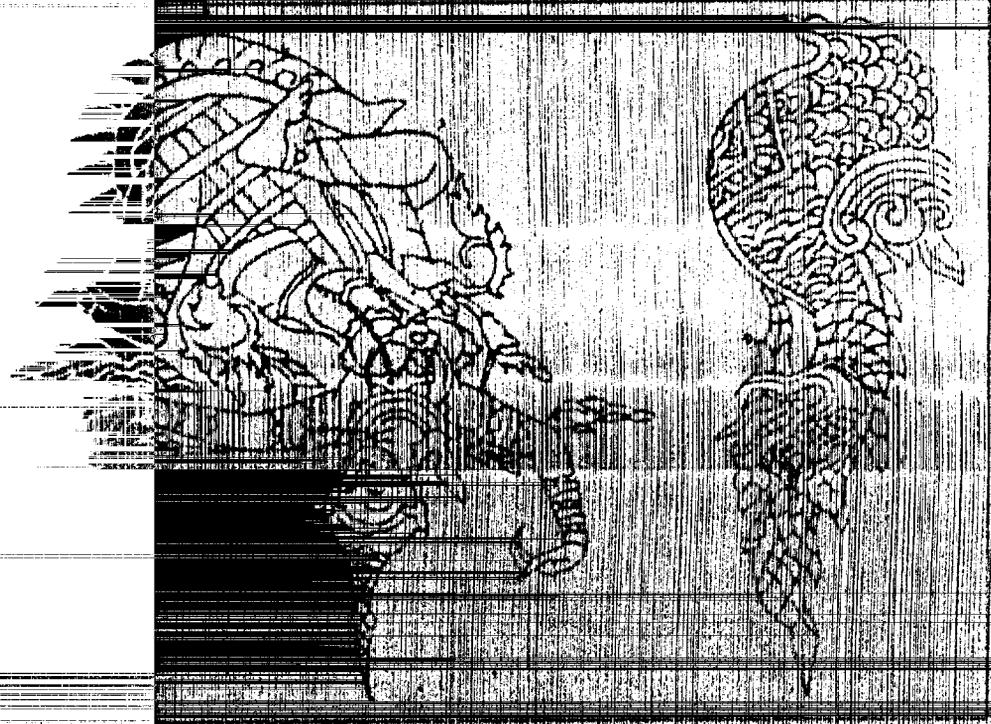


# THE LESSONS OF EAST ASIA

## COMMON FOUNDATIONS OF EAST ASIAN SUCCESS



Peter A. Peter

A World Bank Publication



# **THE LESSONS OF EAST ASIA**

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## **Common Foundations of East Asian Success**

Peter A. Petri

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## CONTENTS

<b>FOREWORD</b> .....	<b>v</b>
<b>ACKNOWLEDGMENTS</b> .....	<b>vii</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>ix</b>
<b>I. INTRODUCTION</b> .....	<b>1</b>
<b>II. THEORIES OF THE MIRACLE</b> .....	<b>5</b>
Right Fundamentals .....	5
Wrong Prices .....	6
Conducive Culture .....	6
Contagion .....	7
<b>III. CAUSAL FACTORS AND COUNTRY EXPERIENCE</b> .....	<b>8</b>
Outward Orientation .....	11
Macroeconomic Discipline .....	13
High Rates of Saving and Investment .....	14
State Enterprises .....	16
Industrial Policy .....	16
Financial Interventions .....	18
Elite Bureaucracies .....	19
Confucian Culture .....	20
Imitation of the East Asian Model .....	21
Favorable External Environment .....	22
<b>IV. TOWARD A SYNTHESIS</b> .....	<b>23</b>
A Spectrum of Strategies .....	23
Multiple Solutions to Key Functions .....	24
Smooth Track .....	25
Efficient Steering .....	25
Engines of Growth .....	26
Fitting the Model to the Environment .....	27
<b>V. CONCLUSIONS</b> .....	<b>28</b>
<b>ANNEX</b> .....	<b>30</b>
<b>REFERENCES</b> .....	<b>32</b>

## FOREWORD

Policymakers everywhere are searching for lessons from East Asia's enormous success in economic development. A number of recent cross-country and thematic studies have sought to identify and analyze the policies behind this success. Among them is *The East Asian Miracle*, a recent World Bank publication, which draws in part on the Lessons of East Asia project. Study teams, including in-country nationals, examined in some depth the experiences of the highly successful East Asian economies and the public policies underpinning them.

Several clear contributions emerge from this set of country studies. The research:

- Highlights considerable variation in approaches within the group of East Asian economies. For example, some economies chose a substantial degree of government intervention; others did not. The studies dispel the notion that there is a single or uniform East Asian model of success.
- Demonstrates that a core set of good economic policies — such as macroeconomic discipline, outward orientation, and human resource development — laid the foundation for East Asia's success. Pragmatic policymaking — understood as being nonideological and reversible — seems to be at the heart of these policies and merits replication.
- Dispels some of the myths about the more idiosyncratic interventions, such as "picking winners" in industry, which sometimes produced the desired result and sometimes did not. Because presence or absence of institutional features seems to have affected the outcomes of these interventions, applications to other regional contexts must be approached cautiously. A dominant finding of the studies is that serious diversions from macroeconomic equilibrium were largely avoided, even by strong interventionists. At the same time, the later generation of industrializers were more successful when they avoided these industrial policies.

