

Getting interventions right: how South Korea and Taiwan grew rich

Dani Rodrik

Columbia University

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% 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 (see, for example, Tsiang, 1984; Kreuger, 1985; World Bank, 1993; Little, 1994). 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

I am grateful to Jagdish Bhagwati, Paul de Grauwe, Ann Harrison, Arvind Panagariya, Andrés Rodríguez-Clare, Robert Wade, Adrian Wood, Alwyn Young, Panel members and especially Gene Grossman and Charles Wyplosz for helpful comments, Eytung Kim for excellent research assistance, and the CEPR MIRAGE project for financial assistance.

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.

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 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 neither for 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 favourable 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 of 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.

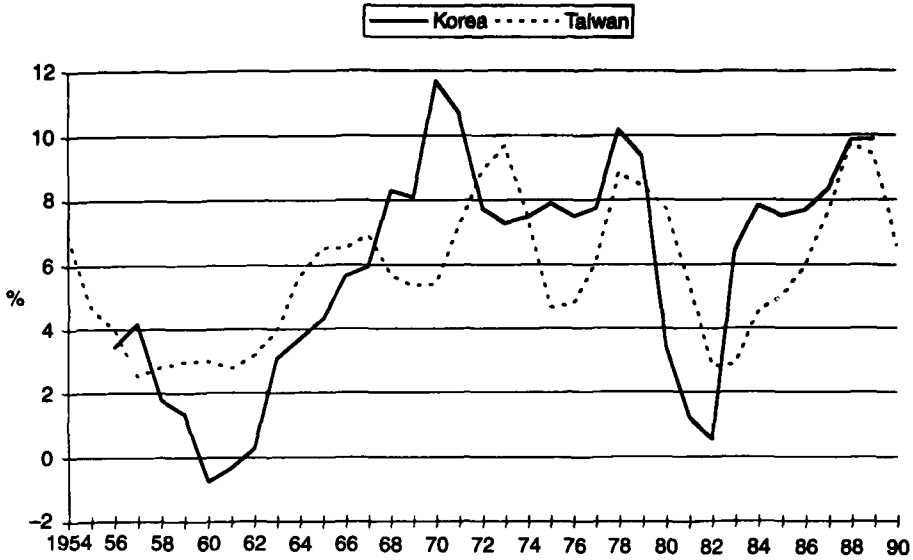


Figure 1. Per-capita growth rates (three-year moving averages), 1954-90

Source: Penn World Table 5.5.

Figure 2 is the chief exhibit for the export-led growth hypothesis. The export-GDP ratio rose from virtually zero in Korea to more than 30% by the early 1980s, and from around 10% in Taiwan to over 40%. 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.

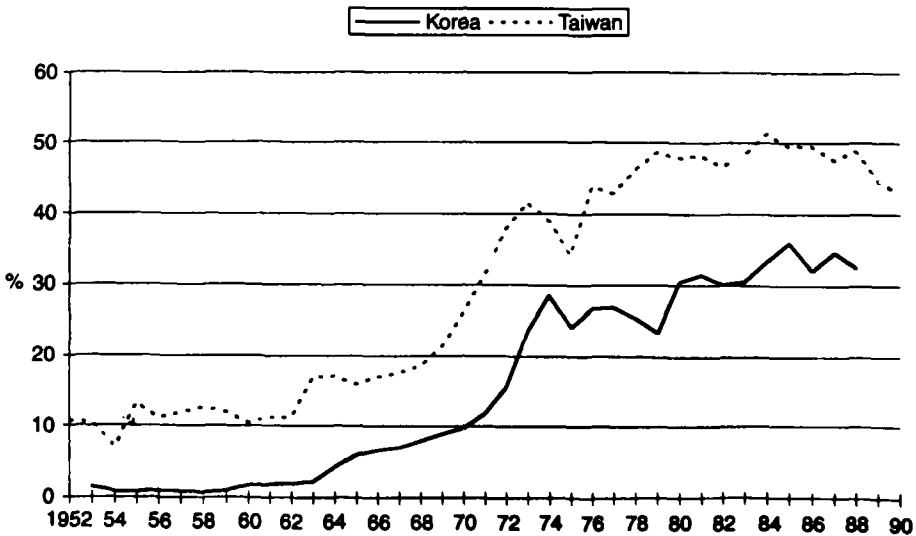


Figure 2. Export/GDP ratios, 1952-90

Sources: Council for Economic Planning and Development, *Taiwan Statistical Data Book*, 1982 and 1992; Economic Planning Board, *Major Statistics of the Korean Economy*, various issues; IMF, *International Financial Statistics*.

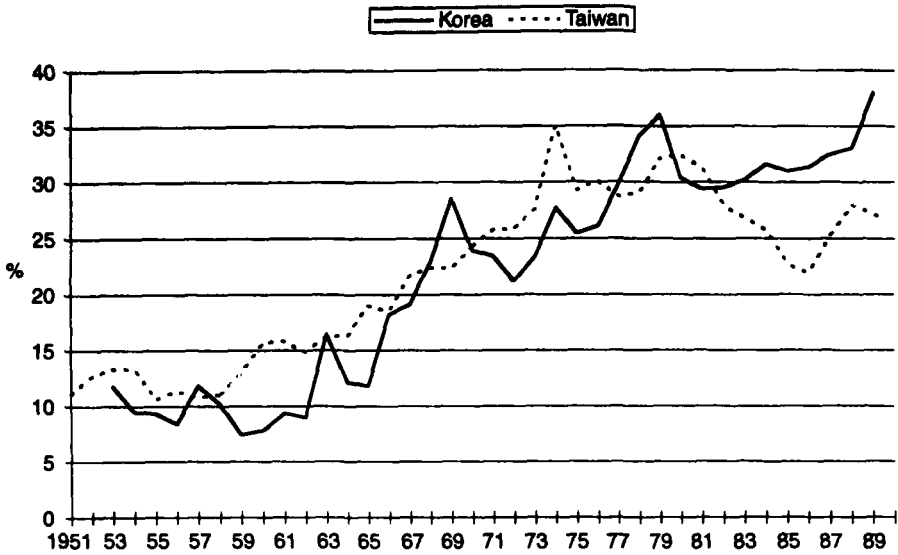


Figure 3. Investment/GDP ratios, 1951–90

Source: Penn World Table 5.5.

Less discussed but certainly more important is the spectacular increase in the investment effort, shown in Figure 3. Investment rose from around 10% of GDP in the late 1950s in both countries to 30% 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.

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

* Non-agricultural economy.

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

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.¹ 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.²

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):

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.

¹ 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).

² 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 and semiconductors. What it suggests is that this transformation has been fully paid for by investments in physical and human capital.

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 was 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 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). There were multiple exchange rates and a haphazard, ineffective programme of export subsidies (Frank *et al.*, 1975). 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% 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 16 May 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). However, the incentive effects of the devaluations and the cash grants were eroded by expansionary macroeconomic policies that led to rising inflation in 1962–3 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 licences 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.*, 1975). 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. Subsidized credit to exporters became particularly important after 1966. Frank *et al.* estimate that the wastage allowance alone provided an export subsidy of 4.6% in 1968 on average, and up to 17–21% in certain fabrics and footwear. Bureaucrats had virtually unrestricted discretion in setting wastage allowances, and their generosity varied from time to time.

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: (1) 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;³ and (2) 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 which is therefore an appropriate index of the profitability of exporting relative to other activities in the Korean economy.⁴ As the denominator of this index is the domestic price level, 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.

