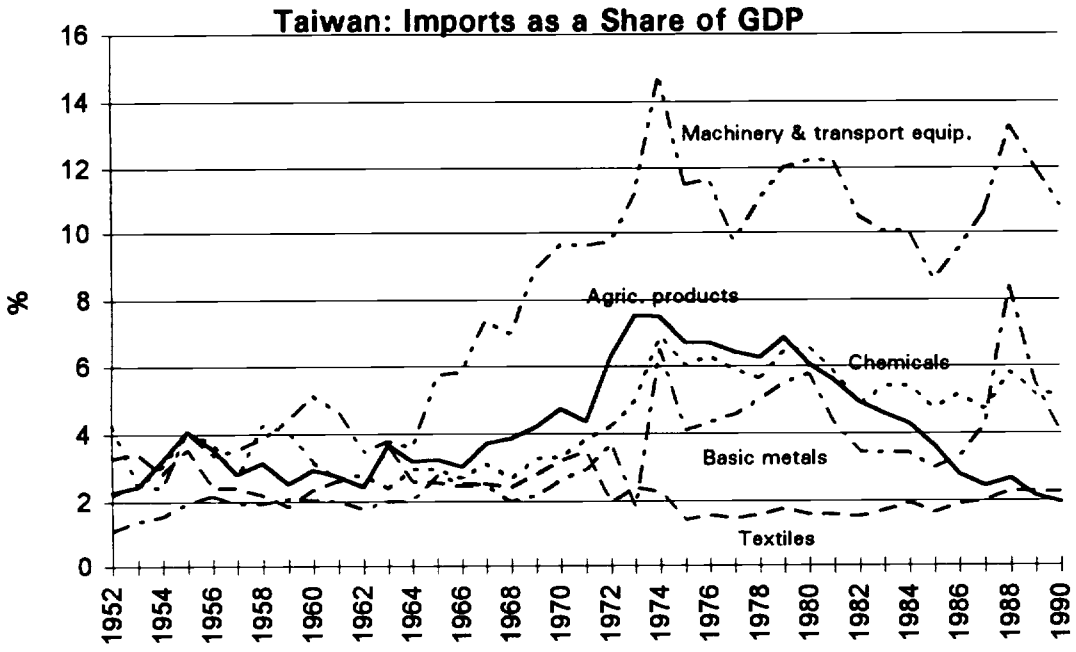
Figure 10

Korea: Imports as a Share of GDP



Source: Economic Planning Board, Major Statistics of the Korean Economy, 1976, 1989.

Figure 11



Source: Council for Economic Planning and Development, Taiwan Statistical Data Book, 1982, 1991.

Figure 12

3.6. The role of savings. In both countries savings rose alongside investment, and therefore enabled growth to proceed without hitting balance-of-payments constraints. This is important as it constitutes another part of the explanation of how a large export surplus could develop without substantial contemporaneous changes in the relative price of exportables. Most accounts view the increase in savings in Korea and Taiwan as having been the result of economic growth itself and of a comparatively early demographic transition (Collins and Park 1989, Collins 1991, World Bank 1993).

Government policy was helpful as well. Real interest rates were raised for depositors to levels that were either positive or only mildly negative (Taiwan in the 1950s and Korea in the 1960s). In addition, an increase in public savings made an important contribution to total savings in both countries. In Taiwan, the increase in the savings rate in the early 1960s coincided with a sharp increase in government saving after 1961 (see Kuo 1983, pp. 8-9). This was enabled in turn by a reduction in government consumption. And in Korea, "it was the rapidly increasing contribution of government savings and the steady inflow of foreign savings which enabled Korea to achieve the very high rate of investment during the 1962-73 period" (Hong, 1976, 19-20).

3.7. Recapitulation. Taken together, these points raise severe difficulties with the proposition that Korea's and Taiwan's economic performance can be ascribed to export-orientation. The switch towards export-oriented policies can not account for the sustained export boom since the mid-1960s, and even less for the equally impressive and sustained investment boom. Export growth itself can explain only a limited part of the early growth in output. The increasing share of exports in GDP is quite consistent with a story of investment- rather than export-led growth. These problems should lead us to search for more direct explanations for the apparent increase in the profitability of private investment around the mid-1960s in both countries.

I think the explanation has to do with government policies that go considerably beyond

export incentives. I will argue that Korea and Taiwan shared some rather special initial conditions that made such government policies possible. So we first step back and look into these initial conditions.

4. Importance of initial conditions

While South Korea and Taiwan were both quite poor around 1960, their social indicators placed them among the ranks of countries at several times their income levels. Table 3 shows Adelman and Morris's (1967) index of socio-economic development for a range of countries, as measured around the late 1950s and early 1960s. This index is derived from factor analysis and is based on a large number of indicators meant to capture characteristics of social structure and social organization. (The indicators include the extent of dualism, urbanization, importance of an indigenous middle class, social mobility, literacy, mass communications, cultural and ethnic homogeneity, fertility, national integration and sense of national unity, and modernization of outlook.) Adelman and Morris place Taiwan and Korea in their most advanced group, even though their per-capita incomes are considerably below average (see Table 3).

If we focus specifically on indicators of educational attainment we see the same discrepancy with the level of per-capita income. Table 4 displays data on three educational indicators which are commonly employed as explanatory variables in cross-country growth regressions. The table shows the actual school enrolment and literacy rates in Korea and Taiwan in 1960 as well as the corresponding rates that would have been expected on the basis of these countries' per-capita income levels alone. The latter are derived from cross-section regressions of educational indicators on per-capita income and its square. We find that both countries had virtually universal primary-school enrolment, while the norm for countries at their income levels stood at around 60 percent only. Korea had more than double the literacy rate compared to the norm, and Taiwan's literacy rate was one-and-a-half times as high. It is clear

Table 3: Socio-Economic Development and Income

	Index of Socioeconomic Development, c. 1960	Per-capita GNP, 1961 ($)
South Korea	.85	73
Taiwan	1.05	145
Brazil	.79	186
Cambodia	-0.55	101
Ivory Coast	-0.98	184
Morocco	-0.57	150
Cyprus	1.08	416
Jamaica	1.06	436

Source: Adelman and Morris (1967), Table IV-5

Table 4: Educational Indicators

	Primary enrolment ratio		Secondary enrolment ratio		Literacy rate	
	Predicted	Actual	Predicted	Actual	Predicted	Actual
Korea	0.57	0.94	0.10	0.27	0.31	0.71
Taiwan	0.62	0.96	0.12	0.28	0.36	0.54

Source: See text.

that both countries had a labour force that was considerably better educated than would be predicted from their income levels.

The other respect in which Korea and Taiwan stood out by 1960 was their exceptionally equal distribution of income and wealth. This was due in part to long-standing historical reasons, and in part due to the serious land reforms undertaken in both countries during the 1950s. Figure 13 plots Gini coefficients for income and land distribution for 41 countries for which both measures are available for a year around 1960. Korea and Taiwan are the two countries closest to the origin, that is, with the lowest overall inequality.

These initial conditions can account, in a statistical sense, for a large part of the two countries' economic performance since 1960. Table 5 shows the results of regressing growth and investment rates on initial primary enrolment and inequality indicators (as well as initial per-capita income) in the sample of countries for which inequality data are available. The primary enrolment rate has a positive and statistically significant coefficient (as expected). In addition, there is a strong negative association between inequality (particularly in land distribution) and subsequent growth. Despite the parsimonious specification (most notably, the exclusion of investment as an explanatory variable from the growth equation), these regressions do rather well, and explain around half or more of the cross-national variation in growth and investment rates.