A question not easily answered is why East Asian governments adopted fundamentally sound policies and were apparently able to achieve better results from their active policies and to incur lower costs from errors. In this connection, the studies touch on such dimensions of policymaking as the role of the state, leadership, and the bureaucracy. It is one thing to describe the institutional features accompanying a successful episode, however, and quite another to know why and how those features came about. For instance, why did East Asian leaders apparently hold themselves more accountable for economic performance than has been the experience elsewhere? How did the governments manage to gain sufficient national consensus to put difficult policies into effect? These aspects of political economy cannot be ignored. Our analytic tools, however, are severely limited in penetrating these issues, in assessing their impacts, and in assigning credit to them. These country studies are only one step, although a significant one, in deepening our understanding of the experience of East Asia. It is hoped that they will prompt additional work on the institutional foundations of rapid growth.

Gautam Kaji  
Vice President  
East Asia and Pacific Region

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## **EXECUTIVE SUMMARY**

From small city states to large resource-rich countries, East Asia has developed remarkably fast. The region's diversity, however, is not adequately recognized in previous interpretations of its economic miracle. Several alternative explanations have been offered, emphasizing (1) sustained market-oriented policies, cultural propensities for education, entrepreneurship and stable government. Each of these explanations provides insight into the causes of one or more of the region's miracles, but none fits fully the region's wide-ranging experience.

This paper argues that the common features of East Asian development lie deeper, in success along three critical dimensions of economic management. Each East Asian miracle economy (1) built a stable macroeconomic environment conducive to investment and enterprise, (2) used powerful market or non-market incentives to guide resources and initiative into efficient activities, and (3) found a dynamic engine of growth to provide leadership for development. Each did so, however, with very different policies. The paper also proposes that East Asian growth was reinforced by the "contagion effects" of rapid progress and successful policies, which helped each economy achieve more than it could have in a less dynamic setting.

The miracle economies addressed the three management objectives with specific (and different) policies matched to their institutional context and external environment. At a time when world markets were willing to tolerate infant industry subsidies, some countries with forward-looking leaders and effective bureaucracies spurred development by publicly guiding and financing large scale enterprise. But others also achieved excellent results by relying on small scale or foreign enterprise as the engine of growth, and international competition as the steering mechanism. Each successful economy's government was firmly committed to economic development, and each ultimately developed a cluster of policies that addressed critical economic needs with tools consistent with its institutional capacity.

Thus no single, widely applicable East Asian recipe emerges from this study. But the finding that rapid growth can be achieved with alternative clusters of policies is optimistic. It means that "miracles" can happen in many different types of countries. It also means, however, that a country's development strategy must be carefully matched to its institutional capacity and economic environment. In East Asia, the adaptation of policies to endowments was not usually the result of luck, but rather of search, experimentation and reform. Pragmatic, perseverant policy-making was facilitated in the region's successful countries by exceptional social and political stability.

## I. INTRODUCTION

Eight of the nine major economies of developing East Asia (China, Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan China and Thailand) were among the 12 most rapidly growing economies of the world during the 1965-1990 period. Had growth rates been randomly distributed across all developing economies, there is roughly one chance in a million that success would have turned out so regionally concentrated. The "coincidence" is still more remarkable if one notes Japan's performance relative to other industrial countries, and southern coastal China's relative to China's inland provinces. There is clearly something very significant about being East Asian.

Empirical studies have shown that much, but not all, of East Asian growth can be attributed to exceptionally large investments in human and physical capital.<sup>1</sup> But the region's total factor productivity (TFP) growth rates are even more unusual than its rates of capital formation. In a study of 87 countries, Page and Petri (1993) found that Hong Kong, Japan, Korea, Taiwan China and Thailand were within the top decile of all countries in terms of TFP growth rates, and that Indonesia, Malaysia, and Singapore were also significant positive outliers. In terms of Chenery, Robinson and Syrquin's (1986) topology of growth, the East Asian economies look more like industrialized countries than developing countries, since they derive nearly half of their output growth from TFP growth rather than accumulation (Table 1).

A second remarkable aspect of East Asian experience is "hyperspeed" growth. While the background rate of growth of East Asian economies is high—seldom do growth rates fall below the four or five percent range—each has also experienced periods of exceptionally fast growth, at rates reaching into double digits. These spurts have been often sustained over several years, and sometimes decades (Table 2). Each spurt seems to have been associated with a powerful and often unique "engine of growth." Each typically increased savings and strengthened international trade and technology linkages. Each also triggered massive changes in economic structure and large slides down the experience curves of major industries.

The daunting task of this paper is to identify the common elements of East Asian success: why did these countries invest so much, how did they use investments so efficiently, and what engines propelled such exceptional growth? In contrast to many previous studies, which limited their attention

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<sup>1</sup> The literature on cross country empirical tests of the sources of growth is examined more fully in Page and Petri (1993).

TABLE 1. Sources of Growth

	Val. Added Growth	TFP Growth	Capital Growth	Labor Growth	TFP/VA Share (%)
<b>Developed Economies</b>					
1947-73	5.4	2.7	2.0	0.7	49.0
<b>Developing Economies</b>					
1960-73	5.1	1.3	7.4	2.2	25.5
1973-87	3.5	-0.2	7.1	2.4	-5.7
<b>East Asia</b>					
1960-73	7.5	2.6	9.8	2.8	34.7
1973-87	6.5	1.3	10.7	2.6	20.0
<b>Hong Kong</b>					
1955-60	8.3	2.4	4.7	6.6	29.1
1960-70	9.1	4.3	7.6	3.0	47.0
<b>Korea</b>					
1955-60	4.2	2.0	2.2	2.3	47.4
1960-73	9.7	4.1	6.6	5.0	42.3
<b>Singapore</b>					
1972-80	8.0	0.0	9.5	5.5	0.0
<b>Taiwan</b>					
1955-60	5.2	3.1	2.7	1.8	59.5

Sources: World Bank (1991), Chenery, Syrquin and Robinson (1986), Table 2-2.