We note that, even with the devaluation of 1964, the level of export incentives in 1964–5 was no more than 10% 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! The argument that export-oriented policies were responsible for the increase in exports is often made in a different guise (see, for example, Page, 1994) by pointing out that trade and exchange rate policies in the 1960s were not overtly discriminatory against exports (as they

³ 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.

⁴ The subsidy equivalent of the export incentives are taken from Kim (1988). This, and the 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.

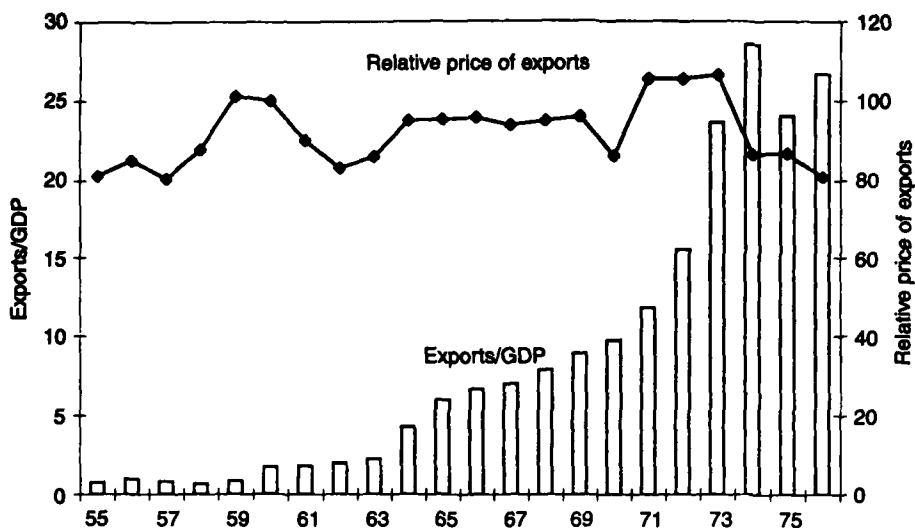


Figure 4. Relative price of exports: Korea, 1955-76

Source: Frank *et al.* (1975), Kim (1988) and Bank of Korea.

commonly have been in other developing countries). The evidence for this comes from taking the ratio of the effective exchange rate for exports to the effective exchange rate for imports (both calculated by Frank *et al.*, 1975), and noticing that the resulting number is around 1 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).

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'. 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'. 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 the export boom (see also Frank *et al.*, 1975). 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 favoured exports over other

activities.⁵ Jones and Sakong (1980) resort to a range of explanations, including greater stability, reduction in rent-seeking opportunities, simpler input acquisition, clear political leadership, a more favourable 'business climate', and non-pecuniary incentives such as presidential awards for successful exporters. 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.⁶

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 1961–3, the number of items positively listed as importables subject to government licensing, quotas, foreign currency allocation and other regulations ranged between 1000 and 1600. Under pressure from the balance of payments, the government actually reduced the number of importable items to fewer than 500 in late 1964. The 1961–3 level was restored in 1965, and further increased later, until 1967 when the switch occurred (Hong, 1993).

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 1954–5, 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% of the foreign exchange they earned from exports and use it for their own import needs. (This ratio was raised to 100% 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: (1) in April 1958, the multiple buying rates were consolidated into two buying rates, in parallel with two selling rates; (2) in November 1958, exports and imports under the lower rate were brought up to the higher rate; and (3) further minor devaluations and simplifications were undertaken during the following two years (Hong, 1993; Lin,

⁵ 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 for both foreign *and* home markets.

⁶ 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'. To extend this to its logical conclusion, we must therefore search for explanations for why it became profitable to invest and expand productive capacity.

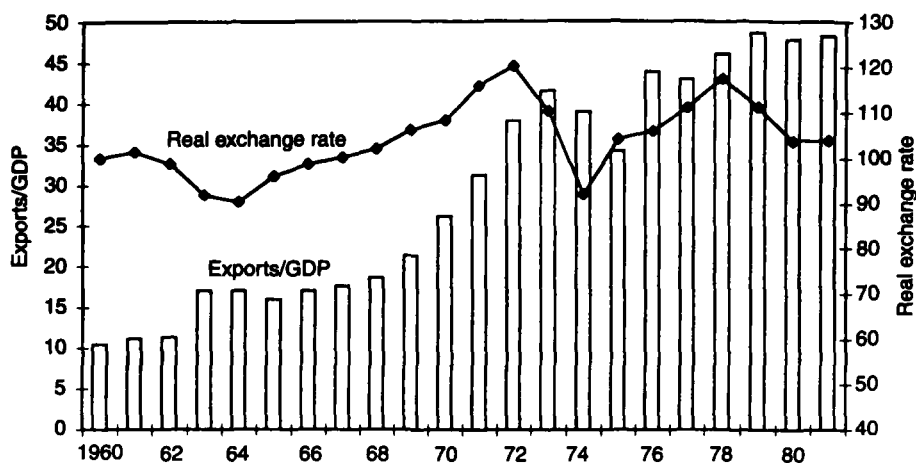


Figure 5. Real exchange rates and exports: Taiwan, 1960-81

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

1973). 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 diagram shows that the initial export spurt (in 1963-4) was actually associated with a decrease in export incentives, indicated by a real appreciation of around 10% (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 such as the one in Figure 5, would have predicted a fourfold increase in the exports-GDP ratio. (The real exchange rate in question is the domestic price of tradables, more specifically exportables, relative to the price of non-tradables. This ratio can change considerably even in a 'small' country with no market power in international trade.)

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. 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. Moreover, 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. Export orientation versus investment boom

It is not clear why export orientation (or the increase in exports) should have led to an 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 sizeable increases in the profitability of exports either have not led to increases in investment or have done so only after

