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East Asian Growth Before and After the Crisis

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Abstract

This paper surveys the literature on the growth performance of the east Asian economies in recent decades, evaluates the sustainability of that performance, and provides a preliminary assessment of their long-term growth prospects in the aftermath of the current crisis. It highlights three special aspects of east Asian growth: unusually high factor accumulation, a favorable demographic transition, and the impact of rapid growth on financial and other institutions. The paper argues that there are downside risks to the east Asian "developmental state" model, despite its favorable attributes, and that an alternative model may become more attractive as these economies mature.

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SUMMARY

Against the background of the current crisis, this paper surveys the literature on the growth performance of the east Asian economies in recent decades, particularly in comparison to the post-World War II "Golden Age" of economic growth in western Europe, and examines the controversy concerning the sustainability of the east Asian "developmental state" model and growth performance. It also assesses the scope for further catch-up in income per capita for the east Asian economies in comparison to the industrial countries, given the relative levels and underlying growth of factor intensity and total factor productivity (TFP) prior to the crisis, and makes a preliminary assessment of how the prospects for the east Asian economies may have changed in the aftermath of the financial crisis.

The paper highlights three special aspects of east Asian growth. First, factor accumulation in east Asia has been much more important than TFP growth, especially in comparison to the European Golden Age. However, although high investment has been a striking achievement of the policies adopted by the countries in the region with regard to both physical and human capital, productivity performance has been stronger than has been allowed by the most strident critics of the east Asian growth experience. Second, the changing population profile in east Asia has given an added boost to economic growth during recent decades, as these countries experienced a temporary demographic advantage of rising labor force participation. Third, development in many of these countries has taken place rapidly from an initial position of "economic backwardness" and this has generated its own legacy of financial and other institutions, with both positive and negative implications for future growth prospects. In particular, the crisis seems to owe a great deal to the weaknesses in financial systems, reflected in overborrowing and excessive investment together with inadequate regulatory responses.

Based on this analysis, the paper argues that despite its favorable attributes—such as effective mechanisms for technology transfer, outward orientation, and high savings, investment, and human capital accumulation—there are downsides to the east Asian "developmental state" model. These include a tendency to wasteful investment and the difficulties that the strategy may pose for the transition to freer capital markets. The latter are more attractive after the initial phase of development when coordination problems loom much less large and diminishing returns are a bigger threat. Because the greatest successes of this managed development approach have tended to come in the context of export-oriented manufacturing and industrialization, the paper concludes that an alternate model may be more appealing in the coming years of deindustrialization.

I. Introduction

Against the background of the Asian financial crisis, this paper offers a survey that may help to inform responses to the following questions—which are far too ambitious to admit of a full answer at this time.

- What was special about east Asian growth in recent decades?
- What does the financial crisis reveal about east Asian growth?
- Has the 'developmental state' Asian model outlived its usefulness?

Obviously, there are enormous differences between the countries of the region to which this paper cannot do justice and it certainly has more to say about Korea than Hong Kong SAR. The argument that is developed is a view from the outside using insights from applied growth economics and European economic history rather than intimate knowledge of the region.

II. Overview of Catch-Up Growth in East Asia and Western Europe

The historical record strongly suggests that really rapid growth of real GDP per person is confined to cases where countries that initially lag behind the leaders in terms of income and productivity levels go through a phase of catching up. Outside such periods growth of per capita income does not typically exceed about 3 percent per year. The end of rapid catch-up growth therefore entails a deceleration in economic growth. Krugman stressed well before the recent Asian crisis that this would happen quite soon to the "Tiger Economies" as growth in east Asia would run into diminishing returns (1994, pp. 77-8). Although this outlook is broadly plausible, I shall argue that forecasting the dimensions and timing of such growth slowdowns is rather difficult.

Two epochs in which remarkable catch-up growth was experienced were the early post-World War II decades in western Europe and Japan through the mid 1970s and the last thirty years or so in several other countries in east Asia. The 'Golden Age' saw western European real output per hour worked grow at 4.7 per cent per year between 1950 and 1973, much faster than before or since (Crafts and Toniolo, 1996, p.2), while east Asia enjoyed average growth of real GDP per person at 4.6 per year from 1960 through the mid-1990s (Collins and Bosworth, 1996, p. 136). Details of the growth rates and output levels achieved by individual countries are shown in Tables 1 and 2. This section both examines some common features of these episodes and also points to some contrasts between the Asian and European cases.

Table 1. Real GDP/Person in 1950, 1973 and 1996
(Constant prices based on PPP exchange rates—1990 international dollars)

1950		1973		1996	
Switzerland	8939	Switzerland	17953	Norway	22256
United Kingdom	6847	Sweden	13494	Switzerland	20252
Sweden	6738	Denmark	13416	Denmark	19803
Denmark	6683	West Germany	13152	West Germany	19622
Netherlands	5850	France	12940	Netherlands	18504
Norway	5403	Netherlands	12763	France	18207
Belginm	5346	United Kingdom	11992	Austria	17951
France	5221	Belgium	11905	Belgium	17756
West Germany	4281	Austria	11308	Sweden	17566
Finland	4131	Finland	10768	United Kingdom	17326
Austria	3731	Italy	10409	Italy	16814
Italy	3425	Norway	10229	Finland	15864
Ireland	3325	Spain	8739	Ireland	15820
Spain	2397	Greeee	7779	Spain	13132
Portugal	2132	Portugal	7568	Portugal	12015
Greece	1951	Ireland	7023	Greece	10950
Singapore	2038	Japan	11017	Hong Kong SAR	21201
Hong Kong SAR	1962	Hong Kong SAR	6768	Singapore	20983
Japan	1873	Singapore	5412	Japan	19582
Malaysia	1696	Taiwan Prov. of China	3669	Taiwan Prov. of China.	14222
Philippines	1293	Malaysia	3167	Korea	12874
Taiwan Prov. of China	922	Korea	2840	Malaysia	7764
Korea	876	Philippines	1956	Thailand	6112
Indonesia	874	Thailand	1750	China	4551
Thailand	848	Indonesia	1538	Indonesia	3464
China	614	China	1186	Philippines	2369
United States	9573	United States	16607	United States	23719

Sources: Maddison (1995) (1997) updated using Asian Development Bank (1997).

Table 2. Growth Rates of Real GDP/Person
(Percent per year)

	1950-73			1973-96	
	Initial Income	Growth		Initial Income	Growth
Switzerland	8939	3.1	Switzerland	17953	0.5
United Kingdom	6847	2.5	Sweden	13494	1.2
Sweden	6738	3.1	Denmark	13416	1.7
Denmark	6683	3.1	West Germany	13152	1.8
Netherlands	5850	3.4	France	12940	1.5
Norway	5403	3.2	Netherlands	12763	1.6
Belgium	5346	3.5	United Kingdom	11992	1.6
France	5221	4.0	Belgium	11905	1.8
West Germany	4281	5.0	Austria	11308	2.0
Finland	4131	4.3	Finland	10768	1.7
Austria	3731	4.9	Italy	10409	2.1
Italy	3425	5.0	Norway	10229	3.4
Ireland	3325	3.1	Spain	8739	1.8
Spain	2397	5.8	Greece	7779	1.5
Portugal	2132	5.7	Portugal	7568	2.0
Greece	1951	6.2	Ireland	7023	3.6
Singapore	2038	4.3	Japan	11017	2.5
Hong Kong SAR	1962	5.5	Hong Kong SAR	6768	5.1
Japan	1873	8.0	Singapore	5412	6.1
Malaysia	1696	2.8	Taiwan Province of China	3669	6.1
Philippines	1293	1.8	Malaysia	3167	4.0
Taiwan Province of China	922	6.2	Korea	2840	6.8
Korea	876	5.2	Philippines	1956	0.8
Indonesia	874	2.5	Thailand	1750	5.6
Thailand	848	3.2	Indonesia	1538	3.6
China	614	2.9	China	1186	6.0
United States	9573	2.4	United States	16607	1.6

Sources: Maddison (1995) (1997) updated using Asian Development Bank (1997).

It is important to distinguish two aspects of the reduction in labor productivity gaps that is characteristic of the catch-up process. One way in which shortfalls in output per worker will diminish is through reductions and ultimate elimination of shortfalls in human and physical capital per worker. This is the familiar process envisaged by traditional neoclassical models of growth in which the transition to the steady state is characterized by a temporary period of rapid growth. During this period, diminishing returns to investment gradually intensify. A second possibility is that the labor productivity gap stems from an inferior level of total factor productivity (TFP) reflecting some combination of lags in technological knowledge and/or the diffusion of technology, inefficient allocation of resources and inability to achieve economies of scale. This is ruled out by assumption in the Solow or Augmented Solow growth models but has always loomed large in the growth accounting literature on why growth rates differ (van Ark and Crafts, 1996). Historical experiences of catch-up typically involve both aspects but not necessarily in the same proportions.

There has been a great deal of econometric investigation of international cross-sections of growth since 1960. A general finding is that growth rates are inversely related to initial income levels provided that enough other exploratory variables are included. Barro (1997) provides a nice introduction by someone who has been a central figure in this literature and whose successive specifications reflect the growing sophistication of this approach. This should not, however, be taken necessarily to indicate support either for some variant of the neoclassical growth model or for the hypothesis that income levels will eventually converge either to the same level or vary only according to the capital intensity of production in the steady state. As further analysis of these large international data sets has proceeded, two important points have emerged:

- that the neoclassical assumption of a universal technology is quite probably false

- that if, in general, there are obstacles to technological diffusion, then should the costs of technology transfer fall there may be periods of catching-up even where the underlying growth process is endogenous and long-run growth rates show no tendency to equalize across countries (Sala-I-Martin, 1994).