Table 6 shows that almost 90 percent of the two countries' growth experience since 1960 can be "explained" by these initial conditions.[19] In a statistical sense, then, there is nothing "miraculous" about their experience. The real outliers are countries like Argentina and India (whose actual growth is vastly over-predicted) or Brazil (whose growth is vastly under-predicted). Of course, while these results may be interesting, they do not amount to an explanation. We still

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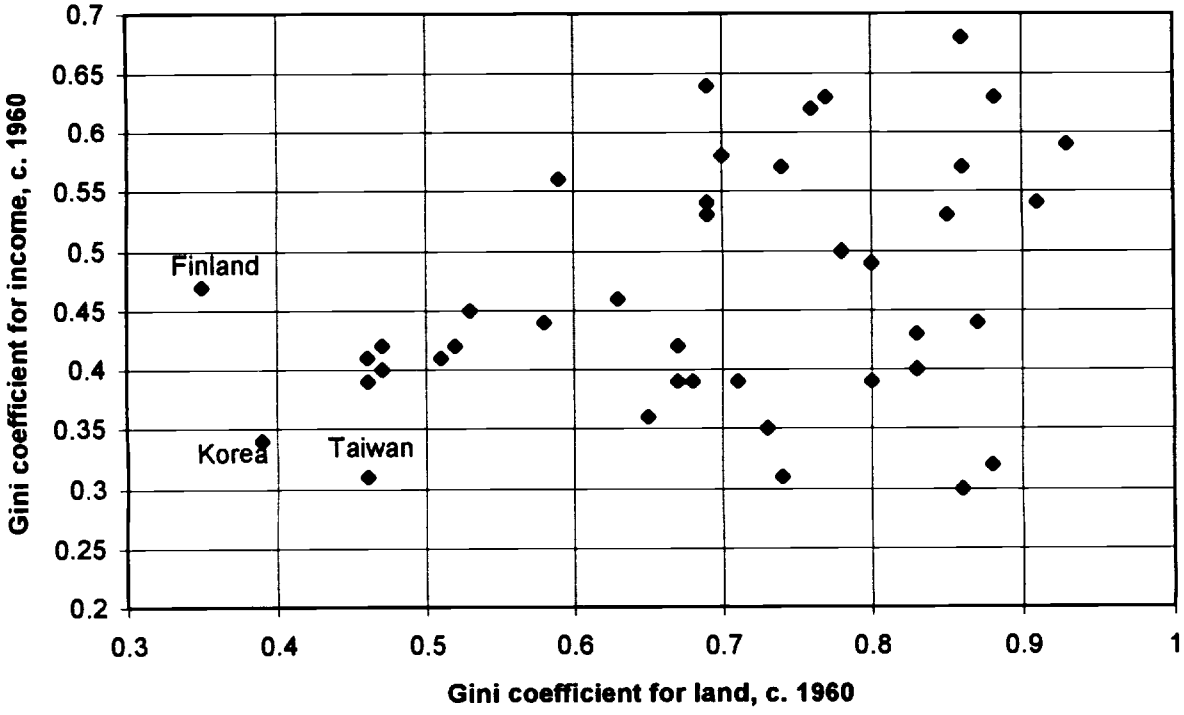
[19]When Korea and Taiwan are excluded from the original sample from which the predicted values are generated, the percentage of actual growth predicted by the regression is a bit lower (82 percent for Korea and 81 percent for Taiwan), but still striking.

Measures of Income and Land Distribution



Source: Alesina and Rodrik (1994).

Figure 13

Table 5: Growth Regressions

	Dependent Variables			
	Per-capita GDP growth, 1960-85		Investment/GDP, 1960-85	
Independent Variables	(1)	(2)	(3)	(4)
Intercept	6.22* (4.69)	3.71* (3.86)	16.06* (2.64)	18.06* (4.32)
Per capita GDP, 1960	-0.38* (-3.25)	-0.38* (-3.61)	0.94 (1.76)	0.49 (1.08)
Primary enrolment, 1960	2.66** (2.66)	3.85* (4.88)	11.01** (2.40)	14.11* (4.11)
Gini coeff. for land	-5.22* (-4.38)	-5.50* (-5.24)	-21.04* (-3.85)	-16.59* (-3.64)
Gini coeff. for income	-3.47 (-1.82)		14.44 (1.66)	
$\bar{R}^2$	0.53	0.53	0.43	0.50
Sample size	41	49	41	49

Notes: Numbers in parentheses are t-statistics. Asterisks denote level of significance:

* Significant at the 1% confidence level
** Significant at the 5% confidence level.

Table 6: Proportion of Growth Explained by Initial Conditions

	Actual Growth (1960-85)	Predicted Growth	Proportion Explained (%)
South Korea	5.95	5.24	88
Taiwan	5.68	4.96	87
Argentina	0.48	1.58	329
Brazil	3.52	1.96	56
India	1.37	3.46	253
Kenya	0.96	1.46	152

Notes: Predicted growth rates are from regression (1) in Table 5.

need a theory on why these initial conditions mattered as much.[20] That is the task of the next section.

5. The argument

What we need is an explanation that can account for the main outlines of Korean and Taiwanese economic performance, and also has a role for the special set of initial conditions discussed in the previous section. Such an explanation can be constructed along the following lines.

a. By 1960 Taiwan and South Korea shared a set of advantageous initial conditions relating to social infrastructure. In particular, both economies had a skilled labour force, relative to their physical capital stock and income levels. These initial conditions made both countries ready for economic take-off, in the sense that the latent return to capital accumulation was high.

b. However, for a number of reasons, the economic take-off could not take place under decentralized market conditions. Chief among these reasons are the imperfect tradability of key inputs (and technologies) associated with modern-sector production, as well as some increasing returns to scale in these activities. These conditions created a situation of coordination failure. In other words, while the rate of return to coordinated investments was extremely high, the rate of return to individual investments remained low.

c. Governments in both countries undertook a set of measures starting in the late 1950s that not only removed some policy-induced distortions, but also served to coordinate and

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[20]Another possibly important initial condition, emphasized by Adrian Wood in personal correspondence, is the lack of a good natural-resource base in Korea and Taiwan. This is in part related to the high educational attainment ratios relative to income: as Wood points out, countries with the same level of education per worker but more land would have had a higher GNP per capita and lie closer to the regression line. But in addition, the meager natural resources gave these countries a clear comparative advantage in manufactures, allowing them to enjoy both rapid industrialization and rapid trade expansion.

subsidize private investment. These measures included: credit subsidies, tax incentives, administrative guidance, and public investment.

d. This active government role helped remove the coordination failure that had blocked industrial growth. As private entrepreneurs responded to these measures, the resulting investments turned out to be profitable not only in financial terms but in social terms as well.

e. Government intervention could be implemented in an effective manner (without leading to rent-seeking behaviour) because initial conditions, once again, had endowed the government in each country with an extraordinary degree of insulation from pressure groups, and with leadership capability over them. Among these initial conditions, a relatively equal distribution of income and wealth was critical.

f. As investment rose as a share of GDP, so did imports of capital goods, as neither country had a comparative advantage in such goods. Thanks to appropriate macroeconomic and exchange rate policies, export supply was adequate to meet the increase in import demand, and rose alongside imports.

g. Hence, the increase in exports played a critical role in paying for the imports of capital goods. But it is more appropriate to view this increase in exports as a consequence of the increase in investment demand, rather than the other way around.

There are two critical claims in this story: (i) both countries were ready for economic take-off by the early to mid-sixties, but economic growth was blocked by a coordination failure, that is, the inability of market forces alone to generate the large and coordinated investments required to place these economies on a self-sustaining growth path; (ii) governments in both countries were able to undertake the measures needed to override this coordination failure.

The evidence on the presence of a coordination failure is necessarily circumstantial. I think the case is reasonably compelling in view of the likelihood that all of the prerequisites for

the existence of a coordination failure were met in the two countries. To see what these prerequisites are, it is useful to lay out a simple analytical model that captures the main issues. This is done in the appendix, and I will rely here on a verbal exposition of the economic logic.

Consider a small open economy that is initially specialized in the production of traditional goods. There is in addition a relatively capital-intensive modern sector, which yields higher factor returns when it is viable. The modern sector has the distinguishing feature that it relies on specialized inputs, which could be viewed as specialized labour skills, technologies, intermediate inputs, or capital goods. These inputs in turn have the following features: (i) they require well-educated workers to be produced at low cost; (ii) they have scale economies; and (iii) they cannot be perfectly traded in international markets. The viability of the modern sector therefore requires the local presence of these inputs, which in turn depends (in part) on the existence of a sufficiently well-educated workforce.

