Draft
ADBI
Workshop on Development Paradigms
10 December, 1999

From Boom to Crisis and Back Again: What Have We Learned?

By
Barry Bosworth and Susan M. Collins*

The 1997-98 financial crisis in Asia dramatically altered perceptions of the region's economic performance. Discussion of an economic miracle was replaced by claims of severe structural imbalances and policy distortions. Even the high rates of capital formation that were originally stressed as a sign of Asia's strength were seen by a new set of commentators as excessive and often in the wrong sectors of the economy. And what was once seen as an important contributor to growth, the intermediation of savings through the banking system, became an illustration of 'crony capitalism' and a predictor of crisis. Prior to the crisis, governments were often seen as having made a positive contribution to growth by coordinating and encouraging private saving and investment. After the crisis, they were blamed for creating situations of severe moral hazard through implicit guarantees on investment and the encouragement of excessive foreign borrowing.[1]

The precise causes of the financial crisis continue to be the cause of heated disputes. One viewpoint blames poor economic fundamentals and inconsistent policies in the affected

* The Brooking Institution and Georgetown University. Olivier Coibion provided extensive research assistance.

countries. The other traces the crisis to a panic by domestic and international investors, similar to an old-fashion bank run. While reality undoubtedly lies between the two interpretations, the strength of the economic recovery in 1999 casts doubts on the more extreme claims of severe structural imbalances. If the problems were as systemic as suggested, we would have expected a gradual and incomplete recovery. Instead, the whole episode is beginning to look more like a typical, albeit severe, business cycle -- triggered by a sharp drop in domestic demand and a buildup of excess inventories -- of the type often experienced in industrial economies. Unlike Latin America in the 1980s debt crisis, but like Mexico in 1995, the Asian economies appear to be bouncing back relatively quickly.

In the following section, we provide a brief summary of East Asia's growth experience, arguing that it has been driven by high rates of capital accumulation. But, it is a mistake to argue that capital accumulation was the only source of growth. It was balanced by substantial increases in the quantity and quality of the workforce and improvements in technical efficiency. Thus, overall rates of return and market interest rates remained above those available in most industrial economies. There was, however, some concern prior to the crisis about the limits to the existing growth strategy that stressed capital accumulation, and a growing recognition of the need to develop more effective means of promoting growth in the efficiency of these economies.

In the second section, we argue that the development of a system of financial intermediation centered around banks played a critical role in sustaining the high rates of capital accumulation. The high rates of debt leverage observed in the region are a natural counterpart of their high growth rates and reliance on banks as the primary source of investment finance.

---

[1] The two contrasting perspectives are most evident in Rodrik (1995) and Corsetti and others (1998).

However, the failure to modernize and diversify the financial system made these economies increasingly vulnerable to financial shocks and crisis.

The role of capital inflows is the subject of the third section. One point is that inflows of foreign capital played a relatively minor role in financing the capital accumulation during the 1980s. East Asia is also notable for the extent to which it relied on bank loans as the primary source of capital inflow. There are also substantial differences among the countries with respect to foreign direct investment: Korea and Taiwan maintained very restrictive policies toward FDI, whereas it was more significant in Singapore, China and Malaysia.

Finally, we turn to the financial crisis. It seems increasingly evident that the problems were caused by a variety of different factors the importance of which varied from country to country. However, we would emphasize two points. First the rapid movement toward capital account convertibility put severe strains on a relatively unsophisticated financial system that had previously focused on the simple intermediation of funds between savers and investors. Given the opportunity to borrow abroad at low rates of interest and invest domestically at significantly higher rates, combined with a fixed exchange rate regime , banks underestimated the degree of currency and interest rate risk that they faced. Second, governments were woefully unprepared to respond to pressures on their currencies. In general, they had extraordinarily low levels of reserve relative to short-term debt; and in some cases, they were also unwilling to raise interest rates for fear of the adverse impacts on an overextended domestic banking system. That left them only with the option of suddenly abandoning their fixed-exchange rate regimes. But, even if we can, with the benefit of hindsight, identify some policy failings, the magnitude of the subsequent collapse seems very extreme. We conclude with a brief discussion of the outlook for recovery and some lessons that might be learned from the experience.

I. The East Asian Growth Experience

East Asia's exemplary growth performance from the 1970s though the mid 1990s is by now an old story. The experiences generated a very large body of research, resulting both in some broadly agreed upon lessons and in some persistent controversies. Building on our own previous analyses, this section provides an overview of key aspects of the East Asian growth experience and discusses the lessons and the controversies. It also highlights some legacies of the boom period, which, we will argue below, may have made these economies more vulnerable to financial crisis while helping them to rebound relatively quickly.

The empirical framework is provided by a set of growth accounts that partition the growth in output per worker from 1960 to 1996 into the contributions from accumulation of physical and human capital and a residual measure of the change in total factor productivity (TFP). This common methodology is applied to 88 developing and industrial countries, including eight East Asian economies, as well as a range of countries from other regions at all levels of development. (A complete country list is provided in the appendix)

Growth accounting is sometimes criticized because it does not identify the underlying fundamental causes of growth. However, this is not its objective. Instead, it provides a consistent decomposition of growth among its proximate sources, which can be very informative. The approach avoids some of the problems associated with cross-country regression analyses. In particular, it has been widely recognized that, because these studies suffer from simultaneity, multi-co-linearity and limited degrees of freedom, their results should be interpreted with caution.

The growth accounting analysis begins with the neoclassical assumption of a stable underlying relationship between output, inputs of physical and human capital, and labor, and technology. Given a degree of competition sufficient to ensure that factor earnings are proportionate to factor productivities, the share of income paid to each factor can be used to measure its relative importance in the production process.[2] To implement the accounting decomposition, we construct indexes of the relevant variables for 88 countries over the period of 1960 to 1996. Gross Domestic Product in 1987 national prices is used as the measure of real output. The measure of the capital stock is updated from data obtained from the World Bank, and is based on a perpetual inventory estimation with a common geometric depreciation rate of 0.04.[3] The measure of the quantity of labor is actual employment for the industrial countries and estimates from the International Labor Organization of the economically-active (labor force) population for the others. Our labor quality index weights the percentage of the population that had attained different levels of educational attainment under the assumption that the return to each additional year of schooling is 7%. Finally, we assume a capital's share of 0.35

Figures 1 and 2 present graphical summaries of the results from the growth decomposition for individual East Asian countries and by region. Similar information over various sub-periods is provided in appendix Tables 1 and 2. We note that very similar results are obtained for different assumptions about underlying parameters. There are several key findings.

---

[2] In principle, the methodology can decompose growth into the contributions from accumulation of capital and technological change that are independent of the parameters or functional form of the production process. In practice, data constraints compelled us to use fixed shares in our calculations, an assumption that is only consistent with a more limited set of production functions. This implies that any deviation from constant returns to scale is allocated to the residual of total factor productivity.

[3] Nehru and Dhareshwar (1993). We extended the estimates through 1996 using data from the 1999 World Tables.

First, as stressed by Alwyn Young, the extent to which the extraordinary growth of East Asia is associated with capital accumulation is striking.[4] During 1973-96, physical plus human capital accumulation in the region accounted for growth in output per worker of 3.1 percent per year, or nearly three-fourths of the region's growth in output per worker. With the exception of the Philippines, where the contribution of capital accumulation to growth in this period was just 1.3%, the contribution ranged from 2.6% for Singapore to 4.4% for Korea. In contrast, the comparable figures for other regions are considerably lower, ranging from 0.6 to 1.6% per year. Our decomposition shows that most of the growth comes from accumulation of physical capital. Educational advances, if adequately measured by wage differentials, make a larger contribution to growth in East Asia (especially Korea) than in other regions, but are still a relatively minor part of the story.

The second, related point is that the contribution from productivity gains in East Asia is surprisingly modest. The estimated growth of TFP for the region is 1.1 percent per year over 1973-96 (as well as the full 36-year period) -- about the same as in the industrial economies of the OECD over the long period. This is, however, well below the 1.8 percent growth rates achieved by industrial countries during 1960-73, a period of rapid growth and "catch-up" for many. As shown in the figures, the role of TFP in East Asia may be changing as there is some evidence of more extensive gains in TFP since the mid-1980s. There are also some important differences among the individual countries – in particular measured TFP growth is higher for

[4]Our results for Korea, Singapore and Taiwan are very similar to those of Young once allowance is made for our inclusion of the agricultural sector.

China[5], while the poor performance of the Philippines pulls down the average. We would have expected that the ability to borrow existing technology and management 'knowhow' from the advanced industrial nations would make the process easier for those who come after. Thus, while it might be tempting to argue that developing economies can make rapid strides forward by simply accelerating the pace at which they adopt the more efficient technologies of the industrial countries, this does not appear to have been the dominant feature of the Asian success story.

An important qualification is that, while the rate of TFP growth in East Asia may seem low in an absolute sense and relative to how far they had to go to catch-up to advanced economies, their TFP growth is far better than that achieved by the other regions. East Asian economies stand out in the extent to which they avoided the large reversals of TFP growth, common in other regions. Indeed, after 1973, TFP growth turned negative in Africa, Latin America and especially the Middle East. In contrast, the major East Asian countries righted their economies and resumed growth relatively quickly. The real surprise is that TFP growth is so low in all of the developing countries.