The Augmented-Solow model based on a production function $Y = AK^{\alpha}H^{\beta}L^{\gamma}$ with constant returns to scale has been seen as a good first approximation to international growth experience (Mankiw et al., 1992). There certainly does seem to be strong support for the proposition that there are diminishing returns to physical investment as this model would claim (Oulton and Young, 1996). Nevertheless, it seems unlikely that the view of one of these authors (Mankiw, 1995) that the neoclassical assumption of universal availability and

application of technological knowledge is also valid can be sustained. A closer look at the data even for the OECD countries suggests that a number of the implications of the Augmented-Solow model are invalid.

First, tests based on time-series econometric methods have rejected both the strong form of convergence that long term forecasts of differences in output per person for OECD countries tend to zero and also the weaker version that long run forecasts of output per person are proportional with a single long term trend for all advanced countries (Bernard and Durlauf, 1995; Mills and Crafts, 1998). Second, Milbourne (1995) devised a test of the restrictions implied by the pure Augmented-Solow model with no technological catching-up and applied to the OECD post-1960; he found that the restrictions were easily rejected by the data and that about half of catch-up among the OECD could be attributed to reductions in the TFP gap with the U.S. Finally, Islam (1995) re-examined the Mankiw et al (1992) results using panel data methods and found that country-specific effects are substantial; his results imply that TFP in the U.S. was 27.5 but Italy only 16.2 and New Zealand 10.5 times the level of the lowest country in the world in 1985.

Where catch-up growth has involved reductions in the TFP gap, it would be wrong to attribute this simply to technology transfer, although this certainly does play a part according to economic historians. For example, Nelson and Wright (1992) document the conditions (market integration, spread of multinational companies, enhanced human capital formation in Europe), that made accelerated technology transfer so prominent a feature of the European Golden Age. At the same time, however, a substantial part of the European TFP growth in the period seems to have reflected improvements in the allocation of resources and economies of scale in the halcyon era of Fordist mass production (Maddison, 1991). In the case of Italy, where TFP growth was very rapid, a careful econometric study allowing for quasi-fixed factors of production, market power and economies of scale found that only one sixth of TFP growth was attributable to technological change (Rossi and Toniolo, 1991).

The upshot of this work is to suggest that countries will vary both in the extent to which they catch up and the speed with which they reduce productivity gaps. This will reflect not only differences in rates of investment in physical and human capital but also the effectiveness of their assimilation of technological opportunities. Growth projections based on the convergence properties of a neoclassical growth model will be unreliable. Indeed it is noticeable from Tables 1 and 2 that European growth slowed down and catching-up vis-à-vis the U.S. virtually ceased in the 1970s well before the gap in income per person had fully closed. Indeed, given that steady-state income levels may be country-specific, it is hard to be confident about medium term growth forecasts in fast-growing latecomer economies—as the case of Japan in the 1970s underlines, cf the projections based on growth accounting techniques in Denison and Chung (1976, p. 126).

The doyen of economic historians writing on this topic, Abramovitz (1986) argued that these differences in the experience of catch-up growth would reflect what he termed

"social capability", of which the standard of education is an important component. In this view, human capital operates in the catch-up process not so much as a factor of production in the Augmented-Solow sense but as a determinant of the rate of change of TFP and ultimate level of TFP through catching-up. Econometric support for this formulation is found in the cross-section growth regression literature in the influential papers by Benhabib and Spiegel (1994) and Islam (1995).

Social capability, however, clearly involves much more than education. Abramovitz himself stressed the role of institutions and the incentive structures to which they give rise. At one level, this involves rent-seeking, the political process and the ability of vested interests to thwart modernization of the economy rather like the sclerotic tendencies highlighted by Olson (1982). More fundamentally, the appropriation of profits is central to investment and efforts to reduce costs through innovation. This suggests the importance of political and institutional structures which permit strong yet restrained and predictable government (Weingast, 1995). In particular, government needs to be able to protect property rights and enforce contracts but to refrain from expropriation, repudiation of its obligations and capricious behavior. Recent work in the cross-section growth regressions literature offers strong support for this claim using measures of institutional quality based on the International Country Risk Guide (ICRG) (Barro, 1997; Knack and Keefer, 1995).

It might be argued that central aspects of social capability concern the climate for investment and the supply of finance. A key requirement is that transactions costs are kept reasonably low and that entrepreneurs are not deterred from investing in fixed costs by opportunism and "hold-up" problems. At the same time, capital market institutions need to be able to allocate resources efficiently, to monitor borrowers effectively and to reduce obstacles to financing investment arising from asymmetric information (Levine, 1996).

In most respects, western Europe generally had already established a political, legal, and financial infrastructure capable of supporting rapid economic growth in the late nineteenth and early twentieth centuries. In the postwar European context, the remaining step taken to reduce "hold-up" problems involved the achievement of unprecedented agreements between employers and organized labor which could create a commitment technology for good behavior by both sides in the form of wage moderation in exchange for high investment (Eichengreen, 1996). Countries which were less successful in this endeavor, such as the U.K., ended up with structures of industrial relations that reduced their relative effectiveness in pursuing rapid catch-up growth (Bean and Crafts, 1996).

For Europe, embarking on the period of fast growth depended on good policy, in particular, avoiding or reversing the serious errors made in the interwar period, much more than institutional innovation. For Japan, the situation was somewhat different. The famous "Japanese economic system" of the postwar years with its distinctive employment practices, keiretsu, main bank system, all of which can be interpreted as responses to the transactions costs problem, seems to have emerged as a result of the wartime experience (Noguchi, 1998).

Catching-up is not automatic therefore and absence of social capability may be a crucial obstacle to growth and development in some countries. Gerschenkron (1962) provided a famous discussion of the opportunities and difficulties of "economic backwardness". He suggested that backward countries could achieve a take-off into very rapid growth if they could substitute for "missing prerequisites", in particular a lack of "entrepreneurship". This might be regarded as much the same thing as establishing social capability. Gerschenkron's arguments can be re-stated as proposing that institutional innovations to establish larger vertically integrated enterprises, to develop investment banking, to provide strong cash-flows for incumbent producers, and to facilitate a major role for the state in investment decisions could solve co-ordination and hold-up problems for investors, mitigate problems of asymmetric information in the supply of finance for industrialization, mobilize savings and develop infant industries. A clear implication of Gerschenkron's approach is that countries which develop rapidly from a position of initial backwardness will have a legacy of institutions which are "unorthodox" from a conventional Western standpoint. Japan is perhaps a case in point.

Obviously, there are several downsides to a Gerschenkronian development strategy. First and most obvious is that the role of the state degenerates into crony capitalism or plunder by myopic autocrats. Secondly, it may be that the institutional structure delivers a lot of investment but is less good at providing incentives for the efficient use of funds or innovation, as a view based on incomplete contracts or agency theory might suggest. The Soviet version of the story seems to reflect an extreme outcome of this kind which resulted in severely diminishing returns in the context of abnormally low substitutability of capital for labor (Easterly and Fischer, 1995). Thirdly, at some later stage, it is likely that the allocative efficiency advantages of freer capital markets will become much more attractive but the transition to such institutional arrangements may be fraught with difficulties of preventing moral hazard and eventual financial crisis where bankers and regulators lack the relevant human capital and resources. Financial de-regulation has, after all, proved hard to manage in many advanced western economies (Mishkin, 1997). A fourth possibility is that the institutions that work so well at the outset eventually become dysfunctional but hard to change. Current discussions of Japanese economic prospects increasingly tend to make this point concerning the future roles of the main bank system, lifetime employment and economic regulation (Ito, 1996).

Gerschenkron stressed the role of the banking system in overcoming economic backwardness, especially in the context of pre-World War II Germany. He argued that "the German investment banks—a powerful invention comparable in economic effect to that of the steam engine ... were a substitute for entrepreneurial deficiencies. From their central vantage points of control, ... It was they who very often mapped out a firm's paths of growth, conceived far-sighted plans, decided on major technological and locational innovations, and arranged for mergers and capital increases" (1968, p. 137). Others, while conceding that there were some advantages to this bank-based financial system relative to Anglo-Saxon type capital markets, have stressed that there were also disadvantages in the

form of greater exposure to financial instability, more moral hazard and a less efficient allocation of investment funds (Collins, 1998).

The German banking system eventually came to grief in the macroeconomic crisis of 1931 following a period of reckless domestic lending and accumulation of short-term foreign debt by banks with little capital at risk (Hardach, 1984). The lessons drawn by the German authorities were that if investment banking was to continue much tighter prudential supervision and regulation was required and this was enacted in a new law in 1934 whose provisions essentially remained in force throughout the postwar Wirtschaftswunder.