Suppose now that the economy's endowment with skilled labour is high so that the modern sector would be viable <u>if</u> a large enough share of the economy's resources were devoted to producing the specialized inputs. This is the interpretation I attach to the economy's readiness for take-off. Would labour and capital now move from the traditional sector to the modern sector, leading to specialization in the latter and to higher incomes? Not necessarily, since only a <u>large-scale</u> movement of resources is guaranteed to be profitable in view of scale economies. From the perspective of an individual investor, it will not pay to invest in the modern sector unless others are doing so as well. The profitability of the modern sector depends on the simultaneous presence of the specialized inputs; but the profitability of producing these inputs in turn depends on the presence of demand from a pre-existing modern sector. It is this interdependence of production and investment decisions that creates the coordination problem.

In the model, coordination failure is least likely to happen when the economy is well-endowed with <u>both</u> skilled labour and physical capital. In such economies, production in the

modern sector is profitable even when entrepreneurs act in an uncoordinated manner. For economies at the other end of the spectrum--lacking both skilled labour and capital--the coordination issue is moot, because the modern sector is not viable in the first place. Therefore, it is in the intermediate economies most reminiscent of Korea and Taiwan in the early 1960s--well-endowed with skilled labour but poor in physical capital--that the coordination problem is most severe.

More generally, we know that markets are not very good at handling resource allocation in the presence of scale economies and non-tradability: market prices reflect the profitability of different activities only as they are currently undertaken; they do not provide any signals about the profitability of activities that would require a large-scale reallocation of resources within the economy (which after all is what economic development is all about). These are of course old ideas that go back to Scitovsky's (1954) analysis of pecuniary externalities and Rosenstein-Rodan's (1943) advocacy of big-push policies. More recently, the arguments have been formalized in papers by Faini (1984), Pack and Westphal (1986), Murphy et al. (1989), Krugman (1991), Matsuyama (1991), Ciccone and Matsuyama (1993), Rodríguez-Clare (1993), and Rodrik (1993).

One problem with this literature has been that coordination failure is often presented as a generic problem affecting all kinds of economies. The model summarized above and laid out in the appendix represents an attempt to be more specific about the prerequisites. The framework highlights the following three prerequisites for a coordination failure to become a serious issue: (i) some degree of non-tradability in the technologies and/or goods associated with the modern sector; (ii) economies of scale; (iii) a reasonably skilled labour force (but a low endowment of physical capital). The last of these has already been discussed in the Korean and Taiwanese context. Scale economies are also plausible in many of the modern-sector activities. Hence, non-tradability is the only feature that requires additional discussion.

Upon a moment's reflection, it should be clear that some degree of non-tradability is necessarily associated with the types of goods produced by rich countries. This must be so, otherwise poor countries would not remain poor for long: arbitrage through trade would eliminate the disparities. In practice, the non-tradability of modern-sector inputs is observed in a number of different ways. Labour services are for the most part effectively non-traded, so that skilled and specialized workmanship must be locally available. The fixed costs often required to develop these skills endow them with features of scale economies. Intermediate and capital goods are in principle tradable, but they sometimes require either geographic proximity to the final user (as when they are manufactured to suppliers' specifications) or the use of complementary local inputs before they can be put to use (as when skilled workers are needed to operate sophisticated imported machinery). Often , the requisite technologies also have a non-tradable element insofar as much of technological capability is tacit and not explicitly codified in designs and blueprints. As Pack and Westphal put it:

> The tacitness of technology leads to problems in its communication over long distances and across social differences, problems which can be overcome--if at all--only at some cost ... Moreover, knowledge that exists (somewhere in the world) does not exist everywhere simultaneously because there are costs in advertising its mere existence or in discovering its existence through search. Only knowledge that is 'close by' is known to exist....Another significant channel for inter-industry externalities is the exchange of technological elements in transactions involving intermediate products and capital goods. Indeed many such exchanges leading to better utilization of local resources and to improvements in the design of capital goods have been observed. A salient aspect of these exchanges is the dependence of their outcome on extensive interaction between suppliers and users in iteratively changing both process and product characteristics. (1986, 109-110)

Some examples drawn from the East Asian experience may help bring these points to life. The importance of specialized labour skills and the complementarities they generate across manufacturing activities is illustrated by the experience of Hyundai, one of Korea's huge conglomerates (*chaebol*). Hyundai first entered manufacturing in 1964 by building a cement plant. According to Amsden: "Hyundai used its cement plant as a laboratory to train its managers with background in construction, before assigning them to other manufacturing affiliates. Trainees gained experience in inventory management, quality and process control, capacity planning, and so on, thus spreading basic production skills throughout the Hyundai organization. After Hyundai Cement, the next manufacturing affiliate in the group was founded in 1967 and named Hyundai Motors. Twenty years later it became the first independent automaker from a late-industrializing country to export globally. The first president of Hyundai motors was a former president of Hyundai Cement" (1989, 267). As we shall see, Korean government policies were highly partial to conglomerates like Hyundai. By giving them access to subsidized capital, the government allowed them to internalize many of the labour-market spillovers in the fashion described in the quote.

Hyundai's experience with shipbuilding (discussed by Amsden, 1989, 278-89) provides a concrete instance of the imperfect tradability of technology (and its interaction with scale economies). The company started out by importing its basic design from a Scottish firm, but soon found out that this was not working out. The Scottish design relied on building the ship in two halves, because the original manufacturer had enough capacity to build only half a ship at a time. When Hyundai followed the same course, it found out that the two halves did not quite fit. Subsequent designs imported from European consulting firms also had problems in that the firms would not guarantee the rated capacity, leading to costly delays. Engines were available from Japanese suppliers, but apparently only at a price higher than that obtained by Japanese shipyards. Moreover, ship buyers would often require design modifications, which Hyundai would

be unable to undertake in the absence of an in-house design capability. Only with large enough capacity would it pay for Hyundai to integrate backwards (into design and engine building). In a highly volatile business, scale in turn depended on having access to a steady and reliable customer (a merchant marine). The Korean government provided Hyundai with substantial assistance, as well as an implicit guarantee of markets. Hyundai eventually integrated both backwards and forwards. (The government's guarantee came handy in 1975 when a shipping slump led to the cancellation of foreign orders. President Park responded by forcing Korean refineries to ship oil in Korean-owned tankers, creating a captive demand for Hyundai [Jones and Park, 1980, 357-58].)

Here is the chairman of the Lucky-Goldstar group, explaining how his company got to where it is:

> My father and I started a cosmetic cream factory in the late 1940s. At the time, no company could supply us with plastic caps of adequate quality for cream jars, so we had to start a plastic business. Plastic caps alone were not sufficient to run the plastic-molding plant, so we added combs, toothbrushes, and soap boxes. The plastics business also led us to manufacture electrical and electronic products and telecommunication equipment. The plastics business also took us into oil refining which needed a tanker-shipping company. The oil-refining company alone was paying an insurance premium amounting to more than half the total revenue of the then largest insurance company in Korea. Thus, an insurance company was started. This natural step-by-step evolution through related businesses resulted in the Lucky-Goldstar group as we see it today. (Cited in Amsden, 1989, 126).

The quotation clearly illustrates the importance of local inputs and customers as well as of scale economies in fuelling the growth of *chaebol*. While the *chaebol* could thus internalize some of the coordination issues, they were greatly assisted in doing so by government policies which will

be discussed in the next section.

In both Korea and Taiwan, the rate of return to capital and profitability in key manufacturing activities rose significantly from the late 1950s on. In Korea, Jones and Sakong (1980, 105) report (based on Hong, 1977) steadily rising real rates of return to capital in manufacturing: the range is 9-18 percent in mid- to late-1950s, 9-26 percent in 1962-1966, 16-38 percent in 1967-1972, and 17-40 percent after 1972. The rate of profit in manufacturing steadily rose from 9 percent in 1951-53 to 16 percent in 1954-56, to 28 percent in 1957-62, and to 35 percent in 1963-70 (Hong, 1993, 347). Apparently, investment became more profitable as the investment rate rose.[21] In Taiwan, profitability rates rose in most of the private manufacturing industries after the late 1950s, with the notable exception of textiles and wood products, two major exporting industries (Lin, 1973, Table A-31). Interestingly, the greatest increase in profitability in the post-1963 period was experienced by public sector manufacturing (excluding food beverages and tobacco). As will be discussed in the next section, it was public enterprises that supplied many of the key intermediate inputs in Taiwan. This is how Lin (1973, 122-23) explains the increase in their profits: "The domestic consumption of the output of these nonfood industries (which produce petroleum products, chemical fertilizers, industrial chemicals, etc.) increased tremendously during the 1960s, due to increased demand from chemical-using industries (such as those making polyvinylchloride, monosodium glutamate, and paper and pulp for both the export and domestic market), as well as from the agricultural sector and the transportation industry." In other words, intermediate industries became profitable thanks to expanding linkages downstream.

