Volume Title: NBER Macroeconomics Annual 1994, Volume 9

Volume Author/Editor: Stanley Fischer and Julio J. Rotemberg, eds.

Volume Publisher: MIT Press

Volume ISBN: 0-262-05172-4

Volume URL: http://www.nber.org/books/fisc94-1

Conference Date: March 11-12, 1994

Publication Date: January 1994

Chapter Title: The East Asian Miracle: Four Lessons for Development Policy

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Chapter URL: http://www.nber.org/chapters/c11011

Chapter pages in book: (p. 219 - 282)

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THE WORLD BANK

The East Asian Miracle: Four Lessons for Development Policy

Since the study of economic development began in earnest at the close of the Second World War, academics and policymakers have debated the appropriate role of public policy in developing economies. East Asia has a remarkable record of high and sustained economic growth. From 1965 to 1990 its 23 economies grew faster than those of all other regions. Most of this achievement is attributable to seemingly miraculous growth in just eight high performing Asian economies (HPAEs)—Japan; the "four tigers": Hong Kong, the Republic of Korea, Singapore, and Taiwan; and the three newly industrializing economies (NIEs) of Southeast Asia, Indonesia, Malaysia, and Thailand.[1] The East Asian economies provide a range of policy frameworks—extending from Hong Kong's nearly complete laissez faire to the highly selective policy regimes of Japan and Korea. The coexistence of activist public policies and rapid

Presented at the National Bureau of Economic Research, Ninth Conference on Macroeconomics. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author. They do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

1. These eight HPAEs are the subject of the World Bank's recently completed study, *The East Asian Miracle: Economic Growth and Public Policy*, on which this essay draws extensively. *The East Asian Miracle* report is the product of a World Bank research team led by John Page and comprising Nancy Birdsall, Ed Campos, W. Max Corden, Chang-Shik Kim, Howard Pack, Richard Sabot, Joseph E. Stiglitz, and Marilou Uy. William Easterly, Robert Z. Lawrence, Peter Petri, and Lant Pritchett made major contributions. Lawrence MacDonald was the principal editor. Background papers are available from the Policy Research Department, The World Bank. The findings, interpretations and conclusions expressed in this paper are entirely those of the author. They do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

growth in some of the East Asian economies—especially Japan, Korea, Singapore, and Taiwan—has raised complex and controversial questions concerning the relationship between government, the private sector, and the market.

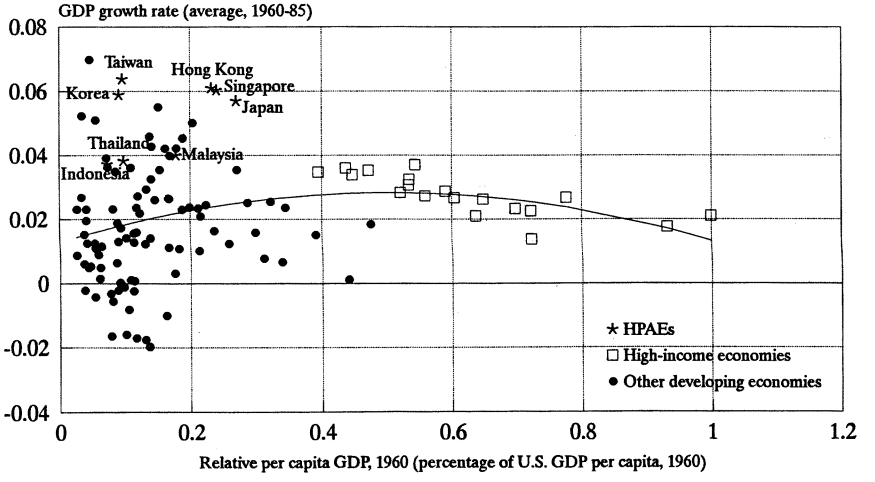
This essay looks at four public policy lessons of the East Asian miracle. Section 1 argues that the eight HPAEs can be grouped together and distinguished from other low- and middle-income countries on the basis of their rapid, sustained, and shared growth. Section 2 examines the controversy over the sources of growth in the HPAEs and presents evidence on the relative roles of accumulation and total factor productivity (TFP) change. Section 3 discusses two aspects of public policy in East Asia that conform to the conventional wisdom concerning good development policy—macroeconomic management and broad-based educational policies. Section 4 examines two more controversial issues —the significance of the HPAEs' export push strategies and industrial policies for TFP change. It concludes that export orientation rather than selective intervention played the dominant role in increasing economy-wide TFP growth rates.

1. *The Nature of the Miracle—Rapid Growth with Equity*

The HPAEs are a highly diverse group of economies, differing in natural resources, population, culture, and economic policy. What are the characteristics that these eight economies shared that cause them to be grouped together and set apart from other developing economies? First, they had rapid, sustained growth between 1960 and 1990. This in itself is unusual among developing economies. Figure 1 shows the relationship between relative income level in 1960 and per capita income growth for a sample of 119 countries during the period 1960–1985. This is the standard "convergence picture" first presented in Romer (1987). The figure also plots an estimated nonlinear relationship between initial income and growth.[2] Per capita income growth is essentialy independent of the level of relative income in 1960. The fit of the regression is poor and the significance of individual coefficients low.[3]

2. The regression line is the result of a regression of per capita income growth (in constant 1980 international prices) on 1960 income per capita, including nonlinear terms up to the second power.
3. Dollar (1991) finds a similar pattern using a sample of 114 countries and the absolute level of per capita income in 1960. He finds a clearer pattern in which the lowest deciles have the lowest per capita income growth rates, the middle-income deciles have the highest, and the high-income countries are between. He also reports low significance of his regression results, however.

Figure 1 GDP GROWTH RATE, 1960–1985, AND GDP PER CAPITA, 1960



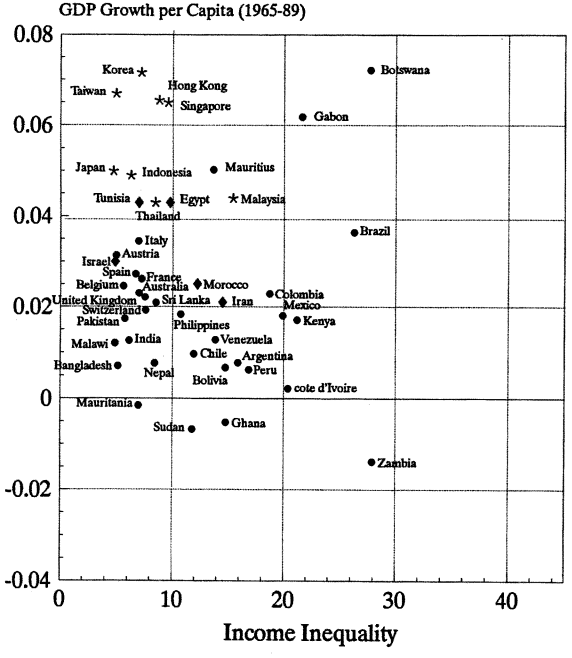
Note: This figure plots this regression equation:
GDPG = 0.013 + 0.062RGDP60 − 0.061RGDP60^2. N = 119; $\bar{R}^2$ = 0.036.
(0.004) (0.027) (0.033)
Source: Summers and Heston (1991); Barro (1989); World Bank data.

The eight HPAEs are all positive outliers in the income-growth distribution. While Malaysia, Indonesia, and Thailand are closer to their predicted values, the remaining five economies, Taiwan, Korea, Japan, Singapore, and Hong Kong, are all significantly above their predicted gross domestic product (GDP) per capital growth rates on the basis of relative income level.[4] All of the HPAEs were catching up to the more developed countries.

Recent work on growth rate persistence suggests that growth rates for individual economies are highly unstable over time (Easterly et al., 1993). The HPAEs, however, appear to be an exception. Depending on the time period selected and the definition of persistent success (in terms of the fraction of the distribution used to define high growth), the four tigers plus Japan consistently rank with the handful of persistently rapidly growing economies. Indeed, Easterly et al. conclude that "the widespread perception of strong country effects in growth is strongly influenced by the Gang of Four."

4. Addition of a dummy variable (HPAE = 1) to the estimated equation appearing below Figure 1 increases the R^2 to .242 and greatly improves the precision of the parameter estimates. The t value on the dummy variable (which is positive) is 4.00.

Figure 2 INCOME INEQUALITY AND GROWTH OF GDP, 1965–1989



Note: Income inequality is measured by the ratio of the income shares of the richest 20% and the poorest 20% of the population.
Source: World Bank data.

Where the HPAEs are unique in combining rapid, sustained growth with highly equal income distributions. The positive association between growth and low inequality in the HPAEs, and the contrast with other economies, is illustrated in Figure 2. Forty economies are ranked by the ratio of the income share of the richest fifth of the population to the income share of the poorest fifth and per capital real GDP growth during 1965–1989.[5]

The northwest corner of Figure 2 identifies economies with high growth (GDP per capita greater than 4.0%) and low relative inequality (ratio of the income share of the top quintile to that of the bottom

5. Because the timing and frequency of observations on income distribution vary among countries in the sample, the ratio of the top to bottom quintile is taken at the date closest to the midpoint.

quintile less than 10). *All* of the high-growth, low-inequality economies are in East Asia. Seven are HPAEs; only Malaysia, which has an index of inequality above 15, is excluded. Within East Asia comparisons of growth rates and Gini coefficients by decade indicate that the distribution of income was substantially more equal in the fastest-growing HPAEs. Moreover, improvements in income distribution generally coincided with periods of rapid growth (Birdsall and Sabot, 1993).[6]

2. *Fundamentalists, Mystics, and the Miracle*

To observe a miracle is not necessarily to understand it. As with those attempting to explain religious phenomena, economists analyzing the "miracle" of East Asia's growth tend to fall into two camps—fundamentalists and mystics.[7] Growth fundamentalists stress the dominant role of factor accumulation in explaining the HPAEs' high-income growth rates. They frequently qualify their explanations by noting that efficient allocation of resources, once accumulated, must also have been a part of the East Asian success story—since such economic laggards as the countries of the former Soviet Union and Eastern Europe have accumulated resources at equally impressive rates with radically different results.[8]

Mystics, on the other hand, while acknowledging the importance of accumulation, tend to place greater stress on the role of the acquisition and mastery of technology. The dominant view—if there is one—is that the East Asian economies, particularly Japan, Korea, and Taiwan,

6. Two qualifications should be noted here. First, some studies of Korea have noted increasing inequality in recent years; however, most of this is due to rising value of assets, particularly land, rather than increased variation in incomes. Second, reductions in inequality in Thailand have been relatively minor compared to those in the other HPAEs, although Thailand's performance is still better than that of most developing economies.

7. Recently a third group—predestinarians—has begun to emerge, placing great stress on the role of initial conditions in 1960, especially education and income equality, in explaining East Asia's persistently superior growth performance in cross-country regressions. Rodrik (1993) provides a survey of the relevant literature and some cross-country regressions. We do not consider their arguments further here since, if predestinarian explanations are relevant, there are few lessons for development policy. This is perhaps why most predestinarian authors ultimately reveal themselves to be fundamentalists or mystics in their policy interpretations of the miracle (see, e.g., Rodrik, 1993).

8. One of the most prominent fundamentalist tractarians, Alwyn Young (1993), has recently provided a succinct statement of their position. Although he subtitles his essay a "contrarian view," it is probably the dominant view among the Anglo-American economics establishment.

have been unusually successful at catching up technologically to the advanced economies.[9] Empirical support for the mystical position is adduced from the high rates of total factor productivity growth estimated for industry in several of the HPAEs, notable Japan, Korea, and Taiwan.

The fundamentalist–mystic distinction is at the heart the debate on the public policy origins of East Asia's success. Fundamentalists have stressed East Asia's success in getting the basics right. They tend to attribute success to policies that increased physical and human capital per worker and that provided for efficient allocation. They argue that the successful Asian economies have been better than others at providing a stable macroeconomic environment and a reliable legal framework to promote domestic and international competition. They also stress that the orientation of the HPAEs toward international trade and the absence of price controls and other distortionary policies have led to low relative price distortions. Investments in people—education and health—are important roles for government in the fundamentalist story (World Bank, 1991).

In contrast to the fundamentalist view, which acknowledges relatively few cases of market failure, mystics contend that markets consistently fail to guide investment to industries that generate the highest growth. In East Asia, the mystics argue, governments remedied this by deliberately "getting the prices wrong" to promote industries that would not otherwise have thrived (Amsden, 1989). The mystics lay stress on the dynamic gains of activist government policies to alter industrial structure and promote technological learning, sometimes at the expense of static allocative efficiency. Moreover, while fundamentalists would explain growth with a standard set of relatively constant policies, mystics note that the policy mixes used by East Asian economies were diverse and flexible. They argue that East Asian governments "governed the market" in critical ways (Wade, 1990). But the crucial question remains: Have interventions, per se, accelerated growth?

The mystics have provided valuable insights into the history, role, and extent of East Asian interventions, demonstrating convincingly the scope of government actions to promote industrial development in Japan, Korea, and Taiwan. They have successfully shown that East Asia does not wholly conform to the fundamentalist model. Industrial policy and interventions in financial markets are not easily reconciled with

9. Amsden (1989, 1993) and Wade (1990) put forward this view. Interestingly, as Young (1993) points out, so do Balassa (1988) and Krueger (1990). They differ, of course, on the policy origins of East Asia's presumed success at technological catching up.

static allocative efficiency. Policies in some economies are much more in accord with models of state-led development.

2.1 SOURCES OF THE MIRACLE—ACCUMULATION AND PRODUCTIVITY CHANGE

Empirically, the fundamentalist–mystic debate can be viewed in terms of the relative roles of factor accumulation and productivity growth in explaining the HPAEs output growth.[10] How unusual are the HPAEs in terms of their rates of factor accumulation? Are the East Asian economies atypical in terms of their rates of productivity change?

2.1.1 East Asia's Record of Accumulation The fundamentalist view of the success of the HPAEs is that their investment levels in physical and human capital substantially exceed those for other countries at similar levels of development, resulting in more rapid growth of per capita income. Figure 3 shows the relationship between income level in 1960 and the average investment rate for 1960–1985. The estimated nonlinear regression relating initial income level to investment is also shown. There is substantially more regularity in the relationship between investment share and relative income, than in the relationship between growth and relative income.[11] The investment rate for all countries increases with income up to about 70% of U.S. GDP in 1960 and then declines.

The HPAEs conform much more strongly to the cross-country pattern of investment rates than to the pattern of growth rates. Thailand and Hong Kong lie close to their predicted values on the basis of the cross-country regression. Japan, Korea, and Malaysia are the extreme outliers among HPAEs, but they are not extreme outliers in the distribution.[12] High investment rates are part of the Asian success story, but they cannot fully explain the extent to which per capita income growth in the HPAEs diverges from the typical pattern.

Figure 4(a b) summarizes the pattern of variation of two measures of human capital with initial income. Figure 4(a) plots the primary school enrollment rate in 1960 against relative per capita income, while

10. While it is broadly correct to associate fundamentalism with policies to promote accumulation and efficient, static allocation, some mystics of the industrial policy school would point to such government initiatives as socialization and bounding of private risks in Korea and Japan as important policy tools that raised accumulation.
11. The fit of the regression is markedly better, as is the variance of the estimated coefficients.
12. Addition of a dummy variable (HPAE = 1) to the estimating equation appearing below Figure 4 does not increase the explanatory power of the regression. The t statistic on the dummy variable is 1.00.

Figure 4(b) presents the scatter of Barro and Lee's (1993) average measure of educational attainment over the period 1960–1985 against initial income. Both scatters confirm that the HPAEs were relatively well endowed with human capital but again conform more closely to the cross-country pattern based on relative income than is the case for income growth.