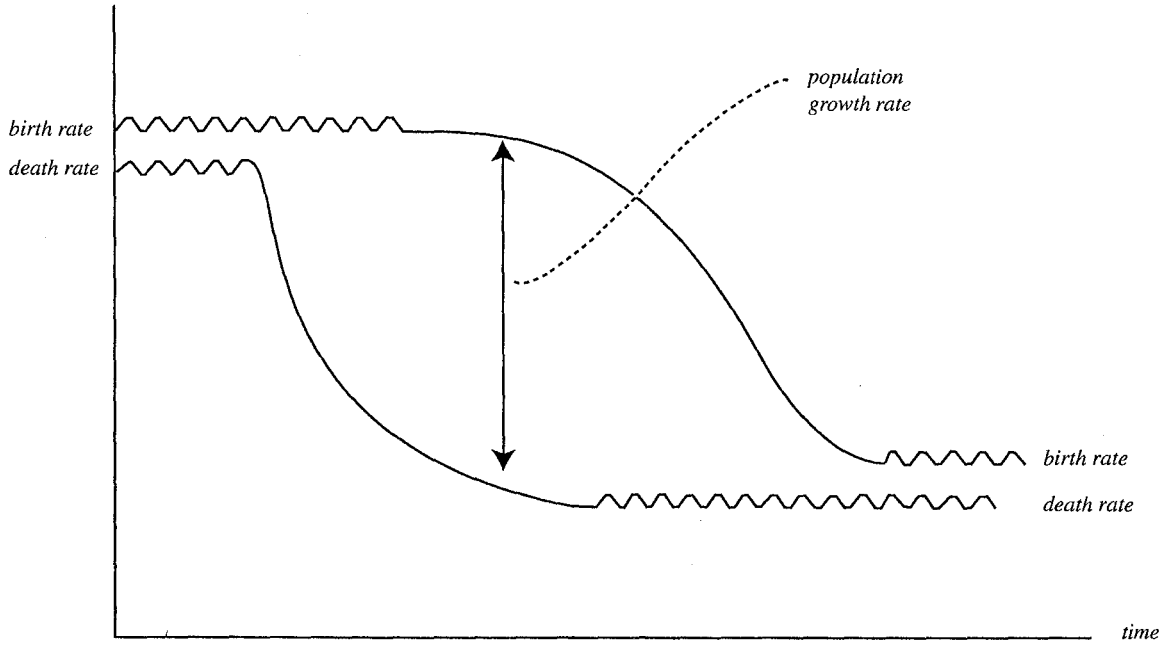
These issues are important in the context of east Asia as strategies to achieve rapid catch-up growth bear strong resemblance in many cases to Gerschenkron's recipe. Thus, the account by Rodrik (1995) of the approaches of Korea and Taiwan Province of China to mobilizing investment matches the above description rather closely. Moreover, the well-known "getting relative prices wrong" and "governed markets" approaches of, respectively, Amsden (1989) and Wade (1990) to explaining rapid growth in these countries can also be seen as having strong similarities. These cases of "late industrialization" involve a stronger and more pro-active role for the state and different approaches to coping with problems of opportunism and moral hazard than was typical of western Europe in its catching-up phase in the 1950s and 1960s.

Economic backwardness has another dimension, not central to Gerschenkron's account, but of considerable import in east Asia and in comparisons between that region and Europe, namely, a demographic one. As economies develop, they typically undergo a demographic transition in which birth and death rates both fall to much lower levels but during which there is an acceleration of population growth because the falls in mortality tend to lead those in fertility. This transition has an impact on the age structure of the population which tends initially to reduce and then significantly to increase the proportion of working age. A schematic diagram of the demographic transition is shown in Figure 1.

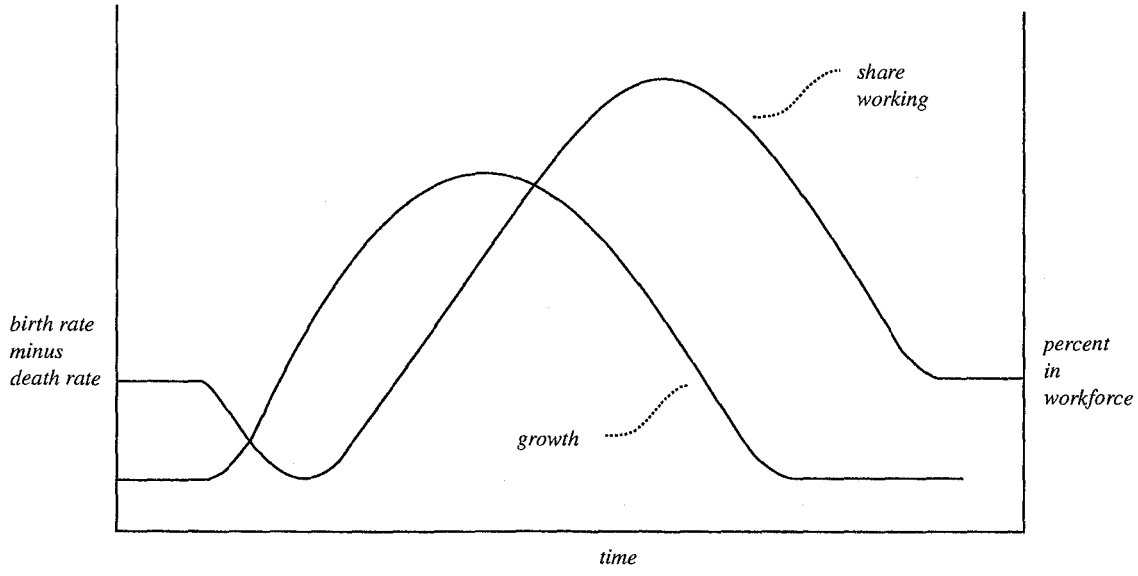
Western European countries had completed the demographic transition prior to the postwar Golden Age of economic growth. They did not therefore experience a demographic boost to labor inputs per person during this period. By contrast, east Asian countries entered into demographic transition much more recently and the proportion in the working age group rose rapidly in many cases between the early 1970s and the early 1990s. A recent analysis has suggested that this change in age structure may have offered a substantial but inherently temporary growth bonus in east Asia, of the order of 1.5 to 1.9 per cent per year, not only through its impact on labor supplies but also through its effects on savings (Bloom and Williamson, 1997).

The Golden Age in Europe came to an end in the 1970s when TFP growth slowed down markedly and permanently, diminishing returns to capital accumulation became very apparent and the postwar settlement between capital and labor unraveled. Oil price shocks made the growth slowdown much more dramatic in the short run but were essentially

Figure 1
Demographic Transition



Population Growth and the Age Structure



irrelevant to long run growth outcomes. Absent the recent financial crisis, something similar might have been expected for the leading Asian exponents of catch-up growth, as Krugman and others have argued, with the additional twist of the ebbing away of favorable demographic trends.

Nonetheless, the dimensions and timing of such a slowdown are not easy to predict, as this review has demonstrated. TFP growth will have a central role both through its direct contribution to growth and its indirect impact on the speed with which incremental capital to output ratios rise. But attainable TFP levels and the rate at which TFP will approach its steady state path depend on social capability, a concept which is not quantifiable and changes in which are not predictable, even though many of its ingredients are well understood. Given that Asian institutions, political economy, savings habits and demography differ from those of western Europe, the earlier experience of that region does not offer any precise guidance on the issue.

III. Productivity Performance in East Asia

The view expressed by Krugman (1994) that leading Tiger economies are facing a growth slowdown is based on an expectation that diminishing returns will soon start to bite hard in economies where growth has come much more from factor accumulation rather than improvements in TFP. This assessment relied heavily on a growth accounting exercise in Young (1995), reported in Table 3, and seemed to place heavy emphasis on the estimate for Singapore (1994. p. 71). Given that the capital to labor ratio grew at over 3 per cent per year in each of Korea, Singapore, and Taiwan Province of China over 1960-1994 (Collins and Bosworth, 1996, p. 157), if TFP growth was relatively modest, then the onset of diminishing returns might indeed seem to be a potential problem in these economies. In fact, Young's estimates have turned out to be quite controversial. Table 3 also presents the results of some other growth accounting studies for comparison.

Growth accounting typically relies on the following identity:

$$\Delta Y/Y = \alpha \Delta K/K + \beta \Delta L/L + \Delta A/A$$

where α and β are the shares of wages and profits in national income, respectively. It is an identity because $\Delta A/A$ is defined as the growth in output not accounted for by increases in the factors of production, capital and labor. This term is the residual after calculating all the other components of the equation and represents the contribution of TFP growth. Measurement issues are fundamental to the use of this technique and have been at the heart of the debate over Young's estimates.

The terms α and β are intended to capture the elasticity of output with respect to growth of capital and labor and approximating these elasticities by factor shares is strictly valid only under perfect competition and where private and social returns to capital are

Table 3. Alternative Estimates of East Asian TFP Growth
(Percent per year)

	Young (1994) (1995)	Collins & Bosworth (1996)	Sarel (1997)	Adjusted Young	Hu & Khan (1997)
Period	1966-90	1960-94	1978-96	1966-90	1979-94
China		4.6*			3.9
Hong Kong SAR	2.3			2.4*	
Indonesia	1.2*	0.8	1.2		
Korea	1.7	1.5		1.3	
Malaysia	1.1*	0.9	2.0		
Philippines		-0.4	-0.8		
Singapore	0.2	1.5	2.2	1.0	
Taiwan Prov.of China	2.6	2.0		1.9	
Thailand	1.5*	1.8	2.0		

Notes: Adjusted Young uses revised factor share weights with capital assumed to have a weight of 0.35. Estimates marked with * refer to periods other than the column label, as follows: in column (1): 1970-85; in column (2), 1984-94; in column (4), 1966-91.

identical. In fact, in the OECD countries the use of the profit share seems to be a reasonable approximation (Oulton and Young, 1996). In the Asian context, this may be more doubtful and this has prompted researchers subsequent to Young to choose α and β on different grounds. Sarel (1997) bases his work on using international evidence to estimate technologically determined coefficients for each major sector of activity and then derives weighted averages for each economy according to their output composition. This leaves α in the range 0.28 to 0.35, notably much lower than Young's estimate of 0.49 for Singapore. Collins and Bosworth (1996) discuss a wide range of evidence, on the basis of which they argue for the imposition of a uniform value of 0.35 for α in each country for international comparisons. Table 3 (column 4) reports the implication of adjusting Young's estimates using this assumption.