We note finally that in both Korea and Taiwan the way policy-makers viewed the economy and their role in it has parallels with the logic of the coordination failure. As the discussion in the

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[21]Little (1994) calculates that the annualized return to investment in Korea was 31.1 percent during the period 1963-73. However, his calculations also show a reduction in the rate of retusn subsequently, to 18.3 percent during 1974-79. He attributes the decline to the HCI drive.

following section will make clear, the Korean government has always perceived itself as a mediating agent and a facilitator for bringing about industrial change, through arm-twisting, subsidies or public enterprises as the circumstances may demand. In the words of Pack and Westphal (1986, 99),

> The Korean government can be seen as having achieved integrated decision-making by acting as a central agent mediating among market agents, forcing and facilitating information interchange and insuring the implementation of the decisions reached. The power of coercion appears to have been important to carrying out this role effectively. But coercion has typically not been absolute; it has balanced costs and benefits. Thus the Korean government can be seen as having adjudicated between suppliers and users, weighing costs and benefits from a collective standpoint and often intervening to reward cooperative players and punish uncooperative ones.

In Taiwan,

> the basic philosophy underlying [the government strategy] is that an economy will undergo certain stages of development, and at each stage there are certain key industries (such as integrated steel mill, large shipyard, and petrochemical plants) which through various linkages will bring about development of the entire economy. This strategy also assumes that government officials know what those key industries are and what policy measures should be adopted to develop these industries (Hou, 1988, cited in Hong, 1993, 349).[22]

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[22]For example, Taiwan's Fourth Plan (1965-68) stated: "For further development, stress must be laid on basic heavy industries (such as chemical wood pulp, petrochemical intermediates, and large-scale integrated steel production) instead of end product manufacturing or processing. Industrial development in the long run must be centered on export products that have high income elasticity and low transportation cost. And around these products there should be development of both forward and backward industries, so that both specialization and complementarity may be achieved in the interest of Taiwan's economy" (quoted in Wade, 1990, 87)

Hence, what these government thought they were doing has much in common with the ideas discussed here.

6. Government policies to subsidize and coordinate private investment

Under the conditions discussed in the previous section, there exists a large role for government intervention. Such intervention can take many different forms. Most directly, policymakers can coordinate private-sector production and investment decisions through their control over credit allocation, the tax regime, and trade policy, as well as through "administrative guidance". Government policies to subsidize investment in the modern sectors of the economy have a large payoff, because they get the private sector to internalize the coordination externalities. The same outcome can also be obtained through investments by public enterprises themselves. The Korean and Taiwanese governments used a combination of these interventions, thereby raising the private return to capital in the modern sectors to the level of the social return.

6.1. Improving the investment climate

As indicated above, both governments actively subsidized and coordinated private investment. However, one of the most important changes that took place in the late 1950s in Taiwan and the early 1960s in Korea was a substantial improvement in the investment climate overall, brought about by a re-orientation of government priorities. We can view this as an important prerequisite to the effectiveness of the interventions themselves.

During much of the 1950s, economic goals did not particularly rank high with the Taiwanese leadership. The government was preoccupied instead with the reconquest of the mainland. By the end of the decade, it became clear that the communist regime was firmly entrenched. As Wade (1990, 246) puts it, "[Taiwan's] party elders came to see that economic

development could be a better guarantee of the party's survival ...." Thereafter, the government turned its energies to eliminating many investment-deterring distortions (such as multiple exchange rates and macroeconomic instability). An important turning point was the Nineteen-Point Reform Programme instituted in 1960. This contained a wide range of subsidies for investment, and will be discussed further below. What's more important at this juncture is that this Programme signalled a major shift in government attitudes towards investment: as Lin (1973, 96) puts it, "[with] the announcement of the nineteen-point reform programme of 1960, the improvement of investment climate became a catchword. The simplification of administrative procedures and the liberalization of regulative measures with regard to economic matters became an official goal." And in 1965, many of the remaining administrative controls on new plants or capacity expansion were removed altogether.

The story in South Korea is quite similar. President Park, who took power in a military coup in 1961, could not have been more different from Syngman Rhee, his predecessor (not counting the short-lived Chang Myon regime). Rhee's attention had been focussed on national consolidation and on political goals; economic growth was never a priority. Park, on the other hand, gave precedence to economics over politics, and to economic growth over other economic concerns. These priorities were reflected in the amount of time he spent on economic matters and in his support of growth-oriented bureaucrats and businessmen (see Jones and Sakong, 1980, 40-43). Park made very clear early on in his rule that entrepreneurs who undertook investments in line with his priorities would be richly rewarded (while others were penalized).[23]

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[23]One of the first acts of Park was to arrest most of the nation's leading businessmen under a Special Law Dealing with Illicit Wealth Accumulation, and to charge them with profiteering under the previous regime. The businessmen were eventually set free, after Park had extracted a commitment from them to undertake specified investments. While locking up businessmen may seem an odd way of enhancing the investment climate, the episode served to underline the expectation that entrepreneurs were to invest in productive activities rather than rent-seeking.

6.2. Investment subsidies

In Korea, the chief form of investment subsidy was the extension of credit to large business groups at negative real interest rates. Korean banks were nationalized after the military coup of 1961, and consequently the government obtained exclusive control over the allocation of investible funds in the economy. As Jones and Sakong put it, "allocation of under-priced credit [became] by far the most important single instrument of government microeconomic control" (1980, 101). Korean firms were highly dependent on external credit, as borrowing made up two-thirds of their cash flow during 1963-74 (Jones and Sakong, 101). According to Jones and Sakong, "the general bank [lending] rate has typically been half of the curb-market rate; and second, the real bank rate has often been negative and generally below even the most conservative estimates of the opportunity cost of capital" (104).

Since bank lending rates were below market clearing rates, a rationing mechanism was needed. Under the Rhee regime, political motives had apparently played a key role in the allocation of scarce credit. Under Park, however, credit was allocated on the basis of "economic" criteria, namely the priority given to different economic activities. Deserving users were judged on the basis of their investment plans, technology, domestic linkages, and scale economies. Since credit was more likely to be awarded to those with some track record, the loan allocations necessarily favored established firms, and the *chaebol* in particular. This explains why, unlike in Taiwan, expansion of the manufacturing sector has come primarily through the growth of existing firms, rather than the entry of new firms. Between 1966 and 1971, the value added share of firms with 200 or more employees rose from 56 percent to 72 percent (Table 7). In the 1970s, Korean credit policy became even more partial to *chaebol* as the government decided to use them as instruments for the government's industrial diversification strategy (Pack and Westphal, 1986, 96).

Another important manner in which investment was subsidized in Korea was through the

Table 7: Size Distribution of Manufacturing Firms, Korea

	1966			1971		
Number of employees	Number of firms	Percentage of workers	Percentage of value added	Number of firms	Percentage of workers	Percentage of value added
5-49	21013	39.4	24.9	21045	27.9	12.8
50-199	1326	20.8	17.6	1605	18.3	15.2
200 and above	379	39.8	57.5	762	53.8	72.0

Source: Hasan (1976)

socialization of investment risk in selected sectors. This came about because the government--most notably President Park himself--provided an implicit guarantee that the state would bail out those entrepreneurs investing in "desirable" activities if circumstances later threatened the profitability of these investments. This is how Hong (1993, 350) describes it: "The Korean government had extensively socialized the investment risk for selected entrepreneurs, and such an arrangement invigorated the *animal spirit* of the big business groups, inducing them to indulge in aggressive expansion through the *fail-safe* government-sponsored investment activities" (Hong, 350). The shipbuilding industry, mentioned above, is a good example of this. Without the personal involvement and encouragement of President Park, Hyundai would not have embarked or completed what eventually became one of the world's best shipyards. The government guaranteed the firm's external borrowing, provided extensive subsidies for the infrastructure, and supplied financial guarantees to get Hyundai its first order (Amsden, 1989, 275-76). As discussed above, when the world shipping industry collapsed in 1975, Hyundai could activate the government's contingent subsidy. The subsidy took the form of a regulation forcing Korean refineries to ship oil in Korean owned tankers (Jones and Sakong, 357-58). Such implicit investment subsidies were greatly reduced during the 1980s, as a consequence of the financial difficulties experienced by some of the investments undertaken in the second half of the 1970s (the period of so-called Heavy and Chemical Industries).