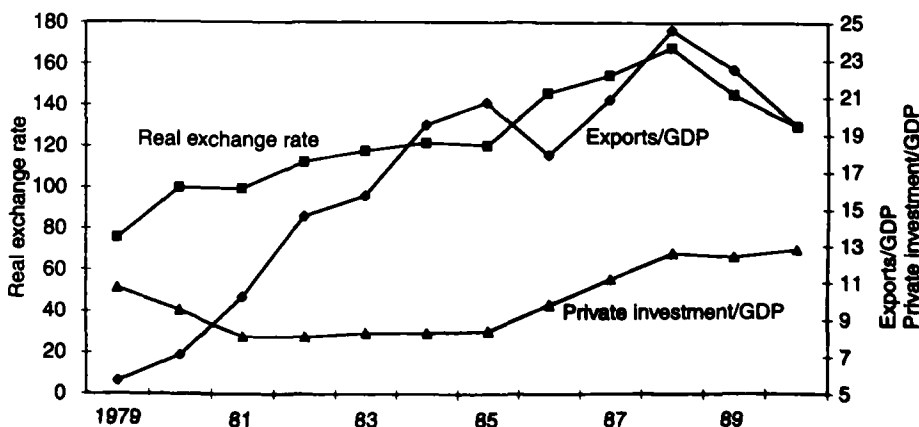


Figure 6. Turkey, 1979–90

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

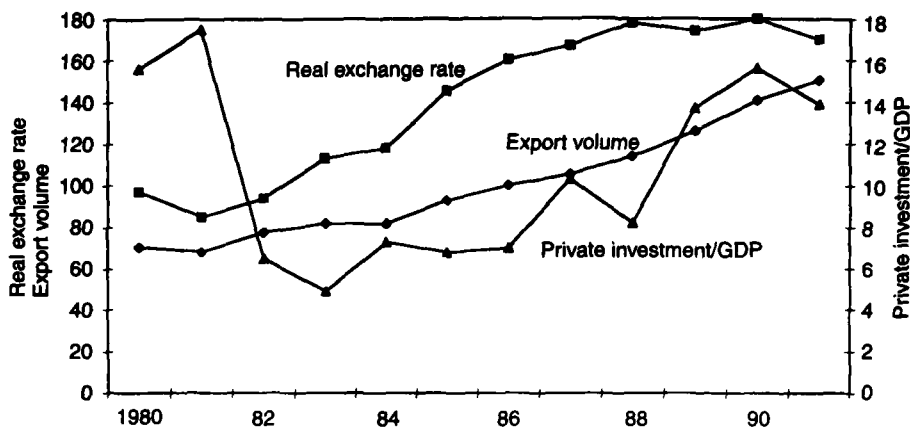


Figure 7. Chile, 1980–91

Source: Bosworth *et al.* (1994).

considerable lag. This is obviously important, in so far 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%), 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 1982–3 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 covary 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.

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 *decline* in the return to capital, and hence reduced investment!

3.3. The contribution of exports

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% of GDP in Korea around 1960, and barely over 10% 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) calculates that export expansion could not have accounted for more than 10% of Korea's growth in 1966–70. Kuo (1983) 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. Of course, 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. 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 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). 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. Productivity spillovers from exports?

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. 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'.

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 favour of productivity spillovers from exports). It is common in this literature to point to correlations between export growth and TFP performance across firms or industries as evidence for technological spillovers. Such correlations obviously say nothing about the direction of causality, if any. The most plausible way to interpret such findings is that firms and industries which are successful in improving their productivity are better able to compete in world markets. Perhaps most 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) 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 rivalled 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 meagre 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 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

Box 1. Endogenous response of exports to an investment boom

The initial levels of consumption and production are represented in Figure 8 by points 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.) The economy's imports and exports 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, following 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 reduction in the price of non-tradables (relative to tradables) to equilibrate the market for non-tradables. The magnitude of the equilibrium real exchange rate depreciation would then depend on the parameters of the model.⁷

⁷ The general case with non-tradables is analysed 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.

by thinking in general equilibrium terms, with a formal illustration provided in Box 1.

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 and Taiwan during the 1960s) has a comparative disadvantage in producing capital goods. The investment boom will require a