**TABLE 2. Hyperspeed Growth**

Country	Growth Spurt*	Years	Growth Rate	Possible Engines
Indonesia	1970-1973	4	8.8	Recovery from Sukarno period
	1976-1979	4	7.5	Oil investment
	1989-	3+	7.5	Manufacturing, foreign investment
Korea	1963-1977	15	9.6	Export promotion
	1981-	11+	9.3	Chaebol dynamism
Malaysia	1969-1972	4	8.3	Raw materials
	1976-1979	4	8.9	Government investment, EPZs
	1987-	5+	8.2	Foreign investment boom
Singapore	1965-1973	9	12.1	Foreign investment boom
	1976-1979	4	8.5	Infrastructure investment
	1986-	6+	9.0	Communications and finance
Thailand	1962-1969	8	8.4	Investment promotion, war
	1975-1977	3	8.0	Industrial promotion
	1986-	6+	9.9	Manufacturing, foreign investment

\* Spurts defined as periods during which the 3-year moving average of real GDP growth remained higher than 7 percent.

to subsets of East Asian countries,<sup>2</sup> this paper will consider the experiences of both the NIEs (Hong Kong, Korea, Singapore, Taiwan China) and the next-tier miracles of East and Southeast Asia (Indonesia, Malaysia, Thailand).<sup>3</sup> The strategies of these "late-comers" may well be more relevant for developing countries today than those of the NIEs decades ago.

The analytical scope of this study will be similarly inclusive. The alternative explanations considered will not be restricted to just the proximate determinants of East Asian success, such as specific policies affecting trade, investment and macroeconomic management. It is equally important

<sup>2</sup> In econometrics terminology, including too few countries "underidentifies" the problem as several different explanations may be consistent with the relatively few data points available. Of course, including too many countries may "overidentify" the problem, making it difficult to find an explanation that fits the different stories that emerge from country experiences.

<sup>3</sup> China and the Philippines are potential candidates for inclusion in this analysis, but are excluded because their political context and hence economic policy framework have differed considerably from those of the other seven East Asian economies. Japan is also excluded because it had reached a high level of industrialization by World War II.

to understand why East Asian economies consistently chose the "right" approaches and implemented them effectively.<sup>4</sup> These questions, in turn, require analysis of factors such as institutional capacity, the political framework of economic decisions, and societal attitudes toward government, education and economic activity.

In the search for common foundations of East Asian success, this paper will confront alternative theories with detailed country experience. Three groups of explanations--"neoclassical," "structuralist" and "culturalist"--will be examined in detail, and each will be shown to capture important aspects of East Asian development. But the most important finding is that none of the explanations fits the full range of East Asian case studies. In nearly every dimension analyzed, the region's success stories are too diverse to yield any single recipe. Rather, East Asian experience illustrates Gerschenkron's (1962) finding of "great elasticity and variability in the industrialization processes that are known from historical experience."

While there is no common set of policies associated with the East Asia's miracles, there are nevertheless important commonalities in East Asian experience. These consist of exceptional achievements in three basic dimensions: (1) a stable environment that encouraged investment and enterprise, (2) powerful incentives to guide resources and initiative into efficient activities, and (3) some dynamic engine of growth to provide leadership for hyperspeed development. These common requirements, however, were achieved by a wide range of specific institutions and policies.

The policy combinations used to meet the basic requirements of development included market-oriented approaches as well as high degrees of government intervention.<sup>5</sup> East Asian incentive systems ranged from unimpeded international competition in Hong Kong to vigorous government oversight in Korea. Growth engines varied from small scale manufacturing in Taiwan to foreign and government-linked enterprises in Singapore. Fundamentally, East Asian economies excelled in fitting what Page and Petri (1993) called strategic growth policies to their domestic and external circumstances. For the most part (excepting perhaps British-controlled Hong Kong) they did not simply inherit successful strategies, but created them with experimentation and reform.

Section II outlines the main existing explanations of the miracles, as well as an additional hypothesis based on the "contagion" of success among East Asian economies. Section III identifies particular factors associated with the various theories, and examines the role of each key factor in the seven countries of the study. Section IV develops a synthesis based on the theory of underlying functional requirements.

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<sup>4</sup> The strategies pursued by many East Asian countries were initially advocated by western advisors, who were presumably dispensing similar recommendations throughout the world. For example, U.S. aid agencies played a critical role in formulating reforms in Korea, the United Nations in Singapore; and the consulting firms, Stanford Research Institute and Arthur D. Little in Taiwan. Thus, the success of East Asian strategies cannot be attributed to some special insights that were unavailable to other countries.

<sup>5</sup> This surface diversity of institutions and policies is why the East Asian experience has proved to be so difficult to interpret, and why it is widely used to defend contradictory development strategies.

## II. THEORIES OF THE MIRACLE

Three broad explanations of the East Asian miracles have emerged in the literature. Neoclassical approaches have emphasized outward orientation and macroeconomic discipline. Structuralist theories have singled out government leadership in industrial policy. Finally, culturalist explanations have focused on governance and societal characteristics, as shaped by the region's Confucian traditions. In addition to these theories, a fourth mechanism is also proposed, arguing that East Asia's dynamism is at least partly the result of a contagion of regional success.