Our examination of the data for East Asia raises several major questions. First, there continues to be some disagreement about the relative importance of capital accumulation versus productivity growth in explaining the East Asian successes. (See Rodrik (1997).) However, we believe that other evidence also supports the assessment given above. As discussed more fully in our 1996 paper, we use regression analysis to study the extent to which, conditional on basic indicators of initial and external conditions, the East Asian growth experience differs from that

[5] There does seem to be some basis for questioning the magnitude of growth reported for China in the 1980s because the size of the gain in TFP is so large and out of line with that experienced by the other East Asian economies at similar stages of their development.

of other economic regions. We find regional effects that are very large and significant for capital accumulation, but marginal for TFP growth. Thus, while East Asia consistently stands out from all other regions in the magnitude of its capital accumulation, we find no evidence that it is unusual in terms of TFP growth.

The view that productivity growth played a modest role relative to capital accumulation is also supported by case studies of key Korean industries. Baily and Zitzewitz's (1998) analyses of autos, semi-conductors and confection finds that, although these industries had obtained levels of capital intensity as high or higher than in the U.S. by 1995, capital productivity was only about half of that of comparable industries in the U.S. They conclude that structural difficulties limited TFP growth, distorted capital allocation within and among industries and (as discussed below) reduced the return to capital. These developments arguably increased Korea's vulnerability to financial crisis. Thus, the work suggests explanations for why only moderate rates of TFP growth were obtained, despite opportunities to simply copy technologies of the industrial economies. At the same time, Baily and Zitzewitz emphasize that Korea's overall record in mobilizing large amounts of capital and labor so rapidly was a major achievement.

A second question, raised most notably by Paul Krugman (1994), is how much the rate of return to capital had fallen in East Asia by the mid 1990s. To the extent that past growth arose from rapid accumulation of capital, the law of diminishing returns should imply a sharp slowing of growth on the horizon. In our view, this assessment of the prospects for continued growth was overly pessimistic. As discussed above, our decomposition does suggest increases in productivity growth in most East Asian economies after the mid 1980s. In addition, aggregate indicators of both physical and human capital-labor ratios in these countries suggested that they

still had a way to go before catching up with ratios in Japan or the U.S. Further, although the OECD's measure of the aggregate rate of return on capital in Korea has fallen since 1970, it was still 5% above the U.S. return in 1995. (Baily and Zitzewitz, p. 255). It is also notable that market rates of interest have remained high through East Asia.

A final question is what role policy played in achieving rapid growth, and especially in enabling the East Asian economies to achieve and maintain such high rates of capital accumulation. Based on a variety of approaches, including cross-country growth regressions and in-depth case studies, a broad consensus seems to have emerged that prudent macroeconomic policies are an important part of the story. Such policies include the maintenance of a sound fiscal policy, avoidance of real exchange rate overvaluation, and a relatively open trade regime. There is a wider range of views on the importance of various microeconomic policies pursued by governments in the region.[6] Some have argued that, by subsidizing and coordinating investment decisions, the government made a major contribution to promotion of the capital accumulation that lies at the core of the East Asian growth.[7] This is the same role of government that is now under attack as a contributor to the crisis.[8]

II. The Role of Finance

A considerable body of empirical research has demonstrated the importance of the financial system to the process of economic development. Given the alternative of financing investment out of the earnings of past investments, financial intermediation plays a critical role

---

[6] See Collins and Bosworth (1996) for additional citations.

[7] Dani Rodrik (1995).

[8] Corsetti and others (1998).

in the achievement of high rates of growth. If firms cannot move beyond their own resources to tap the saving of households, they face strict limits on their rate of expansion. In addition to serving as a intermediary between savers and enterprises, the financial system can have important influences on the allocation of resources, the management and diversification of risk, and potentially on the management of enterprises. However, financial systems can also be a major source of instability, particularly when the regulatory oversight is weak or public guarantees distort the assessment of risks.

It is frequently argued that in the early stages of the growth process, banks might be preferable to markets as a vehicle for simple intermediation between savers and investors -- principally because they can lower the acquisition costs of information. But as economies develop, the role of the financial system expands beyond simple intermediation to include other functions, such as risk management and the broad dissemination of information. These activities require a more diversified financial system that incorporates both institutions and markets. They also necessitate an effective means of regulatory oversight. These issues take on much greater importance when countries move to link their financial markets with those of other economies.

While financial intermediation can contribute to growth, causality will also flow in the other direction as high rates of growth will cause or be associated with high levels of debt leverage. Firms can obtain funds for expansion through retention of profits, bank lending, and issuance of bonds or equities. Equity issues are almost always a trivial source of funds, except for the formation of new enterprises. For East Asian enterprises, the external finance has been largely drawn from banks and non-bank institutions like life insurance, with little emphasis on the development of bond and short-term debt markets.

In a recent article, Levine summarized a large body of empirical research that argues that financial institutions play a critical role in promoting economic growth (Levine, 1997). He and other authors stress bank loans to the privates sector, expressed as a ratio to GDP, as indicators of the extent of financial intermediation, corporate control, and risk management services (Levine, p705). This is the same variable, however, that has been used more recently by others as a measure of financial fragility and a cause of financial crisis in East Asia (Corsetti and others, 1998). Apparently, while financial expansion may be good for growth, it also increases economies' vulnerability to crisis.

Some comparative measures of the role of bank lending and the efficiency of banks are shown in table 1. The ratio of loans to the private sector to GDP shown in the first column clearly illustrates the prominent role played by the banks in East Asia. In several cases, the ratios are comparable to those of Germany and Japan, countries that are usually characterized as being bank-based. They are also comparable to the fast-growing European economies of Spain and Ireland. The estimate for Korea is low because it has a stronger than average reliance on non-bank financial institutions. The low ratio of private-sector loans to GDP in Latin America is a reflection of a smaller role for banks and financial intermediation in those countries; but it is also the result of extensive lending to the public sector, something that is very uncommon in East Asia. Countries in East Asia display few of the more obvious characteristics of repressed markets, such as extremely high or negative real interest rates. Bank loan rates, as shown in column 2, were positive in real terms in the 1990-95 period for all of the East Asian countries except China.[9]

[9] Several studies have found a strong positive correlation between real interest rates and economic growth. See, for example, McKinnon (1991, pp. 13-19)

It has been argued that the financial crisis was induced, in part, by an excessive expansion of credit in the 1990s; and , as shown in figure 3, credit did grow more rapidly than GDP in the 1990s for many East Asian countries. However, a rising ratio of credit to GDP is equally evident in the 1980s, and it should be expected in economies where financial intermediation is a primary means of financing capital. Nor do the years just prior to the financial crisis stand out as episodes of particularly sharp growth in the countries with the most severe crises. There is evidence of a strong expansion of credit in Malaysia and Thailand, but the pattern of a rising ratio of loans to GDP was equally evident in the 1980s. Another country with strong credit growth, Taiwan, was relatively unaffected by the crisis. Furthermore, an acceleration of credit growth does not seem to have played a role in Indonesia.

Given the very large inflows of foreign capital, as discussed in the following section, it is surprising that we cannot find stronger evidence of a credit boom. It is possible, however, that the foreign funds did not pass through the banks, in which case we would be missing a major portion of the growth in credit.

As measures of bank efficiency, the operating costs of the East-Asian banks (column 3 of table 1) are comparable to those of the G-3 countries and substantially lower than those of Latin American banks. The interest rate spreads, reported in column 4, also seem comparable to the G-3, but it has been argued that the low spreads may reflect the mispricing of risk rather than providing an indicator of efficiency

Concrete measures of the quality of the banking system are also difficult to produce. With a strong accounting system, individual banks could be evaluated in terms of their capitalization and profit rates; but it is the regulatory and accounting systems that are most suspect in these countries. As noted above, the Asian economies do not demonstrate traditional

problems of repressed financial institutions, such as abnormally high or negative real interest rates. We know that the rate of non-performing loans was very high after the crisis, but meaningful data for the pre-crisis period are difficult to obtain because countries differ significantly in the regulations that they impose on bank to classify loans as non-performing. Goldstein (1998) presents a variety of measures on non-performing loans from different sources, but most refer to the post-crisis period, and the official estimates from the BIS for 1996 are high only for Indonesia and Thailand. The numbers shown in column 4 of table 1 are from Corsetti and others (1998), but they are based in part on information from late 1997.[10] Caprio (1998) has developed an index of the quality of bank regulation (column 5) in a small sample of emerging market economies that included data for seven East-Asian countries prior to the crisis. By his measure all of the East Asian economies except Singapore and Hong Kong received poor ratings.

With continued economic growth and the move toward capital account convertibility these countries need a more sophisticated financial system that can do more than mobilize saving and pool project risks. They need financial markets to deal effectively with the management of risks and the diversification of sources of finance. In countries that promote banks to the exclusion of markets, a run from banks automatically becomes a run from the currency because there are few domestic options. Markets for government securities can provide an important stabilizing force by giving savers a source of risk diversification and liquidity. Yet, bond markets were very under-developed in the East Asian economies; and because of their prudent fiscal policies, there was little or no marketable public debt. A more complex financial system requires improvement in regulatory oversight. Yet, by all the available measures it appears that advancements in the structure and oversight of the financial system lagged behind the growth of

[10] There is no question that rates of non-performing loans were very high after the currency collapse; but it is

the rest of the economy. The failure to modernize and develop alternatives to debt finance made the system increasingly vulnerable to destabilizing shocks.