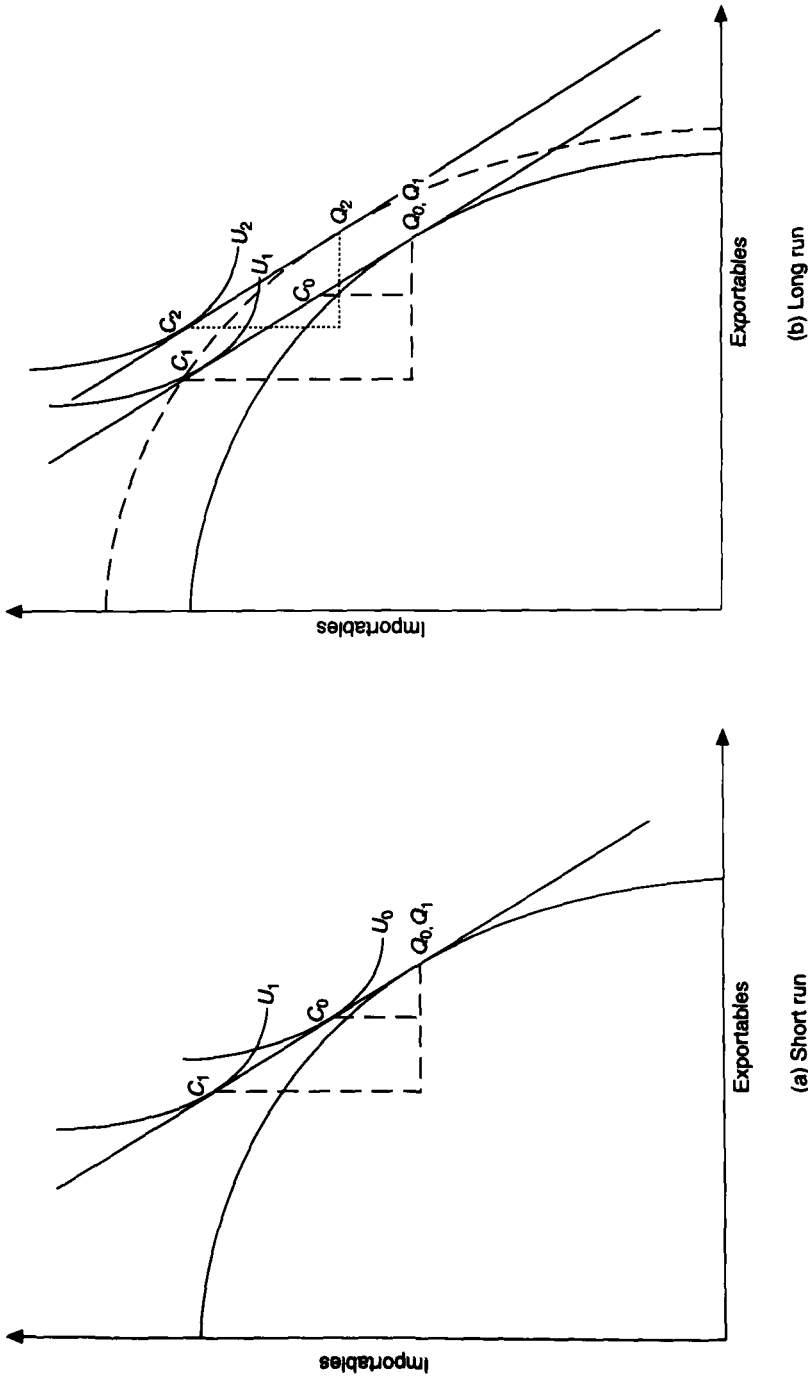


Figure 8. Consequences of an increase in investment demand

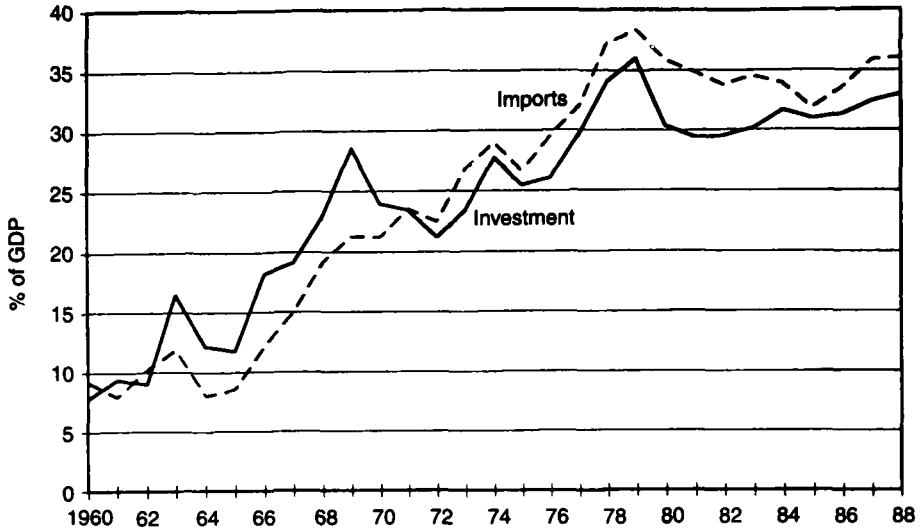


Figure 9. Imports and investment: Korea, 1960-88

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

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

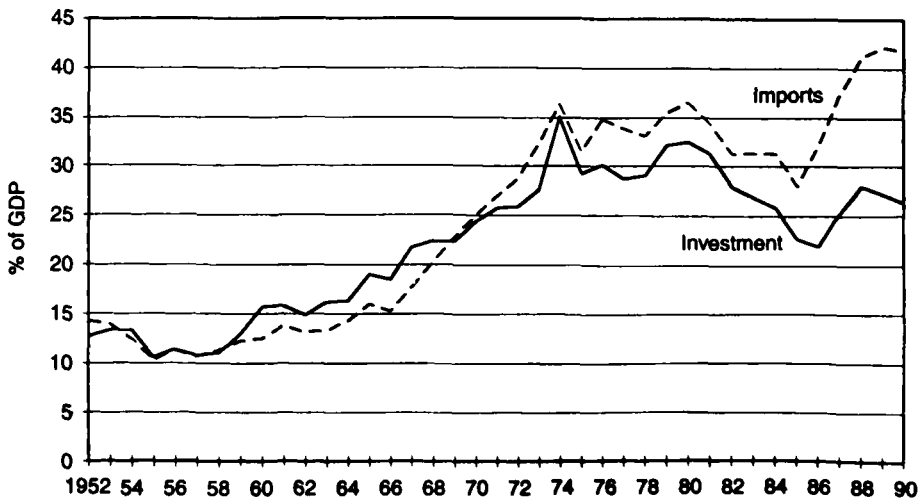


Figure 10. Imports and investment: Taiwan, 1952-90

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

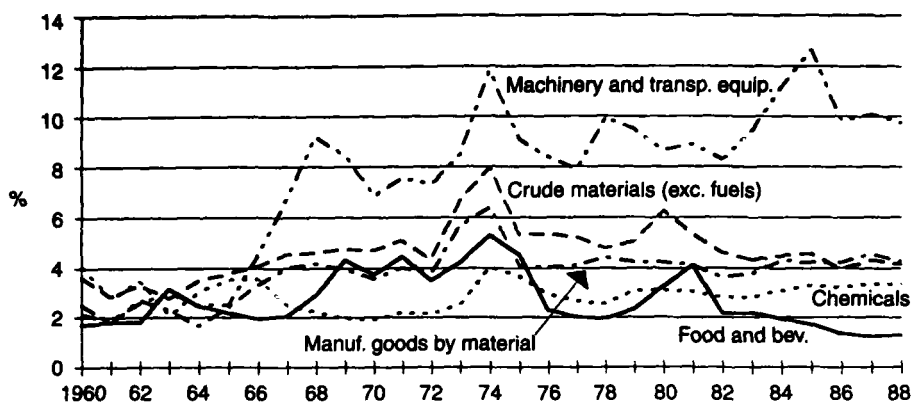


Figure 11. Imports as a share of GDP: Korea, 1960-88

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

ultimate determinant. Ultimately, the reasons for growth must be traced back to reasons why it became profitable to invest.

This story 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

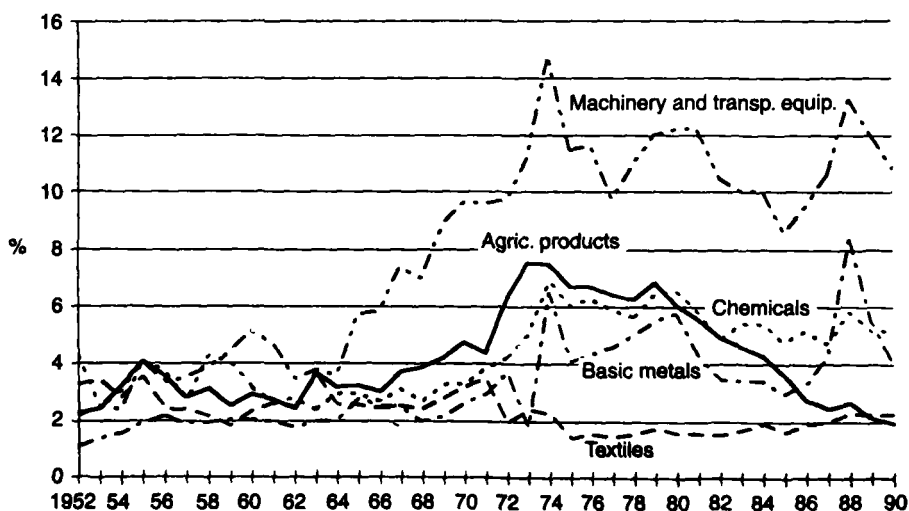


Figure 12. Imports as a share of GDP: Taiwan, 1952-90

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

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.^{8,9}

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 (Kuo, 1983). 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).

3.7. Recapitulation

The proposition that Korea's and Taiwan's economic performance can be ascribed to export orientation faces serious difficulties. The switch towards export-oriented policies cannot 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

⁸ According to Box 1, 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 place in both countries during the 1980s.

⁹ 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 and at the same time explain the rising export-GDP ratio. Bradford (1990), for example, seems to suggest a causal role for investment, but it is unclear as to why the investment was allocated disproportionately in export-oriented sectors.

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. The rest of this paper argues that the explanation has to do with government policies that go considerably beyond export incentives, and that Korea and Taiwan shared some rather special initial conditions that made such government policies possible.

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 socioeconomic 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.

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

Table 3. Socioeconomic development and income

	Index of socioeconomic development, c.1960	Per-capita GNP, 1961 (\$)
South Korea	0.85	73
Taiwan	1.05	145
Brazil	0.79	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.

virtually universal primary school enrolment, while the norm for countries at their income levels stood at around 60% 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 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 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

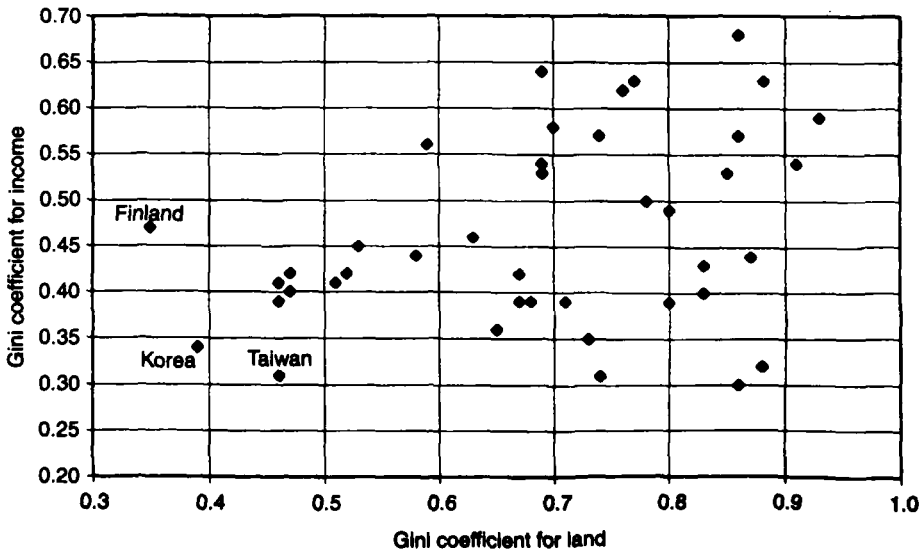


Figure 13. Measures of income and land distribution, c. 1960

Source: Alesina and Rodrik (1994).