In Taiwan, investment subsidies took different forms. Real lending rates were generally positive and credit subsidies were much less important. However, public enterprises did get credit at more favorable terms, and they also served to socialize investment risk. The role of public enterprises will be discussed later on. The most important direct subsidies in Taiwan came in the form of tax incentives. The Statute for Encouragement of Investment (enacted in 1960 in conjunction with the nineteen-point programme mentioned above) represented a "sweeping extension" (Lin, 1973, 85) of the prevailing tax credit system for investment. The

maximum business income tax paid by enterprises was reduced to 18 percent of annual income (from a previous maximum of 32.5 percent); the tax holiday for new investments was extended from 3 to 5 years; tax exemption was given to undistributed dividends for reinvestment, 2 percent of FX earnings, and proceeds of export sales; the stamp tax and deed tax on "productive" real estate were made either tax exempt or taxable at reduced rates; payments of import duties on plant equipment were made deferrable, and payable in installments after starting operations. These incentives were further expanded in 1965, at which time the business income tax was reduced in all priority sectors listed in the investment law, and specified manufacturing sectors (in basic metals, electrical machinery and electronics, machinery, transportation equipment, chemical fertilizers, petrochemicals, and natural gas pipe) were given complete exemption from import duties on plant equipment.[24]

The quantitative significance of these tax incentives for investment can be observed from Table 8, which shows the ratio of tax credits or rebates to the relevant tax base. We observe a sharp rise around 1960 and another one in 1965, associated with the original statute and its revision, respectively. Not coincidentally, these increases are also associated with jumps in the investment-GDP ratio around the same time.

6.3. Direct coordination of investment decisions

In addition to providing subsidies, the Korean and Taiwanese governments played a much more direct, hands-on role by organizing private entrepreneurs into investments that they may not have otherwise made. In both cases, we have good case histories of how the government actively took steps to ensure that private entrepreneurs would invest in certain areas. In Taiwan, it was the government that took the initial steps in establishing such industries as plastics, textiles, fibres, steel, and electronics. In Korea, in the words of Amsden, "[t]he initiative to enter new

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[24]The information in this paragraph is taken from Lin, 1973, 85-87 and Kuo, 1983, 301.

Table 8: Tax Credits and Reimbursements as a Share of the Relevant Tax Base, Taiwan

Year	Percent
1955	0.4
1956	0.7
1957	0.8
1958	1.5
1959	3.4
1960	5.6
1961	9.8
1962	8.5
1963	12.4
1964	12.4
1965	13.1
1966	14.9
1967	18.0
1968	17.2

Source: Lin (1973, Table 6-5).

manufacturing branches has come primarily from the public sphere. Ignoring the 1950s, ..., every major shift in industrial diversification in the decades of the 1960s and 1970s was instigated by the state...." (1989, 80-81).

Wade (1990) provides a nice account of the Taiwanese case. He describes how the island's first plastics plant for PVC was built under government supervision, and handed over to a private entrepreneur upon completion in 1957. In 1966, three more private firms began producing PVC. All four relied on an imported intermediate. Meanwhile, the state-owned Chinese Petroleum Corporation (CPC) produced ethylene, from which an intermediate suitable for processing into PVC could be derived at a cheaper price than the imported intermediate. "So the government forced the four private producers of PVC to merge in a joint venture with the Chinese Petroleum Corporation and another state-owned chemical company, in order to adopt a more efficient ethylene-using production method" (Wade, 92). (While Wade is not explicit on this, there must have been some scale economies or complementarities that prevented CPC from unilaterally moving into the production of the ethylene-based intermediate, without waiting for a commitment from the downstream producers.) The story illustrates nicely the coordinating role of the government.

With respect to synthetic fibres:

> The government ... decided to oversee the creation of a rayon-making plant as part of a plan to diversify the textile industry away from cotton fiber. With much help from U.S. advisors it brought together an American synthetic fiber company with several local textilers from both public and private firms, and oversaw negotiations on the terms of the joint venture.... The resulting corporation ... was the largest "private" firm on the island at the time [1957] .... In 1962, this same state-sponsored rayon company, together with a state financing agency, created another company to make nylon. It started production in 1964. (Wade, 80, 91)

Private firms soon followed after this state-led entry into synthetic fibres.

Finally, in electronics the role of the Taiwanese state was crucial in the early stages of the industry. In 1974 the publicly-owned Electronic Research and Service Organization (ERSO) was formed to bring in foreign technology and disseminate it to local firms. ERSO built the country's first model shop for wafer fabrication and entered a technology transfer agreement with RCA. It trained engineers, who later moved to private firms. The strategy led to many private-sector offshoots that commercialized the technology developed by ERSO (Wade, 103-105).

It is interesting to note that the Taiwanese authorities' approach to selecting industries to nurture in this fashion was based on what Wade calls "engineering concepts" such as "take-off. linkages, gaps, substitutions, and incremental extensions" (Wade, 188)--concepts which have little place in conventional welfare economics. Wade mentions that the justification for building a stainless steel plant in the early 1980s was to "fill a gap in Taiwan's infrastructure." Similarly, "[d]evelopments in electronics are being promoted with the aid of an input-output map which highlights gaps in the production structure within Taiwan" (Wade, 188). This concern with linkages may sit awkwardly with neoclassical development theory, but it does resonate with our emphasis on coordination failures.

In Korea, as we have seen, the presence of large conglomerates helped internalize some of the industrial complementarities that Taiwanese policymakers had to nurture through more direct interventions. But the Korean government was not hesitant to intervene in order to solve what it perceived to be larger-scale coordination problems:

> The state masterminded the early import-substitution projects in cement, fertilizers, oil refining, and synthetic fibers--the last greatly improving the profitability of the overexpanded textiles industry. The government also kept alive some unprofitable factories inherited from the colonial period, factories that eventually provided key personnel to the modern general machinery and shipbuilding industries, which the state also promoted. The transformation from light to heavy industry came at the state's behest, in the form of an integrated iron and steel mill.... [The government] was responsible for the Big Push into heavy machinery and chemicals in the late 1970s. (Amsden, 1989, 80-81).

The case of shipbuilding has already been discussed in some detail. As in Taiwan, the government proceeded on the understanding that some industries and products were more "strategic" than others because they were the source of linkages with the rest of the economy. [25]

6.4. Use of public investment and public enterprise

We have already referred several times to public enterprises in the two countries. These public enterprises played a very important role in enhancing the profitability of private investment in both countries (perhaps more so in Taiwan than in Korea). They did so by ensuring that key inputs were available locally for private producers downstream. In Taiwan, as we have seen, it was common for the state to establish new upstream industries and then either hand the factories over to selected private entrepreneurs (as happened in the case of glass, plastics, steel, and cement) or run them as public enterprises (Wade, 1990, 78). In Korea, the government established many new public enterprises in the 1960s and 1970s, particularly in basic industries characterized by high degree of linkages and scale economies (Jones and Sakong, 1980). In both countries, public enterprises were the recipient of favorable credit terms, as well as direct allocations from the government budget.

Not only did public enterprises account for a large share of manufacturing output and investment in each country, their importance actually increased during the critical take-off years of the 1960s. This can be sen clearly in Table 9, where data on three comparator countries are also listed. Public enterprises actually accounted for a larger share of GDP in Taiwan than in such "socialist" developing countries as India and Tanzania.