III. Capital Inflows

A growing involvement with international capital markets played a major role in the financial crisis, but for many of the East Asian countries, significant inflows of financial capital were a relatively recent phenomenon. In the aggregate, cross-border capital flows now exceed $1 trillion per year, but only about 10 percent of the funds flow to developing countries. And, as shown in figure 4, much of the growth in the 1990s can be traced to a recovery from the depressed levels of the 1980s, particularly for Latin America. For East Asia, total capital inflows were small in the 1980s, but expanded very rapidly in the 1990s. For the eight countries in our sample, inflows rose from $15 billion in 1988 to $170 billion in 1996. The sharp reversal in recent years is also evident in the decline of the total inflow to $7 billion in 1998. Even Singapore experienced a substantial falloff in inflows in 1998, although much of that is undoubtedly due to reduced demand for its services as an intermediary for European banks. The falloff in capital inflows also seems very similar to that for Mexico in 1995, both in terms of the magnitude relative to GDP and the extent to which FDI flows were relatively unaffected.

The composition and the uses of the inflows are summarized in table 2, for East Asia and Latin America. Both regions experienced a substantial growth in FDI in the 1990s; but there were large differences in the relative contribution of portfolio capital inflows and bank lending. Given their problems with bank loans in the early 1980s, most Latin America countries avoided

---

difficult to obtain data indicating a sharp increase in the problem in the months running up top the crisis.

that form of borrowing in the 1990s, relying instead on a very large buildup of portfolio capital. In the case of East Asia, the growth was concentrated in loans.

There are equally large differences in the way that the funds have been used. In Latin America, large portions of the inflow were associated with increases in the current account deficit (resource transfers); but there has been very little change in the current account balance for East Asia as a whole. Instead, the inflow was largely matched by financial outflows and, for China, reserve accumulation.[11]

The diverse experiences of countries within the region is highlighted in figure 5. China has had very high rates of FDI inflows in the 1990s, but other forms of finance have been very small. FDI has also been substantial for Malaysia and Singapore; but for other countries, it was very low throughout the high growth years of the 1980s and began to expand only in the mid-1990s. Also there is little question that FDI is a far more stable source of finance than either portfolio finance or other investments. Even if China is excluded, FDI continued to grow through the crisis period.

The unimportance of capital inflows as a source of financing for capital accumulation and economic growth is further illustrated in table 3. All of these countries had very high investment rates, but they were matched by equally high rates of national saving. Thus, if we use the results from an earlier study[12] that estimated the share of capital inflows that was used to finance investment, we conclude that, except for Singapore, the inflows could have been responsible for only a small portion of the investment. It was significant for Thailand and Malaysia, but

---

[11] There is considerable variety in the experience of the individual countries. Singapore has large outflows because it is a banking center. Taiwan and Korea also report large capital outflows. Until recently the outflows for China were very small but they have been very large in 1997-98. Also, China has a very large influence on the data for FDI and reserve accumulation.

negligible for Taiwan. The insubstantial role of FDI is also striking for Korea, Taiwan, Indonesia, and Thailand. Given their high domestic rates of saving, most of these countries had no need for the capital inflows, and much of the recent anecdotal evidence suggests that the funds were used for highly speculative purposes.

IV. Financial Crisis

The Asian financial crisis has been the occasion for an enormous outpouring of analysis related to the causes of financial crises. A full explanation for the crisis also continues to generate strong debate. However, some major conclusions do emerge. To begin with, there is quite broad agreement that the common story of a deterioration in macroeconomic fundamentals to a subsequent crisis does not work for Asia. While there was some individual country variation, the macroeconomic indicators were generally strong (table 4); and subsequent empirical analysis has confirmed that prior explanations work poorly to explain the severity of the crisis. In addition, there is very little evidence, except for Thailand, of a significant degree of exchange rate overvaluation (see figure 6). It is notable that the two most obvious indicators – market interest rate spreads and rating agencies failed to provide any consistent evident of impending crisis.

Instead, the focus of attention has been on the role of the domestic financial system. And, as discussed above there is some evidence of significant distortions in the domestic banking system of several of these countries. Yet, the problems of the financial systems of East Asia have existed for many years and there are large numbers of countries that have weak

---

[12] Bosworth and Collins (1999).

banking systems, but do not have crises. Thus, to generate a crisis of the magnitude of East Asia there is a need to link a weak banking system to some other triggering event. That second factor was financial liberalization and the effort to link domestic financial markets to those of other countries. Many countries have encountered difficulties in managing this process of financial market reform.

Financial liberalization requires a profound change in the way that both financial institutions and regulators behave. In closed markets, governments often use the banks as tools of their industrial policies, and the banks come to believe that loans embody an implicit guarantee. After liberalization, there must be a much greater concern with the management of risk and the prevention of rent-seeking behavior. In the short run, liberalization can have the perverse effect of raising interest rates as increased competition pushes some banks and enterprises toward bankruptcy. Without a strong regulatory role , weak banks will raise deposit rates and use the funds to bet on one last high-risk role of the dice. The deposit rate competition draws in otherwise healthy banks.

There appear to be several channels through which problems emerged. First, countries that have been closed to foreign capital are likely to have domestic interest rates well above international rates. When combined with fixed exchange rates, the interest rates differential creates an strong incentive to borrow abroad and lend domestically: banks believe that they have found a ‘money machine.’ It appears that mismatched and unhedged currency positions of both banks and enterprises were a major factor behind the East Asia crisis. It is also very reminiscent of the fundamental problem behind the collapse of the Chilean financial system in 1982. The risks were made even greater when foreign lenders, responding to their own risk concerns and what they believed to be the lessons of lending in Latin America in the 1980s, insisted on short

maturities and often included provisions allowing them to recall loans on short notice. On the basis of data from the Bank for International Settlements (BIS) outstanding bank loans to Asia increased from $110 billion at the end of 1990 to $190 billion in 1993; but then surged to over $360 billion by the end of 1996. Of total loans outstanding of $390 billion in mid-1997, two-thirds had a maturity of one year or less.

Second, inflows of portfolio capital can be an equally important source of instability. Modern tools of portfolio diversification tend to drive out knowledge: individual investors adopt diversification and investments in indexed funds as policies that are superior to the costs of learning about the individual countries in which they invest. Yet, investors will still react strongly to news precisely because countries are good substitutes for one another in the portfolio. The reallocation of these assets in what is fundamentally a stock, not a flow adjustment, can create very large claims on foreign exchange reserves.

Finally, it appears that governments made a very major contribution to the crisis by failing to hold adequate levels of reserves. This is most evident, in table 5, which shows the high level of short-term external debt relative to reserves. In fact, for several countries the available reserves were even less than those reported officially. There are two primary means of defending a fixed-exchange rate: raising domestic interest rates to attract funds or being prepared to meet large fluctuations in the demand for foreign exchange. Apparently the affected countries were reluctant to raise interest rates because of concerns about the consequence for the domestic financial system; yet, they were unable to fill requests for foreign exchange. That left them with no choice but to let the exchange rate decline.

The Asian financial crisis revolved around issues that were similar to the Mexican crisis of 1995 in that they involved concerns of liquidity rather than national solvency. The magnitude

of decline in the real exchange rate (figure 6) was also very similar, even though Mexico began with what was thought to be strong evidence of an overvalued rate. The pattern of recovery in the real exchange rate seems more pronounced in the case of Mexico. One difference is that Mexico had a fairly immediate and rapid recovery in the real exchange rate. A similar pattern is evident in East Asia only for Korea, and that is smaller. One surprise is that the trade-weighted real exchange rate for Taiwan has drifted down in parallel with that for Korea even though there has been only a small change in the nominal rate against the U.S. dollar.

The impact on real output has also been similar to that for Mexico both in magnitude and duration. Nearly all of the decline and the subsequent recovery has been concentrated in domestic demand. The largest percentage declines seem to have been in capital formation, but the recovery was evident first in consumer spending. In that sense, the recessions look very similar to the standard business cycle in the industrial economies. The largest cyclical sensitivities are in the demand for durable goods, and excess inventory accumulation plays a major role in generating an even larger cycle in production. Thus far, the gains in export growth have been less than would have been expected, given the magnitude of exchange rate depreciation.

The financial crisis should be interpreted as an interruption of Asian growth, rather than the end of an era. We also believe that the crisis can be traced primarily to a failure to modernize and expand the financial system in step with growth in the rest of the economy. Those problems were made particularly acute when these countries tried to open their financial systems to the rest of the world without sufficient provision for the changes in the behavior of banks and regulators that would be required by such a transformation. However, the historical experience suggests that economies recover relatively quickly from financial crises. While the

financial problems are far from resolved, many enterprises have found means of obtaining financing for current operations.

V. Lessons Learned

The whole crisis experience and its immediate aftermath is very reminiscent of the chaotic conditions generated by banks runs within the context of a domestic financial system. In that sense it would seem to illustrate the need to use an international lender-of-last-resort an part of the policy response to supply the markets with the necessary liquidity. If individual countries have to hold large volumes of financial capital in low-return reserves to meet the potential threat of flights from their currencies, most of the benefits of a more open international market for capital would be lost. Thus, the most appropriate policy response would be to follow Bagehot's dictum to lend quickly and generously, but at a penalty rate.