Another difference between researchers concerns the treatment of improvements in the quality of labor, in particular through education. Whereas Young (1995) and Collins and Bosworth (1996) adjust their raw labor force estimates on the basis of assumptions about rates of return to observed increases in schooling, Sarel prefers to make no adjustment with the implication that any unmeasured improvement in labor force quality will show up in the residual, TFP growth. Moving to this procedure would typically add about 0.5 per cent per year to Collins and Bosworth's TFP growth estimates.

A recent contribution by Hsieh (1997) provides a further check on Young's original results by calculating the dual measure of TFP growth, i. e., that obtained by comparing the growth of output prices with the growth of the weighted average of capital and labor input prices. This method is also quite data-demanding and the results are preliminary; they indicate that TFP growth was significantly higher in Singapore and Taiwan Province of China than estimated by Young (1995), at 2.6 (for 1971-90) and 3.7 per cent, respectively, but the method does not suggest any great change for Hong Kong SAR and Korea. Hsieh argues that official data almost certainly exaggerate the growth of the capital stock in Singapore, perhaps substantially so, and that this a strong reason to suppose that the contribution of capital to growth was less and that of TFP growth was more than found by other researchers.

There is a more subtle reason for supposing that all these TFP growth estimates are biased. They rely, as is conventional, on underlying assumptions about the nature of the production function, namely that the elasticity of substitution between factors of production is unitary and that technological change is Hicks-neutral. Rodrik (1997) argues that the elasticity is likely in practice to be less than 1 and that technological change may well have been labor-saving. In that case, the conventional TFP estimate will be biased downward and is proportional to the growth of the capital to labor ratio which has been rising steeply in the Tiger economies. These points are well-taken but not readily quantifiable. Nevertheless, they lose much of their power in a comparative context since they probably also apply during the European Golden Age when capital deepening was much more pronounced (Maddison, 1996) yet estimated TFP growth was much more rapid, as Table 4 reports.

Table 4. TFP Growth: Recent East Asia in an International Context.

France	3.1
Italy	3.2
Japan	3.6
United Kingdom	1.2
West Germany	3.3
China	4.6
Hong Kong SAR	2.4
Indonesia	0.8
Korea	1.5
Malaysia	0.9
Philippines	-0.4
Singapore	1.5
Taiwan Province of China	2.0
Thailand	1.8
South Asia	0.8
Africa	-0.6
Middle East	-0.3
Latin America	0.2

Sources: France, Japan, UK and West Germany from Maddison (1996); Italy from Rossi et al. (1992); Hong Kong from Young (1995) as amended in Table 3; remainder from Collins and Bosworth (1996). Estimates for Europe and Japan refer to 1950-73, China is for1984-94, Hong Kong is for 1966-91 and others are for 1960-94.

Three main points emerge from this review. First, Young's original estimates are probably too low in some cases, especially with regard to Singapore, but the later estimates, which are broadly similar, are not yielding that much stronger TFP growth on average. Second, taking Collins and Bosworth's estimates as representative of recent work and convenient by virtue of their wide coverage, by comparison with the fast catch-up countries of Europe and Japan during their Golden Age, prima facie, the Tigers do not perform strongly, as Table 4 reports. Third, China since the late 1970s does emerge as a case of rapid TFP growth. This may reflect a different starting point with particularly good opportunities for rapid reduction in inefficiency in the very large agricultural sector but it may also be that the data are less good and TFP growth is overestimated.

Table 5 fills in the factor accumulation side of the sources of growth based on conventional assumptions about factor shares, again using Collins and Bosworth (1996) as representative of recent research on Asia. The tendency for Asian countries to have substantial growth from capital accumulation is clearly shown and is underlined by the comparison with their European predecessors. This originally resulted from relatively low incremental capital to output ratios rather than much higher investment shares in GDP, although recently the latter have tended to be the main reason for sustaining the high contribution to growth made by capital accumulation as Table 6 reports.

Table 5 also documents the much stronger contribution made by labor force growth in Asian countries than in Europe which is also quite important in augmenting the faster growth of total factor input in Asia than in Europe. This reflects both the demographic distinctiveness of Asia in the context of its demographic transition and, to a lesser extent, the tendency of hours worked per year to fall sharply during Europe's Golden Age (Crafts, 1997), an experience that has not yet been repeated in east Asia. Tables 7 and 8 report these differences in labor supply.

Thus far, our review of the evidence has been broadly supportive of the position taken by Krugman (1994)—with the exception of his severe indictment of Singapore—in that it points to factor accumulation rather than TFP growth as the aspect where east Asia's growth performance is strong relative to historical precedent. This raises a serious puzzle, however. Given the high levels of real GDP per person in leading Asian economies such as Singapore and Hong Kong SAR how can they continue to beat the "3 per cent is as good as it gets" rule for growth in advanced economies especially if their TFP growth is nothing extraordinary?

The resolution to this paradox may be found by consideration of productivity levels, taking into account east Asia's very different pattern of labor inputs per person compared with Western countries. The most detailed comparisons of productivity levels are for manufacturing in six Asian economies by Timmer and Szirmai (1997). They found that Korea and Taiwan Province of China have been catching up to the United States such that by 1993 real output per worker in Korea and Taiwan Province of China was 49 per cent and 28 per cent of the U.S. level, respectively (1997, p. 15). By contrast, China's labor productivity was only 6 per cent of the U.S. level exactly the same as in 1980. Timmer and

Table 5. Sources of Growth: Golden Age Europe and Japan vs Recent East Asian Experience
(Percent per year)

	Capital	Labor	TFP	Output
1950-73				
France	1.6	0.3	3.1	5.0
Italy	1.6	0.2	3.2	5.0
Japan	3.1	2.5	3.6	9.2
United Kingdom	1.6	0.2	1.2	3.0
West Germany	2.2	0.5	3.3	6.0
1960-94				
China (1)	2.3	1.9	2.6	6.8
China (2)	4.0	2.1	4.6	10.7
Hong Kong SAR	2.8	2.1	2.4	7.3
Indonesia	2.9	1.9	0.8	5.6
Korea	4.3	2.5	1.5	8.3
Malaysia	3.4	2.5	0.9	6.8
Philippines	2.1	2.1	-0.4	3.8
Singapore	4.4	2.2	1.5	8.1
Taiwan Province of China	4.1	2.4	2.0	8.5
Thailand	3.7	2.0	1.8	7.5

Sources: Europe and Japan from Maddison (1996) except Italy from Rossi et al. (1992); East Asia derived from Collins and Bosworth (1996) except for Hong Kong which is based on Young (1995) with factor shares adjusted to match Collins and Bosworth's assumptions. China (1) is for 1960-1994; China (2) is for 1984-1994.

Table 6. Investment as a Share of GDP
(Percent)

	1960-73	
France	23.8	
Italy	26.9	
Japan	24.6	
United Kingdom	32.6	
West Germany	26.9	
	1960-94	**1981-96**
China	22.3	35.5
Hong Kong SAR	27.2	28.4
Indonesia	18.1	32.0
Korea	23.5	33.5
Malaysia	25.6	35.8
Philippines	19.8	22.3
Singapore	33.2	39.1
Taiwan Province of China	20.0	22.8
Thailand	25.6	35.4

Sources: Asian Development Bank (1997), Collins and Bosworth (1996), Higgins and Williamson (1996), OECD (1995).

Table 7. Demographic Underpinnings of Labor Force Growth

(Percent)

	Growth Ages 15-64 minus Total Population Growth *(Percent)*		Share of Population 15-64		
	1965-90	**1990-2015**	**1965**	**1990**	**2015**
China	0.9	0.1	52.8	67.2	69.3
Hong Kong SAR	1.1	0.0	53.4	70.1	69.1
Indonesia	0.4	0.5	55.3	60.4	69.1
Korea	1.2	0.1	51.2	69.4	69.7
Malaysia	0.5	0.6	50.6	58.2	68.0
Philippines	0.4	0.6	52.1	57.2	65.8
Singapore	1.3	-0.1	52.0	70.8	69.1
Taiwan Province of China	1.0	0.1	52.5	66.7	69.3
Thailand	0.9	0.4	50.8	64.1	70.9
	1950-73		**1950**	**1973**	
Austria	-0.4		61.8	56.2	
Belgium	-0.3		63.1	58.7	
Denmark	-0.1		59.9	58.7	
Finland	0.2		59.8	62.5	
France	-0.3		61.1	57.8	
Greece	-0.2		61.4	58.7	
Ireland	-0.2		56.3	53.2	
Italy	-0.3		61.5	58.4	
Netherlands	0.1		59.2	59.6	
Norway	-0.4		61.6	57.1	
Portugal	-0.2		60.1	57.8	
Spain	-0.3		62.0	58.0	
Sweden	-0.3		61.7	58.3	
Switzerland	-0.2		62.5	60.1	
United Kingdom	-0.3		61.2	57.0	
West Germany	-0.3		62.7	58.4	
Japan	0.6		56.8	64.0	
United States	-0.1		61.0	59.9	

Source: derived from United Nations (1995).