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[25]A recent account in The Economist about how Daewoo got into the shipbuilding business provides yet another example: "Mr. Kim [the founder of Daewoo] found himself in shipbuilding in 1978, when the government twisted his arm to take over a near-bankrupt project to build a giant shipyard at Okpo, on Koje island near the southern port of Pusan. 'I did not have a chance to say no,' says Mr. Kim. Indeed, the government simply announced the move when he was out of the country" (November 26th, 1994, p. 81). The Okpo shipyard is now in the words of The Economist "at the heart of .. . [Korea's] achievement" in shipbuilding.

Table 9: The Importance of Public Enterprise in GDP and Investment (in percent)

	Year	Public enterprise share of	
		GDP	Capital Formation
South Korea	1963-64	6.7	31.2
	1971-72	9.1	21.7
Taiwan	1954-57	11.7	34.3
	1958-61	13.5	38.1
	1962-65	14.1	27.7
	1966-69	13.6	28.0
	1970-73	13.3	30.5
	1974-77	13.6	35.0
India	1966-69	6.5	29.6
Tanzania	1970-73	12.7	48.2
Argentina	1978-80	4.6	19.6

Sources: Wade (1990, Table 6.2), from original data in Short (1983), except for public enterprise share in GDP for Korea, which is from Jones and Sakong (1980, Table 24).

Jones and Sakong (1980) have analysed in detail the expansion of the public enterprise sector in Korea. They find that the Korean government had a coherent set of preferences with respect to where public enterprises should be set up. They summarize their results thus: "the industries chosen for the public-enterprise sector [were] characterized by high forward linkages, high capital intensity, large size, output-market concentration, and production of non-tradables or import substitutes rather than exports" (154-55). These are exactly the characteristics associated with a high potential for coordination failure.

The case of POSCO, Korea's state-owned integrated steel mill, is instructive (if not entirely representative) (Amsden, 1990, 316-17). In the early 1970s, the Korean government was turned down by the World Bank when it applied for a loan to construct a steel plant. The World Bank's argument was that Korea did not have a comparative advantage in steel. The government was undeterred and went ahead nonetheless. The government provided POSCO with capital assistance as well as infrastructure subsidies (for the construction of water supply facilities, port facilities, an electricity generating station, roads, and a railroad line). In addition, the government supported downstream industries to ensure demand for POSCO's production. POSCO eventually became, by the World Bank's own reckoning "arguably the world's most efficient producer of steel" (cited in Wade, 1990, 319), supplying Korean mini-mills with steel at below world prices. Moreover, the presence of POSCO stimulated in turn a wide range of upstream industries, ranging from capital goods to spare parts. Between 1977 and 1984, the local content of POSCO's output rose from 44 percent to 75 percent (Amsden, 317).

7. How could intervention be implemented effectively?

To any economist with experience in the developing world, what is striking about the policies discussed in the previous section is their similarity to those commonly employed in many other, considerably less successful economies. Why have these interventions, along with many others

not specifically discussed (such as quantitative trade barriers or local-content requirements), been successful in Taiwan and Korea and not elsewhere? One part of the answer to this question has already been given: the imbalance between a well-educated labour force and a low endowment of physical capital meant that the return to coordinated investments--and therefore government policy aimed at coaxing these investments--was quite high.

This is an important part of the story, but not the entire story. While the initial human capital advantage may have been a necessary condition for intervention to work, it was not sufficient. On top, what was required was a competent, honest, and efficient bureaucracy to administer the interventions, and a clear-sighted political leadership that consistently placed high priority on economic performance. In Korea and Taiwan, unlike in so many other developing countries, these additional requirements were present. Why? One important factor was clearly the availability of relatively skilled manpower, enabling the formation of a competent bureaucracy. In addition, an exceptionally high degree of equality in income and wealth--one of the other initial conditions I mentioned earlier--was important as well.

How exactly did the latter help? The absence of large inequities meant several things. First, neither government had to contend with powerful industrial or landed interest groups. Such powerful groups had been decimated by the Japanese occupation (Korea), the settlement by the mainland Chinese (Taiwan), and land reform (both countries). Therefore, policy-making and implementation could be insulated from pressure-group politics. In both countries, the implementation of growth-oriented policies required a number of institutional reforms, including the centralization of functions previously distributed among multitudes of ministries and agencies and the creation of new bureaucracies (see Haggard, 1990). These institutional reforms could be undertaken relatively autonomously, and with little pressure form the push and pull of daily politics. Economic laws and regulations could be written by technocratic elites, with little concern for their effect on organized pressure groups.

Second, the absence of large-scale inequities meant that governments felt no immediate need to undertake redistributive policies. The analytical literature on the political economy of growth suggests that regimes which inherit large inequalities are constantly under pressure to implement growth-retarding policies (Alesina and Rodrik, 1994; Persson and Tabellini, 1994). Once concrete form that this takes is the pursuit of populist fiscal and microeconomic policies (as in much of Latin America) which engender high inflation, stop-go cycles, and low growth. The political leadership in Taiwan and Korea could concentrate on expanding the pie instead. The priority given to economic goals after 1960 in both countries has already been discussed above.

Third, and related to the above, the fact that the top political leaders were free to focus on economic goals meant that they could supervise the bureaucracy closely. This is important because interventionist regimes are prone to two fatal problems having their origin in the bureaucracy. The first is that interventions naturally generate opportunities for rent-seeking. A weak, or poorly supervised bureaucracy is incapable of reining in rent-seeking (or becomes part of it). A strong bureaucracy, on the other hand, can choke off entrepreneurial incentives by sticking too closely to the letter of the law and imposing too many cumbersome restrictions aimed at rooting out rent-seeking. In both Taiwan and Korea, the top political leaders closely monitored the bureaucracy to make sure that the bureaucrats assisted rather than hindered private entrepreneurship. President Park, in particular, was famous for his daily involvement in the implementation of his economic policies, and his willingness to override the bureaucracy at a moment's notice when businessmen had legitimate complaints.

Hence, the initial advantage with respect to income and wealth distribution played an important role in shaping the political landscape in both countries. This is probably the single most important reason why extensive government intervention could be carried out effectively, without giving rise to rampant rent-seeking.

8. Some frequently asked questions

The arguments I have made in this paper are naturally controversial. I have challenged one of the most widely-held beliefs in development economics, namely the view that South Korea and Taiwan owe their growth to export-oriented policies. I have also argued that both economies on balance greatly benefited from extensive government intervention in markets, a proposition which neoclassical economists are trained to regard with suspicion. The professionally correct response to these arguments is, and perhaps should be, a high degree of skepticism. All the more so since some of my arguments, regarding the existence of a coordination failure in particular, lack direct empirical confirmation, even if they are suggestive and broadly consistent with the evidence. Without more detailed micro- and industry-oriented studies, we will not know with any degree of confidence whether the hypothesis I have put forward has great relevance to these two cases. My hope is that this paper will stimulate such research, as well as providing some clues and a set of organizing principles to guide it.

Earlier versions of this paper elicited diverse reactions from readers. It may be useful to briefly discuss in this section some of the more frequent reasons for skepticism, as doing this also helps clarify my arguments further.

8.1 Can we really distinguish between export and investment strategies?

One objection to the distinction I have drawn between trade strategy and investment policies is that the distinction is too sharp in view of these governments' preoccupation with both exports and investment. Many observers emphasize that the potential allocative distortions of investment incentives and other interventions were kept in check by the requirement that enterprises eventually become competitive in world markets. Indeed, some of the investment subsidies were in practice contingent on export performance. Besides, since so much of investment went into exportables, exports must indeed have been profitable.

Nothing I have said in this paper should be taken to imply that exports did not play a facilitating role in Korea's and Taiwan's growth miracles. In fact, an implication of my argument is that without the increase in exports the investment boom would likely not have taken place. It is possible, as the above indicates, that exports also made a contribution by acting as a disciplining device on subsidy-receiving firms.[26] However, none of this is very helpful in understanding what made these countries take off. An adequate analysis has to confront the questions: why did investment and exports respond so vigorously to government policies, and which of these served as the driving force behind economic growth? My view is that the investment booms would not have been possible in the presence of gross policy biases against exports, but that these booms were compatible with a wide range of trade policy options.