However, it is also evident that such an institution is unlikely to emerge at the international level in the near future for several reasons. We know from the experience with the domestic financial system that concerns about moral hazard are very real; and most countries try to respond by combining the lender-of-last-resort function with a strong system of regulatory oversight. It is hard to visualize sovereign governments permitting that same degree of oversight and regulation of their domestic institutions by an international institution. Yet, without strong oversight, the system could cause more harm by encouraging unproductive risk-taking and delaying the process of restructuring and closing failed institutions

Furthermore, whether correct or not, the industrial economies do not perceive the institution of an international lender-of-last-resort to be something that they need. It is viewed as

very costly and directed toward problems that are of immediate threat only to developing countries who are faced with positions of large net indebtedness and the potential for currency runs. It is difficult to visualize a system in which they would authorize lending with the magnitude and speed that would be required. An international lender will always be too little, too late.

Thus, countries that envision a process of financial reform and opening of capital markets need to understand that they are essentially on their own, and that international assistance will essentially be limited to advice. That suggests a defensive strategy that emphasizes a staged process of liberalization that focuses on strengthening domestic institutions and regulatory oversight prior to exposing the system to much larger international market. It also probably implies a shift in the structure of the financial system toward an expanded role for markets to complement the role of lending institutions. By their nature, markets are a faster means of resolving valuation problems in the aftermath of a crisis, they can provide greater liquidity, and they can serve as important benchmarks in the pricing of financial claims.

Second, countries need to carefully monitor their liquidity position by holding large reserves of foreign currency and restricting short-term inflows of capital, as with the system used by Chile or by restricting portfolio investments to closed-end funds. There is strong empirical evidence that FDI can have highly beneficial economic effects, both as a means of financing capital formation and as a vehicle for importing technology and management skills. Such inflows have also been surprisingly impervious to transitory financial crises. But, the benefits of portfolio capital and bank lending seem much smaller, and their potential for instability is much greater.

Third, countries may also need to limit the risks by moving away from fixed exchange rate regimes. Perversely, the more that private financial institutions believe the government's commitment to a fixed rate, the more they will be tempted to accept large unhedged foreign currency exposures. The shift to a flexible exchange rate or the opposite extreme of moving to monetary union may be the only means of managing those risks. Speculators are becoming increasingly aware of the political and economic limits on governments' willingness to defend their currencies from major attacks. Small policy errors can in such a world suddenly explode into very costly currency crises.

References

Asia Development Bank. 1999. *Asian Development Outlook*. (Hong Kong: Oxford University Press).

Alexander, William E., Jeffrey M. Davis, Liam P. Ebrill, and Carl-Johan Lindgren (editors). 1997. *Systemic Bank Restructuring and Macroeconomic Policy*, Washington D.C: the International Monetary Fund.

Baily, Martin Neil, and Eric Zitzewitz. 1998. "Extending the East Asian Miracle: Microeconomic Evidence from Korea," *Brookings Papers on Economic Activity, Microeconomics*, 249-322.

Calvo, G., Morris Goldstein, Eduard Hochreiter (editors). 1996. *Private Capital Flows to Emerging Markets After the Mexican Crisis*, Washington D.C: Institute for International Economics and the Austrian National Bank.

Calvo, G. and Enrique Mendoza. 1996. "Mexico's Balance of Payments Crisis: A Chronicle of a Death Foretold," *Journal of International Economics* 41: 235-64.

Caprio, Gerard, and Daniela Klingebiel. 1996. "Bank Insolvency: Bad Luck, Bad Policy, or Bad Banking?" in Michael Bruno and Boris Pleskovic, *Annual World Bank Conference on Development Economics*, Washington D.C: the World Bank

Chang, Roberto, and Andres Velasco. 1997. "Financial Fragility and the Exchange Rate Regime," working paper, Federal Reserve Bank of Atlanta.

Collins, Susan M., and Barry Bosworth. 1996. "Economic Growth in East Asia: Accumulation Versus Assimilation," *Brookings Papers on Economic Activity,2:1996*: 135-203.

_____. 1998. "Capital Flows to Developing Countries: Implications for Saving and Investment," *Brookings Papers on Economic Activity,1:1999*: 143-180.

Corsetti, Giancarlo, Paolo Pesenti, and Nouriel Roubini. 1998. "Paper Tigers: A Model of the Asian Crisis," NBER Working Paper No. 6783 (Cambridge: NBER).

Diamond, Douglas W., and Philip H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity," *Journal of Political Economy*, 91, no.3: 401-19.

Dornbusch, Rudiger, Ilan Goldfajn, and Rodrigo O. Valdés, "Currency Crises and Collapses," *Brookings Papers on Economic Activity,1995:2*, 219-95.

Dziobek, Claudia, and Ceyla Pazarbasioglu. 1997. " Lessons From Systemic Bank Restructuring: a Survey of 24 Countries," IMF Working Paper 97/161.

Eichengreen, Barry, Andrew Rose, and Charles Wyplosz.1995. " Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks," *Economic Policy* 21: 249-312.

Frankel, Jeffrey, and Andrew Rose. 1996. "Currency Crashes in Emerging Markets: An Empirical Treatment, *Journal of International Economics* 41: 351-66.

Goldstein, Morris. 1998. *The Asian Financial Crisis: Causes Cures, and Systemic Implications*, Washington D.C: Institute for International Economics.

International Monetary Fund. 1999. *International Financial Statistics*, Monthly CD-Rom, Washington D.C:

Kaminsky, Graciela L, Saul Lizondo, and Carmen M. Rienhart. 1997. "Leading Indicators of Currency Crises," IMF Working Paper 97/79, Washington D.C:International Monetary Fund.

Krugman, Paul R. 1979. "A Model of Balance of Payments Crises," *Journal of Money, Credit, and Banking*, 11: 311-325.

_____. 1996. "Are Currency Crises Self-Fulfilling?" *NBER Macroeconomics Annual 1996*; 345-407.

Levine, Ross. 1997. "Financial Development and Economic Growth: Views and Agenda," *Journal of Economic Literature*,35 (June): 688-726.

McKinnon, Ronald I. 1991. *The Order of Economic Integration*, Baltimore: John Hopkins Press.

Mishkin, Frederic S. 1999. "Lessons From the Asian Crisis," NBER Working Paper No. 7102 (Cambridge: NBER)

Obstfeld, Maurice. 1986. "Rational and Self-Fulfilling Balance-of-Payments Crises," *American Economic Review*, (March): 72-81.

Radelet, Steven, and Jeffrey D. Sachs. 1998. "The East Asian Financial Crisis: Diagnosis, Remedies, Prospects*," Brookings Papers on Economic Activity, 1:1998*: 1-90.

Republic of China, Council for Economic Planning and Development, *Taiwan Data Book*, 1997, Taipei.

Rodrik, Dani. 1997. "TFPG Controversies, Institutions, and Economic Performance in Asia," NBER Working Paper, No 5914 (Cambridge: NBER).

_____ .1995. " Getting Interventions Right: How South Korea and Taiwan Grew Rich," *Economic Policy*, vol 20 (April) and , NBER Working Paper, No 4964 (Cambridge: NBER).

Sachs, Jeffrey D, and Steven Radelet. 1998. "The East Asian Financial Crisis: Diagnosis, Remedies, Prospects*," Brookings Papers on Economic Activity, 1:1998*, 1-74.

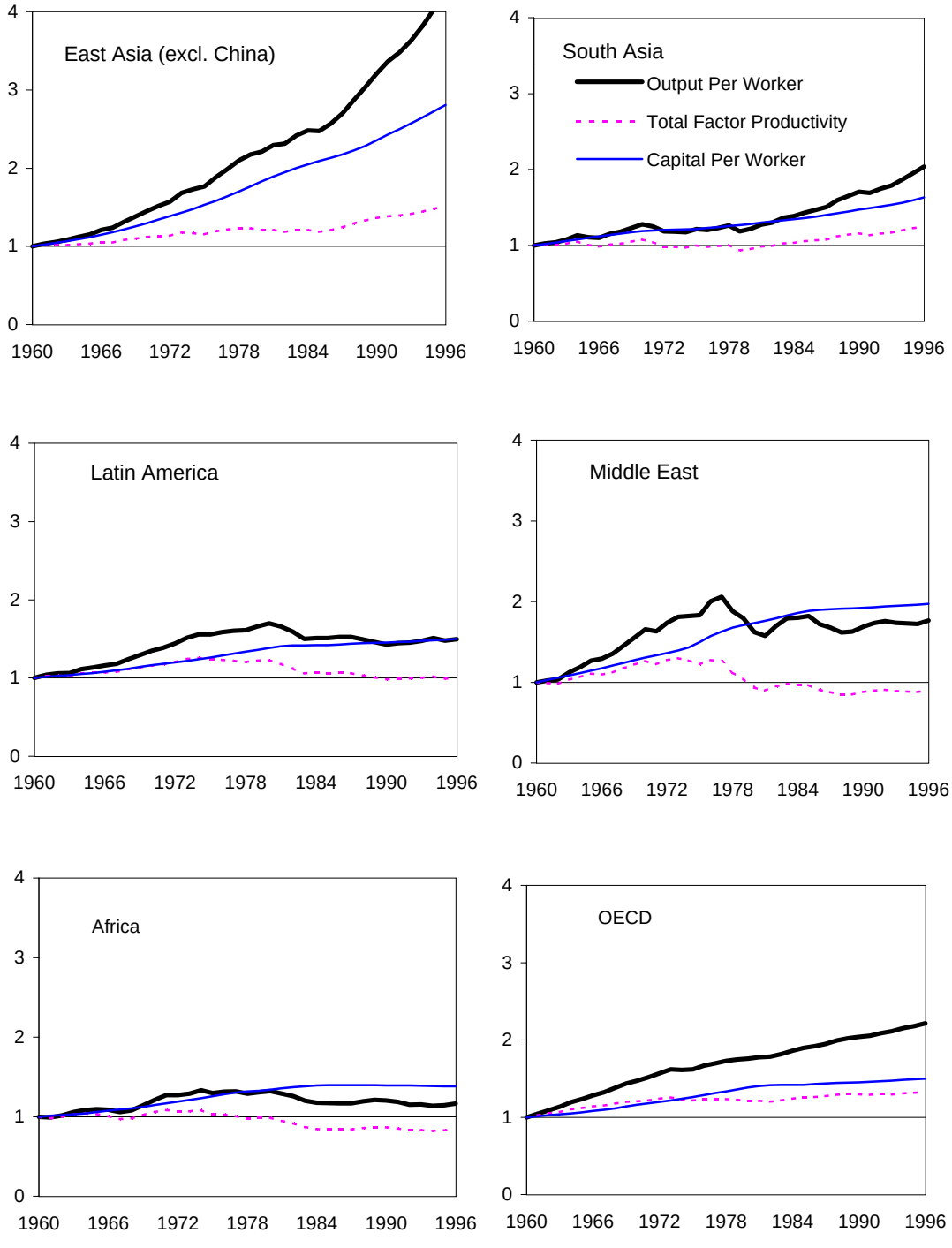
Sundararajan, V. And Tomás J.T. Baliño (editors). 1991. *Banking Crises: Causes and Issues*, Washington D.C: the International Monetary Fund.