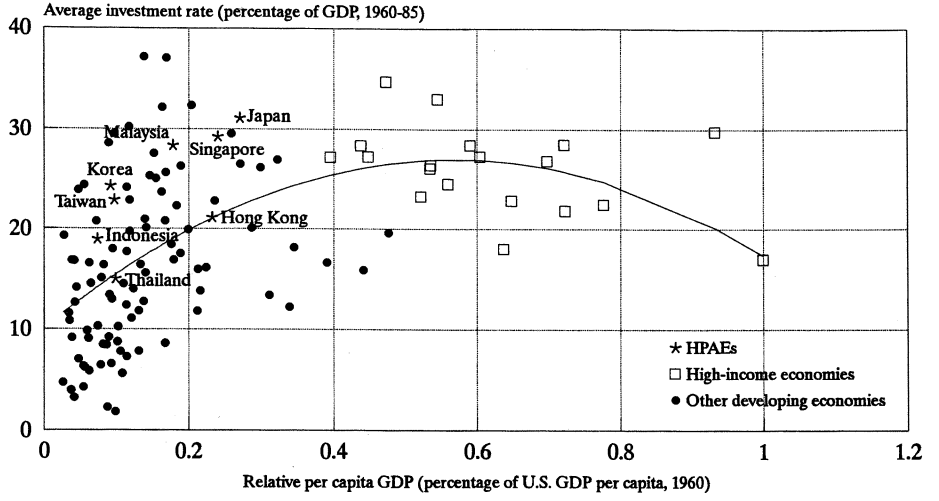
2.1.2 Productivity Change TFP is estimated in a simple neoclassical framework by subtracting from output growth the portion of growth due to capital accumulation, to human capital accumulation, and to labor force growth. Assume that every economy has access to an international cross-economy production function of the form:

$$Q = AF(K, E, L), \tag{1}$$

where A is total factor productivity, K is a measure of capital services, E is a measure of human capital endowments, and L is a measure of labor services in natural units.

TFP change can be then found as the residual of growth of output per worker after deducting the contributions of human and physical

Figure 3 AVERAGE INVESTMENT RATE AS A PERCENTAGE OF GDP, 1960–1985, AND GDP PER CAPITAL LEVEL, 1960



Note: Regression equation:

$16085 = 10.125 + 59.120\text{RGDP60} - 51.881\text{RGDP60}^2$. $N = 119$; $\bar{R}^2 = 0.295$.
(1.383) (10.344) (12.593)

Sources: Summers and Heston (1991); Barro (1989); World Bank data.

Figure 4a INITIAL INCOME LEVEL AND PRIMARY ENROLLMENT RATE

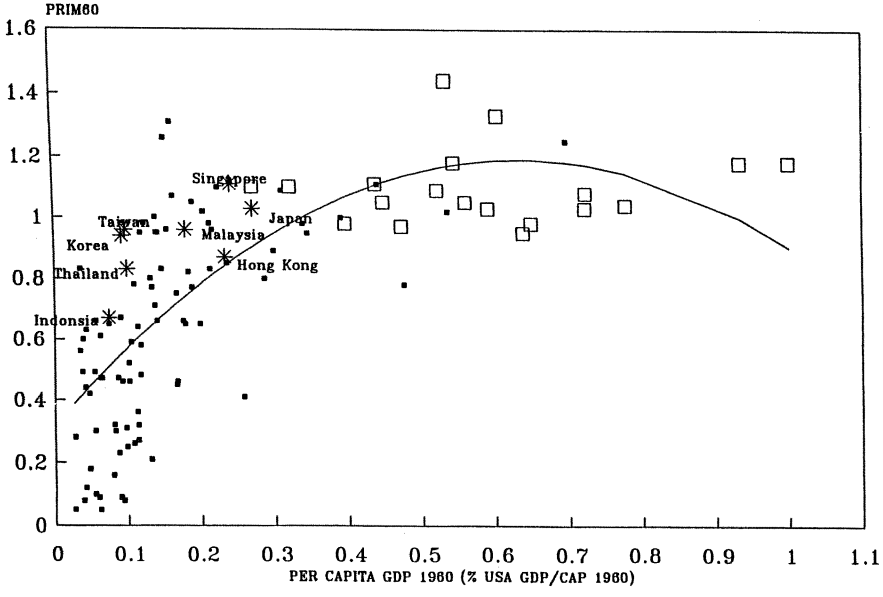
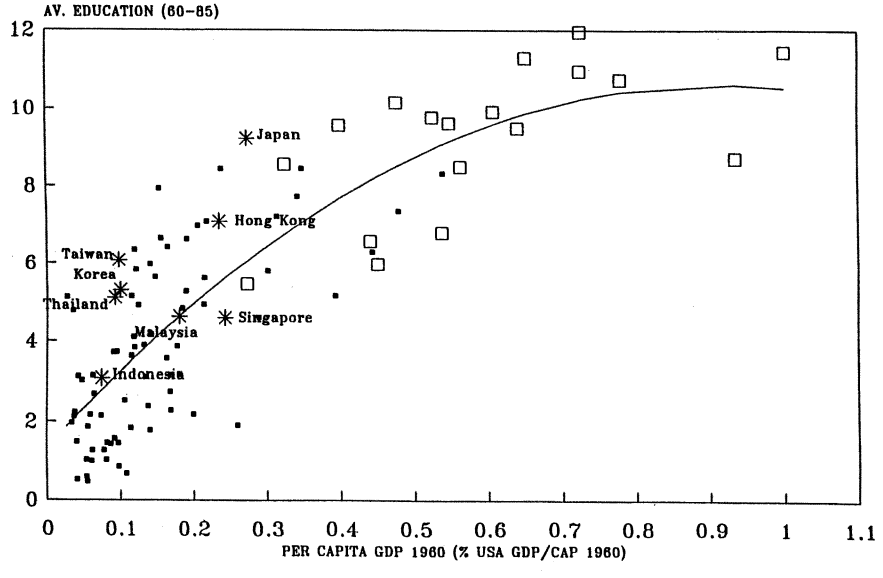


Figure 4b INITIAL INCOME LEVEL AND AVERAGE EDUCATION STOCK



capital accumulation:

$$a = (q - 1) - s_K(k - 1) - s_E(e - 1). \quad (2)$$

Under assumptions of competitive factor markets and constant returns to scale, s_K and s_E are equal to the income shares of factors. Thus, most empirical applications of Equation (2) estimate the output elasticity coefficients with income shares.[13]

Because income share data are not available for most countries in our sample, we instead estimate the output elasticities directly using a simple, cross-economy production function. We regress annual log output growth on log capital growth, log human capital growth, and log labor growth between 1960 and 1990, constraining their coefficients to sum to unity (i.e., specifying the production function to be Cobb–Douglas). We also include economy-specific dummy variables to estimate individual rates of TFP change for each of the sample's economies.

We estimate TFP change for 87 high- to low-income economies. The data set includes new constant price capital stock data (Nehru and Dhareshwar, 1993). Measures of human capital are incorporated in the specification using Barro and Lee's (1993) measure of educational attainment. Table 1 reports the production function parameters and the estimated TFP growth rates.

The low elasticity of output with respect to capital from the cross-country sample is striking but not altogether surprising. There is a subset of developing economies in our data (13 in number) that have positive net investment and human capital growth per worker, but negative output per worker growth rates. In effect, the marginal product of both physical and human capital was negative in these economies, an indication of severe allocation inefficiency. Empirically, this is reflected in a lower elasticity of output of both physical and human capital in the production function based on the whole sample than when only economies with nonnegative growth of output per worker are included.

We have reestimated the production function based only on high-income economy input–output relationships. This is predicated on the assumption that allocation efficiency in the high-income economies is greater than in the whole sample and, hence, that TFP growth rates estimated on the basis of the production function parameters will contain loss "noise" due to allocation mistakes. These results and the estimated TFP growth rates derived from standard growth accounting

13. This literature is briefly surveyed in Nishimizu and Page (1987).

methods are displayed in Table 1. The elasticity of output with respect to capital in the high-income economy production function rises to more conventional levels. TFP estimates, particularly for those economies within rapidly growing capital stocks, are correspondingly reduced.

Figure 5 compares the TFP growth estimates from the two production functions. Three inferences are supported by both sets of estimates:

1. The range of TFP growth rates for high-income countries is quite compact, especially in comparison with the low- and middle-income countries.
2. Nearly one third (32%) of the low- and middle-income countries in the sample had negative rates of TFP growth for the period 1960–1989, regardless of the parameter estimates used.
3. There is very little productivity based "catch-up" exhibited by the low- and middle-income countries.

Table 1 ELASTICITY OF OUTPUT WITH RESPECT TO CAPITAL (SK), LABOR (SL), AND HUMAN CAPITAL (SH): FULL SAMPLE AND HIGH-INCOME ECONOMIES

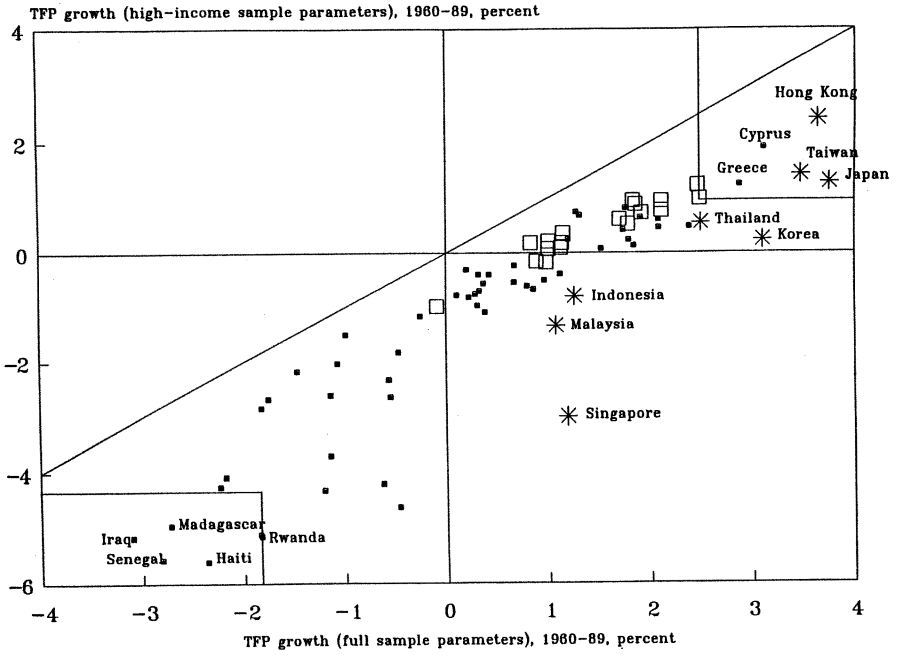
	Observations	*SK*	*(t-stat)*	*SL*	*(t-stat)*	*SH*	*(t-stat)*
Full sample	2,093	0.178	10.895	0.669	6.411	0.154	1.49
High-income economies	460	0.399	10.237	0.332	1.679	0.269	1.476

RESULTING TOTAL FACTOR PRODUCTIVITY GROWTH ESTIMATES FOR THE HPAES (1960–1989)

Economy	*TFP growth (full-sample parameter estimates*	*TFP growth (high-income only, parameter estimates)*
Hong Kong	3.6470	2.4113
Indonesia	1.2543	−0.7953
Japan	3.4776	1.4274
Korea, Rep. of	3.1021	0.2355
Malaysia	1.0755	−1.3369
Singapore	1.1911	−3.0112
Taiwan	3.7604	1.2829
Thailand	2.4960	0.5466
Latin America	0.1274	−0.9819
Africa	−0.9978	−3.0140

Source: World Bank data.

Figure 5 COMPARISON OF TOTAL FACTOR PRODUCTIVITY ESTIMATES



These are not promising results for the developing world. Despite a substantial literature on the potential for developing countries to achieve rapid growth through the adoption of known, "best practice" technologies, very few countries appear to have realized these potential gains.[14] Catch-up, where it is taking place, is due primarily to higher rates of factor accumulation.

Three of the HPAEs are in the upper decile of the TFP distribution in both sets of estimates—Hong Kong, Taiwan, and Japan. Two others—Thailand and Korea—are in the upper decile of the distribution based on the full sample production function parameters, but they are unremarkable on the basis of the high-income country production function parameters.[15] Three—Indonesia, Malaysia, and Singapore—shift from

14. For a concise review of the arguments for technologically based catch-up, see Pack (1993).
15. When we compare our estimates of TFP growth with two other independently derived estimates for a large sample of countries (Elias, 1991; Fischer, 1993), the pattern of productivity growth rates in Figure 5 is remarkably robust to the specification of the growth accounting equation and to the capital stock series used. The IMF

modest, but positive, TFP growth to negative TFP growth when the production function parameters are changed from those estimated from the whole sample to those derived from the high-income sample.

Presumably in the high-income countries, most of the estimated TFP growth is due to technical progress—advances in best practice—which explains the relatively compact distribution of TFP growth rates between 0.5% and 1.5% per year, and the tendency among the high-income countries for TFP growth to decline with rising income (World Bank, 1993). In low- and middle-income countries, however, changes in TFP must reflect more than technical progress, otherwise we would never find negative TFP growth rates.

We have already argued that TFP growth for low- and middle-income economies contains an element of catching up to (or falling behind) best practice technologies. But TFP growth rates in a one-sector, cross-country estimate will also contain an element of allocative efficiency; economies that allocate physical and human capital to low yielding investments will have low or negative estimated TFP growth rates. The clearest demonstrations of this are the 13 economies with negative output growth and positive accumulation.

In an attempt to look at patterns of technologically based catch-up, we assume that the elasticities of output that should be used to calculate TFP change are those that apply to the high-income economies only. We subtract the average rate of TFP change for the high-income economies, which we associate with movements in international best practice, from TFP change to get an estimate of technical efficiency change. Using this method Hong Kong (2.0%), Japan (1.0%), Taiwan (0.8%), and Thailand (0.1%) are the only HPAEs catching up to international best practice. Korea (−0.2%) was essentially just keeping pace with technological progress in the high-income economies, while the investment driven economies of Indonesia, Malaysia, and Singapore were falling behind international best practice at rates of 1.2% (Indonesia) to 3.5% (Singapore) per year (Table 2).[16]

(1993) *World Economic Outlook*, contrasting Asia with other developing economies, reaches similar conclusions, both with respect to the estimated magnitudes of TFP change and the relative contribution of TFP change to output growth. Thomas and Wang (1993) and Edwards (1992) also reach broadly similar results concerning the pattern of productivity change in the HPAEs compared with other economies.

16. Friedberg, Khamis, and Page (1993), using a cross-country stochastic frontier production function to estimate movements in international best practice, reach similar conclusions with respect to the pattern of technical efficiency change among the HPAEs.

Table 2 TECHNICAL EFFICIENCY CHANGE ESTIMATES FOR THE HPAES

Economy / Region	*Technical efficiency change, 1960–1989*
Hong Kong	1.9714
Indonesia	−1.2352
Japan	0.9876
Korea, Rep. of	−0.2044
Malaysia	−1.7767
Singapore	−3.4510
Taiwan	0.8431
Thailand	0.1067
Latin America	−1.4217
Africa	−3.4539

Source: World Bank data.

When the HPAEs are contrasted with other developing regions, however, their ability to keep pace with international best practice seems somewhat more remarkable. Using the same method, we have estimated the average rate of technical efficiency change for Latin America (−1.4%) and Africa (−3.5%). Against these benchmarks, all of the HPAEs except Singapore stand up well in terms of their ability to keep pace with the world's shifting technological frontier.[17]

What, then, are we to make of the fundamentalist–mystic debate? Figure 6 suggests that each camp can claim partial victory. The diagram shows the relative contribution to output growth of factor accumulation (share-weighted total input growth) and TFP growth.