These four theories will be described very briefly below. Based on these descriptions, specific causal factors—policies, endowments, external circumstances—are identified that are closely associated with the workings of each theory. The importance of these factors are checked against country case histories (in the next section) in order to see how well each theory fits experience.

### Right Fundamentals

"The neutrality and stability of the incentive system, together with limited government interventions, well-functioning labor and capital markets, and reliance on private capital ... have been the main ingredients of successful economic performance in East Asia." (Balassa 1988, p. 288 as quoted in Chau 1993).

The first analyses of the East Asian miracles emphasized neoclassical causes by arguing that the NIEs "got the fundamentals right" in several key policy areas. In this view, East Asian economies succeeded because they came closer than other developing countries to providing (1) a stable macroeconomic environment for saving and investment, and (2) a competitive, open economic structure for the spontaneous, efficient growth of enterprise (Kuznets 1988). Modern versions of this approach retain the neoclassical thrust, but place somewhat more emphasis on investment, especially in human capital and infrastructure (World Bank 1991). Thus, East Asia's miracle economies:

- o adopted an outward oriented trade strategy to build strong linkages with world markets and technology. They achieved this with policies ranging from complete liberalization to export promotion designed to offset protectionist biases favoring domestic industries.
- o pursued conservative macroeconomic policies to create a stable, predictable environment for investment and trade. Imbalances were addressed swiftly and decisively, keeping inflation low, exchange rates competitive, and debt affordable.
- o invested vigorously in human capital to develop an educated and technically competent labor force.
- o maintained competitive markets for factors to facilitate the structural transformation from primary production to manufacturing and eventually to knowledge-intensive industries.

The empirical evidence presented later in this paper confirms that East Asia performed better

(in the neoclassical sense) on most measures of accumulation and allocation than other developing countries. Yet it also suggests that these factors explain only part of the region's exceptional success, and are not always closely associated with dramatic periods of hyperspeed growth.

### **Wrong Prices**

"... economic expansion depends on state intervention to create price distortions that direct economic activity toward greater investment. State intervention is necessary in even the most plausible cases of comparative advantage, because the chief asset of backwardness—low wages—is counterbalanced by heavy liabilities" (Amsden 1989, p. 14).

Structuralist interpretations of East Asian success emphasize that policy regimes in many East Asian countries departed significantly from market-oriented norms. In the structuralist view, these interventions were key to the region's success, because it would not have been possible to develop infant industries and to upgrade the industrial structure without them. In more sophisticated variants of the argument, these interventions are seen as remedies for market failures in capital markets (Stiglitz 1989) and for externalities in the development of new industries (Pack and Westphal 1986). To overcome these common problems of early industrialization, the East Asian economies:

- o **created elite, autonomous bureaucracies that could design and implement sectoral policies without becoming the tool of special interests. (The Confucian legacy of meritocratic government may have been essential in this respect.)**
- o **targeted sectors that offered strong opportunities for growth and productivity, based on the experiences of similar, more advanced economies (e.g. Japan).<sup>6</sup>**
- o **directed resources into targeted sectors by "getting prices wrong" with selective trade restrictions, preferential access to credit and important inputs, and government investment.**
- o **avoided big policy mistakes by limiting the duration of government support and setting performance-oriented criteria, such as export success, for promoted firms.**

Despite the far-reaching consequences of these arguments, there is little empirical evidence on the significance of market failures. Also, only two of the seven East Asian economies examined in this study—Korea and to a lesser extent Taiwan China—have pursued structuralist policies for any significant length of time. As will be shown later, the other five followed relatively unregulated strategies, or tried and abandoned intervention, or intervened in ways that cannot be reconciled with structuralist prescriptions.

### **Conducive Culture**

"Four institutions and cultural practices rooted in the Confucian tradition but adapted to the

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<sup>6</sup> If market failures are systematically associated with early stages of development, it may be relatively easy to identify appropriate interventions and to choose sectoral "winners."

needs of an industrial society—a meritocratic elite, an entrance exam system, the importance of the group, and the goal of self-improvement—have ... ignited the greatest burst of sustained economic growth the world has yet seen." (Vogel 1991, p. 101)

Chinese culture and Confucian traditions are important throughout East Asia and figure prominently in both Asian and Western interpretations of the miracles. The culturalist approach argues that Confucian traditions have had a large impact on the economic behavior among agents, and on social organization and methods of governance. Specifically, Confucian cultures may have had an especially high propensity to undertake saving and educational investments, and may have given rise to strong, publicly motivated bureaucracies. Confucian traditions contributed to these objectives because they:

- o emphasized group values over individual values, giving rise to cohesive forms of political and business organizations.
- o developed meritocratic institutions, creating strong incentives for learning and education.
- o created mutual obligations between government and the governed, yielding (relatively) publicly motivated policy making.
- o legitimized authoritarian rule, leading to long-lived regimes and stable, consistent policies.

The country studies will show, however, that the applicability of culturalist arguments is limited. Confucian traditions were strong in the four NIEs, and also extended to Southeast Asia (Hamilton 1991). Several Southeast Asian countries had significant Chinese minorities, and these groups played a disproportionately important role in economic activity (Table 3). But Chinese influence on patterns of governance was very limited. Another problem is that, while cultural endowments have changed only very slowly, the economic behavior of East Asian agents and governments have changed dramatically.