8.2 Doesn't the experience of many other countries show that investment is not enough for sustained growth?

An argument about investment-led growth often elicits the reaction: but look at what happened to the Soviet Union and other Soviet-type economies. Doesn't this experience show that accumulation is far from enough for sustained growth? I think this objection is fundamentally misguided. It is not appropriate to compare economic systems lacking markets and private property and in which both the level and allocation of investment are determined by central planners to market systems where investment decisions are made on the basis of profitability. For all the government interventions, it is not possible to confuse South Korea and Taiwan with the German Democratic Republic or the former Czechoslovakia.

Limiting ourselves to non-Soviet type economies, the causal relationship between

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[26]I might add, however, that the analytical basis for this argument has, to my knowledge, never been properly laid out. If fulfilling an export target is the price to be paid for hefty subsidies, many firms will willingly pay the price. There is nothing inherently efficient or desirable about the resulting exports.

investment and growth should be one of the least controversial propositions in economics. The empirical correlation is clear enough, as can be seen from the scatterplot in Figure 14. Conceptually as well, all theories of growth are based at least in part on capital accumulation. That is not to say that all countries which invest a lot have experienced high growth: Figure 14 shows a number of outliers. But in view of the overall correlation, it is these exceptions that require explanation, not the cases (like South Korea and Taiwan) which have followed the general rule.

8.3 Isn't the evidence on coordination failures too weak in view of failed government interventions elsewhere?

As I have already pointed out, the case for coordination failures is based on circumstantial, rather than direct, evidence. This is not the kind of evidence that will move anyone with strongly held priors on the inefficiency of government intervention. Those with long memories will remember the "big push" ideas of the 1950s and how these led nowhere. Others, familiar with the debates on industrial policy, will ask how it was possible for these governments to have "picked the winners." And finally, what about the example of free-market, yet successful Hong Kong?

Without disagreeing on the need for more evidence, I would point out a number of things. First, I have tried to be explicit about the conditions under which a coordination failure is most likely to exist, and have not treated it as a generic issue as in much of the early (and current) literature. There is nothing implausible about the presence of these conditions in the South Korea and Taiwan of the 1960s. Second, I have tried to bring considerable amount of case-study evidence to bear on these issues. In fact, so voluminous is the case-study literature on government interventions (and their apparent success) in these countries that one may as well regard the main problem as being one of finding an adequate theory on which to hang this evidence, rather than being one of locating the evidence to support a particular theory. The

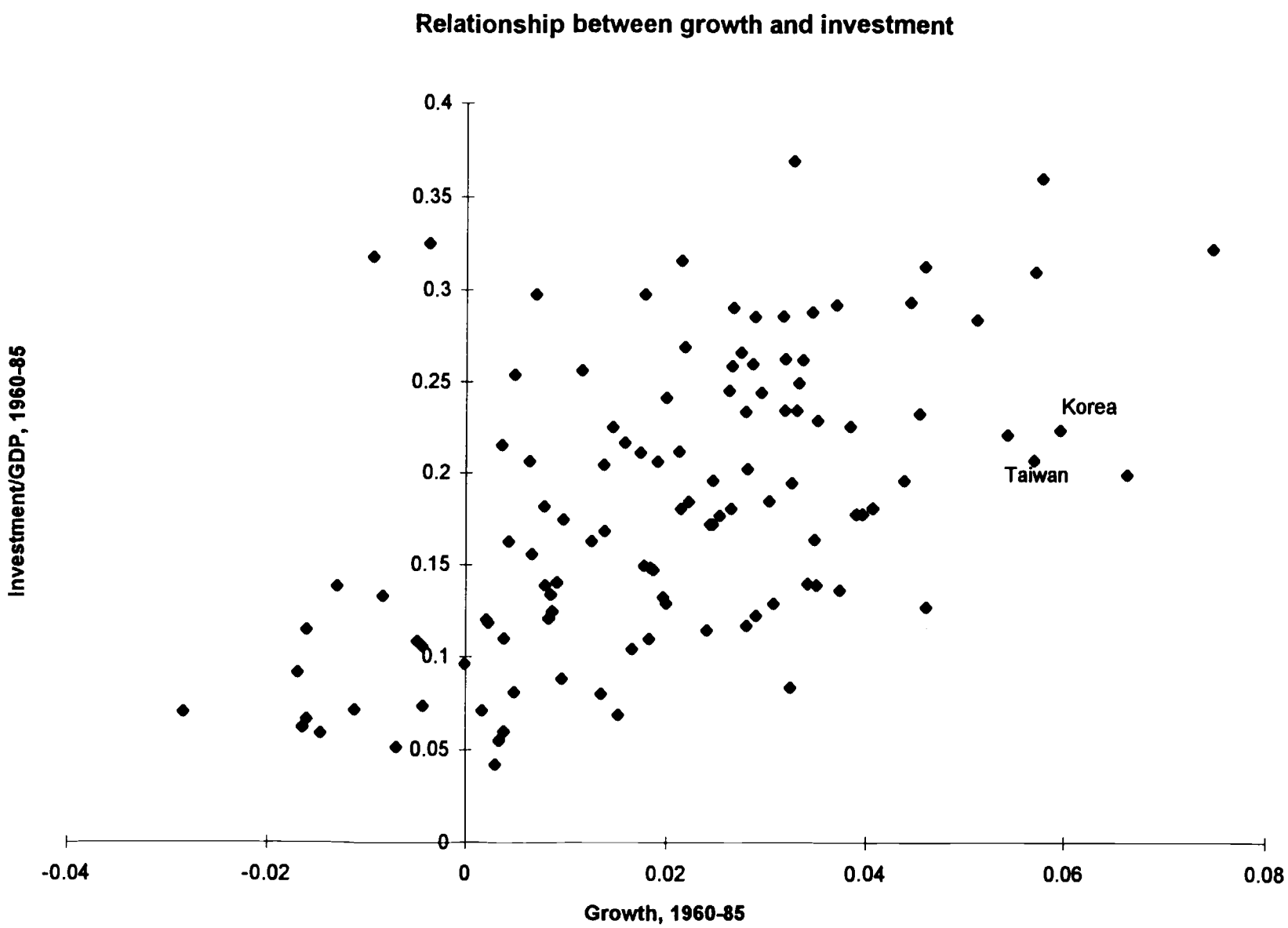
Relationship between growth and investment
Investment/GDP, 1960-85
Growth, 1960-85
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.04
-0.02
0
0.02
0.04
0.06
0.08
Korea
Taiwan

Figure 14

framework I have proposed here helps us make sense of the findings of this case-study literature, something that is hard to do with the conventional approach.[27]

This approach also clarifies why "picking winners" was not so difficult in the early years of the Korean and Taiwanese experience. Policy-makers in these countries only had to look at Japan and more advanced countries to see their future. Of course, once the catch-up is nearly complete, it becomes more difficult to play the same game.

Finally, Hong Kong's experience is not as telling as it may seem at first glance. And not only because Hong Kong is a small city state, with significant geographical and historical advantages in foreign trade. Hong Kong was already a high investment country by 1960: its investment ratio stood above 20 percent (of GDP) in 1960, almost double the figure for Korea and Taiwan at the time. Consequently, Hong Kong never faced the challenge of raising investment. And the absence of government policy in this regard reveals itself in an investment ratio that has remained virtually flat since 1960. Therefore, one might as well read the Hong Kong evidence as suggesting that an increase in domestic investment requires government action.

8.4 Doesn't the initial imbalance between human and physical capital suggest an even simpler story of catch-up, with little role for government policy?

In some recent models of growth with human and physical capital, it is possible to show that an initial imbalance between human and physical capital speeds up growth (Mulligan and Sala-i-Martin, 1993). That is, growth is higher in economies where human capital is large relative to physical capital. This result holds even in the absence of increasing returns to scale or other possible market failures. Such models may explain why South Korea and Taiwan grew fast,

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[27]A clear example is the need to square the Korean and Taiwanese governments' emphasis on inter-industry linkages with the complete neglect of such linkages in standard welfare economics.