Velasco, Andres. 1987. "Financial and Balance of Payments Crises: A Simple Model of the Southern Cone Experience," *Journal of Development Economics* 27:263-83.

World Bank. 1993. *The East Asian Miracle: Economic Growth and Public Policy* (New York: Oxford University Press).

Figure 1: Growth in Output per Worker and Its Components, by Region, 1960-96

Index, 1960=1



Source: See Appendix Table A1

Figure 2: Growth in Output per Worker and Its Components in East Asian Countries: 1960-96

Index, 1960=1

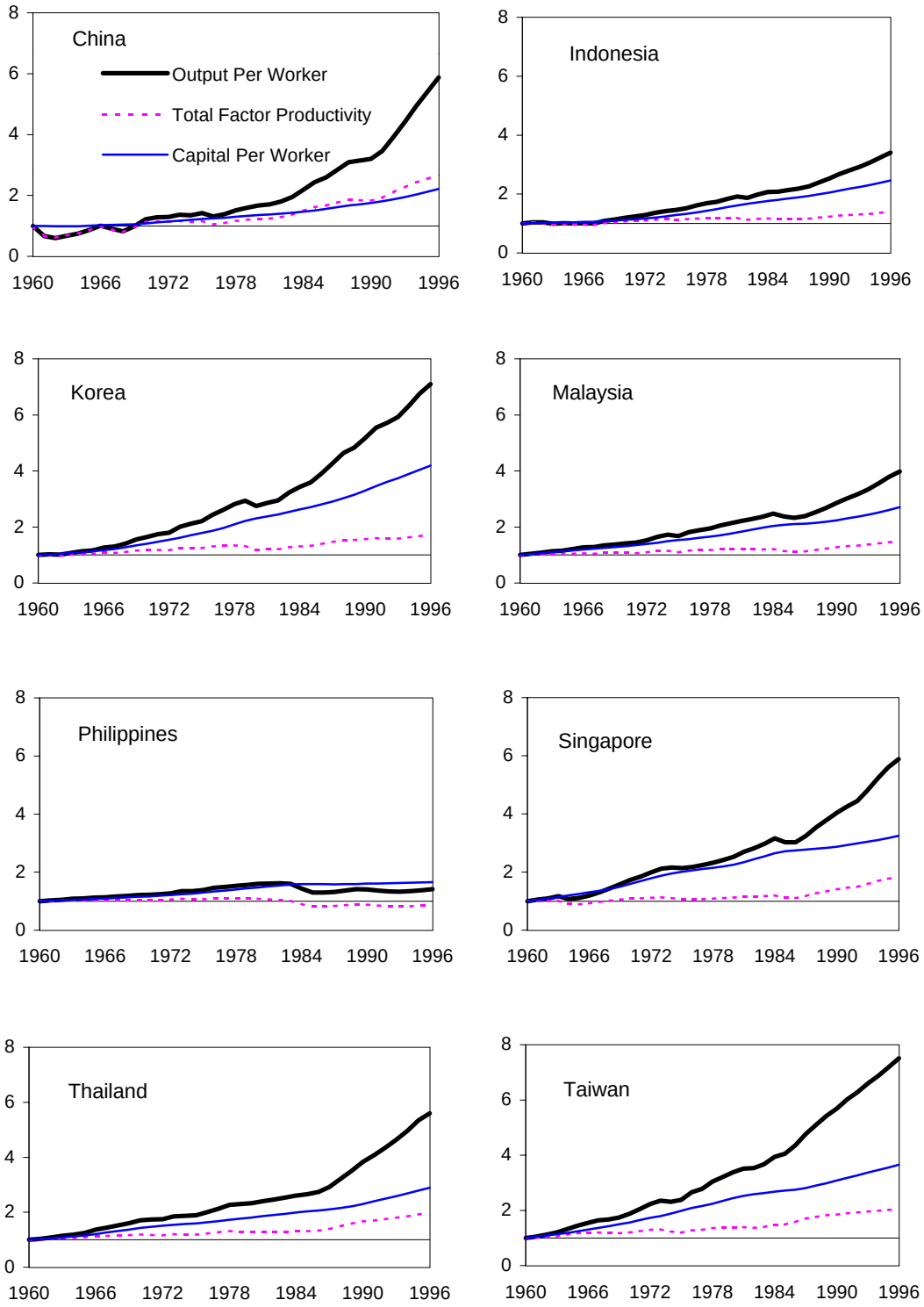
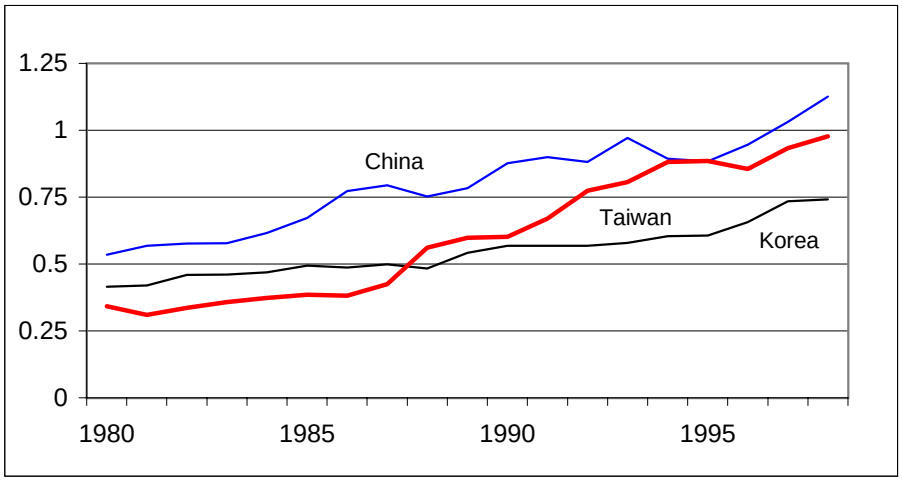
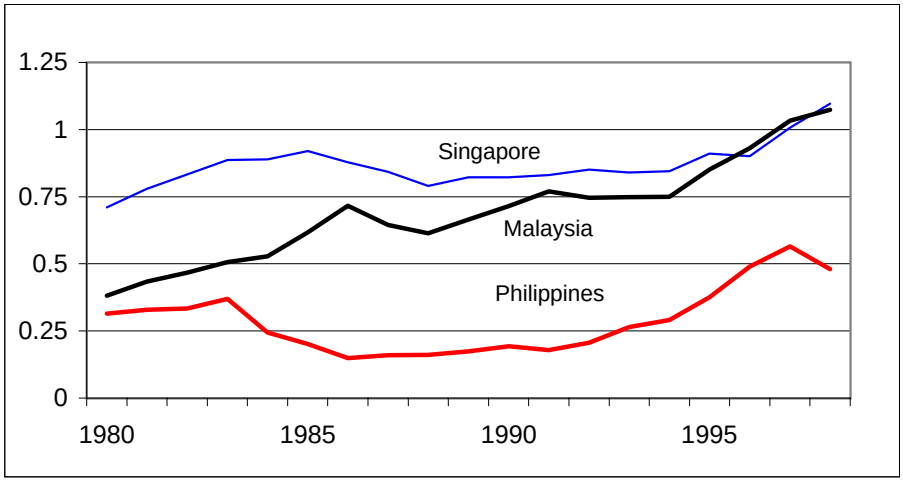
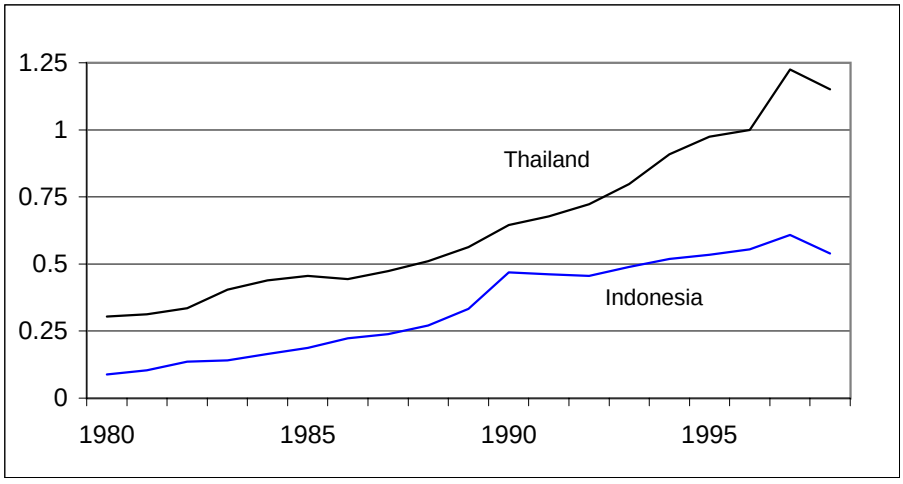