### **Contagion**

Although most previous writing has focused on variants of the above three approaches, the obvious common feature of the East Asian miracles is geography. East Asian development patterns are also more alike than might have been expected on the basis of similarities in resource endowments. This suggests that East Asian economic growth may have been partly induced by regional contacts—including flows of goods, investments, technologies, aspirations, and ideas about governance. These external ties, which were already strong at the beginning of the postwar period, were reinforced by the region's outward oriented development strategies. Thus, individual East Asian economies might have been much more successful together than they would have been in isolation. Geographical proximity of East Asian countries may have:

- o encouraged the imitation of each other's policies by exposing policy makers to successes in similar, nearby economies;
- o promoted the imitation of technologies and business strategies by exposing entrepreneurs to the achievements of similar, nearby companies;

- o expedited international trade through low transport costs;
- o facilitated direct investment, particularly by smaller firms, through cultural and ethnic ties based on history and migration.

Empirical studies show that physical distance is an important correlate of economic integration, and East Asia is well-integrated through trading, investment and migration relationships (Petri 1992). Also, economic cycles seem to have a strong regional components in many parts of the world. Nevertheless, the contagion hypothesis has an important limitation. While it does shed light on why growth was so spectacular, widely shared, and regionally concentrated, it does not ultimately specify what caused East Asian growth.<sup>7</sup>

These four approaches offer different, and sometimes conflicting interpretations of the East Asian miracles. Each is usually framed as a distinct, exclusive theory of East Asian success. In practice, however, while each makes an important contribution, none explains the full range of East Asian experience. If common lessons are to be drawn from the East Asian miracles, then these explanations will have to be fitted into a broader, more general model of development. The effort to reconcile the approaches will also require that single-cause explanations give way to more complex, multi-cause interpretations of East Asian success.

### III. CAUSAL FACTORS AND COUNTRY EXPERIENCE

Each of the approaches sketched so far points to a handful of critical determinants of East Asian success. This section collects the factors associated with all of the approaches—altogether ten are identified—and confronts them with country and econometric evidence. One objective is to examine how each factor influenced development in one or more countries of the East Asian sample. Another is to test whether the factor was a "common" feature of East Asian development—that is, whether it was present and significant in most of the miracles.

The evidence presented below is primarily qualitative and draws heavily on the country studies of this volume. But in addition, some limited quantitative evidence is also developed along the lines of the regression approach pioneered by Syrquin and Chenery (1989).<sup>8</sup> This exercise seeks to identify what characteristics East Asian countries have in common, and whether the region is an outlier (from international norms) in these characteristics. In other words, how do East Asian countries differ from other developing countries in terms of the factors theoretically associated with success?<sup>9</sup>

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<sup>7</sup> The contagion hypothesis has points in common with the Japanese "flying geese" model, which argues that late-comers follow the development patterns of economies in more advanced stages of growth (Amakamatsu 1960).

<sup>8</sup> The equation, before the addition of dummy variables, was:  $z = b_0 + b_1 y + b_2 y^2 + b_3 n + b_4 n^2$ , where  $y$  is log GDP and  $n$  log population.

<sup>9</sup> This question is quite different from that asked in conventional production function studies, which seek to decompose growth into the contributions of particular determinants.

TABLE 4. East Asian Performance and International Norms

	OUTWARD ORIENTATION		MACROECONOMICS		
	Exports /GDP (%)	FDI/ GDP (%)	Inflation Rate (%)	Gov. Sur. /GDP (%)	Debt/ Exp. (%)
<b>MEAN VALUES</b>					
<b>All LMICs</b>					
1965	22.6	0.9	14.0	-3.3	153.3
1990	30.1	0.7	34.8	-2.6	335.4
<b>East Asia</b>					
1965	44.3	1.0	13.0	-3.7	91.6
1990	83.7	2.8	4.6	2.0	102.8
<b>EAST ASIA DUMMY</b>					
<b>East Asia</b>					
1965	28.0 *	0.67	-1.7	-0.8	-83.3 +
1990	49.1 *	2.10 *	-30.3 *	5.5 *	-119.9 +
<b>COUNTRY DUMMIES</b>					
<b>Hong Kong</b>					
1965	45.3 *	na	-11.8	na	na
1990	106.4 *		-55.9 *		
<b>Indonesia</b>					
1965	2.1	0.83	24.4 *	-0.5	-69.3
1990	8.7	0.35	-5.2	3.5	-36.6
<b>Korea</b>					
1965	-2.3	0.66	7.2	-2.2	-61.8
1990	9.7	-0.81	-43.3 +	3.6	-114.9
<b>Malaysia</b>					
1965	21.5 *	0.96	-11.2	-6.2 .	-123.9 .
1990	52.8 *	6.10 *	-26.1	0.0	-164.5 .
<b>Singapore</b>					
1965	92.5 *	na	-11.3	6.8 +	na
1990	154.5 *		-61.1 *	14.3 *	
<b>Thailand</b>					
1965	3.0	0.21	-5.9	-2.3	-75.5
1990	16.5 .	2.34 *	-18.0	8.7 *	-166.3 .

Note: \* = significant at 5% level; + = 10%; . = 20%.