Table 8. Annual Hours Worked Per Worker and Per Person

	Per Worker		Per Person	
	1973	1996	1973	1996
Austria	1778	1710	741	725
Belgium	1872	1637	720	595
Denmark	1742	1644	842	797
Finland	1915	1790	900	732
France	1904	1666	783	600
Greece	2000	1733	724	641
Ireland	2199	1694	763	622
Italy	1885	1830	781	641
Netherlands	1751	1487	692	592
Norway	1721	1407	728	686
Portugal	1900	2009	768	853
Spain	2238	1810	818	559
Sweden	1571	1554	749	693
Switzerland	1930	1643	982	874
United Kingdom	1929	1732	861	764
West Germany	1865	1558	817	661
Hong Kong SAR	2400	2259	1008	1127
Indonesia	2010	2200	754	903
Japan	2201	1898	1065	976
Korea	2428	2453	798	1099
Philippines	2235	2110	776	679
Singapore	2410	2318	872	1193
Taiwan Province of China	2690	2339	930	988
Thailand	2606	2546	1232	1394
United States	1896	1951	782	931

Sources: Estimates for 1973 are taken from Crafts (1997). Estimates for Europe, Japan and the United States in 1996 are derived from OECD (1998) and Maddison (1997) where OECD figures are not available. Estimates for Hong Kong, Korea, Singapore and Taiwan are updated versions of those in Crafts (1997) and use the same sources. Estimates for other Asian countries in 1996 were derived as follows:
Indonesia: derived from Republic of Indonesia (1997).
Philippines: derived from Republic of the Philippines (1973) (1993) assuming a 50 week work year; data are for 1993 not 1996.
Thailand: derived from Republic of Thailand (1973) (1996) assuming a 50 week year.

Szirmai'scomparative results for capital per worker and TFP are shown in Figures 2 and 3. For both Korea and Taiwan Province of China it is clear that catching up has been in capital intensity rather than in TFP and that the remaining efficiency gap is very wide. This is perhaps not so surprising given the growth accounting estimates reviewed earlier, which highlighted factor accumulation as a large part of these countries' growth. Timmer and Szirmai's comment appears apposite: "[These data] point to abundant opportunities for further catch-up growth in the Asian economies (except Japan)" (1997, p. 33).

Scope for further catch-up is certainly informed by remaining productivity gaps, even though, as section 2 made clear, this potential is usually not fully realized. At the whole economy level, comparisons of labor productivity levels are perhaps a more reliable guide than those of TFP levels given measurement difficulties. Table 9 reports these in terms of real GDP per hour worked. It is here that the further implication of the contrasting trends in labor inputs per person in east Asia and Europe becomes strikingly apparent. Once the differences in age structure and hours worked per worker each year are taken into account, the labor productivity gaps between Asia and the West are revealed to be much larger than might be supposed from simply looking at real GDP/person. The opportunity for further rapid catch-up growth has not been completely eroded even in the leading east Asian economies.

It is also important to recognize that an economy's TFP growth potential through catch-up will tend to vary over time as its social capability changes rather than simply depending on the productivity gap. In general, this will reflect institutional and policy changes and is not directly quantifiable. Nevertheless, social capability for catch-up will be influenced in part by educational standards and these are often (crudely) approximated by years of schooling of the labor force. We might expect that as countries develop they are likely to experience a narrowing of the productivity gap but also an improvement in educational inputs to the catch-up process. In order to assess the net implications for catching-up in TFP it is necessary to weight schooling relative to the productivity gap. One such weighting can be obtained from the cross-section econometric analysis of Benhabib and Spiegel (1994) which offers an interesting perspective on both on normalized success in and opportunities for catch-up TFP growth.

In effect, Table 10 extends the comparison made earlier in Table 4, this time normalizing for schooling and productivity gaps. It reinforces the suggestion that, in general, the European countries and Japan took more advantage of their opportunities for catch-up TFP growth. European countries tend to exceed the projected TFP growth, Japan matched it, while the other east Asian countries fell short, sometimes appreciably so. The result is not universal, however, and Hong Kong SAR stands out as an exception to this generalization.

Table 11 repeats the exercise of Table 10 for the east Asian countries looking at things from the perspective of later years. For the leading Tigers, it is clear that increases in schooling have not outweighed the closing of the productivity gap, although recognizing

Relative Capital per worker in Manufacturing
in Six Asian Economies, 1955-1993 (USA=100)

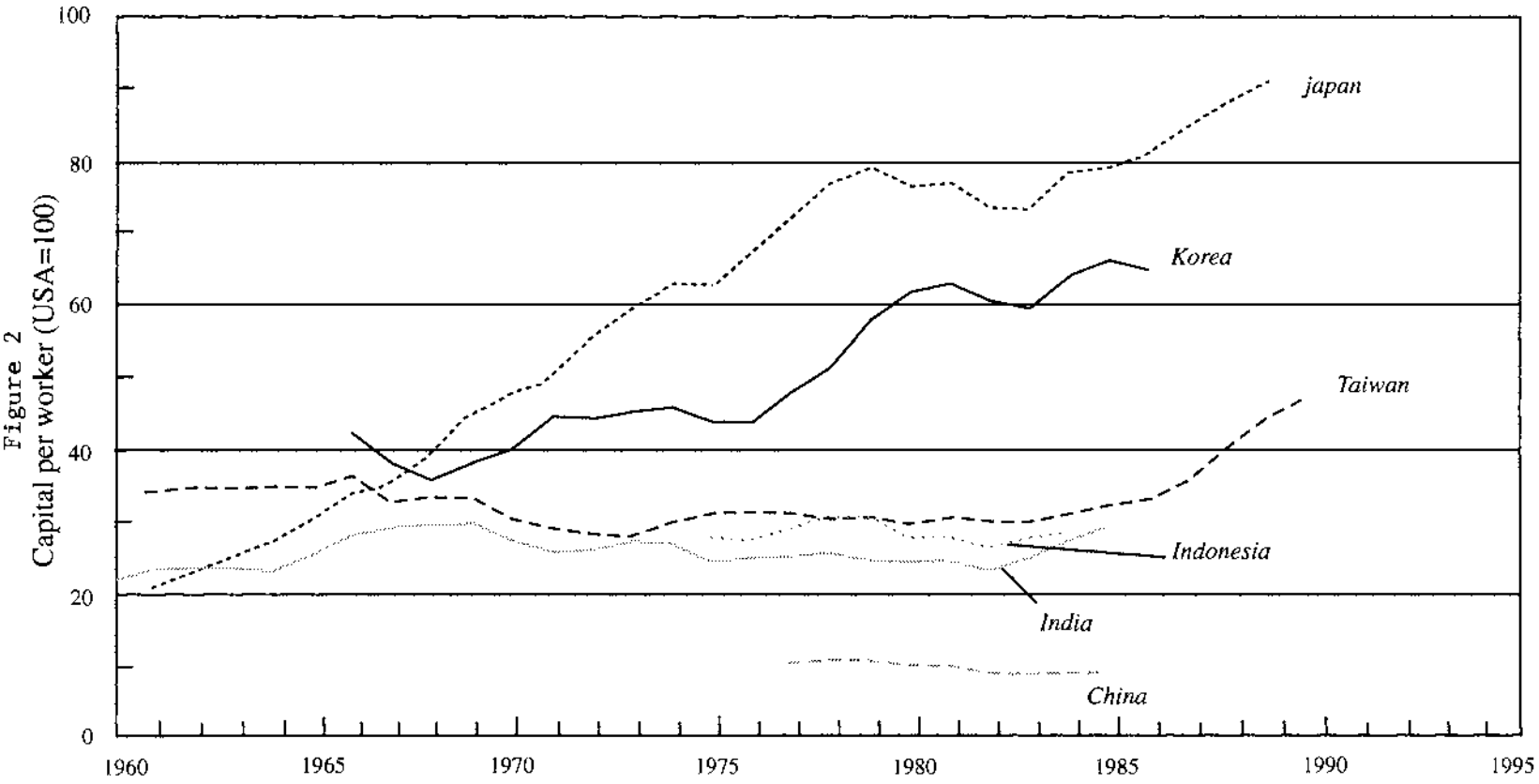


Figure 2

Relative Total Factor Productivity Levels in Manufacturing
in Six Asian Economics, 1955-1993,(USA=100)