Table 5. Growth regressions

Independent variables	Dependent variables			
	Per-capita GDP growth, 1960–85		Investment/GDP, 1960–85	
	(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.

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% of the two countries' growth experience since 1960 can be 'explained' by these initial conditions. When Korea and Taiwan are

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.

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% for Korea and 81% for Taiwan), but still striking. 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 overpredicted) or Brazil (whose growth is vastly underpredicted). Of course, while these results may be interesting, they do not amount to an explanation. We still need a theory on why these initial conditions mattered as much.¹⁰ That is the task of the next section.

5. THE COORDINATION FAILURE INTERPRETATION

5.1. The argument

What we need is an explanation that can account for the main outlines of Korean and Taiwanese economic performance, and which 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.

First, 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.

Second, 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, and 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.

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

Fourth, 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.

¹⁰ 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 meagre natural resources gave these countries a clear comparative advantage in manufactures, allowing them to enjoy both rapid industrialization and rapid trade expansion.

Fifth, 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.

Sixth, 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.

Seventh, as a consequence, 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.

5.2. A framework of analysis

There are two critical claims in this story: (1) both countries were ready for economic take-off by the early to mid-1960s, but economic growth was blocked by a coordination failure; (2) 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. The appendix presents an analytical framework which makes explicit what these prerequisites are. Here I rely on an intuitive exposition of the economic logic.

Imagine a small open economy, initially specializing in the production of traditional goods. Alongside there exists a relatively capital-intensive modern sector, which yields higher factor returns when it is viable. The modern sector relies on specialized inputs (e.g. particular labour skills, technologies, intermediate inputs or capital goods). These inputs share the following features: (1) they require well-educated workers but at low cost; (2) they exhibit scale economies; and (3) they cannot be perfectly traded in international markets. The viability of the modern sector requires the local presence of these inputs, which in turn depends (in part) on the existence of a sufficiently well-educated workforce.

Such an economy is ready for take-off if there is enough skilled labour that the modern sector would be viable if a large enough share of the economy's resources were devoted to producing the specialized inputs. Yet there is no certainty that labour and capital move from the traditional sector to the modern sector, leading to specialization in the latter and to higher incomes. The reason is that, because of scale economies, only a large-scale movement of resources is guaranteed to be profitable. 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.

Coordination failure is least likely to happen when the economy is well endowed with both skilled labour and physical capital, for then 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. 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.

Markets are known to handle resource allocation poorly 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 present framework is more specific about the prerequisites. It highlights the following three prerequisites for a coordination failure to become a serious issue: (1) some degree of non-tradability in the technologies and/or goods associated with the modern sector; (2) economies of scale; (3) a reasonably skilled labour force (but a low endowment of physical capital). The last one clearly applies to the case of Korea and Taiwan. Scale economies are also plausible in many of the modern-sector activities. Hence, non-tradability is the 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. 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 lead to 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, in so far as much of the technological capability is tacit and not explicitly codified in designs and blueprints. As Pack and Westphal (1986) 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.

Some examples drawn from the East Asian experience may help bring these points to life.

5.3. Case studies: Hyundai and Lucky-Goldstar

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 (1989):

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.

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 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 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 in 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 Sakong, 1980).

The chairman of the Lucky-Goldstar group explains the success of his company in this way:

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-moulding 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)

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) report (based on Hong, 1977) steadily rising real rates of return to capital in manufacturing: the range is 9–18% in mid- to late-1950s, 9–26% in 1962–6, 16–38% in 1967–72, and 17–40% after 1972. The rate of profit in manufacturing steadily rose from 9% in 1951–3 to 16% in 1954–6, to 28% in 1957–62, and to 35% in 1963–70 (Hong, 1993, p. 347). Apparently, investment became more profitable as the investment rate rose.¹¹ 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). Interestingly, the greatest increase in profitability in the post-1963 period (outside food, beverages and tobacco) was experienced by public-sector manufacturing. 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) explains the increase in their profits:

The domestic consumption of the output of these non-food 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 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):

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)

¹¹ Little (1994) calculates that the annualized return to investment in Korea was 31.1% during the period 1963–73. However, his calculations also show a reduction in the rate of return subsequently, to 18.3% during 1974–9. He attributes the decline to the HCI drive.

Indeed, Taiwan's Fourth Plan (1965–8) 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 centred 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)

Hence, what these governments 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, policy-makers 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 reorientation 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 rank particularly 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: '[Taiwan's] party elders came to see that economic development could be a better guarantee of the party's survival' (Wade, 1990). Thereafter, the government turned its energies to eliminating many investment-detering distortions (such as multiple exchange rates and macro-

economic 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 is more important at this juncture is that this programme signalled a major shift in government attitudes towards investment: Lin (1973) notes that '[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 focused 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 (Jones and Sakong, 1980). 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. In fact, 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, providing the government with exclusive control over the allocation of investible funds in the economy. 'Allocation of under-priced credit [became] by far the most important single instrument of government microeconomic control' (Jones and Sakong, 1980). Korean firms were highly dependent on external credit, as borrowing made up two-thirds of their cash flow during 1963-74. 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'.

With bank lending rates below market clearing rates, a rationing mechanism was needed. Under the Rhee regime, political motives 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 favoured 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 58% to 72% (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).

Another important manner in which investment was subsidized in Korea was through the socialization of investment risk in selected sectors. 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. '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, 1993). The shipbuilding industry is a good example. Without the personal involvement and encouragement of President Park, Hyundai would not have embarked on 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). 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

Table 7. Size distribution of manufacturing firms: Korea

Number of employees	1966			1971		
	Number of firms	Percentage of workers	Percentage of value added	Number of firms	Percentage of workers	Percentage of value added
5–49	21 013	39.4	24.9	21 045	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).

Table 8. Tax credits and reimbursements as a share of the relevant tax base: Taiwan

Year	Percentage
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).

regulation forcing Korean refineries to ship oil in Korean-owned tankers. 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 favourable terms, and they also served to socialize investment risk. 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) of the prevailing tax credit system for investment. The maximum business income tax paid by enterprises was reduced to 18% of annual income (from a previous maximum of 32.5%); the tax holiday for new investments was extended from three to five years; tax exemption was given to undistributed dividends for reinvestment, to 2% of foreign exchange earnings, and to proceeds of export sales; 'productive' real estate was made either exempt from stamp tax and deed tax, or taxable at reduced rates; and payments of import duties on plant equipment were made deferrable, and payable in instalments 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. (Information in this paragraph is taken from Lin, 1973; and Kuo, 1983.)

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 co-ordination 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 otherwise have made. 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 (1989), '[t]he initiative to enter new 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.'

Wade (1990) describes how Taiwan'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, 1990). (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.

A similar account is given regarding 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 fibre. With much help from US advisors it brought together an American synthetic fibre 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, 1990)

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

Finally, the role of the Taiwanese state was crucial in the early stages of the electronics 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, 1990).

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 – 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'. 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 policy-makers 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 fibres, the last greatly improving the profitability of the overextended 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)

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. A recent account 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' (*The Economist*, 26 November 1994, p. 81). The Okpo shipyard is now 'at the heart of [Korea's] achievement' in shipbuilding.