TABLE 4. CONTINUED

	GOVERNMENT		INVESTMENT		FINANCE	
	Spending /GDP (%)	Saving /GDP (%)	Investm't /GDP (%)	Primary Enr. (%)	Secondary Enr. (%)	Money /GDP (%)
MEAN VALUE						
All LMICS						
1965	17.4	14.3	17.4	72.7	16.9	20.8
1990	20.7	17.5	20.3	90.1	38.1	34.4
East Asia						
1965	18.6	16.5	20.2	91.5	27.2	23.9
1990	21.2	33.7	35.2	103.8	60.3	70.7
EAST ASIA DUMMY						
East Asia						
1965	0.3	3.0	2.7	18.4 +	8.7 *	8.3 .
1990	-5.6	14.8 *	15.8 *	-2.6	-5.9	29.6 *
COUNTRY DUMMIES						
Hong Kong						
1965	na	27.7 *	14.2 *	6.2	-0.4	na
1990		na	6.7	-4.9	-10.2	
Indonesia						
1965	2.6	-11.1	-6.2	30.2	1.6	na
1990	1.6	13.8	15.1 +	17.4	4.1	
Korea						
1965	3.3	-13.7 +	1.2	48.0 *	25.0 *	-8.1
1990	-16.3 .	16.1	18.3 *	-3.2	7.6	
Malaysia						
1965	5.4	6.4	1.7	7.4	6.7	1.5
1990	6.3	14.2	17.2 +	-7.6	1.0	
Singapore						
1965	-9.6 .	na	-0.1	5.6	18.0 +	36.4 *
1990	-21.6 +	19.5	15.2	-2.9	-13.9	
Thailand						
1965	1.0	2.9	4.8	14.6	0.6	1.6
1990	-6.1	11.9	18.6 *	-16.7	-25.4	

Several regressions were estimated, with each examining a quantitative proxy for one of the ten qualitative factors analyzed below. Each variable of interest was regressed on income and population across the full cross section of LMIC data. In addition to these controls, dummy variables were added for East Asia (all seven economies), and then in separate regressions for each of the seven economies individually. A significant coefficient for a dummy variable indicates that East Asia (or a particular East Asian country) is an outlier in cross-country patterns. The results are presented in Table 4 and are discussed below.

As Table 4 shows, and qualitative evidence confirms, some of the factors theoretically associated with success are much more pervasive in East Asian experience than others. Also, due to the great variability of international experience, even these cannot be always statistically identified as unique to the region. Finally, in some dimensions the region's uniqueness emerged only in the latter period, casting doubt on its causal role in the region's success. For all these reasons, few factors will emerge from this analysis intact as potential candidates for a common theory of the miracles.

### **Outward Orientation**

Balassa (1981), Krueger (1985) and other neoclassical writers argue that openness to international trade has been the critical factor in the East Asian miracles. The neoclassical case for outward orientation rests on allocative gains associated with specialization according to comparative advantage, as well as dynamic gains associated with increased competition and access to international technology. There is a substantial, albeit still somewhat controversial empirical literature that links rapid growth to openness (World Bank 1991, chapter 5).

For different reasons, outward orientation is also important in the contagion approach and is consistent with structuralist explanations. In the contagion theory, outward orientation facilitates the flow of goods, capital, technology and ideas. In the structuralist model, outward orientation is not a goal per se, but the acquisition of international technology and entry into international markets are.

Thus, outward orientation is not the objective, but the result of the successful, selective promotion of certain industrial sectors.

There is ample empirical evidence that international trade did play an unusually important role in nearly all East Asian economies. This is evident in Table 4, where openness appears as the most consistently significant attribute of East Asian economies. Even allowing for their small size, Hong Kong, Malaysia and Singapore (after 1963) have some of the world's highest export/GDP ratios. Korea, Taiwan and Thailand had average trade propensities in 1965, but moved well above international norms after switching to outward-oriented policies. Indonesia's trade orientation is closer to world norms, but here too recent liberalization efforts are now sharply increasing external linkages.

The policy approaches of different countries are well correlated with their trade intensity rankings. Hong Kong and Singapore, building on entrepot traditions, rapidly adopted trade-oriented strategies after their contacts were severed with China and Malaysia, respectively. Malaysia, never highly protectionist due to its extensive trade with Singapore and the Commonwealth, also strengthened its export-oriented policies in the late 1960s. Indonesia, Korea, Taiwan and Thailand began with stronger traditions of import substitution, but all eventually shifted to export promotion. Taiwan did so in 1958, and Korea in the mid 1960s. Thailand followed more recently and more

gradually. Indonesia has just begun to adopt export oriented policies, moved by the sharp decline in oil prices in the mid 1980s.

The tougher question—the one that divides neoclassical and structuralist interpretations of East Asian policy—is whether outward orientation resulted from a neutral incentive system or the promotion of selective industries. In some East Asian economies—Hong Kong, Malaysia and Singapore—outward orientation was clearly the result of neutral policies, since these countries largely or entirely eliminated trade barriers. However, several other economies—notably Korea and Taiwan—selectively supported exports without dramatically cutting import barriers. In the structuralist view, these policies worked because they channeled support to a few targeted industries. In the neoclassical view, they worked because the combination of import barriers and broad measures of export promotion added up to essentially neutral policies—they equalized incentives between exports and domestic production.

Some limited empirical evidence on this issue is offered in Table 5, which compares effective protection rates in several East Asian and non-East Asian trade regimes. The thrust of the evidence is that East Asian economies did have generally more neutral—less anti-export biased—trade regimes than other developing countries. Korea, Taiwan and Singapore all had stronger overall export incentives than the non-East Asian countries in the study. But the debate is far from settled; Leude-Neurath (1988) and other structuralists have criticized the methodology of the critical Korean study included in this table (Westphal and Kim, 1982, Balassa 1982), arguing that the measurements understate the extent of distortions in the Korean and Taiwanese incentive systems.