Figure 3: Private Sector Lending of the Banking Sector, 1980-98
ratio to GDP

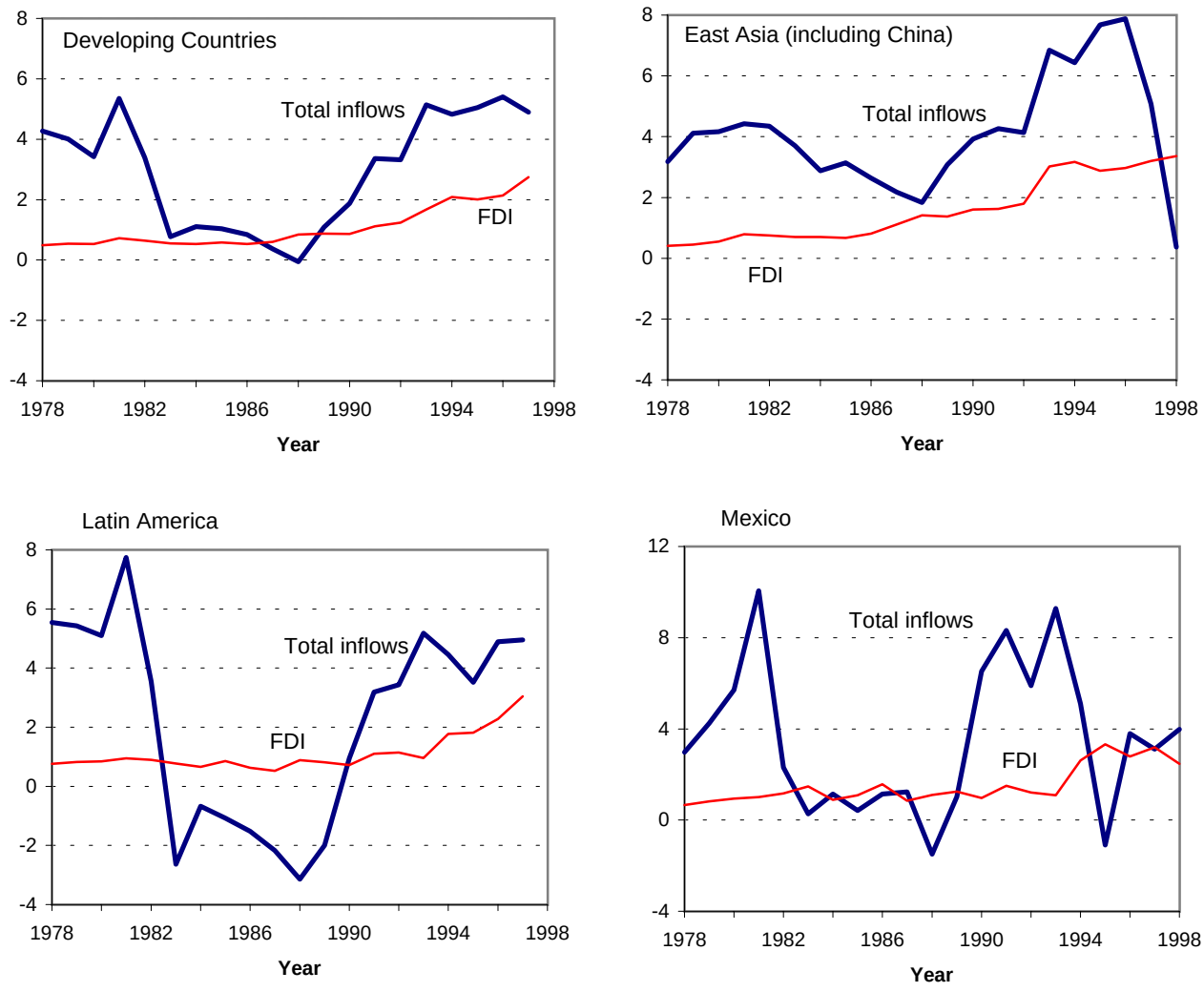






Source: IMF(1999).

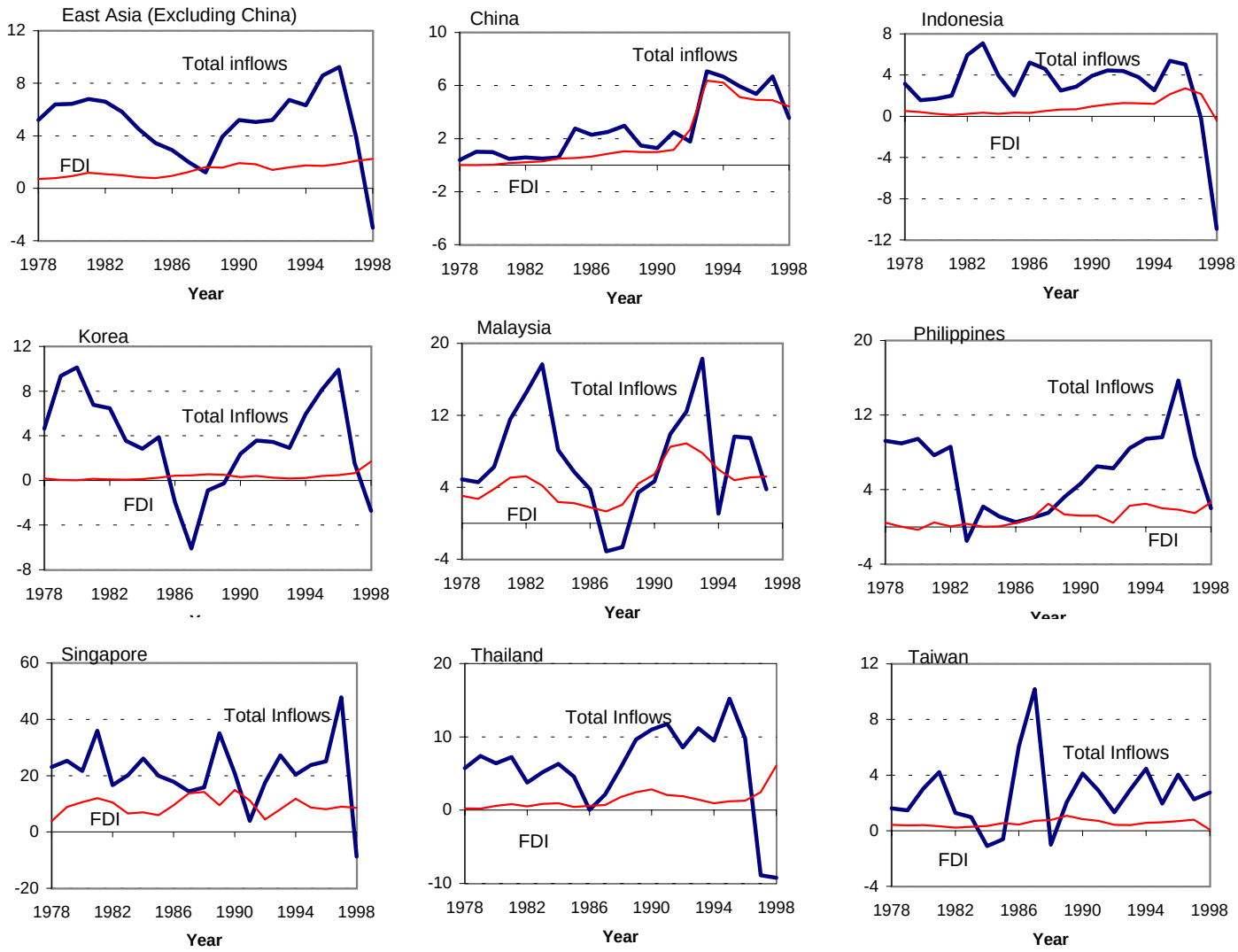
Figure 4: Total Capital Inflows and Foreign Direct Investment to Developing Countries, 1978-98
percent of GDP



Source: International Monetary Fund 1999.

Note: No data available for Malaysia 1998, so it is not included in calculations for East Asia 1998.