Table 10: Countries with human capital "imbalance", c. 1960

	Per-capita growth, 1960-89	Primary enrolment ratio		Secondary enrolment ratio		Literacy rate	
		Predicted	Actual	Predicted	Actual	Predicted	Actual
Dominican republic	2.48	0.64	0.98	0.13	0.07	0.39	0.65
Philippines	1.58	0.62	0.95	0.12	0.26	0.36	0.72
Paraguay	2.72	0.65	0.98	0.14	0.11	0.40	0.75
Sri Lanka	1.83*	0.65	0.95	0.14	0.27	0.39	0.75

Source: Same as Table 4.

Note: * 1960-85.

without having to rely on the role of government policy.

Table 10 suggests, however, that such an imbalance does not necessarily translate into high growth. I have listed in the table four countries which had roughly the same human capital advantage (as measured by educational indicators) in 1960 as did Korea and Taiwan: Dominican Republic, Philippines, Paraguay, and Sri Lanka. None of them experienced the kind of growth rates that Korea and Taiwan did. It would seem plausible that the difference in outcomes has much to do with differing government policies in the two sets of countries.

9. Concluding remarks

The role of government policy in Korea and Taiwan is open to diverse interpretations. In principle, one could argue in favor of any of the following propositions.[28]

i. government policy was a hindrance, but these countries overcame it nonetheless;

ii. it was irrelevant, not helping growth but not hindering it either;

iii. it was helpful, though not essential (that is, it speeded up a process which would have happened anyway);

iv. it was necessary for the growth experience of these countries.

Propositions (i), (ii) and (iii) are hard to sustain because the experience of Taiwan and South Korea was far from exemplary throughout the 1950s, prior to the concerted efforts made by governments in both countries to make their economies grow. In fact, it was not uncommon for visiting economists to despair that these economies would remain basket cases for the foreseeable future. Hence, the real debate should be over <u>which</u> government policies made the difference, not whether policy made a difference or how much.

I have argued in this paper that the South Korean and Taiwanese "miracles" can be best

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[28]With thanks to Gene Grossman, for laying out these different positions. I am borrowing his wording here.

understood by taking seriously what the two governments thought and said they were doing, namely coordinating and encouraging private (and public) investments with a high degree of linkages within the modern sector. Such policies had a high payoff because they helped remove coordination failures in economies where the latent return to investment was already high. A relatively skilled and educated workforce was a necessary condition. So was a relatively equal distribution of resources, which endowed the political leadership with insulation and allowed it to focus on economic growth as the top priority. Export-oriented policies (and chief among them exchange-rate policies) were important insofar as they enabled a steady rise in imported capital goods. But, as I have explained, viewing export-orientation as the clue to the growth puzzle misses the mark by a wide margin.

This approach can explain why so many other developing countries have failed miserably with government interventions that bear more than a passing resemblance to those employed by the East Asian countries. South Korea and Taiwan shared a number of special initial conditions--high levels of educational attainment relative to income, and equal distribution of income and wealth--that these other countries lack. Consequently, the relevance of their experience with government intervention to other developing economies may well be limited.

Mathematical Appendix

The model discussed here is taken from Rodrik (1993), to which the reader is referred for further details (see also Rodríguez-Clare, 1993). We focus on a small-open economy that can produce two tradable final goods. Both of these goods are produced under constant returns to scale. The first of these is a labor-intensive good, requiring labor and capital, which we associate with the "traditional" sector. Its unit cost function is given by $\theta(w, r)$, with w and r standing for the wage and rental rates prevailing in the economy. The other good, produced in the "modern" sector, uses capital and a range of intermediate goods (producer services and specialized inputs) that are imperfect substitutes for each other. We use the Dixit-Stiglitz-Ethier specification for the way that these intermediates enter the production function of the modern good. In a symmetric equilibrium in which n intermediate goods are available at price p, the unit cost function of the modern good is given by $\phi(r, pn^{-1/(\sigma-1)})$, where $\sigma > 1$ is the elasticity of substitution between any two of the intermediate goods. Note that the productivity of the modern sector is linked to the number of input varieties available: as n increases, unit costs in the modern sector decline.

As discussed in the text, a key assumption is that the intermediates are non-tradable. They are produced using labor and under increasing returns to scale. Intermediate-good production is assumed to be intensive in labor skills, so that the educational attainment of the workforce is taken to be an important determinant of costs in this sector. The unit cost function of the representative intermediate is expressed as $w\lambda(h)c(z)$, where h is an index of the skill level of the work force (so that $\lambda'(h)<0$), and z is the output level of the representative intermediate Due to increasing returns, $c'(z)<0$. The presence of scale economies implies that each intermediate will be produced by a single firm under monopolistically competitive conditions. Therefore, when the intermediate sector is active, $p = w\lambda(h)c(z)$. In addition, marginal costs equal (perceived) marginal revenue, so that $[p-MC]/p = 1/\sigma$. These two conditions, together with the separability of the intermediates' cost function, imply that the ratio AC/MC depends only

on z, and can be written as AC/MC = $\mu(z)$. The result is that the equality between marginal cost and marginal revenue can be written in a simple form:

$$\mu(z) = \frac{\sigma}{\sigma-1} \tag{1}$$

This fixes the output level of each intermediate as a function of the elasticity of substitution alone. Hence, any change in the scale of the intermediate sector will have to come from a change in n. Let X and Y stand for the output levels of the modern and traditional goods, and K and L for the economy's (fixed) endowments of capital and labor. Let the world prices of the modern and traditional goods be π and 1, respectively. The remaining equations of the model can be expressed in the following form:

$$\theta(w,r) \geq 1, \quad Y \geq 0, \quad Y[\theta(w,r) - 1] = 0 \tag{2}$$

$$\phi(r, pn^{-\frac{1}{\sigma-1}}) \geq \Pi, \quad X \geq 0, \quad X[\phi(r, pn^{-\frac{1}{\sigma-1}}) - \Pi] = 0 \tag{3}$$

$$w\lambda(h)c(z) \geq p, \quad z \geq 0, \quad z[w\lambda(h)c(z) - p] = 0 \tag{4}$$

$$\theta_w(w,r)Y + \lambda(h)c(z)nz = L \tag{5}$$

$$\theta_r(w,r)Y + \phi_r(r, pn^{-\frac{1}{\sigma-1}})X = K \tag{6}$$

$$\phi_p(r, pn^{-\frac{1}{\sigma-1}})X = nz \tag{7}$$

The first three equations are the appropriate complementary slackness conditions that relate domestic costs to prices. The next two equations are the full-employment conditions, where we have used the fact that the partial derivatives of the unit cost functions with respect to factor

prices yield unit factor demands. The last equation is the market-clearing condition for the intermediate-goods sector. There are seven endogenous variables in this system (w, r, p, n, z, X, Y) to be determined by the seven equations above.

A key feature of the model is that the competitiveness of the modern sector depends on both the skill level of the workforce (h) and on the range of domestically produced intermediate varieties (n). For sufficiently low levels of h and K, the modern sector will not be competitive even when the economy produces the maximum feasible number of intermediates (which is reached when the entire labor force is employed in the intermediate-goods sector). When h and K are sufficiently large, on the other hand, the modern sector will be competitive even when a very small number of intermediate goods is produced.

But when h is large and K is low, the economy can have two equilibria: one in which the economy specializes in the traditional sector and the modern sector remains uncompetitive, and another one in which the modern sector is competitive and becomes active. The possibility of multiple equilibria arises from a coordination problem. If the economy is initially specialized in the traditional sector, it will not pay for any single firm to enter the modern (or the intermediate-goods sector) at the prevailing factor prices, even though a large-scale shift of resources in that direction can be both privately and socially profitable. The reason, in turn, is that there will be demand for intermediates only if a sufficiently large number of them is being produced. Hence the profitability of being in the intermediate-goods sector depends on the number of other firms already there.

When there are two competing equilibria, specialization in the modern sector produces at least as high a level of real income as specialization in the traditional sector (and generally the inequality is strict). And the rate of return to capital (r) is necessarily higher in the equilibrium with specialization in the modern-sector. This is so for two reasons: (i) as just explained, the modern sector produces higher incomes and can pay out higher factor returns; and (ii) the

modern sector is capital intensive. Government policies that push resources into the modern sector will improve resource allocation as well as increase the return to capital. These results form the basis of the argument in the text.

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