6.4. Use of public investment and public enterprise

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. In Korea, the government established many new public enterprises in the 1960s and 1970s, particularly in basic industries characterized by a high degree of linkages and scale economies. In both countries, public enterprises were the recipient of favourable 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 seen 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.

Table 9. The importance of public enterprise in GDP and investment (%)

	Year	Public enterprise share of	
		GDP	Capital formation
South Korea	1963-4	6.7	31.2
	1971-2	9.1	21.7
Taiwan	1954-7	11.7	34.3
	1958-61	13.5	38.1
	1962-5	14.1	27.7
	1966-9	13.6	28.0
	1970-3	13.3	30.5
	1974-7	13.6	35.0
India	1966-9	6.5	29.6
Tanzania	1970-3	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'. 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). 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 railway line). In addition, the government supported downstream industries to ensure demand for POSCO's production. POSCO eventually became, by the World Bank's reckoning, 'arguably the world's most efficient producer of steel' (cited in Wade, 1990), 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 to 75%.

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 labour, 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 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 from the push and pull of daily politics. Economic laws and regulations could be written by technocratic élites, 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). An example 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. 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 scepticism.

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.

This section addresses some of the more common reasons for scepticism.

8.1. Can we really distinguish between export and investment strategies?

One objection is that the distinction between a trade-oriented strategy and investment policies is too sharp, that these governments were preoccupied with both exports and investment. It is argued that the potential 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 probably 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.¹² However, none of this is very helpful in understanding what made these countries take off. An adequate analysis has to confront the questions:

¹² However, 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.

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?

Investment-led growth irresistibly invites comparison with the Soviet Union and other Soviet-type economies. Doesn't this experience show that accumulation is far from enough for sustained growth? 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.

Overlooking Soviet-type economies, the causal relationship between 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

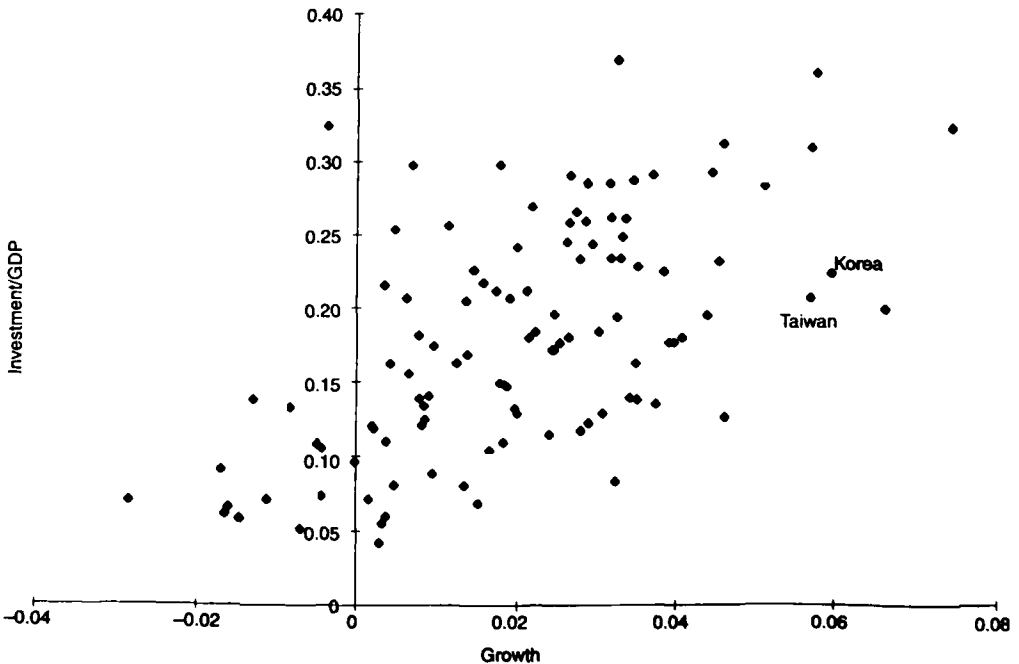


Figure 14. Relationship between growth and investment, 1960–85

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 already noted, 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. Traditional arguments against it abound. The 'big push' ideas of the 1950s have led nowhere. How is it possible for governments to 'pick the winners'? And 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 a 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 locating the evidence to support a particular theory. The 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.¹³

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% (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

¹³ 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.

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?

Recent theories of growth show that an initial imbalance between human and physical capital speeds up growth (Mulligan and Sala-i-Martin, 1993). That growth is higher in economies where human capital is large relative to physical capital holds even in the absence of increasing returns to scale or other possible market failures. This applies well to South Korea and Taiwan, and perhaps we do not need the role of government policy to explain fast growth in these two countries.

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.

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

*1960-85.

Source: Same as Table 4.

9. CONCLUDING REMARKS

The role of government policy in Korea and Taiwan is open to diverse interpretations. In principle, one could argue in favour of any of the following propositions:¹⁴ (1) government policy was a hindrance, but these countries

¹⁴ With thanks to Gene Grossman, for laying out these different positions. I am borrowing his wording here.

overcame it nonetheless; (2) it was irrelevant, not helping growth but not hindering it either; (3) it was helpful, though not essential (that is, it speeded up a process which would have happened anyway); (4) it was necessary for the growth experience of these countries. Propositions (1), (2) and (3) 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 which 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 best be 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 in so far as they enabled a steady rise in imported capital goods. But 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.

Discussion

Gene Grossman

Woodrow Wilson School, Princeton University

It is always a pleasure to read one of Dani Rodrik's papers. They are clear, well organized and well argued. And they are always provocative.

This paper is no exception. Dani challenges the view that trade policy 'explains' the success of South Korea and Taiwan. In fact, he takes the orthodoxy head on, and tries to demolish it entirely. Export orientation could not deserve pride of place in these stories, he argues, because: the timing of the export booms was not

right to account for the growth experiences; the changes in relative prices were not large enough to have such a dramatic effect on growth performance; export orientation itself has no obvious implications for the rate of investment, which surely shot up in both countries and evidently played a major role in spurring growth; and there is no real evidence of productivity spillovers from export activities to the rest of the economy. For each of these arguments, Dani musters empirical evidence from the raw data and by referring to the studies of others.

Having disposed of the traditional explanation, Dani sets out to build a new one to replace it. He argues that Korea and Taiwan had (1) favourable initial conditions thanks to the high levels of human capital in their labour forces and the relative equality in their income distributions, and (2) good policy, which overcame a coordination failure that otherwise would have impeded investment in the modern industrial sector. He lays out a theoretical structure (informally in the text, more formally in the appendix) that explains how such a coordination failure could arise, how the preconditions for its existence are consistent with the initial conditions that prevailed in these countries in the late 1950s, and how government policy could in principle be used to overcome the market failure. Finally, he discusses the policies that were actually used, argues that their intended purpose in the eyes of the policy-makers was exactly the one suggested by the theory, and shows that the evidence is at least consistent with the view that they were successfully implemented.

I find the rejection of the export-led growth story to be rather convincing. How could the trade sector have been the driving force? What was the exogenous change? The relative price changes were surely too small to affect such a large movement in resources. And even if productivity in the exportable sector improved dramatically, this sector was much too small to begin with to generate a large boost in the growth rate.