When the TFP estimates based on the high-income country sample are used, the dichotomy between investment driven and productivity driven economies is dramatic.[18] Rapid growth in Indonesia, Malaysia,

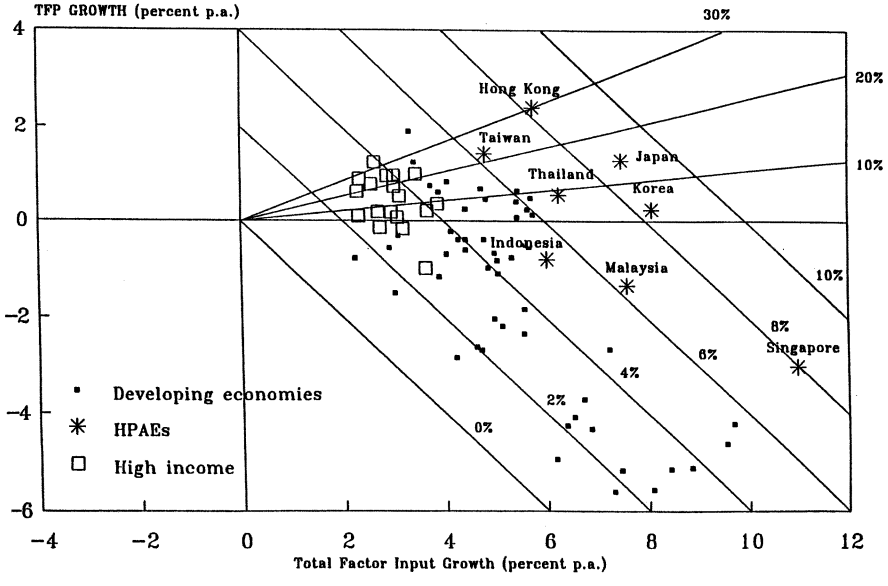
17. Alwyn Young (1992) in a well-known paper finds similarly disappointing results with respect to Singapore's TFP performance. Some caution is needed in interpreting these results, however. Much of Singapore's investment between 1960 and 1990 was in housing and social infrastructure, output of which are notoriously difficult to measure. It is possible that we have undervalued the rate of growth of output and, hence, the rate of TFP change. Similar detailed criticisms could be made for other economies, both HPAE and non-HPAE, and our TFP results are best regarded as indicative of broad international trends.

18. Despite the low elasticities of output with respect to capital in the full sample production function, only 10 of the 60 non-HPAE low- and middle-income economies have contributions of TFP growth exceeding 30%. Among the HPAEs, the investment-driven economies—Indonesia, Malaysia, and Singapore—conform to a typical developing economy pattern with a low (but positive) TFP contribution to output growth. The productivity-driven economies—Japan, Korea, Taiwan, China, Hong Kong, and Thailand—on the other hand are more unusual and look more like advanced economies with a relatively high contribution of TFP to output growth of above 30%.

and Singapore is wholly due to high rates of factor accumulation. Indeed, their productivity performance, like that of the vast majority of developing economies, detracted from the potential output growth that could have been achieved, based on their rates of factor accumulation. Hong Kong, Taiwan, and Japan in contrast had relatively high TFP growth rates and derived from 15% to 30% of their output growth from TFP growth, a characteristic shared by only four other developing economies. Thailand and Korea had rates and relative contributions of TFP growth that were atypical for developing economies—they were positive—but less than the relative share for advanced economies. The contrasting sources of growth of Hong Kong, Korea, and Singapore, all of which shared essentially the same rate of growth, are a good illustration of the varying roads to rapid growth among the HPAEs.

The East Asian success story is, then, primarily a fundamentalist one. Depending on the estimates used, between 60% and 120% of their output growth derives from accumulation of physical and human capital and labor force growth. The results also suggest that the HPAEs were unusually successful in allocating these factors of production. The estimates of TFP growth based on the full sample address the following question: Based on the average efficiency with which physical and

Figure 6 TOTAL FACTOR PRODUCTIVITY GROWTH AND PART OF GROWTH DUE TO GROWTH OF FACTOR INPUTS, 1960–1989 (HIGH-INCOME SAMPLE PARAMETERS)



human capital are used in the world economy, does accumulation over- or underpredict income growth? The answer is that for most low- and middle-income economies, it overpredicts growth, while for the HPAEs it underpredicts. Even when the production function is estimated from the high-income sample only, accumulation underpredicts growth for five of the eight.

Nevertheless, mystics can claim some victories. The subset of productivity-driven HPAEs are unusual among developing economies because of the relatively important role of TFP in their growth, even when attempts are made, as here, to correct for the gains from superior accumulation.[19] They are also among the very few developing countries keeping pace with or catching up to the moving target of international best practice. Two of the productivity-driven economies—Taiwan and Japan—are among the East Asian economies most identified with activist policies to promote technological learning. Hong Kong—the most productivity driven of all of the HPAEs—in contrast is the least interventionist of the group. Taiwan, Korea, and Japan are economies in which activist policies to allocate resources were undertaken, yet apparently without the deleterious effects that characterized the performance of other economies with similar policies.

2.2 THE POLICY ORIGINS OF SUCCESS

The HPAEs have achieved rapid growth through successful attainment of both fundamentalist and mystic objectives. They have performed better than most low- and middle-income countries three critical functions—accumulation, allocation, and technological catch-up. They did this with combinations of policies ranging from market-oriented to state led that varied both across economies and over time.

Despite the diversity there are a number of common policy threads that bind the HPAEs. Macroeconomic management was unusually good and macroeconomic performance unusually stable, providing the essential framework for private investment. Policies to increase the integrity of the banking system, and to make it more accessible to nontraditional savers, increased the levels of financial savings. Education policies that focused on primary and secondary education generated rapid increases in labor force skills. Agricultural policies stressed productivity change

19. Technical efficiency change—movement toward best practice—should be free of the allocative gains characteristic of TFP estimates by growth accounting methods (see Nishimizu and Page, 1982). Friedberg, Khamis, and Page (1993), using a stochastic frontier production function, find that the HPAEs are the only regional grouping of developing countries that have consistently closed the gap with international best practice.

and did not tax the rural economy excessively. All of the HPAEs kept price distortions within reasonable bounds and were open to foreign ideas and technology.

But these fundamental policies do not tell the entire story. In most of these economies, in one form or another, the government intervened —systematically and through multiple channels—to foster development, and in some cases the development of specific industries. Policy interventions took many forms—targeted and subsidized credit to selected industries, low deposit rates and ceilings on borrowing rates to increase profits and retained earnings, protection of domestic import substitutes, subsidies to declining industries, the establishment and financial support of government banks, public investments in applied research, firm- and industry-specific export targets, development of export marketing institutions, and wide sharing of information between public and private sectors. Some industries were promoted, while others were not. These strategies of selective promotion were closely associated with high rates of private investment and, in some of the HPAEs, high rates of productivity growth.

The relative importance of policy fundamentals and selective interventions has been and will continue to be at the center of the debate over the policy origins of East Asia's success. To consider in any depth the catalogue of policies outlined earlier exceeds the scope of this essay. Rather, we examine four possible lessons for public policy arising from the HPAEs success.

3. *Conventional Wisdom—Macroeconomic Management and Educational Strategy*

Among fundamental economic policies that have contributed to East Asia's superior record of accumulation and allocation of resources, two stand out—good macroeconomic management and emphasis on broadly based education.[20] The nature of the policies pursued and their impact on growth in the HPAEs are described briefly in the following.

3.1 MAINTAINING MACROECONOMIC STABILITY

In contrast with many other developing economies, the HPAEs have been remarkably successful in creating and sustaining macroeconomic

20. World Bank (1993) enumerates a number of other "policy fundamentals" that have acted primarily to increase accumulation and improve allocation. These are omitted here to allow for a fuller discussion of the two described. Of the omitted fundamentals, perhaps the most significant is the focus on building secure, bank-based financial systems.

Table 3 CONSOLIDATED PUBLIC SECTOR DEFICITS, SELECTED EAST ASIAN AND OTHER ECONOMIES

Economy / Region	*Average public deficit, percentage of GDP, 1980–1988*	*Rank among 40 developing countries (1 = highest deficit)*
HPAEs		
Korea, Rep. of	1.89	34
Malaysia	10.80	6
Thailand	5.80	23
Average, 40 developing economies	6.39	
Average, OECD economies	2.82	
Other economies		
Argentina	9.62	
Brazil	4.02	
Mexico	6.73	
Philippines	4.40	

Source: Easterly, Rodriguez, and Schmidt-Hebbel (forthcoming).

stability. Here we consider the HPAEs' successful management of three macroeconomic variables: budget deficits, external debt, and exchange rates.

3.1.1 Budget Deficits and Inflation International experience suggests that the macroeconomic consequences of public sector deficits depends on how they are financed. Although the HPAEs' budget deficits are not dramatically smaller as a group than those of other developing economies, they were better at keeping deficits within the limits imposed by their ability to finance them without destabilizing the macroeconomy.[21] The financing limits themselves were also higher due to the more rapid growth of the HPAEs.

Table 3 shows consolidated public sector deficits for the 1980s for three developing country HPAEs that have good data compared with a sample of OECD and other developing economies. As a percentage of

21. The analysis in this section draws on W. Easterly and K. Schmidt-Hebbel, "The Macroeconomics of Public Sector Deficits: a Synthesis" in W. Easterly, C. Rodriguez, and K. Schmidt-Hebbel, eds., *Public Sector Deficits and Macroeconomic Performance*, Oxford University Press (forthcoming). The data on consolidated public deficits, as well as the rest of the data in this section except where otherwise indicated, are from the same source. Consolidated public deficits, though less widely available than central government deficits, are a much more reliable indicator of fiscal management, because they include operating deficits of public enterprises that have played a critical role in some macroeconomic crises.

GDP, Korea's budget deficits were below even the OECD average. Malaysia and Thailand are more complicated. Thailand's budget deficits were about average for developing economies in the 1980s, while deficits in Malaysia were substantially bigger than average. Both ran larger budget deficits than such troubled economies as the Philippines, Brazil, Argentina, and Mexico.

Unlike these and other economies that encountered difficulties, however, Malaysia and Thailand successfully financed their deficits. This was possible for the following reasons:

- First, there was *feedback from high growth*. Because rapid growth increased the demand for financial assets, Malaysia and Thailand were able to absorb higher levels of monetary financing without a rapid rise in inflation. Moreover, rapid growth in GDP raised the level of sustainable domestic and external borrowing.
- Second, there was *feedback from high financial savings*. Savings rates were high in Malaysia and Thailand, and much of this saving went into the domestic financial system (as opposed to real assets or capital flight as in Latin America). This further increased the demand for money and other domestic financial assets, making increased domestic financing of the deficit possible without resort to inflationary financing. In Malaysia, the government Provident Fund mobilized domestic saving for the government's use in noninflationary financing of the deficit.
- Third, there were *low initial debt ratios*. In Thailand, the initial level of external debt to GDP was very low, which meant that external financing was available when needed.

By holding public deficits within the bounds of prudent financing, the HPAEs have avoided the inflation-inducing bursts of money creation that afflict other developing economies. Figure 7 shows money creation as a ratio to GDP in Korea, Malaysia, and Thailand and in three unstable comparators, Argentina, Mexico, and Zaire. The contrast is striking: While money creation has been relatively constant among the HPAEs, each of the comparators experienced two episodes of rapid money creation when fiscal balances deteriorated or external financing dried up.

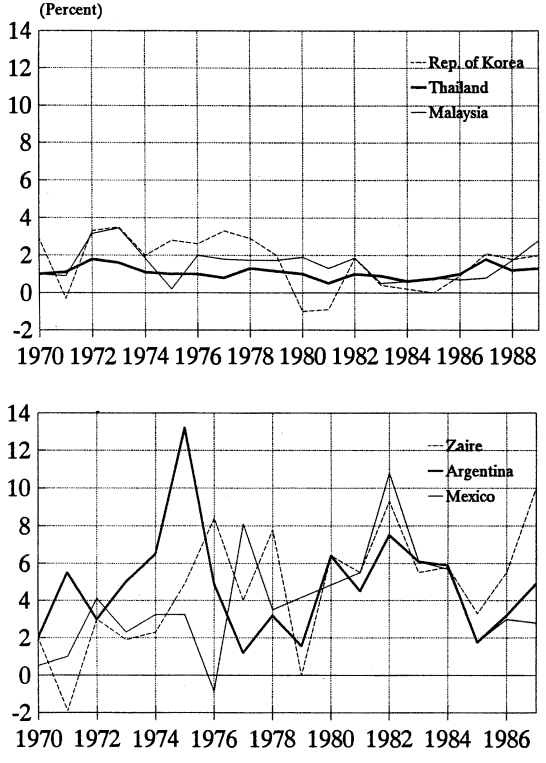
Moderate inflation was a corollary of fiscal prudence (Table 4).[22] East Asian governments never had to rely heavily on the inflation tax

22. Recent research suggests that inflation below 20%, a level not breached by any of the HPAEs during their rapid growth periods, can be maintained for long periods without generating macroeconomic instability (Dornbusch and Fischer, 1993).

because their deficits were within financable limits. In general, HPAE governments have been strong enough to alter public spending and foreign borrowing as needed, although in Thailand this has been a continuous struggle (Warr and Nadhiprabha, 1993).

One result of low-to-moderate inflation rates particularly welcome to business is stable real interest rates. Figure 8 shows real interest rates in Korea, Malaysia, Thailand, Argentina, Ghana, and Mexico. As with money creation, the contrast is remarkable. In the East Asian cases, low inflation and flexible financial policies kept real interest rates within a narrow range.

Figure 7 REVENUES FROM MONEY CREATION AS A PERCENTAGE OF GDP: EXAMPLES FROM EAST ASIA AND OTHER SELECTED ECONOMIES



Note: Revenues from money creation as a percentage of GDP is defined as ratio of nominal change in high-powered money to nominal GDP.
Source: World Bank data.

3.1.2 Managing Foreign Debt Of the seven developing HPAEs, only Indonesia, Korea, Malaysia, and Thailand have public or publicly guaranteed foreign debt. The governments of the others—Singapore, Hong Kong, and Taiwan—have not borrowed abroad. None of the four with foreign debt has faced a crisis in the sense of having to reschedule debt, but sharp increases in debt have led to rapid adjustment.

In Korea in 1980–1985, Malaysia in 1982–1988, and Indonesia since 1987, debt to GNP ratios have been quite high compared with other indebted economies (Table 5). As with fiscal deficits, however, favorable feedback from other policies enabled the HPAE debtors to sustain higher ratios of external debt to GDP than other economies. In particular, high levels of exports have meant that foreign exchange was readily available to service the foreign debt. For example, when Mexico faced severe problems with its creditors in 1982, it had a much *lower* debt to GNP ratio than Korea in 1984 but a much *higher* debt to export ratio.