Less widely cited, but extremely important in East Asian development has been openness toward foreign investment. Major growth spurts in Indonesia, Malaysia, Singapore, Taiwan and Thailand are closely associated with surges in foreign investment. In turn, these surges can be attributed to a hospitable environment for foreign investment and favorable external conditions.

TABLE 5. Incentives for Domestic Relative to Export Sales

	Traditional Industry	Nontraditional Industry	Manufacturing Industry
Argentina	1.02	3.58	3.53
Columbia	0.97	0.87	1.42
Israel	1.11	1.39	1.63
Korea	1.18	1.09	0.95
Singapore		1.09	1.06
Taiwan	1.11	1.13	1.34

Note: The table shows the ratio of effective protection on sales in domestic markets plus one to effective protection in export markets plus one in the late 1960s. Source: Balassa (1982).

Back when mainstream development thinking still favored protection and nationalization, several East Asian countries aggressively sought out foreign firms. Singapore introduced strong tax incentives, leading to a spectacular foreign investment surge between 1968 and 1973. Liberal export processing zone (EPZ) regulations produced similar surges in Taiwan (Dahlman and Sananikone 1993) and Malaysia. Foreign investment in Malaysian EPZs reached 19 percent of GDP in 1975 and the internal rate of return on the government's EPZ investments was variously estimated at 23 and 32 percent per year (Meyanathan and Salleh, 1993). Recently, Indonesia, Malaysia and Thailand have again witnessed major investment inflows. But foreign investment was not universally encouraged; Korea carefully screened and restricted foreign investments, much as Japan had done during its period of rapid development.

Foreign investment surges provide a case study in the virtuous interaction of policy experiments, favorable external factors, and policy imitation. In the late 1960s and early 1970s investing countries both within and outside the region began to search for new investment locations due to uncertainties over the future of Hong Kong, the procurement demands of the Vietnam war, and rising Japanese costs due to the revaluation of the yen. (A similar boom was triggered by yen appreciation in the late 1980s.) Singapore, Taiwan and other East Asian host countries met this demand by offering concessions and improving their investment regulations. The resulting investments led to further incentives for policy changes in these host countries, as well as competitive policy reactions in others wishing to participate in the boom.

### **Macroeconomic Discipline**

In neoclassical explanations of the East Asian success, macroeconomic stability plays several key functions. Steady economic growth and low rates of inflation provide a stable framework for long-term planning and encourage saving, investment, and the efficient deployment of resources. Steady real exchange rates reduce the risks inherent in tradables production and thus contribute to openness. Finally, prudent fiscal policies help to increase the flow of resources into productive investments, and prevent the development of a debt overhang that could frighten investors.

East Asia appears unusually successful on most of the macroeconomic indicators analyzed in Table 4. But Table also shows that this is a recent phenomenon; the East Asian countries did not yet differ from international norms in the 1960s. In any case, Thomas and Wang (1992) show that in the intervening period, East Asia succeeded in various dimensions. Inflation rates were only half as high, on average, as in other LMICs. Real interest rates averaged a positive 4 percent, compared to a negative 3 percent in other LMICs, ensuring good returns on savings and clearly signalling the cost of capital. Real exchange rates were generally competitive and less variable than exchange rates elsewhere, and less debt was accumulated.

East Asia's excellent inflation record is largely the result of budgetary discipline. Using a wide range of institutional arrangements, East Asian governments kept public sector deficits well below developing country averages (Thomas and Wang 1992). In Hong Kong, Taiwan and Singapore, conservative governments consistently ran budget surpluses. In Thailand, Parliament could only propose expenditure reductions, but not additional spending, and so the government could set the budget to meet macroeconomic objectives (Christensen et al. 1993). In Indonesia, an open capital account imposed external discipline: when oil prices were high, the government limited borrowing to avoid revaluation, and when oil prices fell, it switched to austerity to prevent capital flight (Bhattacharya and Pangestu, 1993).

Because of the region's outward oriented strategies, realistic exchange rates were a hallmark of East Asian macroeconomic policy. Several of miracles began with major exchange rate reforms, which included devaluations, the unification of multiple exchange rates, and commitments to keeping real exchange rates competitive. Some of the region's economies even kept exchange rates undervalued (Taiwan in the 1960s and all of the NICs in the 1980s) in order to build export market shares (Petri 1989). While these aggressive exchange rate policies were initially adopted in solve some severe balance of payments problem (such as the withdrawal of U.S. aid or a price decline for primary exports), they proved so successful in generating export growth that they became a centerpiece of East Asian policy.

The combination of budgetary discipline and competitive exchange rate policies have East Asian governments avoid excessive accumulations of external debt. Only Korea and Indonesia became significant debtors in the 1970s and early 1980s, and both moved decisively to reduce the demand for external funds. Indonesia remains a major debtor, but its debt service obligations are well covered by oil revenues.