Figure 5: Total Capital Inflows and Foreign Direct Investment (FDI),1978-98, percent of GDP

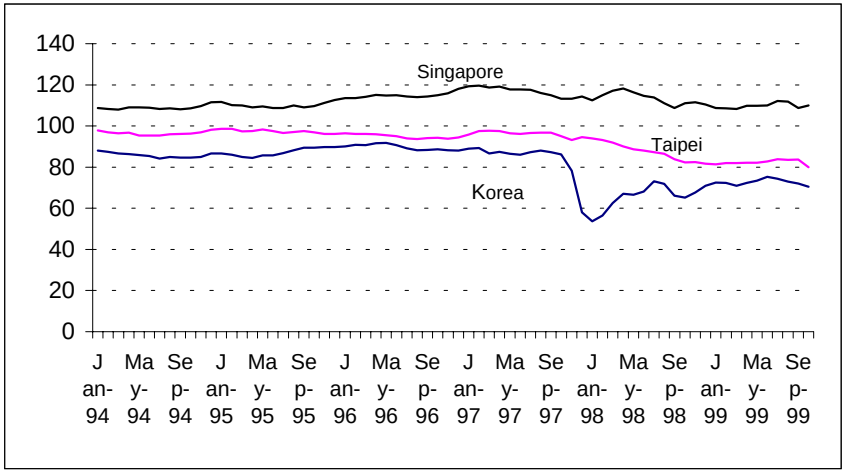


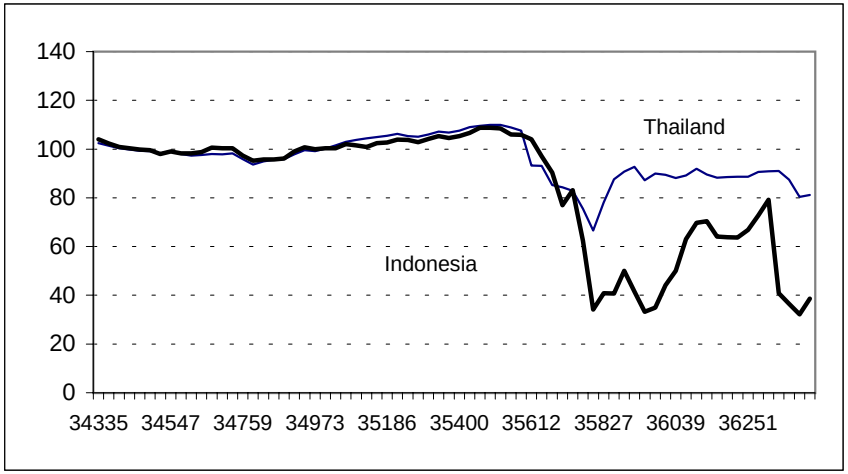
Source: International Monetary Fund 1999.

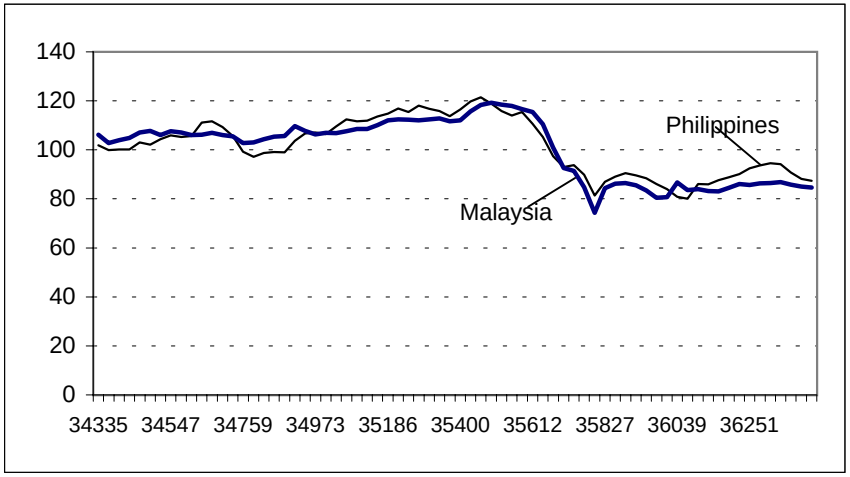
Note: No data available for Malaysia 1998, so it is not included in calculations for East Asia 1998.

Figure 6. Indexes of the Real Exchange Rate, Morgan-Guaranty, 1994-99

1990 = 100







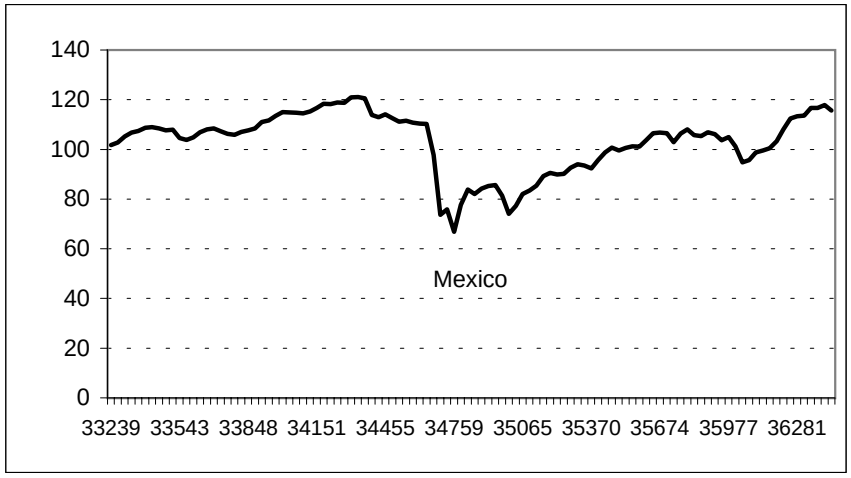
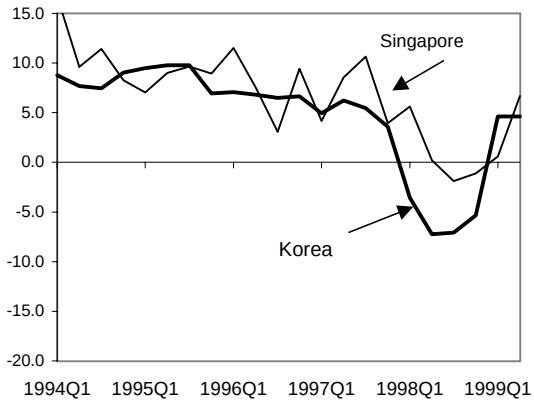
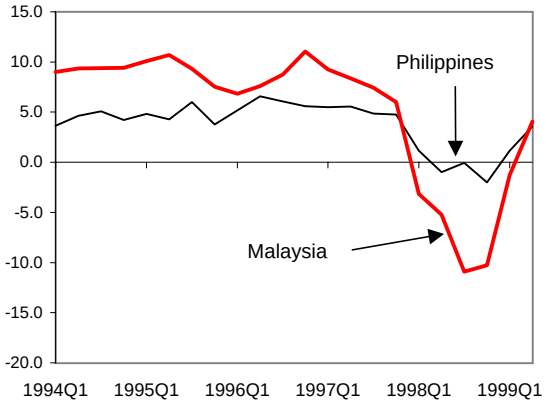
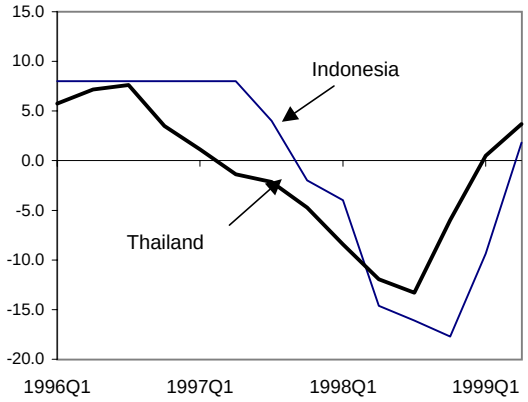
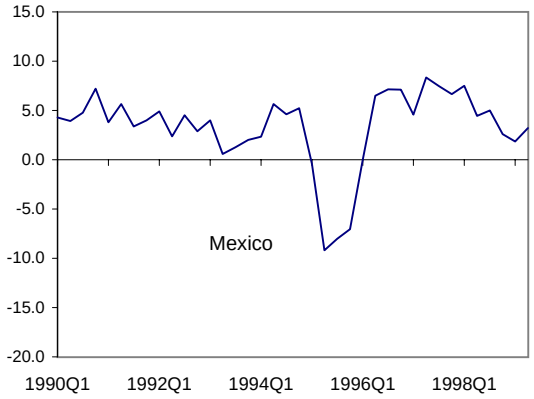


Figure 7. Rates of GDP Growth in East Asia and Mexico, Quarterly, 1994:1 to 1999:2
percentage change over prior year









Annual Growth Rate of GDP (% per year)

Countries	1996	1997	1998	1999	2000
China	9.6	8.8	7.8	6.8	6.0
Indonesia	7.8	4.9	-13.2	2.0	4.0
Korea	7.1	5.5	-5.8	8.0	6.0
Malaysia	8.6	7.7	-7.5	2.0	3.9
Philippines	5.8	5.2	-0.5	3.0	4.5
Singapore	6.9	7.8	1.5	5.0	6.0
Taiwan	5.7	6.8	4.8	5.5	6.3
Thailand	5.5	-1.3	-9.4	3.0	5.0

Source: Asian Development Bank, 1999

Table 1. Comparative Measures of Size and Efficiciency of the Banking System

Country	Private Sector Loans/GDP 1998	Real Loan Rate 1990-95	Non-interest Operating Costs	Net Interest Expense	Non-Performing Loans[a]	Index of Regulatory Environment[b]
			Percent of total assets			
China	1.13	-0.79	n.a.	n.a.	14.0	n.a.
Indonesia	0.54	11.54	2.4	3.3	12.9	52
Korea	0.74	2.60	1.7	2.1	8.4	45
Malaysia	1.07	3.94	1.6	3.0	9.9	41
Philippines	0.48	7.19	n.a.	n.a.	14.0	47
Singapore	1.10	3.62	1.4	1.6	4.0	16
Thailand	1.15	7.51	1.9	3.7	13.3	52
Taiwan	0.97	4.46	1.3	2.0	3.9	n.a.
Brazil	0.29	n.a.	6.0	6.8	5.8	30
Chile	0.62	9.74	3.0	6.1	1.0	25
Mexico	0.18	8.92	3.9	5.1	12.5	n.a.
Greece	0.23	10.94	n.a.	n.a.	n.a.	n.a.
Ireland	1.12	6.71	n.a.	n.a.	n.a.	n.a.
Spain	0.98	6.92	n.a.	n.a.	n.a.	n.a.
Germany	1.08	8.83	1.1	1.4	n.a.	n.a.
Japan	1.17	3.71	0.8	1.1	3.5	n.a.
United States	0.71	4.13	3.7	3.7	0.8	n.a.