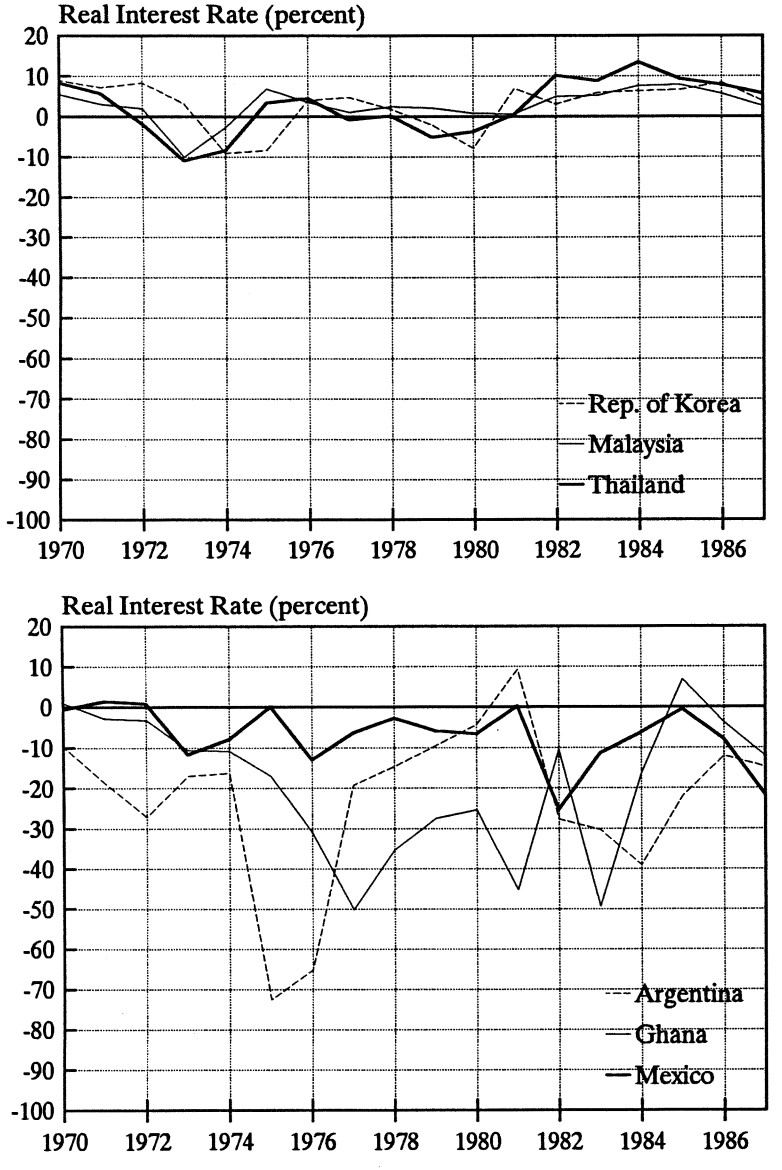
3.1.3 Exchange Rate Management The evolution of exchange rate regimes in the HPAEs has been broadly similar. Most moved from long-term fixed rate regimes to fixed-but-adjustable rate regimes with occasional steep devaluations to managed floating rate regimes. Due to the combination of moderate inflation and active exchange rate management, the HPAEs avoided the severe exchange rate appreciation that beset Africa

Table 4 INFLATION RATES

Economy / Region	*Average CPI, 1961–1991*
HPAEs[a]	7.5
Hong Kong[b]	8.8
Indonesia[c]	12.4
Korea, Rep. of	12.2
Malaysia	3.4
Singapore	3.6
Taiwan	6.2
Thailand	5.6
All low- and middle-income economies	61.8
South Asia	8.0
Sub-Saharan Africa	20.0
Latin America and Caribbean	192.1

[a]Averages are unweighted
[b]1972–91 only.
[c]1969–91 only.
Sources: World Bank data; World Bank (1992); Taiwan (1992).

Figure 8 REAL INTEREST RATES: EXAMPLES FROM EAST ASIA AND OTHER SELECTED ECONOMIES



Note: Real interest rates are defined as the deposit rate deflated by the consumer price index.
Source: World Bank data.

and Latin America (Table 6) and achieved unusual stability of the real exchange rate. The HPAEs' success at maintaining stable real exchange rates is apparent in Figure 9, which contrasts real exchange rates since 1970 in Korea, Malaysia, and Thailand with those in Sri Lanka, Argentina, and Peru.

RESPONDING EFFECTIVELY TO MACROECONOMIC SHOCKS One important element of the HPAEs' capacity to maintain macroeconomic stability has been their prompt and effective response to macroeconomic shocks. The HPAEs made definite policy decisions to keep the macroeconomy under control, rather than simply benefiting from a feedback from rapid growth to macroeconomic stability. These decisions are illustrated by the experiences of Korea and Thailand in adjusting to rather different macroeconomic shocks.

KOREA RETRENCHES In 1979, Korea encountered a variety of problems that threatened to undercut the 1970s impressive growth. Rising oil prices depressed the terms of trade, the world recession dampened export demand, and high interest rates increased debt service costs. Real appreciation during the 1974–1979 fixed exchange rate regime had made exports less competitive, the rice crop had failed, and the assassination of President Park Chung-Hee had exacerbated political uncertainty (Collins and Park, 1989). Korea responded with an aggressive 1980 stabilization package backed by IMF standby credits. The govern-

Table 5 INTERNATIONAL INDEBTEDNESS

	Ratio of total debt to GNP		*Ratio of total debt to exported goods and services*	
Economy / Region	Peak year[a]	1991	Peak year[a]	1991
HPAEs				
Indonesia	69	66.4	263.5	225.6
Korea, Rep. of	52.5	15.0	142.4	45.2
Malaysia	86.5	47.6	138.4	54.2
Thailand	47.8	39.0	171.7	94.8
All low- and middle-income economies		38.4		176.2
South Asia		29.6		293.3
Sub-Saharan Africa		106.1		340.8
Latin America and Caribbean		37.4		268.0

[a]1987 for Indonesia, and 1985 or 1986 for the other three countries.
Source: World Bank data.

ment ended the fixed exchange rate regime, devalued the won by 17%, and tightened monetary and fiscal policy. In 1980, output fell 5%, inflation exceeded 25%, and the current account deficit approached 9% of GDP. By 1982 inflation dropped to 7% and in 1983 to 3.4%. The current account deficit fell to 2% of GDP in 1983.

GRADUAL ADJUSTMENT IN THAILAND Thailand only partially adjusted to the first oil shock and in the late 1970s engaged in a mild private and public spending boom. By 1980–1981, the consolidated public sector deficit was 7% of GDP, nearly half of which was the deficit of the nonfinancial public enterprises, and the current account deficit was also about 7%. Because past foreign borrowing had been moderate—the debt/GDP ratio was only 35% in 1982—Thailand continued to have access to international capital markets. Even so, the new government that took over in 1980 perceived that macroeconomic adjustment was needed.

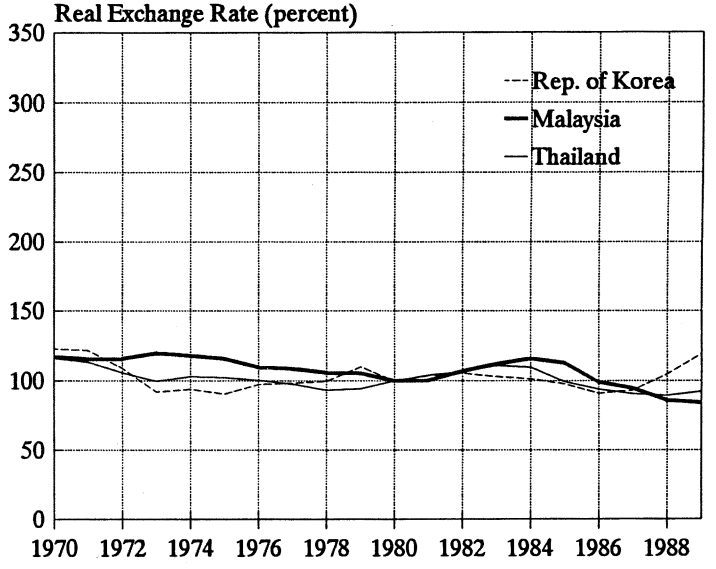
Monetary policy options were limited by the fixed exchange rate and the relatively open capital market. Therefore, the government took the alternative path, fiscal contraction, moving gradually but consistently

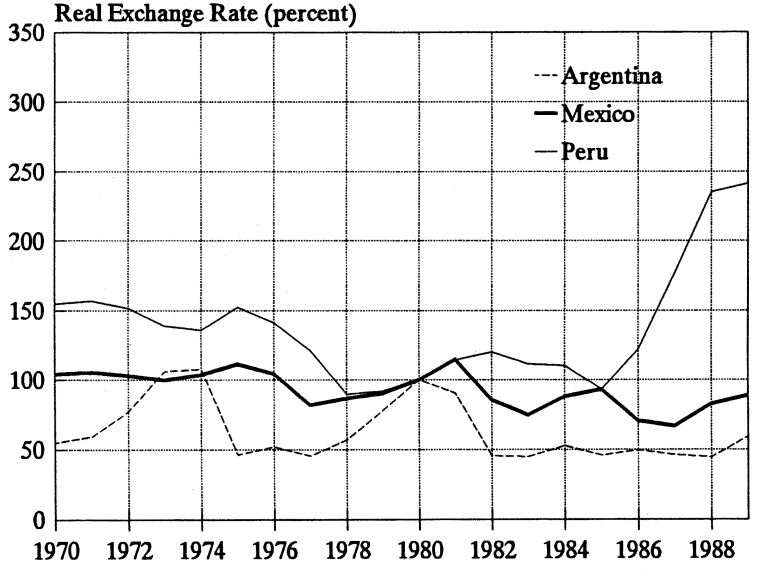
Table 6 AVERAGE APPRECIATION INDEX, 1976–1985

Economy	*Index (higher value means more appreciated)*[a]	*Percentage rank (100 means most appreciated, 0 least)*
HPAEs		
Hong Kong	64	1
Indonesia	98	25
Korea, Rep. of	110	41
Malaysia	88	12
Singapore	87	11
Taiwan	116	47
Thailand	75	5
Other selected economies		
Argentina	113	45
Bolivia	181	89
Côte d'Ivoire	185	90
Ghana	248	99
Nigeria	277	100
Zaire	201	95

[a]Dollar's index is based on Summers–Heston purchasing power parity comparisons. An index value of 100 signifies that the economy's deviation from PPP is where it should be given its per capita income.
Source: Dollar (1992).

Figure 9 EXAMPLES OF REAL EXCHANGE RATE VARIABILITY IN EAST ASIA AND OTHER SELECTED ECONOMIES





Note: Index of real exchange rate: 1980 = 100; real depreciation is down.
Source: World Bank data.

over the next several years to cut expenditures and increase revenues. Policymakers steeply cut deficits of the nonfinancial public enterprises, then gradually reduced the central government deficit. As a result, the consolidated government deficit declined from 8% of GDP in 1981–1982 to 1.6% in 1986–1987, when adjustment was essentially complete. Meanwhile, steeper tax rates and tougher collection efforts boosted central government tax revenue from 13% of GDP in 1982 to 16% in 1988.

3.1.4 Macroeconomic Management and Rapid Growth It cannot be a coincidence that all of these seven economies have been exceptional high-growth economies by world standards, and all have had unusual success managing their macro economies over the long run. Cross-economy, econometric studies generally find that higher inflation, larger budget deficits, and distorted foreign exchange markets reduce growth (Fischer, 1993; Rodrick, 1993). All of the HPAEs but Indonesia and Korea have been long-period, low-inflation economies, while Indonesia and Korea fall into the moderately low-inflation category.

The channels by which inflation and budget deficits reduce growth are also of some interest. Fischer (1993) concludes that high inflation and high-budget deficits reduce *both* the rate of capital accumulation and the rate of productivity change. Uncertainty, arising primarily from the variability of inflation and the inconsistency of relative price signals, reduces both private investment and the efficiency of resource allocation.

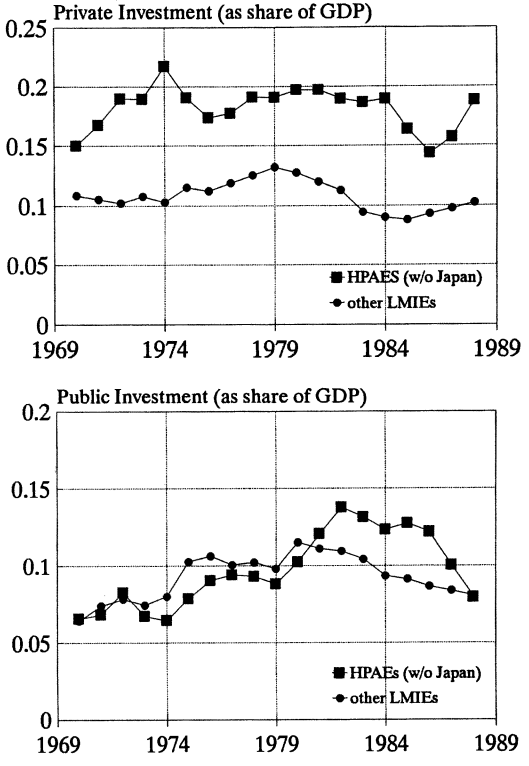
The HPAEs provide at least partial confirmation of this hypothesis. Figure 10 shows private and public investment as a share of GDP for a sample of 47 low- and middle-income countries (including five of the developing country HPAEs) for which consistent data are available.[23] The HPAEs are remarkable for their high share of private investment. Private investment is about seven percentage points higher in the HPAEs than in other middle-income economies. It rose from about 15% of GDP in 1970 to nearly 22% in 1974, then declined and held at about 18% between 1975 and 1984. Private investment contracted sharply between 1984 and 1986, reflecting the global recession, then recovered by 1988.[24] In contrast, private investment in other low- and middle-income countries has remained relatively stable at about 11% of GDP.

23. The data are drawn from Pfeffermann and Madarassy (1992).
24. This basic pattern is observed in four individual economies—Korea, Thailand, Singapore, and Malaysia. The pattern for Indonesia differs; real private investment declined continuously during the 1980s from a peak of 20% of GDP to a low of 13% in 1989.

One important element of the HPAEs' capacity to maintain macroeconomic stability has been their prompt and effective response to macroeconomic shocks. This has been greatly facilitated by two characteristics. First, by limiting transfers to public enterprises and tightly supervising banks, governments reduced the spillover from the real sector into the financial sector that in other economies exacerbated fiscal woes. Second, flexible labor and capital markets enabled the real sector to react quickly to government initiatives, setting off new growth cycles that eased the recessionary impact of stabilization measures.

Effective responses to macroeconomic shocks may also have contributed to the HPAEs' long-run growth. Relatively cautious fiscal and foreign borrowing policies meant that serious debt crises were avoided,

Figure 10 PUBLIC AND PRIVATE INVESTMENT



Note: LMIEs = low- and middle-income economies.
Source: World Bank data.

which reduced the stop–go pattern of crisis and response that characterized many developing economies in the 1980s. Avoiding crisis and the need for rescheduling meant that credit-worthiness was maintained, and it was easier to borrow in the short term and to avoid very deep cuts, especially in investment.

In the 1970s overall levels of public investment did not differ markedly between the HPAEs and other developing economies; over the decade public investment rates in all economies rose from about 7% to 10% (Figure 10). During the 1980s, public investment was higher in the HPAEs than in other developing economies, but it had declined to historical levels by the end of the decade. The HPAEs as a group responded to the economic contraction of the 1980s by increasing public investment above historically maintained levels. Sudden reductions in aggregate demand and in investment compelled by debt crises were major causes of the sharp declines in growth rates in many of the heavily indebted economies of Latin America and elsewhere.

Better responses to macroeconomic shocks may also have resulted in better measured productivity growth. A recent examination of the sources of TFP change in developing countries concludes that in Latin America and Africa, productivity levels increased relative to international best practice until 1973 and declined from 1973 onward, primarily due to the inability of these economies to adapt to external shocks. The decline was large enough in Latin America (and nearly large enough in Africa) to offset gains due to technical progress (Friedberg, Khamis, and Page, 1993).

The HPAEs, in contrast, are the only regional grouping of developing economies that show steady improvement in productivity levels relative to international best practice. While macroeconomic contractions are clearly visible in the HPAEs' pattern of movement of productivity levels over time, the difference is the more rapid return to prior productivity levels following the period of adjustment.

3.2 BROADLY BASED EDUCATIONAL STRATEGIES

In most of the economies of East Asia, public investments in education were not only larger than elsewhere in absolute terms—they were also better. They responded more appropriately to failures in the market for education. Social rates of return to education are probably highest at the primary level, where there are many positive externalities associated with literacy (Psacharopoulos, 1993). Capital market imperfections and information problems, moreover, are also most severe at the primary level, reducing the scope for self-financed private systems. Returns from training at the university level, on the other hand, are

almost fully captured by the higher income of university graduates. All of this argues for universal primary and broadly based secondary education combined with restraint of public subsidies to higher education.