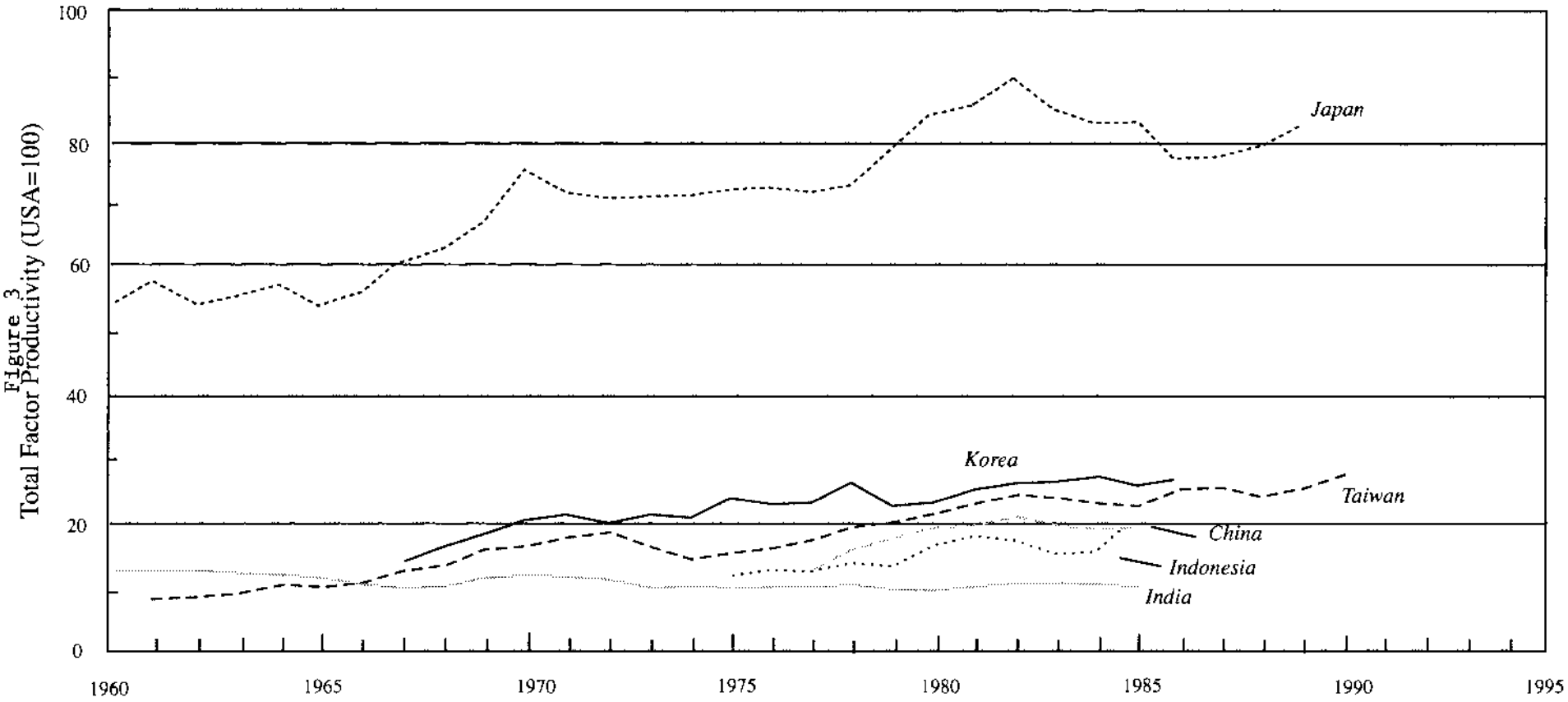


Figure 3

Table 9. Real GDP/Hour Worked, 1973 and 1996
(PPP based; constant 1990 prices)

1973		1996	
Netherlands	18.43	Norway	32.46
Switzerland	18.28	Netherlands	31.26
Sweden	18.02	Belgium	29.84
Belgium	16.53	West Germany	29.68
France	16.53	France	28.47
West Germany	16.09	Italy	26.23
Denmark	15.94	Ireland	25.43
Austria	15.27	Sweden	25.35
Norway	14.05	Denmark	24.85
United Kingdom	13.93	Austria	24.76
Italy	13.32	Spain	23.50
Finland	11.96	Switzerland	23.17
Greece	10.77	United Kingdom	22.68
Spain	10.69	Finland	21.67
Portugal	9.86	Greece	17.08
Ireland	9.20	Portugal	14.09
Japan	10.35	Japan	20.06
Hong Kong SAR	6.71	Hong Kong SAR	18.81
Singapore	6.22	Singapore	15.87
Taiwan Province of China	3.95	Taiwan Province of China	14.28
Korea	3.56	Korea	11.70
Philippines	2.52	Thailand	4.51
Indonesia	2.04	Indonesia	3.75
Thailand	1.42	Philippines	2.87
United States	21.24	United States	25.49

Source: derived from Tables 1 and 8.

Table 10. Projected Versus Actual TFP Growth
(Percent per year).

	Years of Schooling	Gap	Projected TFP Growth	Actual TFP Growth
1950-73				
France	8.18	1.84	1.3	3.1
Italy	4.92	2.81	1.4	3.2
Japan	8.12	5.13	3.6	3.6
United Kingdom	9.40	1.40	1.1	1.2
West Germany	8.51	2.25	1.7	3.3
1960-84				
China	1.7	12.75	3.3	1.8
Hong Kong SAR	5.2	3.48	1.8	2.4
Indonesia	1.1	9.90	2.1	0.8
Korea	3.2	8.60	3.1	1.5
Malaysia	2.3	5.74	1.7	0.9
Philippines	3.8	7.52	3.0	-0.4
Singapore	3.0	5.62	2.0	1.5
Taiwan Province of China	3.2	8.00	2.9	2.0
Thailand	3.5	10.88	4.2	1.8

Sources: Years of schooling from Maddison (1996) and Collins and Bosworth (1996); actual TFP growth from Maddison (1996) and Collins and Bosworth (1996), except Italy from Rossi et al. (1992) and Hong Kong from Young (1995) for 1966-91, as revised in Table 3. The weighting formula to produce column (3) is derived from Benhabib and Spiegel (1994, p. 162, equation 5) and is 0.0007*Schooling*Gap + 0.0014*Gap where Gap is defined as the ratio of the highest GDP/person to that of the country concerned in the initial year.

Table 11. Benhabib and Spiegel TFP Growth Projections
(Percent per year)

	Years of Schooling	Gap	Projected TFP Growth	Actual TFP Growth
1984-94				
China	3.6	9.62	3.8	4.6
Indonesia	3.8	9.86	4.0	0.9
Korea	7.9	3.47	2.4	2.1
Malaysia	5.4	4.32	2.2	1.4
Philippines	6.5	9.67	5.8	-0.9
Singapore	4.6	1.92	0.9	3.1
Taiwan Province of China	6.9	2.79	1.7	2.8
Thailand	5.1	7.20	3.6	3.3

	Years of Schooling	Gap	Projected TFP Growth (1)	Projected TFP Growth (2)
1996				
China	5.3	5.21	2.7	
Indonesia	5.0	6.85	3.4	3.4
Korea	9.7	1.84	1.5	1.8
Malaysia	7.0	3.05	1.9	
Philippines	7.4	10.01	6.6	5.8
Singapore	6.1	1.13	0.6	0.9
Taiwan Province of China	6.2	1.67	1.0	1.0
Thailand	7.5	3.88	2.6	2.6

Sources: As for Table 10, except that Projected TFP Growth (2) uses the ratio of USA GDP/hour worked to that of the country concerned derived using Table 9.

the rather greater productivity gap with the U.S. in terms of hours worked would modify the projections a little bit, as Table 11 shows. Yet, at the same time it is striking that actual TFP growth appears to have been much stronger recently in several cases, for example, in Korea and Thailand, and also to have exceeded the projections in some countries, notably in Singapore and in Taiwan Province of China. It would seem that other aspects of social capability have been changing favorably so as to enhance the efficiency with which resources are used and/or technology can be improved. Once again, this is a far more optimistic basis on which to assess future growth prospects than might be gained from a reading of Krugman (1994).

In sum, this review of productivity performance in east Asia leads to the following conclusions:

- Neither levels nor growth rates of east Asian total factor productivity have been as strong as the person in the street might suppose.

- Accordingly, productivity gaps with the United States are still quite large and there remains a good deal of scope for rapid catch-up growth before diminishing returns to heavy capital accumulation bite severely.

- Exploiting this potential is not automatic but will depend on efforts to continue to improve social capability.

- The recent TFP growth of much of the region is considerably more impressive than that of the early years of rapid economic growth.

Taken together, these points imply that growth potential is probably a good deal stronger than Krugman's pessimism would allow. The next two sections look at possible impediments to, and requirements for, realizing this potential.

IV. Backwardness and East Asian Catch-Up

Section 2 recalled the argument in Gerschenkron (1962) that initially backward countries have an opportunity for rapid catch-up if they take radical measures to promote development through institutional innovations and controlled capital markets. It was also remarked that this would tend to leave a legacy of institutions different from the standard American model and that, especially in the longer term, there were a number of downside risks of this type of strategy. With the exception of Hong Kong SAR, the fast-growing countries of east Asia all have some similarities with the Gerschenkron model and it seems useful, especially in the context of the present crisis, to ask to what extent the downside risks have materialized.

This should not be done without first recognizing the strong positives, at least for the more successful Asian economies. These not only include the mobilization of very high rates of domestic saving and investment but also unusually strong efforts to accumulate human capital and to improve and to develop imported technology (Bell and Pavitt, 1993). Table 12 reports on these technology strategies using Japan and Latin American countries as comparators. Imports of capital goods and foreign direct investment have clearly been central components of technology transfer. A recent World Bank report emphasized the success of Korea, Singapore and Taiwan Province of China in rapid development of the IT industry through effective public-private sector partnership to overcome potential market failures in the diffusion of new technology (Hanna et al. 1996). One basic difference among the NIEs, however, is that by the late 1980s Korea was already investing 2 per cent of GDP in R and D while Singapore invested only about half as much while at the same time the FDI stock/GDP ratio was 91.7 per cent in Singapore but only 2.1 per cent in Korea.

Recent empirical work has stressed the importance of institutional quality for economic growth outcomes (Barro, 1997; Knack and Keefer, 1995). A clear risk of a Gerschenkronian development strategy is that it increases opportunities for rent-seeking and corruption that ultimately undermine economic growth. This has clearly happened in some Asian countries and it has been suggested using the same ICRG measure of institutional quality that this discriminates very well between the winners and losers in Asian catch-up growth (Rodrik, 1997). Table 13 reports the ICRG scores of east Asian countries together with those of European comparators. It also displays scores for a similar measure, BERI, which has also been used in the regression studies and has the advantage that it is first available for 1972 whereas ICRG did not appear until 1984 for most countries.