Source: IFS(1999) and Goldstein and Turner (1996)

a. Corsetti and others (1998)

b. Caprio (1998). Low values indicate a high ranking.

Table 2. Capital Inflows to Latin America and East Asia by Type and Use, 1982-97

Category	Latin America		East Asia	
	1982-89	1990-97	1982-89	1990-97
	Billions of US $			
By Type of Inflows:				
Foreign Direct Investment	6	26	7	45
Portfolio Investment	-1	37	2	19
Other Investment	-15	-3	11	37
Total	-9	59	20	101
By Use of Inflows:				
Current Account Financing	12	35	-6	0
Capital Outflows	1	17	10	54
Reserves and Related Items	-26	6	14	30

Source: IMF (1999), and authors' calculations.

Table 3. The Contribution of Capital Inflows to Domestic Investment, 1978-95
period averages, percent of GDP

	1978-1989			1990-1995		
		Contribution from Capital Inflows:			Contribution from Capital Inflows:	
Country	Investment	Total	FDI	Investment	Total	FDI
China	29.0	0.7	0.4	32.2	2.2	3.0
Indonesia	24.2	1.9	0.3	27.3	2.1	1.1
Korea	29.9	1.7	0.2	36.7	2.2	0.2
Malaysia	29.6	3.2	2.6	36.3	4.8	5.7
Philippines	23.2	2.2	0.4	22.3	3.9	1.3
Singapore	31.4	11.8	7.6	33.8	9.6	8.1
Thailand	28.0	2.8	0.7	40.7	5.8	1.4
Taiwan	23.2	2.2	0.4	22.5	0.4	0.5

Notes: Investment implied by capital inflows are calculated using actual capital inflows and regression coefficient estimates from Bosworth and Collins (1999, p. 160,162).

Table 4. Macroeconomic Indicators, Selected Asian Economies, 1990-96
percent

	Growth Rate		Inflation rate		Fiscal balance/GDP	
Economy	**1990-95**	**1996**	**1990-95**	**1996**	**1990-95**	**1996**
Korea	7.8	7.1	6.6	5.0	0.2	0.5
Indonesia	8.0	7.8	8.7	7.9	0.2	0.2
Malaysia	8.9	8.6	3.7	3.5	-0.4	0.7
Philippines	2.3	5.8	10.6	9.1	-1.1	0.3
Singapore	8.6	6.9	2.7	1.4	9.4	6.8
Thailand	9.0	5.5	5.0	5.9	3.2	2.4
China	10.7	9.6	11.3	8.3	-1.0	-0.8
Taiwan	6.4	5.7	3.8	3.1	-5.0	-6.6

	Savings/GDP		Current Account/GDP	
Economy	**1990-95**	**1996**	**1990-95**	**1996**
Korea	35.6	33.7	-1.2	-4.7
Indonesia	31.0	27.3	-2.5	-3.4
Malaysia	36.6	42.6	-5.8	-5.0
Philippines	16.6	18.5	-3.7	-4.7
Singapore	47.0	51.2	0.6	15.4
Thailand	34.4	33.7	-3.9	-7.9
China	40.8	40.5	1.2	0.9
Taiwan	26.9	25.1	4.2	4.0

Source: Asian Development Bank (1999, p.25)

Table 5: Short-Term External Debt and International Reserves, 2nd quarter of 1997

Economy	Short-Term Debt (billions $)	International Reserves (billions $)	Debt-Reserve Ratio
Korea	70.18	34.07	2.06
Indonesia	34.66	20.34	1.7
Malaysia	16.27	26.59	0.61
Philippines	8.29	9.78	0.85
Singapore	196.6	80.66	2.44
Thailand	45.57	31.36	1.45
China	n.a	n.a	n.a
Taiwan	21.97	90.02	0.24

Source: Asian Development Bank (1999,p.26)

Table 6. Indicators of Corporate Financing, 1996

Economy	Debt-to-Equity Ratio	Ratio of short-term debt to total debt
Hong Kong	1.56	0.60
Indonesia	1.88	0.54
Japan	2.21	0.58
Korea	3.55	0.57
Malaysia	1.18	0.64
Philippines	1.29	0.48
Singapore	1.05	0.58
Taiwan	0.80	0.59
Thailand	2.36	0.63

Source: Asian Development Bank (1999,p.27)

Appendix Table A1: Sources of Growth by Region, 1960-96
annual percentage rate

Region/Period	Output per Worker	Contribution of: Physical Capital	Education	Factor Productivity
East Asia				
1960-73	4.1	2.3	0.5	1.3
1973-96	4.3	2.6	0.5	1.1
1960-96	4.1	2.4	0.5	1.1
South Asia				
1960-73	1.3	1.1	0.3	-0.2
1973-96	2.5	0.9	0.5	1.1
1960-96	2.0	0.9	0.4	0.6
Africa				
1960-73	2.0	1.3	0.2	0.5
1973-96	-0.5	0.4	0.2	-1.0
1960-96	0.4	0.7	0.2	-0.5
Middle East				
1960-73	4.7	2.1	0.4	2.0
1973-96	-0.1	1.0	0.6	-1.7
1960-96	1.6	1.4	0.5	-0.3
Latin America				
1960-73	3.2	1.3	0.3	1.7
1973-96	-0.1	0.5	0.4	-1.0
1960-96	1.6	1.4	0.5	-0.3
OECD				
1960-73	3.8	1.7	0.3	1.8
1973-96	1.4	0.8	0.4	0.2
1960-96	2.2	1.1	0.3	0.8

Source: Updated data fro Bosworth and Collins (1996), author's calculations.

Appendix Table A2: Sources of Growth, East Asia, 1960-96
Annual percentage rate

Region/Period	Output per Worker	Contribution of: Physical Capital	Education	Factor Productivity
China				
1960-73	2.4	0.8	0.4	1.2
1973-96	6.9	2.4	0.5	3.8
1960-96	5.0	1.8	0.5	2.7
Indonesia				
1960-73	2.4	0.9	0.5	0.9
1973-96	4.3	2.8	0.5	0.9
1960-96	3.5	2.0	0.5	0.9
Korea				
1960-73	5.5	3.1	0.6	1.7
1973-96	5.9	3.4	1.0	1.4
1960-96	5.6	3.2	0.8	1.5
Malaysia				
1960-73	3.9	2.4	0.5	1.1
1973-96	4.1	2.5	0.4	1.1
1960-96	3.9	2.4	0.4	1.1
Philippines				
1960-73	2.3	1.1	0.5	0.7
1973-96	0.2	0.9	0.4	-1.1
1960-96	1.0	1.0	0.4	-0.4
Singapore				
1960-73	5.9	4.6	0.3	0.9
1973-96	4.8	2.5	0.1	2.2
1960-96	5.0	3.2	0.2	1.7
Thailand				
1960-73	4.9	3.4	0.0	1.4
1973-96	5.2	2.4	0.4	2.2
1960-96	4.9	2.7	0.3	1.9
Taiwan				
1960-73	6.8	3.8	0.7	2.1
1973-96	5.4	2.8	0.5	2.1
1960-96	5.8	3.1	0.6	2.0

Source: Updated data from Bosworth and Collins (1996), author's calculations

Appendix Table A3

Country Sample

The Eighty-Eight countries in our sample, in their regional groupings, are as follows:

China

East Asia
Indonesia
Korea
Malaysia
Philippines
Singapore
Taiwan
Thailand

South Asia
Bangladesh
India
Myanmar
Pakistan
Sri Lanka

Africa (sub-Saharan)
Cameroon
Cote d'Ivoire
Ethiopia
Ghana
Kenya
Madagascar
Malawi
Mali
Mauritius
Mozambique
Nigeria
Rwanda
Senegal
Sierra Leone
South Africa
Sudan
Tanzania
Uganda
Zaire
Zambia
Zimbabwe

Middle East (with North Africa)
Algeria
Cyprus
Egypt
Iran
Israel
Jordan
Malta
Morocco
Tunisia

Latin America
Argentina
Bolivia
Brazil
Chile
Columbia
Costa Rica
Dominican Republic
Ecuador
El Salvador
Guatemala
Guyana
Haiti
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
Trinidad and Tobago
Uruguay
Venezuela

Industrial Countri
Australia
Austria
Belgium
Canada
Denmark
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Japan
Netherlands
New Zealand
Norway
Portugal
Spain
Sweden
Switzerland
Turkey
United Kingdo
United States