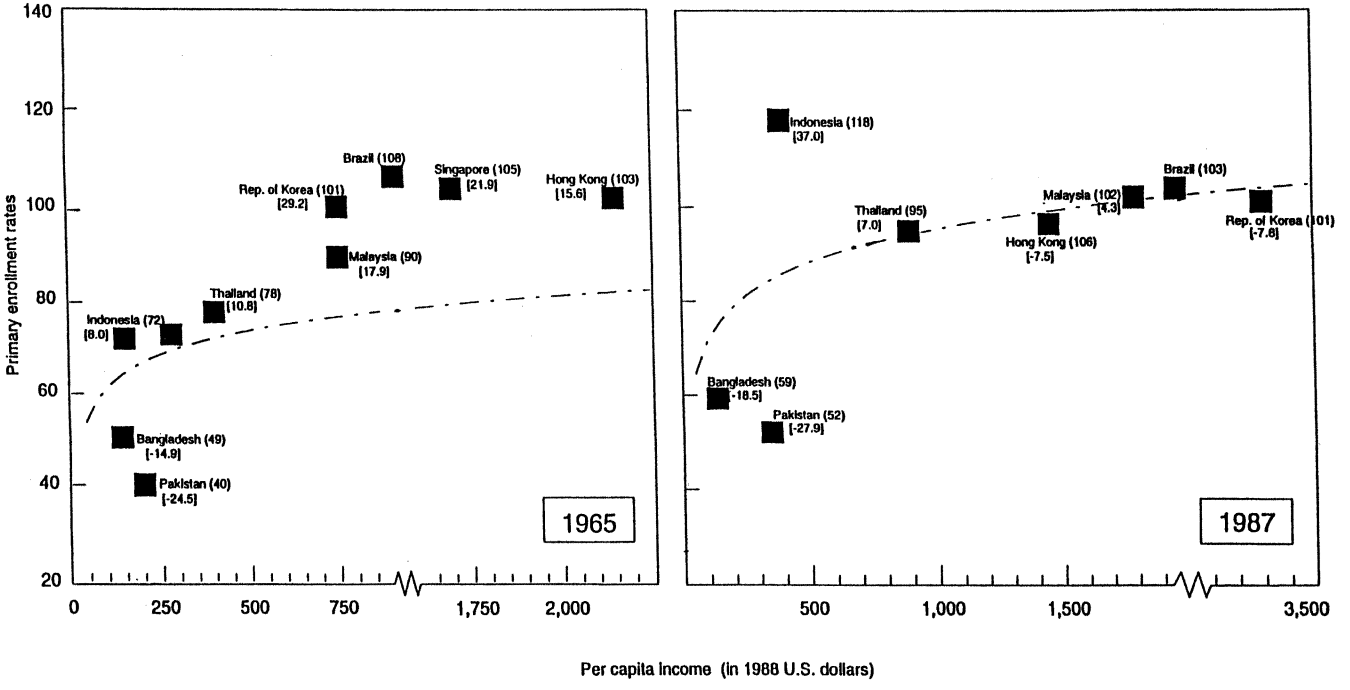
3.2.1 Educational Performance in the HPAEs This was precisely the educational strategy adopted by the HPAEs. Figures 11 and 12 present a stylized summary of the results of regressing primary and secondary enrollment rates on per capita national income for more than 90 developing economies for the years 1965 and 1987.[25] Enrollment rates are higher at higher levels of per capita income. But HPAE enrollment rates have tended to be higher than predicted for their level of income. At the primary level, this was most obvious in 1965, when Hong Kong, Korea, Singapore, and Taiwan had already achieved universal primary education, well ahead of other developing economies, and even Indonesia with its vast population had a primary enrollment rate above 70%.

By 1987, East Asia's superior education systems were evident at the secondary level. Indonesia had a secondary enrollment rate of 46%, well above other economies with roughly the same level of income, and Korea had moved from 35% to 88%, maintaining its large lead in relative performance. Only in Thailand was the 28% secondary enrollment rate well below the income-predicted 36% and the 54% mean for middle-income economies.[26] In recent years Thailand's weak educational performance has been felt, as serious shortages of educated workers have begun to threaten continued very rapid growth. In part as a function of their success in increasing enrollment, the East Asian economies have also been faster to close the gap between male and female enrollments.

A common, though imperfect measure of educational quality, is expenditures per pupil. Between 1970 and 1989, real expenditures per pupil at the primary level rose by 355% in Korea. In Mexico and Kenya, expenditures rose by 64% and 38%, respectively, over the same time period, and in Pakistan expenditures rose by only 13% between 1970 and 1985 (Birdsall and Sabot, 1993). These dramatic differences reflect

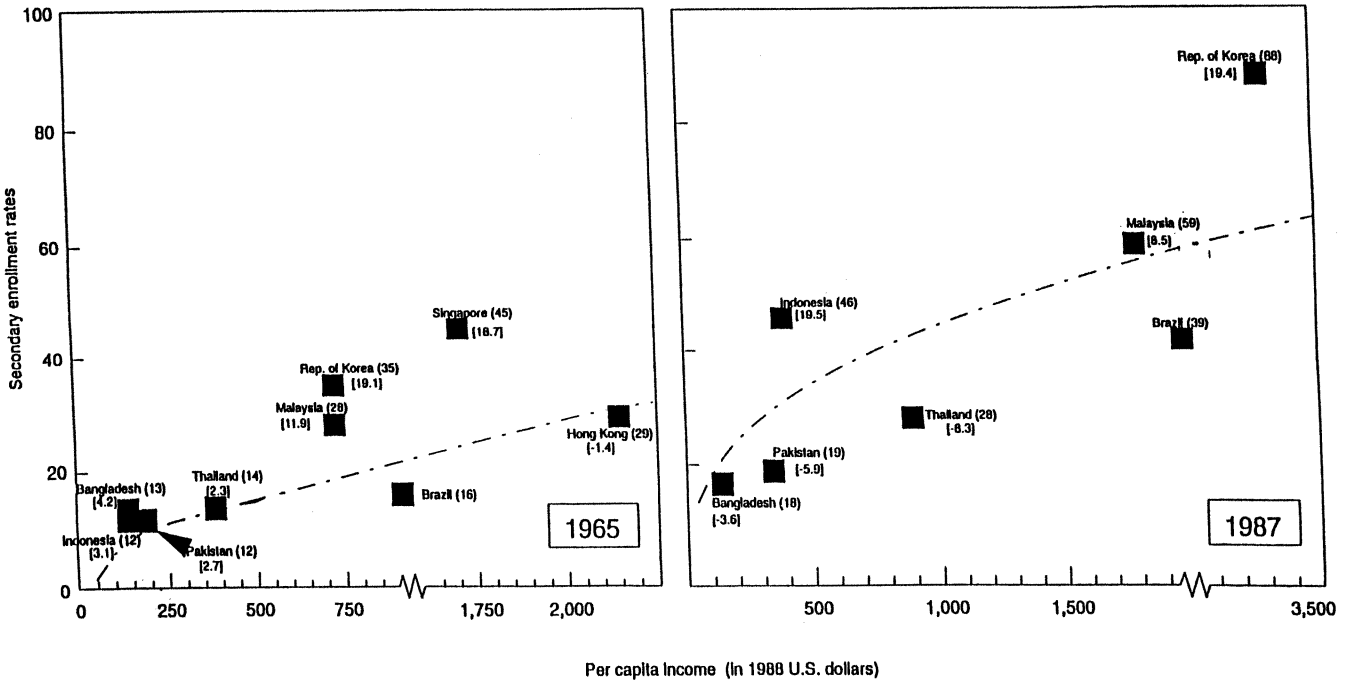
25. Behrman and Schneider (1992). The regressions control for a polynomial in average per capita income in the relevant year. The authors used per capita GNP at official exchange rates as the measure of income.
26. Despite increasing its secondary enrollment rate from 29% to 74%, Hong Kong also fell well below the predicted level in 1987. This is because, at $15,000, the per capita income of Hong Kong was so high that the OECD countries were now its comparators.

Figure 11 CROSS-ECONOMY REGRESSION FOR PRIMARY ENROLLMENT RATES, 1965 AND 1987



Note: Figures in parentheses are enrollment rates; bracketed numbers show residuals.
Source: Behrman and Schneider (1992).

Figure 12 CROSS-ECONOMY REGRESSION FOR SECONDARY ENROLLMENT RATES, 1965 AND 1987



Note: Figures in parentheses are enrollment rates; bracketed numbers show residuals.
Source: Behrman and Schneider (1992).

mostly differential changes over the period in income growth and in the number of children entering schools, both of which favored the East Asian economies. A somewhat better measure of school quality is the performance of children on tests of cognitive skills, standardized across economies. In the relatively few international comparisons available from such tests, East Asian children tend to perform better than children from other developing regions—and even, recently, better than children from high income economies.[27] Table 7 offers some comparative data on expenditures per pupil in the HPAEs and other countries between 1965 and 1989.

3.2.2 Focusing Educational Spending Higher shares of national income devoted to education cannot fully explain the larger accumulation of human capital in the HPAEs. In both 1960 and 1989, public expenditure on education as a percentage of GNP was not much higher in East Asia than elsewhere (Table 8). In 1960 the share was 2.2% for all developing economies, 2.4% for sub-Saharan Africa, and 2.5% for East Asia. Over the three decades that followed, governments of East Asia markedly increased the share of national output they invested in formal education. But so did governments in other developing regions. In 1989 the share in Africa, 4.1%, was higher than the East Asian share, 3.7%, which barely exceeded the average share for all developing economies, 3.6%.[28]

The allocation of public expenditure between basic and higher education is the major public policy factor that accounts for East Asia's extraordinary performance with regard to the quantity of basic education provided. The share of public expenditure on education allocated to basic education has been consistently higher in East Asia than elsewhere. The share of public funds allocated to tertiary education in East Asia has tended to be low, averaging roughly 15% over the last three decades.[29] In Latin America the share has been roughly

27. Birdsall and Sabot (1993) cite Stevenson and Stigler (1992), among others, who report results of tests in cities of Japan, the United States, and Taiwan.
28. Government expenditure on education, expressed as a percentage of GNP, was used as an explanatory variable in a cross-country regression in which expected years of schooling of the school-age cohort (essentially an aggregate of enrollment rates) is the independent variable. For a sample of 15 Asian and Latin American countries, the expenditure variable was insignificant. See Tan and Mingat (1992).
29. In Korea and Taiwan the share of public expenditure on education allocated to higher education has increased over the last decade or so for two reasons. On the one hand, universal and near universal enrollment rates have been achieved at the primary and secondary levels, respectively. On the other hand, the increase has been consistent with the shift in the structure of production and exports to more technologically sophisticated and skill-intensive products, and the consequent increase in the demand for engineers and other skilled workers.

Table 7 PUBLIC EXPENDITURE PER STUDENT ON PRIMARY AND SECONDARY EDUCATION (U.S. DOLLARS)

	1965		*1975*		*1985*		*1989*	
Economy	Primary	Secondary	Primary	Secondary	Primary	Secondary	Primary	Secondary
HPAEs								
Hong Kong			192.3	180.5	558.1	810.2		
Korea, Rep. of	9.9	14.7	51.2	32.9	389.8	352.5	609.6	449.9
Malaysia					351.2	572.5		
Singapore			193.3	314.7	834.0			
Thailand	17.6	67.7	49.0	74.8	133.0		188.1	229.5
Other selected economies								
Brazil			76.9	179.1	155.4	225.2		
Ghana	22.3	122.0			27.9	62.3	36.3	78.0
India	5.3	71.3	17.5	30.9	38.1			
Kenya	28.9	336.7			50.3	149.7	62.2	290.4
Mexico	23.8	56.6	110.2	315.2	101.9	287.5	93.8	300.2
Pakistan	5.9	7.1	15.9	33.4	21.1	122.6		

Note: Cells are empty where data are unavailable.
Source: Computed from UNESCO and World Bank data.

Table 8 PUBLIC EXPENDITURE ON EDUCATION AS A PERCENTAGE OF GNP

Economy / Region	*1960*	*1989*
HPAEs		
Hong Kong	—	2.8
Korea, Rep. of	2.0	3.6
Singapore	2.8	3.4
Malaysia	2.9	5.6
Thailand	2.3	3.2
Indonesia[a]	2.5	0.9
Average[b]	2.5	3.7
Other		
Brazil	1.9	3.7
Pakistan	1.1	2.6
Less developed economies[c]	1.3	3.1
Sub-Saharan Africa	2.4	4.1

[a]Alternative sources of data indicate that expenditure on public education as a percentage of GDP was 3.0% in Indonesia in 1989.
[b]Average does not include Indonesia.
[c]Lower- and middle-income economies.
Source: United Nations Development Program (1991).

24%.[30] In South Asia the share is close to the Latin American level. This had been the case in Africa as well, but in recent years the share has declined to East Asian levels.

The broad base of human capital was critically important to rapid growth in the HPAEs. Because the HPAEs attained universal primary education early, literacy was high and cognitive skill levels were substantially above those in other developing economies. Basic education in the HPAEs is highly oriented to the acquisition of general academic skills, while postsecondary education tends to be oriented toward vocational skills. Some HPAEs have also been unusually large-scale importers of educational services, particularly in vocationally and technologically sophisticated disciplines. Firms, therefore, had an easier time upgrading the skills of their workers and mastering new technology. In addition, rapid human capital accumulation reduced income inequality by increasing the relative abundance of educated workers, thereby lowering the scarcity rents associated with cognitive skills.

30. Given the smaller size of the basic education age cohort in East Asia than in Latin America, this difference underestimates the gap between the two regions in the strength of the public sector's commitment to basic education.

These benefits were particularly evident in the countryside (Birdsall and Sabot, 1993).

4. *Unconventional Wisdom—The Export Push and Industrial Policies*

Most East Asian governments have pursued sector-specific industrial policies to some degree. The best known instances include Japan's heavy industry promotion policies of the 1950s and the subsequent imitation of these policies in Korea. These policies included import protection as well as subsidies for capital and other imported inputs. Malaysia, Singapore, Taiwan, and even Hong Kong have also established programs—typically with more moderate incentives—to accelerate development of advanced industries. In the capital market, governments intervened systematically both to control interest rates and to direct credit.

Industrial targeting could have resulted in extensive rent seeking and great inefficiency. Because it apparently did not, the success or failure of selective interventions are among the most controversial aspects of the East Asian success story. Some of the reasons why selective interventions do not appear to have had the disastrous results of those pursued in other developing economies are straightforward. Labor market policies in the HPAEs tended to emphasize flexibility and competitive determination of wages (Fields, 1993). Directed credit programs were undertaken within a framework of generally low subsidies to borrowers and careful monitoring (Vittas and Cho, 1993). As a consequence, the relative prices of labor and capital in the HPAEs were closer to their scarcity values than in other developing economies (World Bank, 1993).

Nevertheless, abundant evidence exists that, especially in the cases of Japan, Korea, and Taiwan, governments made systematic efforts to alter industrial structure for the purpose of accelerating productivity change. The impact of these policies on the HPAEs growth remains a topic of heated debate.[31] This section proposes two policy lessons: first, that promotion of manufactured exports was a significant source of measured TFP change, and second, that industrial policies mattered relatively little in the overall record of East Asia's extraordinary growth. The upshot of these propositions is that export—not industrial—promotion was at the heart of the HPAEs' productivity performance.

31. See, e.g., the collection of essays in *World Development* (1994); Rodrik (1993), critically reviewing World Bank (1993).