Table 13 does show some marked differences between Asian countries. When the scores are first reported Hong Kong SAR, Singapore and Taiwan Province of China look similar to the best European counterparts whereas Indonesia and Philippines look much less well-placed. Korea is roughly on a par with Greece but well behind the strongest countries in the table. Poor scores are unfortunate because econometric analysis shows a strong link between corruption and foreign investment, which is just as evident in east Asia as elsewhere in the world. Corruption has a similar impact to imposing very high taxes on FDI (Wei, 1997). At the same time, Table 13 also reports some quite strong improvements by 1995, at least on the ICRG index, and a more encouraging picture overall in that year.

A second danger of the Gerschenkron approach to development is that it spawns government policies which serve the interests of special interest groups and actually inhibit economic growth by inducing misallocations of resources, for example, through so-called "industrial policy". Although there is no consensus in the literature on the overall effects of these policies, even the fast-growing economies, increasingly, econometric analysis is tending to find that selective interventions on balance retarded rather than stimulated growth. An analysis of industrial productivity growth across sectors in Korea during 1963-83 found that tax and financial incentives did not enhance productivity growth while non-tariff barriers to trade reduced both capital accumulation and TFP growth (Lee, 1995).

Table 12. National Innovation Systems in East Asia

		FDI Stock/GDP (percent)	Capital Goods Imports/ GDI (percent)	Students Abroad/ 100K POP	R&D/GDP (percent)
Asian NIEs	1980	17.0	40.7	160.1	0.53
Asian NIEs	1990	30.2	62.2	219.6	1.32
NIE Followers	1980	10.2	20.1	60.5	0.51
NIE Followers	1990	11.5	30.4	52.0	0.40
Japan	1980	0.3	1.6	14.2	2.19
Japan	1990	0.6	1.8	29.1	2.84
Latin American 3	1980	5.4	7.3	9.6	0.55
Latin American 3	1990	11.9	2.8	9.4	0.36

Source: Dahlman (1994); Asian NIEs are Hong Kong, Korea, Singapore and Taiwan; NIE Followers are China, Indonesia, Malaysia and Thailand; Latin American 3 are Argentina, Brazil and Mexico. Figures for R&D in rows 1 and 2 exclude Hong Kong.

Table 13. BERI and ICRG Index Scores.

	BERI 1972	BERI 1995	ICRG 1984	ICRG 1995
China		7.3		
Hong Kong SAR			49.0	46.7
Indonesia	6.6	7.0	15.0	35.7
Korea	9.2	9.0	28.7	45.0
Malaysia	9.4	8.8	41.2	37.0
Philippines	7.8	6.7	13.0	32.0
Singapore	12.2	13.2	47.5	45.0
Taiwan Province of China	11.0	11.5	44.0	43.3
Thailand		8.4	30.9	38.7
Austria			44.7	
Belgium	13.4		47.8	
Denmark	12.9		47.8	
Finland			47.8	
France	11.7		45.6	
Greece	9.5		25.5	
Ireland	12.0		40.3	
Italy	10.1		38.4	
Netherlands	13.7		49.0	
Norway	12.6		48.2	
Portugal	8.8		43.2	
Spain	9.8		35.8	
Sweden	12.3		47.2	
Switzerland	14.4		49.5	
United Kingdom	13.4		47.2	
West Germany	13.4		45.2	
Japan	12.5		44.9	
United States	14.8		47.9	

Sources: data supplied by the collecting agencies. BERI (Business Environmental Risk Intelligence) is an index aggregating "bureaucratic delays", "nationalization potential", "contract enforceability" and infrastructure quality" and has a maximum score of 16. ICRG (International Country Risk Guide) is an index aggregating "quality of the bureaucracy", "corruption in government", "rule of law", "expropriation risk" and "repudiation of contracts by government" with a maximum score of 50.

There is also evidence that Japanese industrial policies diverted resources away from high-growth sectors towards declining industries and did not have a positive effect on TFP growth within sectors during the period 1960-90 (Beason and Weinstein, 1996). Similar results apply to 1980s Taiwan Province of China (Smith, 1995).

A third class of problems arises from the heavy reliance on banks to finance industry and from distortions in the allocation of funds. After the initial phase of rapid growth when solving co-ordination problems is perhaps the most dominant concern, the advantages of financial liberalization will create strong pressures for reform even in relatively successful cases of "getting prices wrong" such as Korea. Indeed, the weakness of the Korean banking system is highlighted by the exceptionally rapid rate of decline of the real rate of return on capital by over 5 percent per year on average during 1966-1990 (Hsieh, 1997, p. 21). The eventual outcome of the financial liberalization process for Korea has been a major financial crisis in 1997/8 that was made more likely by its earlier approach to economic and banking development, as was the German crisis of 1931.

As a sympathetic observer of Korean development noted some while ago, however, "Credit rationing has denied financial institutions the experience needed to develop adequate processes of independent decision-making" (Westphal, 1990, p. 58). Moreover, the financial sector policies of a developmental state tended to place little weight on proper auditing, accounting, credit rating, disclosure requirements or prudential regulation (Park, 1994). Yet, despite severe problems of non-performing loans in the 1970s and 1980s banks were not allowed to fail in Korea. Independent commentators repeatedly stressed continuing weaknesses in all these areas during the first half of the 1990s (White, 1995).

With asymmetric information, implicit guarantees for depositors and weak bank balance sheets, partly reflecting continued political pressures to support favored enterprises, this is a classic recipe for moral hazard and a serious risk of financial crisis unless regulators with incentives and powers to take prompt corrective action are available. This is the more true because the government itself is unlikely to be able to eliminate the moral hazard problem by credibly promising not to provide implicit deposit insurance. As capital markets are opened up to external flows then the overborrowing that will be symptomatic of this situation will tend to be reflected in excessive capital inflows and the eventual crisis will include a loss of confidence by foreign lenders and depositors (McKinnon and Pill, 1996).

The Korean crisis can be seen as the Achilles Heel of a Gerschenkronian style development. Its short term implication will be a severe contraction in economic activity as services of financial intermediation dry up. In this way, it may bear some resemblance to the depression in early 1930s America (Calomiris, 1993). This does not imply that the aim of financial liberalization was wrong, rather that it has been badly mishandled. Other Tigers such as Taiwan Province of China may be better placed to avoid such mistakes. Nor does it necessarily imply that long term growth potential has been damaged. With the advantage of hindsight, we know that America returned to its previous trend growth path and had completed its transition back to that path by the early 1940s (Ben-David and Papell, 1995).

V. Growth Prospects With and Without the Crisis

One way to provide an illustrative benchmark for future growth prospects is to consider what a steady state growth path for real GDP per person might look like and then to compare the outcome with past performance. This approach has recently been adopted for ASEAN countries by Sarel (1997) and for transition economies by EBRD (1997). The starting point for any such calculation is to choose an estimate for TFP growth and growth of labor inputs per person. Capital accumulation is assumed to come into line as in an Augmented-Solow or endogenous innovation growth model. The results of an exercise of this type are shown in Table 14.

Before considering Table 14 in detail, it is vital to recognize that the numbers in it are *not* forecasts, although they may represent feasible paths that each country could sustain. The discussion of section 2 gave many reasons why exercises of this kind only produce benchmarks. In particular, it argued that forecasting TFP growth during catch-up is extremely difficult because it will depend on social capability and policy choices and cannot be inferred from the predictions of a pure neoclassical convergence model. Feasible TFP growth depends on scope for catch-up and the projections in Table 14 therefore make use of the analysis of Table 11; realizing this potential depends on good policy and is certainly not automatic. For example, the TFP projections for Indonesia and the Philippines far exceed their recent performance and would surely require major supply-side reforms to be realized, including improvement of their BERI and ICRG scores (cf. Table 13) to the Singaporean level.

For most of the economies in Table 14, the steady state growth projection is below the rates that they have achieved in the recent past. There are three reasons for this:

- scope for further catch-up is now reduced, although not exhausted
- labor force growth will slow appreciably
- most countries have been enjoying transitional growth with capital-deepening at above the steady state rate.

The steady-state projections themselves are notable for the relatively modest demands they would place on domestic savings relative to recent levels and could be achieved with lower domestic investment rates than have prevailed in the past. Given that demographic factors will not tend to reduce domestic savings much even in the countries where the demographic transition is most advanced before 2010 (Heller and Symanski, 1997), savings would not seem to be a constraint on achieving these growth rates. One way for growth to be higher than these projections would be for countries to continue to invest more. For example, if Korea and Singapore, while sustaining the TFP growth of Table 14, invested sufficient to reach the

Table 14. Illustrative Steady State Growth Projections
(Percent per year).