Barro and Lee (1993) provide additional corroborating evidence. They estimate a relationship between growth in per-capita income and a number of country-specific variables for the decades from 1965 to 1975 and 1975 to 1985. These regressions, which use data for 85 countries in the first period and 95 in the second, are similar to those reported by Rodrik in his Table 5, except that the list of regressors is different. Barro and Lee use as explanatory variables: the beginning of period log of real GDP per capita; measures of educational attainment by males and females (entered separately); the log of life expectancy; the investment/GDP ratio; the ratio of government consumption to real GDP less the ratio of nominal spending on defence and non-capital expenditures on education to GDP; the log of (one plus) the black market premium on foreign exchange; and the average number of successful and unsuccessful revolutions per year. Recognizing the possible endogeneity of many of these regressors, Barro and Lee estimate their growth relationship using instrumental variable techniques. Note that the black market premium here is intended as a proxy for the size of market distortions.

Table 11. Sources of growth in Korea and Taiwan

	Korea		Taiwan	
	1965-75	1975-85	1965-75	1975-85
Net convergence effect	0.028	0.023	0.026	0.017
Investment/GDP ratio	0.002	0.008	0.003	0.008
Government consumption	0.007	0.014	-0.008	-0.003
Black market premium	0.001	0.005	0.003	0.006
Number of revolutions	-0.003	-0.003	0.002	0.002
Fitted value	0.081	0.061	0.060	0.040
Actual per-capita growth	0.078	0.063	0.061	0.057

Note: Contributions to per-capita GDP growth measured as deviations from sample means.

Source: Barro and Lee (1993) and additional calculations by Robert Barro.

Using the estimated coefficients from the growth regression, Barro and Lee can decompose a country's growth experience into its proximate 'sources'. Table 11 shows the results of this decomposition for Korea and Taiwan.¹⁵ The table shows the contribution of each variable to the fitted growth rate of real per-capita GDP, expressed relative to the sample mean for all countries. The 'net convergence effect' is the combined impact from the initial values of log (GDP), male and female educational attainment, and log (life expectancy); it corresponds roughly to what Dani terms 'the initial conditions'.

The table shows that, with the possible exception of Taiwan in the period from 1975 to 1985, the short list of regressors 'explains' most of these two countries' growth experience; perhaps there is no 'miracle' here. Moreover, the biggest contribution to growth comes from the 'net convergence effect', i.e. the fact that these countries had low initial per-capita GDP levels, but high initial levels of human capital per worker (and thus, by implication, low initial physical capital to worker ratios). The relatively modest levels of government consumption also seemed to play a role. Apparently, the elimination of price distortions, to the extent that this is captured in the change in the black market premium, is not a big part of the story.

The argument that there existed coordination failures that inhibited investment in the modern manufacturing sectors in Korea and Taiwan until the government intervened to overcome them is intriguing, but requires further elaboration and empirical investigation. I am not sure how one would definitively establish the existence of a coordination failure, let alone the potential for one in a counterfactual world where government policy was different. I am naturally

¹⁵ The Barro and Lee paper does not report the decomposition for individual countries. The table here is based on calculations performed by Robert Barro, to whom I am grateful.

inclined to be suspicious of any argument that says, 'there are important non-traded inputs that are critical to an entire sector's being whose production entails such substantial scale economies that profitability requires a very large *local* market'. But this suspicion is nothing more than the usual suspicion economists have when reference is made to unmeasured, and perhaps unmeasurable, externalities.

Dani briefly addresses the possibility that the experiences of Korea and Taiwan could be explained by a much simpler story, such as the one told by Mulligan and Sala-i-Martin (1993). These authors investigate an endogenous growth model where the production technology for final output is homogeneous of degree one in physical and human capital, but there are no non-convexities or multiple equilibria. Mulligan and Sala-i-Martin show that in the transition phase, the growth rate rises with the magnitude of the gap between the ratio of physical to human capital and its steady-state value. This 'imbalance effect' arises from the fact that gross rates of investment in each type of capital must be non-negative. Dani rejects this possible alternative explanation because it would have also predicted 'miraculous' performances in countries like the Dominican Republic and the Philippines. This is true, but on the other hand, the alternative may be somewhat more consonant with the results reported in Table 1. The table shows that, after taking account of the initial high levels of human capital accompanied by the initial low levels of real GDP, the high ratios of investment to GDP in these countries apparently did not contribute much extra to growth. I would guess that the 'imbalance effect', even if not the entire story, is an important part of it.

I would also draw attention to the recent argument put forward by Ventura (1994), which seems relevant as well. Ventura notes that in an integrated world economy, small countries like Korea and Taiwan can accumulate capital at very high rates for long periods of time without driving down the marginal product of capital, because they can continually reallocate resources among sectors with different factor intensities. In this context, he shows, a small country that is a little more patient than others can have dramatically faster capital accumulation and superior growth performance for a prolonged period, until it eventually ceases to be small.

In the concluding section of his paper, Dani lists the various roles that government policy might have played in the Korean and Taiwanese experience. My own personal assessment (which has a large standard error) is described by (3): I suspect that the governments of Korea and Taiwan implemented wise policies that speeded up a process that would have happened anyway. But Dani dismisses this view with reference to the 1950s: if it would have happened, why did it not start sooner? In one sense he is surely right. Governments can always find policies that will interfere with growth, and Korea and Taiwan probably had such policies in place in the early post-war period. So, by removing the impediments, the change in government policy made growth possible. What I wonder is whether the

targeted industrial policies, such as the selective investment subsidies, the direct coordination of investment decisions, and the strategic use of public enterprises, were necessary for the successful performance. I suspect not, but I really do not know the answer. Dani's paper highlights this question; future researchers will surely be inspired by his challenge to provide definitive answers.

Victor Norman

Norwegian School of Economics and Business Administration

There are two main arguments in this paper. One is that the success of South Korea and Taiwan had little to do with export orientation. The other is that government intervention, to overcome a coordination failure, had a lot to do with their success. The arguments are linked, but it is useful to consider the two separately.

Export orientation and growth

To a traditional trade theorist, the idea of export-led growth might be comforting and politically appealing, but intellectually puzzling. If growth stems from a growing resource base or better technology, there is no obvious link between trade and growth, except in so far as a static gain from trade, by producing higher income, could give higher savings. And even that link is weak, since the gain from trade is a permanent one, with a correspondingly low marginal propensity to save.

In that perspective, it is not Rodrik's argument which is surprising. The surprising assertion is the conventional one that Korea and Taiwan (and a number of other countries) have taken off industrially through large-scale exports.

A puzzle remains, however. Why is the belief in exports as a source of growth so persistent? And why is a strong correlation between export orientation and growth apparently observed in so many countries?

The answer is, I think, that there are good reasons to expect – at least for small countries – a strong correlation between exports and growth, even in the absence of a simple causality between the two. The correlation derives from perhaps the oldest observations in economic theory: namely, Adam Smith's assertion that the division of labour is limited by the extent of the market. If there are economies of scale – internal or external to firms – efficient production is only possible if there is access to markets of sufficient size. In countries such as South Korea and Taiwan, that simply was not the case. To take one of Rodrik's own examples: the Korean shipbuilding industry has a world market share of 25%, and much of its efficiency derives from its scale. Three firms (Hyundai, Daewoo and Samsung) account for 93% of production; and Hyundai alone builds 10% of all new tonnage in the world (Nagatsuka, 1994). Clearly, production units of this size could not have been developed on the basis of the internal Korean market for transport equipment.