4.1 EXPORT GROWTH AND PRODUCTIVITY CHANGE

Although all HPAEs except Hong Kong passed through an import substitution phase, with high and variable protection of domestic import substitutes, these periods ended earlier than in other economies. Hong Kong, Malaysia, and Singapore adopted trade regimes that were close to free trade; Japan, Korea, and Taiwan adopted mixed regimes that were largely free for export industries. Indonesia and Thailand have in the 1980s begun to reduce protection. Exchange rate policies were liberalized, and currencies frequently devalued, to support export growth.[32]

Export push strategies were implemented in three very different ways in the HPAEs. Hong Kong and Singapore established free-trade regimes, linking their domestic prices to international prices; the export push was an outcome of the very limited size of the domestic market coupled with neutral incentives between producing for the domestic or international market. Both economies made export credit available, although they did not subsidize it, and Singapore focused its efforts on attracting foreign investment in exporting firms.

In Japan, Korea, and Taiwan, incentives were essentially neutral *on average* between import substitutes and exports. But within the traded-goods sector, export incentives coexisted with substantial remaining protection of the domestic market. Export incentives, moreover, were not neutral among industries or firms. There was an effort in Japan, Korea, Singapore, and Taiwan to promote specific exporting industries. Protection was combined with either compulsion or strong incentives to export. In Korea, firm specific export targets were employed; in Japan and Taiwan access to subsidized export credit and undervaluation of the currency acted as an offset to the protection of the local market. What was important in all cases was that governments were credibly committed to the promotion of manufactured exports. They adopted an export push strategy.[33]

The HPAEs' export performance is reflected in their steadily rising share of world exports (Table 9). As a group, the HPAEs increased their share in world exports from 7.9% in 1965 to 13.1% in 1980 and 18.2% in

32. Corden (1993) refers to this as "exchange rate protection."
33. Colin Bradford was the first to introduce the concept of export push into the analysis of East Asia's rapid growth. He has defined it as effective exchange rates for exportables exceeding those for importables (Bradford, 1994). We use the term somewhat more broadly to indicate a credible commitment to a policy regime that will ultimately yield effective exchange rates for exportables equal to or greater than the EER for importables.

Table 9 EXPORT PENETRATION, SELECTED EAST ASIAN ECONOMIES, 1965–1990

	Share in world exports			*Share in developing economy exports*		
Economy	1965	1980	1990	1965	1980	1990
Total exports						
Japan	5.0	7.0	9.0	—	—	—
Four tigers[a]	1.5	3.8	6.7	6.0	13.3	33.9
Southeast Asian NIEs[b]	1.5	2.2	2.4	6.2	7.8	12.4
HPAE Subtotal	7.9	13.1	18.2	12.2	21.1	56.3
All developing economies	24.2	28.7	19.8	100.0	100.0	100.0
World	100	100	100	—	—	—
Exports of manufactures						
Japan	7.8	11.6	11.8	—	—	—
Four tigers[a]	1.5	5.3	7.9	13.2	44.9	61.5
Southeast Asian NIEs[b]	0.1	0.4	1.5	1.1	3.8	12.0
HPAE Sub-total	9.4	17.3	21.3	14.2	48.6	73.5
All developing economies	11.1	11.8	12.9	100	100	100
World	100	100	100	—	—	—

[a]Republic of Korea, Hong Kong, Singapore, and Taiwan.
[b]Indonesia, Malaysia, and Thailand.
Source: UN Trade Systems data.

1990. Manufactured exports have provided most of this growth. From 1965 to 1990, Japan emerged as the world's biggest exporter of manufactured goods, increasing its share of the world market from nearly 8% to almost 12%. In the 1970s and 1980s, the locus of growth shifted to the four tigers, whose share of manufactured exports grew nearly four times faster than Japan's (Table 9). Beginning around 1980, the three southeast Asian HPAEs (Indonesia, Malaysia, and Thailand), historically dependent on commodity exports, recorded a similar but so far smaller surge in manufactured exports.

Some analysts have, with hindsight, attributed these achievements to unique cultural and geographical circumstances. But there was little evidence at the outset that East Asian economies would achieve such spectacular results. In the 1950s even trade optimists were export pessimists and did not anticipate that Korea's exports would grow four times as fast as world trade over the next 30 years.[34] One obvious effect of rapid export growth has been a marked increase in the openness of

34. See, e.g., Little (1982).

these economies as measured by the share of exports plus imports in GDP (Table 10).

Most explanations of the link between TFP growth and exports emphasize such static factors as improved resource allocation among sectors (presumably arising from reductions in anti-export bias), economies of scale and improved capacity utilization, which may account for a high level of productivity being achieved after a short period of export orientation but not for continuing high TFP growth rates. However, the relationship between exports and productivity growth may arise from export's role in helping economies adopt and master international best practice. Because firms that export have greater access to best practice technology in imperfect world technology markets, there are both benefits to the enterprise and spillovers to the rest of the economy that are not reflected in market transactions (Pack and Page, 1993; Bradford, 1994). These information-related externalities can be an important source of rapid TFP growth.

Trade and educational strategies, moreover, may have worked together. High levels of labor force cognitive skills permit better firm-level adoption, adaptation, and mastery of technology (Birdsall and Sabot, 1993). It is doubtful that the HPAEs could have made as productive use of foreign knowledge and imported capital and benefited as much from embodiment without highly skilled domestic engineers and workers.

Table 10 RATIO OF TOTAL TRADE TO GDP

Economy / region	*1970*	*1980*	*1985*	*1988*
HPAEs				
Hong Kong	1.50	1.52	1.78	2.82
Indonesia	0.25	0.46	0.38	0.42
Korea, Rep. of	0.32	0.63	0.66	0.66
Japan	0.19	0.25	0.23	0.21
Malaysia	0.89	1.00	0.85	1.09
Singapore	2.12	3.70	2.77	3.47
Taiwan	0.53	0.95	0.82	0.90
Thailand	0.28	0.49	0.44	0.35
Sub-Saharan Africa	0.24	0.30	0.27	0.45
South Asia	0.11	0.17	0.16	0.19
Latin America and Caribbean	0.20	0.25	0.22	0.23

Note: Total trade = value of exports and value of imports/gross domestic product.
Sources: World Bank data; Taiwan, various issues; National Accounts Statistics: Analysis of Main Aggregates, 1988–1989 (United Nations).

Thus, exports and human capital formation may have interacted to provide a particularly rapid phase of productivity-based catch-up.

To test the hypothesis that export orientation played a significant role in the HPAEs' TFP growth, we attempt to explain variations across economies in TFP growth rates in terms of relative income, educational attainment (as measured by the average stock of education per person), a measure of trade orientation, and measures of manufactured export performance (Table 11).

The relative level of GDP in 1960 is included in the explanatory regression to test for the presence of conditional, productivity-based catch-up. The interpretation of the variable is not straightforward, however, since it also captures the resource allocation gains arising from structural transformation at low levels of income. Because these potential gains decline with increases in per capita income, the relative income variable also captures the effect of structural change on the one-sector TFP estimates (Pack, 1993).

Numerous efforts have been made to test the relationship between "outward orientation" and productivity growth.[35] Dollar (1990) uses the international comparisons of price levels compiled for 121 market countries by Summers and Heston (1988) to develop an index of "outward orientation" for 95 developing countries. We employ Dollar's index in our basic specification and find that there is a significant and positive relationship between "outward orientation" and TFP growth.

The interpretation of this variable is also not straightforward, however. Rodrik (1993) has discussed the problems in the construction of the index and its interpretation, and argues that it is best regarded as an index of exchange rate mismanagement. To the extent that this is correct, our results differ from those of Fischer (1993) in finding a significant negative relationship between inappropriate exchange rate policy and productivity growth.

Manufactured export performance is strongly correlated (at the 1% level) with increased rates of TFP growth. We use two measures of export orientation that have somewhat different interpretations. The first is the share of manufactured exports in total exports. This is a crude measure of the probability that the marginal export will be a manufactured good. The second is the more conventional share of manufactured exports in GDP, which measures manufactured export concentration for the economy. Both the share of manufactured exports in total exports and the share of manufactured exports in GDP are

35. See, e.g., Thomas and Wang (1993) and Nishimizu and Page (1991).

Table 11 DETERMINANTS OF TOTAL FACTOR PRODUCTIVITY GROWTH, 1960–1989
(DEPENDENT VARIABLE: RATE OF GROWTH OF TOTAL FACTOR PRODUCTIVITY, 1960–1989)

Number of observations	*56*	*62*	*47*	*47*	*64*	*49*	*49*
Intercept	−83.1863**	−0.3584	−64.9123**	−71.1186**	−0.1315	−72.0692**	−70.8604**
	(15.6575)	(0.2614)	(14.0585)	(14.8657)	(0.3244)	(15.6104)	(15.4608)
GDP relative to U.S., 1960	−4.5638*	−3.3864**	−4.8047*	−5.5757**	−1.4501	−2.3509	−2.1562
	(2.1994)	(1.0189)	(1.9771)	(2.0637)	(1.1912)	(2.3225)	(2.3008)
Educational attainment, 1960	0.3083**	0.2158**	0.1471	0.0680	0.2269*	0.1574	0.0738
	(0.0951)	(0.0808)	(0.0874)	(0.1082)	(0.0990)	(0.1064)	(0.1207)
Dollar index	0.8328**		0.6493**	0.7154**		0.7225**	0.7134**
	(0.1579)		(0.1417)	(0.1508)		(0.1574)	(0.1558)
Average manufactured exports/ total exports, 1960–1985		0.0345**	0.0314**	0.0159			
		(0.0058)	(0.0066)	(0.0142)			
Interaction term: Education attainment 1960 times manufactured exports /total exports, 1960–1985				0.0032			
				(0.0026)			
Average manufactured exports/GDP, 1965–1985					0.0828**	0.0625*	−0.0686
					(0.0279)	(0.0269)	(0.0966)
Interaction term: Education attainment 1960 times manufactured exports/ GDP, 1965–1985							0.0284
							(0.0201)
Adjusted R^2	0.4854	0.4665	0.6333	0.6376	0.1950	0.4507	0.4628

*Statistically significant at the 0.05 level.
**Statistically significant at the 0.01 level.
Note: Coefficient is top number. Standard error is bottom number in parentheses.
Source: World Bank staff estimates.

significantly and positively correlated with TFP growth, controlling for relative income and educational attainment.[36]

When the manufactured export variables are introduced together with the Dollar index, both are significant, although the coefficient on the share of manufactured exports in total output is less precisely estimated. Our interpretation of these results is that controlling for overall "outward orientation" (or appropriate exchange rate policy), high manufactured export orientation increases TFP growth. A high concentration of manufactured exports relative to total exports, rather than the relative size of the manufactured export sector, is more closely associated with productivity growth in a cross-economy framework. This is consistent with the hypothesis that export-based learning is more closely related to manufactured export orientation than to manufactured export volume.

The education stock variable is included as a crude test of educationally based externalities. We find, consistent with this hypothesis, that the education stock variable is positively and significantly associated with TFP growth when either the Dollar index of outward orientation or either index of manufactured export orientation is used independently in the regressions. When both indices of outward orientation are introduced jointly, however, the magnitude of the coefficient on educational attainment declines, as does its significance (to the .10 level). This is suggestive of an interaction between trade orientation and educational attainment.

We also find some evidence of a positive interaction between the share of manufactured exports in total exports and in national income and the stock of education. The coefficient of the interaction term between these two variables is positive but not significant at conventional levels, and the export share variable becomes insignificant. When we consider the contribution of the variables taken together to explaining the variation in TFP growth rates, however, it is statistically positive. We conclude that export performance and education interact

36. The evidence from our cross-economy estimates is supported by a number of recent microeconomic studies that attempt to test the link between exports and productivity growth. Pack and Page (1993) present evidence from Korea and Taiwan that at the sectoral level, rapid export growth is correlated with the pattern of productivity change; exporting sectors have higher sectoral rates of TFP growth. Wei (1993) uses city level data from China and finds a statistically significant relationship between export growth and productivity growth. Aw and Hwang (1993), using firm-level microeconomic data from Taiwan, find a statistically significant relationship between productivity level differences among manufacturing firms and export orientation.

positively; higher levels of education raise the contribution of manufactured export concentration to TFP growth.[37]

4.2 THE INSIGNIFICANCE OF INDUSTRIAL POLICY

Proponents of neutrality and intervention both cite the high performing East Asian economies as evidence supporting their views. Balassa (1991), Krueger (1993), Hughes (1992), and others argue that openness to international trade, based on largely neutral incentives, was the critical factor in East Asia's rapid growth. On the other hand, advocates of interventions, while acknowledging the importance of trade, note that incentives deriving from quantitative restrictions on imports, tariffs, and subsidies were not neutral among sectors (or firms) during the HPAEs' periods of rapid growth. They argue that the HPAE governments successfully intervened to change comparative advantage (Amsden, 1989; Wade, 1990; Singh, 1992).

Industrial policy interventions, which often use trade policy instruments, are motivated by the belief that shifting industrial structures toward newer and more modern sectors increases the opportunities for capturing the dynamic scale economies that result from learning. We define industrial policies, as distinct from trade policies, as government efforts to alter industrial structure to promote productivity-based growth. This productivity-based growth may derive from learning, technological innovation, or catch-up to international best practice.

All of the HPAEs, except Hong Kong, have employed industrial policies as defined earlier. Japan and Korea had the most systematic set of policies to alter industrial structure. Taiwan's efforts were less systematic but were nonetheless widespread. Industrial policy in Singapore was more functionally directed at the rapid upgrading of technology by direct foreign investors, regardless of type of output. Malaysia, Indonesia, and Thailand have all used industrial policies but much less systematically than the northeastern HPAEs.

37. We ran two joint F tests on the regressions including the interactive term. The F tests were both consistent with a high degree of multicollinearity between the interaction term and the export term. The F Test rejects the null hypothesis that, taken jointly, the coefficients on the three variables (education, manufactured exports/total exports, and the interactive term) are not significantly different from zero (taken together, the three are significantly different from zero at the .01 level). Likewise, the F test rejects the hypothesis that, taken jointly, the interactive term and the export variable are not significantly different from zero (taken together, the two are significantly different from zero at the .01 level). Where there is a high degree of multicollinearity between the variables, the coefficients on the interaction term and the export variable, despite being separately insignificant, should still be treated as best point estimates.

Table 12 EFFECT OF SECTORAL COMPOSITION ON MANUFACTURING WIDE GROWTH OF TFP

Economy	*TFP growth, actual value added weights*	*TFP growth, adjusted weights*
Korea, Rep. of, 1966–1985	6.7	6.1
Japan, 1960–1979	2.3	1.9

Note: Weighted by value added shares that would have prevailed if the metal products and machinery sector had conformed to that predicted by the equations estimated by Syrquin and Chenery (1989).
Sources: Pack (1993). Based on Kuroda, Korgenson, and Nizhimizu (1985) for TFP estimates for Japan.

4.2.1 Industrial Growth and Productivity Change HPAE industrial growth patterns differ from the patterns in most other low- and middle-income economies in the relative size and growth rates of two important industrial subsectors—metal products, electronics and machinery, and textiles and garments. Table 12 shows the ratio of the share of the value added in five key International Standard Industrial Classification (ISIC) subsectors as a percentage of the total value added of manufacturing to cross-country norms (Chenery, 1987). Among the HPAEs, metal products, electronics, and machinery (ISIC subsector 38, or MPM) have grown unusually fast. The sector's share of manufacturing value added doubled in Singapore and Japan, nearly tripled in Korea, and Indonesia, and quadrupled in Malaysia. More surprising than the importance of growth in MPM, which provides vital inputs to numerous other manufacturing subsectors, is continued importance of textiles and garments even as the rapidly developing Asian economies shifted from labor intensive to capital intensive production.