	TFP	Labor/ Person	K/Y	I/Y reqd.	GDP /head	2015 income	S/Y 1991-6	I/Y 1991-6
China	2.7	0.8	1.7	18.9	5.0	11500	40.1	39.2
Indonesia	3.4	1.2	2.8	35.8	6.4	11253	32.1	34.7
Korea	2.2	0.6	2.9	28.1	4.0	27120	35.4	36.9
Malaysia	1.9	1.1	2.5	27.0	4.0	16354	35.0	41.5
Philippines	3.6	1.1	2.0	26.6	6.6	7970	19.0	22.2
Singapore	1.3	0.6	2.9	24.7	2.6	34165	47.8	34.6
Taiwan	1.4	0.6	1.8	15.5	2.8	15210	27.4	23.4
Thailand	2.6	1.4	2.2	23.8	4.9	24031	34.9	42.6

Sources:
TFP: projected TFP growth based on Table 11 for catch-up component except for Philippines where it is assumed that catch-up would not exceed Japanese TFP growth in 1950-73 and Korea, Singapore and Taiwan where the development of an R & D capability is assumed to add a further 0.4% per year to TFP growth.
Labor/person: projected growth of labor inputs per person based Table 7 and an addition of 0.5 per cent per year (0.7 per cent in China, Indonesia, and Singapore) for improved labor force quality from extra schooling based on past trends as estimated by Collins and Bosworth (1996).
K/Y: the 1994 capital to output ratio (Collins and Bosworth, 1994, p. 189).
I/Yreqd.: the percentage of GDP needed to be invested to maintain the capital to labor ratio along the steady state path, assuming 5 per cent of the capital stock depreciates each year and $\alpha = 0.35$. The steady state growth path is characterized by a constant capital to output ratio in which case $\Delta Y/Y = \Delta L/L + \frac{\Delta A/A}{(1 - \alpha)}$
GDP/Pop: derived steady state growth rate for real GDP per head.
2015 income: projected real GDP per person measured in 1990 $ international (comparable with the estimates in Table 1) assuming the steady state is maintained.
S/Y: the domestic savings ratio (Asian Development Bank, 1997).
I/Y: the domestic investment ratio (Asian Development Bank, 1997).

Japanese capital to output ratio of 4.6 by 2015, growth of real GDP per person would be projected over the 20 year period to average 5.1 and 3.7 per cent, respectively.

Comparisons with post-Golden Age Japan and western Europe may be instructive in assessing the likelihood that the Tigers can achieve these TFP benchmarks. Table 15 reports TFP growth in the business sector of these economies and shows both a dramatic slowdown after 1973 and a tendency for most countries to fall short of the TFP growth projected for the leading Tigers in Table 14. This slowdown in TFP growth undermined the 1970s projections for Japan made on a growth accounting basis by Denison and Chung (1976). While they recognized that earlier Japanese growth had a very high transitory catch-up component, they thought that this would not be completely exhausted until around 2002. They projected an average growth rate of 6.2 per cent for real GDP from 1971-2000 (1976, p. 126) with growth in the first half of the 1990s still up around 5.5 per cent per year.

Why were Denison and Chung wrong? The main reason is that they assumed much stronger growth in TFP from continued catch-up. In fact, Japan has become a somewhat sclerotic economy, in significant part due to excessive regulation (Blondal and Pilat, 1997), and has had weak productivity performance in the non-tradables sector. Whereas labor productivity in tradables grew at 4.6 percent per year between 1981 and 1992, in non-tradables it was only 1.9 and in services only 0.5 percent per year (Ito, 1996, p. 237). Even in manufacturing, Japan did not close the labor productivity gap with the USA at all between the mid-1980s and the mid-1990s (Pilat, 1996). Although Japan has continued to invest high proportions of its GDP, the outcome has been that capital productivity has declined dramatically at an average rate of 2 percent per year during 1979-1996 (OECD, 1997). Significant reforms to the postwar Japanese economic system may well be required before Japan can resume its catch-up to the United States.

The slowdown in European productivity growth after the Golden Age probably also reflects a reluctance to de-regulate even though the postwar settlement no longer delivers fast growth. A quantitative study by Koedijk and Kremers (1996) found that, if West Germany had deregulated its product markets to the same extent as Ireland, its TFP growth in the business sector could have been over 1 per cent per year higher. In the European case, a further influence on overall productivity growth has been the rapid growth of the public sector and taxation as a proportion of GDP. While current government spending in the median west European country was 31.9 per cent of GDP in 1960-73 in the first half of the 1990s this had risen to 50.6 per cent (OECD, 1995; OECD, 1997). The impact that rising tax burdens have on growth rates is a very controversial topic in applied economics but the trend in recent studies has been to find that an increase of this magnitude in the tax burden could have an appreciable, negative impact on growth of at least 1 and perhaps 2 per cent per year (de la Fuente, 1997; Engen and Skinner, 1996; Leibfritz et al., 1997). Thus, the slowdown in European growth appears to have been exacerbated by policies targeting other objectives.

Table 15. TFP Growth in the Business Sector
(Percent per year)

	1960-1973		1979-1995
Japan	5.4	Ireland	2.8
Ireland	4.6	Finland	2.6
Italy	4.4	Spain	1.6
Finland	4.0	United Kingdom	1.5
Belgium	3.8	France	1.3
France	3.7	Belgium	1.2
Netherlands	3.4	Denmark	1.2
Spain	3.2	Italy	1.1
Austria	3.1	Japan	1.1
West Germany	2.6	Netherlands	1.1
United Kingdom	2.6	Sweden	1.1
United States	2.5	Austria	1.0
Denmark	2.3	West Germany	0.6
Switzerland	2.1	United States	0.5
Norway	2.0	Norway	0.2
Sweden	2.0	Switzerland	-0.1

Source: OECD (1997)

There are several implications of this discussion for east Asian growth prospects, as follows:

- Some aspects of the Asian situation appear more favorable than in the European case, notably, the absence of the pressures of aging on fiscal policy and the lack of a tradition of expensive social programs which may reduce the risk of rising taxation inhibiting growth.

- Full catch-up to the U.S. requires that attention is paid to non-tradables and other sectors as well as manufacturing. It seems likely that the traditional Asian developmental state model with its emphasis on export targets and performance to limit rent seeking and to inform the allocation of credit is not particularly well-suited to this requirement.

- Catch-up is not automatic and would tend to be held back by inappropriate policy or inefficient use of capital. The industrial policy prescriptions of the developmental state, which are liable to result in the support of declining industries at the expense of the rapid exploitation of new service sector opportunities, are likely to be still less helpful to the next phase of catch-up. Well-handled, financial liberalization can help strengthen market disciplines which will facilitate better productivity performance.

This review of Asian growth prospects essentially represents the situation before the present crisis. Indeed, the TFP growth rates chosen to illustrate the steady state paths are broadly within the range thought likely in a recent pre-crisis OECD projection that projected TFP growth for "Dynamic Asia" at 2.0 to 2.8 per cent and for China at 2.0 to 3.4 per cent per year through 2020 (Richardson, 1997). It is surely too soon to be sure how much has changed or even how many countries will eventually become directly rather than indirectly affected by financial and/or currency crises.

Some favorable features of strong growth countries will presumably be resilient—these might include stocks of human capital, high personal savings, effective mechanisms for technology transfer and their outward orientation. Others such as high investment rates are likely to be undermined in the short term, although not necessarily in the longer term, as American experience during the Great Depression suggests. That episode is an excellent example of an economy that was subject both to macroeconomic and financial mismanagement and experienced a catastrophic decline in economic activity yet, where in the longer term, underlying supply-side strengths enabled the economy to return to its earlier strong growth path.

The most intriguing aspect of the crisis is whether it will tend to promote favorable institutional and policy innovations, leading to improved productivity performance and better use of capital. There is no model available that we can turn to for predictions though it has been argued that crisis may be necessary to overcome the status quo bias of politics as usual and thus to facilitate reform packages (Rodrik, 1996). On the other hand, the

response by Europeans to the world economic crisis of the 1930s in the form of protectionism and loss of faith in market economics is hardly encouraging.

VI. Conclusions

It is now time to reflect on the questions posed in the introduction in the light of the discussion of the intervening sections of the paper. The comments to be made are in the nature of generalizations that really deserve to be heavily nuanced and qualified but may nevertheless serve a useful purpose by provoking others to react.

Three special aspects of east Asian growth have been highlighted. First, compared to the European Golden Age it is the factor accumulation of the region rather than its TFP growth that has been most impressive. High investment has been a striking achievement of the policies adopted by countries in the region with regard both to physical and human capital. Having said this, productivity performance has been stronger than has been allowed by the most strident critics. Second, the population profile of east Asian growth marks the region out as different, especially in the Tigers who have experienced a temporary demographic advantage of rising labor force participation in recent decades. Third, in many countries development has taken place rapidly from an initial position of "economic backwardness" and this has generated its own legacy of financial and other institutions. This history does exert an influence, comprising both positive and negative aspects, on future growth prospects.

The current Asian crisis seems to owe a great deal to the weakness of financial systems reflected in overborrowing and excessive investment together with inadequate regulatory responses (IMF, 1997 and 1998; Miller and Luangaram, 1998). Clearly, there is also a risk of contagion through trading partner difficulties for other fundamentally sound economies. Crisis probably says more about the way that financial liberalization has been handled than about the fundamental growth potential of the economies concerned. Nevertheless, the Korean experience, in particular, does suggest that its earlier approach to financial market decision-making and regulation left the economy badly exposed to a high risk that financial liberalization would turn out badly.

This tends to suggest that there are downsides to the "developmental state" model that its proponents tend to gloss over, in particular its tendency to wasteful investment and the difficulties that it may pose for an eventual transition to a freer capital markets model. The latter will tend to grow in attractiveness after the initial phase of development when co-ordination problems loom much less large and diminishing returns become a bigger threat such that efficient use rather than sheer volume of investment becomes a higher priority. The greatest successes of the managed development approach have tended to come in the context of export-orientated manufacturing and industrialization. In the coming years of de-industrialization, a different model may be more appealing.

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