In the Adam Smith view then, market size is a prerequisite for growth. It is not the *cause* of growth, however. Access to large markets is of no help unless the internal conditions, such as the quality of the labour force, market infrastructure, savings, etc., are right. The point is simply that internal conditions are not sufficient, unless the market is large enough. That may explain why exports and growth are strongly correlated for small countries, while countries such as Germany and the USA could combine industrialization with protection.

Rodrik suggests an entirely different explanation for the correlation between exports and growth – that growth generated import demand, which in turn generated exports. That cannot be correct. As shown in Rodrik's Figures 4 and 11 (for Korea) and 5 and 12 (for Taiwan), the export boom preceded the import boom. For Korea, for example, the ratio of exports to GDP trebled from the early to the mid-1960s – from a level of around 2% to 6% in 1965, and roughly 7% in 1966–7. Imports of capital goods, on the other hand, did not take off until the second half of the decade. They amounted to between 2 and 4% of GDP from 1960 to 1966, then rose to around 7% in 1967 and more than 9% in 1968. It takes exceptional belief in the foresight of policy-makers if this is to be seen as consistent with the view that 'thanks to appropriate macroeconomic and exchange rate policies, export supply was adequate to meet the increase in import demand, and rose alongside imports'.

Investment and coordination

If my interpretation of the role of exports is correct, it is easier to accept the rest of Rodrik's story. There could well have been a coordination failure which prevented industrial take-off and rapid export growth in the 1950s, and it might be that government intervention to overcome the failure was important. One should ask, however, why he argues for a complex intervention story (direct intervention to overcome a coordination failure) when a simple one – a high saving and investment rate – suffices. As he demonstrates, in the 1960s the rate of investment rose sharply in both South Korea and Taiwan. He also shows that saving by publicly owned firms was a major source of higher investment. In Korea, for example, public enterprises in 1963–4 accounted for 31.2% of capital formation, while only contributing 6.7% of GDP. Furthermore, the governments in the two countries stimulated private savings and investment through credit subsidies and tax incentives. One can argue that these measures were sufficient to initiate a self-reinforcing process of industrialization. In fact, in Rodrik's own model they would be sufficient. Why then add a less convincing story about government coordination of investment projects?

The complex story is particularly puzzling when contrasted with the examples cited. Rodrik cites Jones and Sakong, who argue that the Korean government had a 'coherent set of preferences' for public enterprises, favouring industries with

'high forward linkages, high capital intensity, large size, output-market concentration, and production of non-tradables or import substitutes rather than exports'. He then takes the steel mill POSCO as an example, saying that it is instructive, but not representative. The examples of *private* firms that he cites are also curious relative to the stated government preferences. He makes a point of government promotion of shipbuilding, which has no forward linkages, is labour intensive, sells in an almost perfectly competitive market, and is export oriented. The other Korean example, the Lucky-Goldstar group, was successively in cosmetics, plastics, telecommunications, oil refining, tanker shipping and insurance. How that fits in with the 'clear government preferences' is unclear to me. The story could be made consistent if the private firms were dependent on inputs from public enterprises with the Jones-Sakong characteristics; but that is equally unclear in the Hyundai and Lucky-Goldstar cases – Korean shipbuilders, for example, import steel and main engines from Japan or Western Europe.

A central part of Rodrik's explanation is that successful government intervention was possible in South Korea and Taiwan because the governments were insulated from pressure groups. He then describes President Park, pointing out that he spent a lot of time on economic matters and supported growth-oriented bureaucrats and businessmen. To me, that does not sound like insulation from pressure groups. On the contrary, policy-makers who are insulated from public opinion, and who depend on a small group of 'prominent' associates, must be prime candidates for regulatory capture. Did Edward IV control the Woodvilles? Was the military-industrial complex in the USA easier to control before it came under public scrutiny?

The assertion of successful industrial policies in South Korea and Taiwan to me remains unproven.

General discussion

Several Panel members wondered under exactly which conditions the results claimed by Rodrik would obtain. Thus there were discussions about whether it was a story about two sectors (one backward, one modern) or about capital accumulation. The role of human capital was often explicitly mentioned.

In establishing a favourable climate for investment, George Alogoskoufis pointed out, the political regime is important. It is essential to have a regime that guarantees that there will not be expropriation. David Begg made a similar point regarding the role of the exchange regime, including restrictions to capital movements, and the risk of partial expropriation through devaluation and inflation as well as limits to where to hold incomes from profit. Mathias Dewatripont stressed the importance of the initial distribution of wealth, which is one of the preconditions listed by Rodrik. Unequal distribution of wealth may create pressure

for redistribution and thereby discourage investment. He also wondered whether the more recently successful Asian countries had followed the same pattern of growth and government intervention, or whether South Korea and Taiwan are exceptions.

Hans-Werner Sinn thought that the paper dismissed too quickly the Hecksher–Ohlin theory. He observed that this theory is compatible with the stylized facts used by Rodrik. If the economy starts from a situation where only the labour-intensive commodity is produced, then allowing capital movements immediately triggers capital inflows. These inflows have nothing to do with government intervention; they simply reflect natural scarcities.

Assaf Razin raised another issue. He questioned the treatment of relative prices of exports as exogenous. On the contrary, he expected that a push for exports would lead to an exchange rate appreciation. Dani Rodrik responded that it is possible to treat that relative price as exogenous as long as it is acceptable to treat Korea as a small country with no market power. Inderjit Singh wondered about the role of the size of military spending. He noted that a country with less military expenses should perform better. He also thought that the paper should have looked at the importance of the homogeneity of society. Much as with equality, a homogeneous society is often characterized by less social conflict. Alessandra Casella questioned measures used to evaluate equality. She further asked whether the policy which had been carried out had increased inequality.

Xavier Vives drew a parallel with Japan. In this case, he felt that the coordination of investment had indeed been important, as stressed by Rodrik. Yet, in his view, the role of public subsidies has been mostly symbolic as their size has been quite modest. He was seconded by Michel Keen, who asked Rodrik to provide more information on the size of investment subsidies.

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 labour-intensive good, requiring labour 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 labour and under increasing returns to scale. Intermediate-good production is assumed to be intensive in labour 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 workforce (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:

$$\mu(z) = \frac{\sigma}{\sigma - 1} \quad (\text{A1})$$

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 labour. 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:

$$\theta(w, r) \geq 1, Y \geq 0, Y[\theta(w, r) - 1] = 0 \quad (\text{A2})$$

$$\phi(r, pn^{-1/(\sigma-1)}) \geq \pi, X \geq 0, X[\phi(r, pn^{-1/(\sigma-1)}) - \pi] = 0 \quad (\text{A3})$$

$$w\lambda(h)c(z) \geq p, z \geq 0, z[w\lambda(h)c(z) - p] = 0 \quad (\text{A4})$$

$$\theta_w(w, r)Y + \lambda(h)c(z)nz = L \quad (\text{A5})$$

$$\phi_r(w, r)Y + \phi_r(r, pn^{-1/(\sigma-1)})X = K \quad (\text{A6})$$

$$\phi_p(r, pn^{-1/(\sigma-1)})X = nz \quad (\text{A7})$$

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 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 labour 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: (1) as just explained, the modern sector produces higher incomes and can pay out higher factor returns; and (2) the modern sector is capital intensive. Government policies that push resources into the modern sector will improve resource allocation as well as increasing the return to capital. These results form the basis of the argument in the text.

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