Detailed sectoral growth rates of TFP are available for Japan, Korea, and Taiwan. There is both good news and bad news for advocates of industrial policy in the productivity performance of East Asian industry. The good news is that, on average, rates of productivity change in industry in Japan (before 1973), Korea, and Taiwan, which are the only economies for which we have detailed sectoral estimates of TFP growth, were high by international standards (Page, 1990).[38] There are now sufficiently long time series data to conclude that in these economies, TFP growth has accounted for a substantial fraction of the growth of

38. Young (1993) disputes even this assertion, although his sample of LDC comparators is small.

constant price value added in manufacturing. Given the length of time of the observations, it seems unlikely that the measured growth rates of TFP could be attributable to cyclical phenomena or growing capacity utilization of initial large investments.

The bad news is that, in general, productivity change has not been higher in promoted sectors. Japan may be an exception. Between 1960 and 1979, chemicals and the metal working machinery complex had unusually good TFP performance (Jorgenson, Kuroda, and Nishimizu, 1987). Japan's industrial structure differs from international norms in these sectors and exhibits quite high values of the share of value added in total manufacturing. These industries are those that observers usually point to as having received significant government support including efforts to stimulate productivity growth.

A number of calculations of TFP have been carried out for Korea for a variety of periods (Dollar and Sokoloff, 1990; Lim, 1991). From these studies a number of patterns can be identified that are broadly consistent with one another. What is most striking are the high values of TFP change in most sectors by international standards (Nishimizu and Page, 1991). Although the Korean government selectively promoted chemicals and iron and steel (included in basic metals), the large growth in the share of iron and steel was accompanied by quite low TFP performance between 1966 and 1985; textiles and clothing, on the other hand, had very high rates of TFP growth. The promoted chemical sector, whose relative size was decreasing, was characterized by considerably higher than average TFP growth during this same period.

The government in Taiwan did not attempt to influence sectoral evolution as strongly as the government of Korea. Nevertheless, there was substantial effort devoted to encouraging specific sectors, particularly those viewed as either capital- or technology-intensive. However, there is no relationship between capital intensity and productivity change at the sectoral level. In fact, the highest sectoral rates of TFP change are recorded in textiles and apparel.

Overall, the evidence that industrial policy systematically promoted sectors with high productivity change is weak. In Japan there is some support for the assertion that TFP growth was higher in selected sectors, while in Korea and Taiwan, activities that were not promoted (e.g., textiles) had equally as impressive TFP performances as those that were. The critical empirical question, of course, is whether, given any plausible assumptions regarding the relative size of promoted sectors in the absence of industrial policy and their observed rates of productivity change, industrial policies accelerate the overall rate of productivity change in manufacturing.

4.2.2 The Effect of Industrial Policy on Manufacturing Productivity Growth
Aggregate TFP in any period can be decomposed by weighing each sector's level of total factor productivity, $A_{i,t}$, by the sector's share in value added, $v_{i,t}$. The growth of TFP will then depend on changes in $A_{i,t}$ and changes in $v_{i,t}$. Algebraically, this relation can be written as

$$\Delta \text{ Log } A = \sum_i (v_{it} \log A_{i,t} - v_{i,t-1} \log A_{i,t-1}). \tag{3}$$

Equation (3) gives the growth in A due to the change in productivity of sectors assuming constant sectoral shares and/or the growth in the value added share of sectors, whose productivity is high.

Of the countries considered here, Japan and Korea are the countries in which activist industrial policies were employed most consistently to achieve productivity-based catch-up. On the basis of international comparisons, two sectors were generally overrepresented in the industrial sectors of the HPAEs, metal products and machinery, and textiles and apparel. Broadly speaking, only the former sector was promoted in HPAEs that used industrial policy. One test of the significance of industrial policy, then, is whether, given the observed values of sectoral TFP growth, the unusual evolution of the sectoral pattern of production in some of the countries had a significant quantitative impact on overall TFP growth.[39]

To answer this we first calculate the manufacturing-wide growth of A^* using the observed value-added shares at the end of the period of 1966 to 1985, and the A_i^* values estimated for Korea by Lim (1991) and for Japan by Jorgenson, Kuroda, and Nishimizu (1987). We then recalculate the value added weights assuming that the sectors in ISIC 38 had been at their predicted value, on the basis of international norms taken from Chenery (1986), and we reassign the residual value added to all other sectors equally. Thus, in Korea, instead of accounting for 38% of manufacturing value added, sector 38 accounts for 14%.[40]

The result for Korea is shown in row 1 in Table 12. The actual sector-wide growth rate, A^*, was 6.7%, the recalculated one 6.1%, during a

39. It is possible that industrial policy significantly increased the values of A_i^* in sectors other than those promoted due to one or more externalities. While this may be the case, it is likely that most externalities occur within individual sectors or in closely related ones. Given the many branches constituting the Metal Products and Machinery sector, the externalities should have been revealed in its own TFP value.

40. Put differently, it has been shown earlier that Korea's v^P/v^A ratio for MPP was 2.76. If this had been one, the actual share of value added would have been 13% rather than 36%, i.e., the share would have been constant at the 1968 level. If factors had been allocated to all of the remaining sectors equally, the sector-wide average value for A^* would have been .061 rather than .067.

period in which the growth rate of manufacturing value added was 17.5% per annum. Even if the "excess" growth of the MPM sector is attributed to selective intervention, its rate of TFP growth was not sufficiently above that of other sectors to make a large contribution to overall industrial TFP growth. The major reason for Korea's manufacturing success lay in high individual TFP growth rates for most sectors in most periods. A calculation, similar to that for Korea can be done for Japan. Table 12 shows the actual growth of A^* for 1960–1979 and the estimated growth, had the sectors constituting 38 been at the international norm, 24% of manufacturing value added rather than 41% in 1979. The value of A^* would have declined from 2.3 to 1.9, a relatively small decrease given the growth rate of manufacturing value added of 8.7% per annum.

5. *Policies for Rapid Growth in a Changing World Economy*

What caused East Asia's success? In large measure the HPAEs achieved high growth by getting the basics right. Private domestic investment, combined with rapidly growing human capital, were the principal engines of growth. Agriculture, while declining in relative importance, experienced rapid growth and productivity change. Population growth rates declined more rapidly in the HPAEs than in other parts of the developing world. And some of these economies also benefited from a head start in terms of the education of the labor force and capable and effective systems of public administration. In this sense there is little that is "miraculous" about the HPAEs' superior record of growth; it is largely due to superior accumulation.

To what extent are those lessons from East Asia applicable to other developing economies? In the HPAEs, a wide variety of policies, across countries and over time within countries, were used to achieve the critical functions of growth: accumulation, allocation, and productivity growth. While the sheer variety of policies precludes drawing any simple lessons or making any simple recommendations, two fundamentalist lessons can be drawn. Macroeconomic stability and the capacity to respond effectively to macroeconomic shocks helped to accelerate growth through all three mechanisms, increasing accumulation, improving resource allocation, and increasing productivity growth. Education policies that stressed broadly based primary and secondary education contributed directly to output growth and apparently also indirectly through the interaction of educational shocks and export orientation to TFP growth.

Our judgment was that the promotion of specific individual industries made relatively little difference to the HPAEs' success. Rather, export push strategies have been the most generally successful selective approach used by the HPAEs and hold the greatest promise for other developing economies. It is not altogether surprising that we conclude that export orientation rather than industrial policy was mainly responsible for improving productivity growth in Japan and Korea. These economies, although selectively promoting capital and knowledge intensive industries, still aimed at creating profitable, internationally competitive firms. The yardstick used to evaluate industrial policies success —mainly export performance—provided a market test of the success or failure of the policy instruments chosen. Picking winners may have succeeded more because Japan and Korea set export targets for promoted industries and used export performance to assess the success of policies than because of success in selecting industrial subsectors.

Despite their potential benefits, selective interventions, especially when combined with access to scarce resources such as foreign exchange and credit, have a high risk of capture by the participants. Capture was avoided—and resource allocation may have been improved—in Japan and Korea by the combination of repeated relationships between business and government and the use of exports, not domestic GDP growth, as the yardstick by which the success of the industrial strategy was measured. In other HPAEs, however, such elaborate contests were not used—e.g., in Hong Kong, Singapore, or Taiwan—or were unsuccessful, as in the cases of the HICOM drive in Malaysia or recent efforts at technological leapfrogging in Indonesia.

In the HPAEs that intervened selectively to promote exports, a contest based on performance in global markets played the allocative role that is normally ascribed to neutral exposure of both import substituting and exporting industries to international competition. But these contest-based incentive structures required high government institutional capability. One of the keys to success of the export push in some of the HPAEs, especially Japan and Korea, was the government's ability to combine cooperation with competition. They were able to do this first, because their civil services and public institutions were largely staffed by competent and honest civil servants, and second, because firms and bureaucrats knew that there was a single yardstick for performance, exports.

Export targets provided a consistent yardstick to measure the success of market interventions. When protected sectors interfered with the exports of other sectors, the latter could seek redress and were successful. Even where domestic content rules were imposed, e.g., on foreign

direct investors in Taiwan, they were suspended if they interfered with exports. The emphasis on export competitiveness gave businesses and bureaucrats a transparent and objective system to gauge the desirability of specific actions. Interventions could not be made arbitrarily, because these could be appealed at a higher level of government if they interfered with exports. The more recent export push efforts of the Southeast Asian NIEs have relied less on highly specific incentives and more on gradual reductions in import protection, coupled with institutional support of exporters and a duty-free regime for inputs into exports. These "GATT friendly" export promotion strategies offer substantial scope for adoption by other developing economies.

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Comment

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This provocative paper reexamines the experiences of the East Asian miracle economies (so-called because of their remarkable growth performances). One relatively noncontroversial section of the paper provides further evidence in support of two conventional conclusions—that sound macroeconomic management as well as broad-based educational policies played important roles in the impressive performances. The provocative part of the paper focuses on the role of micro-management, concluding that while export promotion did contribute to high growth, the targeted industrial policies many of the countries employed did not.

Unfortunately, I am not convinced that the methodology used here supports the author's conclusions. In my view, the jury is still out as to the lessons East Asian economies teach about the merits of micro interventions.

Before discussing the specifics of the paper, let me make two points. First, the paper addresses very important issues that it is helpful to put in context. There is a long-standing debate about the role that government intervention has played in high-performing Asian economies (HPAEs). This study comes out of a major World Bank project to assess the development strategy in East Asia and draw lessons for other countries with poor growth histories. In particular, was there a reason to amend the traditional World Bank view that such intervention is harmful? Thus, the present paper and the larger World Bank study seem to represent a qualitative change in World Bank doctrine, which now allows a limited role for micro-management as part of a sensible development strategy. In my view, this more balanced "conventional wisdom" is warranted and appropriate.

Second, based on my own knowledge of the Korean experience, I am quite sympathetic to the view that the extensive interventions have helped to foster growth in East Asia—in fact, I believe that this view is probably correct. My critique of this paper should be taken as an assessment of the specific approach and conclusions presented here, and not as an outgrowth of my priors about the role of intervention.

Let me now return to the specifics of the paper, roughly in the order of presentation. The first part of the paper is devoted to documenting the experience of rapid growth among HPAEs and to examining alternative explanations for it. The author divides the views into two camps: fundamentalists—who stress the role of factor accumulation and tend to believe that markets worked well—versus mystics—who focus on the role of technology and tend to believe that activist government policies helped to remedy market failures. The author's analysis of the data leads him to conclude that "the East Asian success story is, then, primarily a fundamentalist one."

The analysis presented does not really allow one to distinguish between the two views. It seems to me that the approach is likely to underestimate the role of technology, making it difficult to draw firm conclusions—if the objective is to debunk the mystic view, surely one would like to know the maximum amount that technology could reasonably contribute to growth. The paper estimates total factor productivity (TFP) for HPAEs under the assumption that they all have the same production function as industrial countries. It seems more reason-

able to assume that their production functions were converging toward the function for industrial countries. In fact, the paper tells us that the elasticity of output with respect to capital is much larger for the industrial country sample than for the full sample including the developing countries. This suggests that the methodology overstates the contribution of capital accumulation to growth in the developing country HPAEs, thus understating the contribution of TFP. However, it is difficult to tell how large the underestimate might be.

It is also difficult to draw strong conclusions from the evidence about factor accumulation here. To study the role of accumulation, the paper presents scatter plots of average income growth, investment rates, and education indicators during 1960–1985 each relative to 1960 per capita incomes for HPAEs and a group of comparator countries. Although the HPAEs are outliers in terms of their growth rates, it is much less obvious that they are outliers in terms of investment and education. One problem is that these very aggregate measures of factor accumulation may mask important differences among countries. Further, the method seems quite sensitive to time period. For example, Korea had very low investment rates (12.1% of GDP) during 1960–1965 versus 27.2% during 1965–1985. If the period selected began in 1965, Korea might be an "outlier" in terms of both growth and investment rates. I also note that Denison-style growth decompositions do point to the importance of factor accumulation in Korea. Kim and Park (1985)[1] find that increases in factor inputs contributed substantially to growth in Korea during 1963–1982 (4.9% per annum).

It seems to me that both accumulation and technological progress have been important—as a group, the HPAEs stand out because they have tended to do well in both. (Of course, there are differences across countries.) Perhaps the fundamentalist–mystic debate creates a false dichotomy. Technical progress and accumulation appear to interact in complex but difficult to measure ways, and we may learn a considerable amount by studying this interaction.

The next section of the paper reaffirms two conventional lessons, both of which I agree with strongly. I mention these lessons only briefly. First, sound macroeconomic management produced a stable environment for economic activity to flourish. In fact, over the past decade, there has been a striking convergence of views about the

1. See Kim, K. S., and J. K. Park. (1985). *Sources of economic growth in Korea: 1963–82.* Seoul, Korea: Korea Development Institute, pp. 67–69.

importance of small budget deficits, monetary control, and realistic exchange rates. The experiences of these high-growth economies have played a role in the development of this consensus. At the same time, the paper does not address the political economy of how and why these economies were able to initiate, implement, and follow through on sound macroeconomic policies.[2]

Second, the paper emphasizes the role of broad-based education systems. Here, I wonder if the point could have been made even more strongly if data on private spending on education had been included along with the public expenditure figures. In many Asian economies a strikingly large fraction of disposable household income is devoted to tutors and other additional education expenditures for children. In addition, the paper notes that the share of national income devoted to education during both 1960 and 1989 in HPAEs is similar to the share in comparator countries. This is a little misleading, because the HPAEs have had a dramatic decline in dependency rates between 1960 and 1989–hence, the rise in per pupil expenditures.

The last part of the paper draws two "unconventional" conclusions: that the promotion of manufactured exports was a significant source of measured TFP change, while industrial policies mattered little. In the remainder of my remarks, I explain why the jury is still out on the effects of these types of policies.

To study export promotion, the paper presents a cross-country regression of average TFP growth on the ratio of manufactured to total exports, a measure of "openness" and other right-hand-side variables. The export ratio and openness are found to be significant. However, what does this tell us about the effects of active interventionism that promoted certain types of exports through direct credit allocations and other forms of micro management? The export ratio is partially a structural variable that depends on endowments as well as on policy. Further, as the paper notes, the measure of openness used is typically described as a measure of sensible exchange rate management. Perhaps this variable is simply picking up the importance of sound macroeconomic policy—a "conventional" lesson.

To study industrial policy, the paper compares TFP growth across two-digit industries within countries. It finds that although the *average*

2. For example, see Haggard, S. and R. Kaufman (eds.). (1992). *The politics of economic adjustment*. Princeton, NJ: Princeton University Press; and Williamson, J. (ed.). (1994). *The political economy of policy reform*. Washington, DC: Institute for International Economics.

TFP is high among HPAEs, it does not appear to be *relatively* higher in certain promoted sectors than in nonpromoted ones. However, it is not clear that the promoted/nonpromoted distinction is made appropriately. For instance, textiles and garments are taken to be a sector that was not promoted, even though Korea promoted it during part of the period under consideration. Further, perhaps a successful industrial policy works by raising average sectoral productivity and reducing the variation in productivity growth across sectors. This finding may be quite consistent with an effective intervention strategy.

There are three additional problems with this analysis—as well as the concern expressed earlier about how TFP is measured. First, the attempted distinction between export promotion and industrial policy is strange. Industrial policies are defined as "distinct from trade policies, government efforts to alter industrial structure to promote productivity based growth." How would the author classify selective credit allocations to firms producing color televisions that helped to increase their productivity and their exports? Surely such an intervention should count as both industrial policy and export promotion!

Second, there is the problem of the "appropriate counterfactual." It is not at all clear that other countries (with a variety of different characteristics) are the appropriate benchmark against which to measure the implications of a given country's attempt to promote a particular group of exports. Also, as already discussed, "good" industrial policy may work to reduce differences in cross-sectoral productivity instead of increasing them. These issues warranted considerably more discussion in the paper. A clearer analytic framework that spelled out the channels through which export promotion and industrial policies are expected to work would have helped in this regard.

Finally, the methodology tries to look for broad generalizations, when surely the HPAE and other experiences suggest that some types of interventions work under some conditions. Thus, it would be instructive to focus our research on trying to understand better when particular types of interventions are most likely to work well, and when poorly. For example, does sector matter—is it easier to succeed in promoting certain types of industries? When are direct credit allocations riskier than tax-based incentives?

Overall, this paper has reinforced my view that sound macroeconomic policies and educational emphasis promote growth. However, it has not altered my view that while the upside potential from an activist intervention strategy appears to be high, the down-side risk appears to be even more considerable.

Comment

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This paper presents Dr. Page's view on how rapid economic growth occurred in the eight East Asian countries—Japan, Hong Kong, Korea, Singapore, Taiwan, Indonesia, Malaysia, and Thailand. His knowledge and analyses are mainly based on a grand research study conducted at the World Bank (1993).[1] The study at the World Bank is considered to be an overture to second thoughts on its development assistant strategy. The value and virtue of government intervention, such as policy loans (subsidized loan to targeted industries), is at the heart of the controversy. This paper succinctly summarizes major debate points in the literature of East Asian growth experience. My comments follow the presentation of Page's paper.

1. Rapid Growth and Its Source

No one disagrees that growth experiences in the eight East Asian countries were miraculous. All of the eight countries have recorded growth in GDP per capita exceeding 4% a year, especially the "Four Tigers" exceeding 6% a year from 1965 to 1989. This presents "outliers" in the so-called convergence regression. Figure 1 of the paper clearly shows that these East Asian countries are outliers in the regression of growth on the initial level of income. Theory predicts that low-income countries tend to grow faster so that "convergence" in the level of income among countries in the world will occur. Of course growth depends on accumulation of labor, capital, and technology. Even adjusting for those factors, i.e., basically looking at TFP growth such as in Tables 1 and 2, the TFP growth experience is impressive for most, not all, of the eight countries.

I have reservations on this way of introducing a "miracle" and set up the following analysis, as many papers do by now. As a student of "old growth theory," I tend to distinguish a growth process, which is a

I am indebted to Anne O. Krueger and David Weil for their helpful comments on the preceding version of this comments.

1. The World Bank (1993), *The East Asian Miracle*, has already been widely reviewed. Rodrik (1993) challenges some of its assertions, especially links between hypotheses and regression results. Amsden (1993) criticized the half-hearted appreciation of government interventions and industrial policy.

process of quantity changes, from economic development, which is more about quality changes. My objection to a convergence regression is that it ignores the nonlinear process, or qualitative change, of economic development.[2]

Simon Kuznets observed that when a country starts on a sustainable growth path, qualitative changes have to occur. Investment grows sharply, industrial structures change, and growth results with social changes. Britain led the industrial revolution and modern economic growth in the mid-18th century, followed by France, the United States, and Germany in the first half of the 19th century. Many European countries started rapid economic growth between 1860 and 1870, according to Kuznets. Kuznets (1959) coined the phrase "modern economic growth," listing some common features: (1) the application of modern scientific thought and technology to industry; (2) a sustained and rapid increase in real product per capita, usually (but not always) accompanied by a high rate of population growth; (3) a rapid transformation of the industrial structure (changing sectoral output, labor force, and capital stock distribution); and (4) an expansion of international contacts. Kuznets, by the way, dates the start of modern economic growth of Japan at around 1874 and 1879.

Was it also a "miracle" to have seen the European countries experience rapid economic growth around the turn of century? If Kuznets dates modern economic growth for Asia in the year 2020, the date for the Four Tigers would be sometime around 1960 and the ASEAN four around 1970. Wouldn't it be more heuristic to compare East Asian experiences not with the current developing nations but with the European industrial revolution? Of course, Korea in 1960 faced quite different economic conditions from Britain in 1780. However, the kind of change in industrial structures, work habits, saving behavior, and other social changes may be similar.

This is more than just a philosophical point. Consider the Solow diagram of (Y/L) on (K/L). Depending on the shape of the production function, there may be many steady states. Let us suppose that there are two stable equilibria, the low, k^*, and the high, k^{**}, with an intermediate, unstable steady state, k^c. If a country can make a jump (in a matter of a decade) from k^* to somewhere above k^c, the critical value, then the "convergence" logic works. But an interesting part is not the convergence process between k^c and k^{**}, but an initial jump from k^* to above k^c. Is the jump a miracle or a big push?

2. The following argument is a summary of my previous comments on a convergence paper by Easterly (1994); see Ito (1994).

I consider that it is more interesting to see what causes the jump from a low equilibrium (vicious circle) onto a path toward a high equilibrium. Once high investment kicks in, growth results, and growth fosters confidence in the country and high savings result, which connects to investment, a virtuous circle.[3]

Many countries made a jump or a takeoff to a high-growth path in different times. We may be witnessing a group of countries taking off from Asia. A benchmark to be compared should be the earlier development experiences by European countries, the United States, Canada, Australia, and Japan in different times, rather than contemporary developing countries.

If this version of Kuznets's view of the world is accepted, then the regular convergence regression does not make sense. At best, it is misspecified in that it mixes up three groups of countries: one large group of countries that are yet to take off—low level of incomes with low rates of growth; a group of OECD countries—a high level of income with a low rate of growth; and a small group of countries that are in the process of catching up—high-growth rates with a low- to middle-income level, i.e., "converging." What a convergence regression attempts to capture is the third group of countries.

2. *Common Denominators of Success*

The paper lists common denominators among the eight countries. First, the paper observes that the growth experience was accompanied by relative income equity. Then, four keys for success are explained: (1) maintaining macroeconomic stability, (2) broad-based educational strategies, (3) export growth, and (4) insignificance of industrial policy. The first two are called "conventional," while the latter two are called "unconventional." Obviously, few disagree with the conventional wisdom, and I make only passing remarks. I will make more extensive comments on the unconventional ones, (3) and (4).

It is obvious that macroeconomic stability is important for growth. But macroeconomic stability is easy to achieve when growth is high, a possibility of reverse causality.[4] When income is growing faster than

3. This is a simple argument of low- and high-income multiple equilibria in the framework of the Solow model. I certainly do not claim this argument to be particularly original. Professor James Tobin pointed out to me during the conference that similar points were made by Richard R. Nelson (1956, 1960).
4. In 1960, Japanese political power was paralyzed over the new security treaty with the United States. A new 10-year plan "to double income" was proposed by a new prime minister, Hayato Ikeda, to heal the wounds between the political right and left. Growth as a national target was used to achieve political and macroeconomic stability. See Ito (1992, pp. 61–67) for macroeconomic planning.

expected, tax revenue will be higher to help fiscal balance, and inflation is easier to control.

Education is important. Usually, primary and secondary enrollment rates or public expenditure on education, as in Tables 7 and 8 of this paper, are used to show the evidence on high human capital accumulation.[5] These variables are admittedly proxies. What is learned in an education system, from knowledge accumulation to group conducts, as well as education at home, may be more important in growth. But they are hard to measure.

3. *Sequencing as Industrial Policy*

The paper argues that export push was a successful strategy, while industrial policy was "insignificant." Exports have enhanced growth, while trying to pick particular industries has not been successful. The former assertion was supported by high correlations between some measures of openness and exports, including the admittedly controversial Dollar index, and growth. The latter assertion was supported mainly by evidence that TFP growth in promoted sectors in Japan, Korea, and Taiwan were not particularly high, and promotion of particular industries did not change overall growth, compared with what it would have been without intervention.

In discussing industrial policy, I will challenge the paper from two aspects: What is important in industrial policy is "sequencing," which is not discussed in the paper.

Sequencing of the leading industries in the economy is considered to be a key to growth, according to an oral tradition of East Asian countries.[6] For example, industrial policy in Japan has been centered around promoting industry after industry: textiles and toys, steel, chemicals, shipbuildings, to high-tech industries. Due to required sophistication in technology and large fixed costs, the government was aware of the importance of sequencing industries. The developed "light and low-tech" industries make a platform for a jump to the next stage, "mid-tech" industries. A jump to "high tech" is only appropriate after a

5. Rodrik (1993) pointed out that growth can be explained by the "initial" condition of high education levels and equity in income and land distributions, without using the investment/GDP ratio that Rodrik correctly points out as "endogenous."
6. A broad concept of sequencing in economic development is often called a "flying geese pattern" in the Japanese literature. Originally, the flying geese pattern was named after the pattern of import substitution to export substitution, in one industry after another. Later, it is directed to a pattern of regional countries' development sequencing; the leader, Japan, is followed by Korea, Taiwan, Hong Kong, and Singapore, and they in turn are followed by other ASEAN countries.

	Japan	*Korea*	*Taiwan*	*Hong Kong*	*Singapore*
Textile	1900–1930 Again 1950		1960s 1970s	Early 1950s (dominant)	Early 1960s Again 1970s
Clothing, apparel	1950s		1960s 1970s	1950s–1960s	
Toys, watches, footwares	1950s		1960s 1970s	1960s–1970s	
Refining		(promo) Early 1960s			
Steel	1950s–1960s	(promo) Latye 1960s– Early 1970s			
Chemicals	1960s–1970s	Late 1960s Early 1970s	1970s		
Shipbuilding	1960s–1970s	1970s			
Electronics	1970s	Late 1970s 1980s	1980s		1970s
Automobile	1970s–1980s	1980s			
Computers, semiconductors	1980s	Late 1980s			
Banking and finance				Late 1970s 1980s	1980s

Source: Japan, Korea, Taiwan: author's judgment; Hong Kong, Singapore, Young (1992).

success at the mid tech" industries. Profits and experiences—both management and labor—in a lower stage are key for a success in developing a higher stage. Too high a jump to skip a stage, just like an attempt to take off an airplane with too steep an angle, would result in a crashing failure. East Asian countries, having observed a history of European and U.S. economic history, have repeated the same process, but faster.[7]

The table that appears in this Comment shows an experience among East Asian countries of such sequencing.

If sequencing is important, then four implications follow. First, it is not a "miracle" to observe takeoff in Asia. It is just repeating what Europe did a century ago. (This is also pointed out in the first part of these comments.) Second, when repeating a history, it is easy to predict which industry comes next, hence "picking a sunrise industry" is not as

7. See Ito (1992, Chapter 2) for elaboration on economic takeoff and sequencing. Ito (1992, Chapter 2, footnote 18) invokes an analogy to a biological idea that "ontogeny recapitulates phylogeny."

risky as it is often claimed. Many Japanese economists argue that promoting particular industries in the 1950s and 1960s was theoretically possible and successful, but it became impossible and undesirable to pick winners in the 1980s, as the economy became more "mature."

Third, showing low TFPs in "promoted sectors" cannot be used as evidence for a failure of industrial policy. If industrial policy made it possible to run up the stages faster, it is a success even without realizing high TFPs in each stage.[8]

Fourth, showing that the composition of industries in Japan and Korea is not different from the theoretical prediction (Table 12 of Page's paper) cannot be taken as evidence of the irrelevance of industrial policy. Even if the composition after intervention is the same as the composition predicted from theory, the success is getting there fast.

4. *Regional Secret?*

However, the puzzle still remains. If an initial push can be done anywhere in the world, one should observe high growth taking place randomly on the globe. This is not the case. The 19th-century growth was concentrated in Europe and North America (with an exception of Australia and Japan), while the late 20th-century growth is happening in Asia. Certainly geographical proximity plays an important role. Technological transfers, worker mobility, trade links, and political peer pressure may be important factors in regional development. It happened in Asia in the 1980s. Maybe another "miracle" will occur somewhere else in the 2000s.

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8. The point made by Young (1992), in that Singapore invested too fast to enjoy learning curve effects, is also not taken as a failure from the sequencing point of view.

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Discussion

Page responded to several points raised by Collins and by Ito. He agreed with Collins that creating a dichotomy between the productivity growth and accumulation views was misleading. The more important question, suggested Page, is how these economies performed so well on both fronts and how they were able to generate and sustain such high rates of accumulation of physical and human capital without the efficiency losses observed in the former Soviet Union and in Eastern Europe. Page also agreed with Collins that it is important to address the political economy issue of policy implementation and to understand the particular institutions that might explain the success of the macroeconomic managers and bureaucracies in these countries.

Page clarified the distinction made in the paper between industrial policy and export promotion. According to the export promotion view, the actual process of exporting is special, rather than the goods that are produced. Under the industrial policy view, however, it is the particular goods and industries that are important. Page agreed that it is often difficult to disentangle the effects of the two stories, especially since the criteria for success of industrial policies often seems to be related to export performance. While Page felt that the results of the paper and other more micro-oriented studies support the export-promotion story, he noted that more case-study evidence was needed before reaching stronger conclusions. Page also suggested that one way to interpret industrial policy in Japan and Korea was as a response to coordination failures or market imperfections. He noted that this would make it more difficult to determine whether industrial policy was successful since such a policy would appear market-conforming, ex post.

Olivier Blanchard questioned the use of the high-income country elasticity for the computation of TFP growth. The standard approach is either to use capital's share of income as the elasticity or to estimate the

elasticity. Page responded that data on capital income shares were not available. In estimating the elasticities, the issue is how to separate the effect of TFP growth from the effects of allocative inefficiencies. For a subset of developing countries in the sample, output growth was negative, while factor accumulation was positive, suggesting severe resource allocation problems that would introduce noise in the production function estimates. Therefore, the elasticities were computed from the high-income countries since they were the least likely to suffer these allocation inefficiencies.

Herschel Grossman commented that an important prior question is whether initial conditions allowed particular countries to achieve high-growth rates. If certain growth rates are economically infeasible given the available resources, then the political economy issue of how institutions foster growth is a secondary issue. Page responded that the initial conditions that are imposed by the data are presumably affected by prior public policy actions, which is why understanding the evolution of institutions is important. He added that the historical record on identifying necessary conditions for growth and predicting growth rates was poor. For example, in the late 1950s the USAID identified Burma and the Philippines as the growth poles for East Asia and wrote that the most serious impediment to South Korea's economic development was its bureaucracy.

Andrew Atkeson asked whether it was exports or trade more generally that was connected to growth. He noted that factor proportions theory would suggest that by opening up to trade, the economy could buy more capital services or intermediate inputs. This might be related to the sequencing theory advanced by Ito, if factor proportion differences were viewed as the reason that the economy moved from industry to industry. Page answered that the high trade to GNP ratios for the HPAEs were not achieved by incentive-neutral policies, but rather by highly selective promotion of exports and admission of imports. He added that there was evidence from the micro literature that firms competing with imports and firms that compete on the export market but within the same industry have different learning effects.

John Cochrane commented that important variables in the regressions such as s vings, education, and growth, were endogenous, and questioned whether any causal statements could be made. Cochrane interpreted the experience from the Soviet Union and Eastern Europe as evidence that an exogenously high savings rate doesn't cause growth, suggesting that the observed positive correlation between savings and growth should be interpreted as the result of countries saving because they know that their growth prospects are good.