The fact that East Asian macroeconomic performance improved over time also raises the question as to whether it caused, or was caused by, economic success. Also, the generalization of steady, strong performance did not apply to all countries at all times. Real exchange rates became overvalued and/or large public sector deficits emerged in Malaysia in the mid 1970s, Korea in the late 1970s, and Indonesia in the mid 1980s. But these disequilibria were usually short-lived; each triggered devaluations and decisive retrenchments within a short period of time. Due to the exceptional flexibility of East Asian economies, the adjustments were rapidly completed. East Asian countries have not altogether avoided macroeconomic difficulties, but they reacted more quickly and often adjusted less painfully than other developing countries.

### **High Rates of Saving and Investment**

High saving rates feature prominently in both neoclassical and structuralist interpretations of the miracles. In the neoclassical framework, high saving rates are the intervening variable between sound macroeconomic and financial sector policies and high rates of investment. In the structuralist framework, high rates of saving and investment are components of a general government effort to mobilize capital and to promote investment either directly through public enterprise or indirectly through inducements to private investors.

There is little doubt that East Asian savings and investment rates today are exceptional by world standards. Which way the causation runs is more problematic. Three countries with especially high savings rates now—Indonesia, Korea and Singapore—saved ten percent or less in the 1960s and borrowed heavily in international markets. Only in 1990 does Table 4 show East Asian savings to be significantly above world norms. Most econometric studies of savings show that the growth rate of income is a significant positive determinant of savings, and studies that have examined East Asian savings behavior in an international context have not found significant differences between the parameters of savings behavior in East Asia and other regions (Leff and Sato, 1988). So, the region's high recent savings rate may be primarily a symptom of success.

In the same vein, East Asia's high saving rates also reflect its macroeconomic discipline. Savings equations typically show that inflation affects savings negatively; in East Asia inflation was generally low. However, the frequently cited connection between high deposit rates and high savings

is theoretically indeterminate. Cross-section econometric studies suggest that high deposit rates have little effect on the overall volume of savings, although they do tend to shift savings into financial assets (Fry 1988).

The proximate causes of high savings appear to vary considerably across countries. Taiwan encouraged private savings with high interest rates and a large, reliable postal savings system. But once rapid growth got underway, Korea also achieved high private savings despite strictly regulated deposit rates. Public savings were important in Hong Kong, financed in large part by the development of "crown land." Singapore pursued an especially aggressive public savings strategy through its Central Provident Fund, which at one time imposed contribution rates of 50 percent of wages on employers and employees. This variety in the sources of savings is consistent with Fry's (1986) "Ricardian" finding that the approach a country uses to mobilize capital, say undertaking high government saving, does not significantly affect its overall savings rate, which is almost fully explained by macroeconomic factors.

Effective public investments in infrastructure are cited in both structuralist and recent neoclassical theories of East Asian success. Infrastructure investments have been prominent in Hong Kong and Singapore, which established major public housing programs and invested heavily in transportation and communications. Aggressive programs of industrial estate development were undertaken by Malaysia, Taiwan and Singapore. Korea and Thailand built extensive road networks, in part to meet military objectives. But most East Asian countries today face severe infrastructure constraints and a serious backlog of environmental investments. These are largely symptoms of rapid development, but they suggest that infrastructure policy generally accommodated, rather than led, economic growth.

Finally, human capital investments are prominent in virtually all models of East Asian success. In Table 4, the educational enrollment variables are the only factors that are more significant in 1965 (when the miracles were getting underway) than in 1990. Such investments were indeed vigorous. Universal elementary education became a norm throughout East Asia. East Asia's more advanced economies have also increased secondary enrollment rates to nearly OECD levels, and developed special programs for building technical skills. For example, Singapore requires 4 percent of earnings to be targeted for training (Soon and Tan, 1993) and Taiwan trains more scientists and engineers per capita than the Japan, Germany or the United States (Dahlman and Sananinokone 1993).

But educational achievements are also high in less successful countries (the Philippines, for example, leads most other East Asian countries in enrollment statistics, and many Latin American countries also have superior enrollment rates). Thomas and Wang (1992) find that educational expenditures, as a percentage of GDP, are now lower in East Asia than in other LMICs. If human capital accumulation in East Asia is unique, it is not so because of the current scale of the public educational effort. Rather, East Asia appears to stand out in the technical orientation of its educational programs, and in its broad-based, private commitment to learning.

While East Asian capital accumulation is impressive by world standards, there is little evidence that it preceded the region's miracle, or that it reflects unusual determinants. East Asian capital accumulation stands out less in terms of quantity than in terms of quality. It is unusual in the effectiveness of both human and physical investments.

## State Enterprises

Different theories divide sharply over the role of state enterprises in East Asia's development. In neoclassical analyses, East Asian governments are typically credited for confining their attention to infrastructure and avoiding the direct production of goods and services (Wolf 1988). In structuralist writing, they are credited with launching a whole range of new industries which private entrepreneurs were unwilling or unable to start (Wade 1990).

The empirical picture is mixed. Thomas and Wang (1992) found, on average, less intervention in East Asia than in other LMICs on each of eight measures analyzed. But the differences were small—less than one standard deviation in each case. Table 4 shows East Asian government spending rates to be near international norms.

State-owned enterprises (SOEs) did, at times, play major roles in Indonesia, Malaysia, Singapore, Taiwan and Thailand. Singapore's government-linked companies accounted for 23 percent of the assets of larger firms in 1986 (Soon and Tan, Table 4) and Indonesia produced 60 percent of its manufacturing output in SOEs in 1987. Thailand's industrialization began with state investments, and Malaysia's "velvet nationalization"<sup>10</sup> substantially increased public ownership in the 1970s. SOEs have been also prominent in Korea (steel, fertilizer, machinery) and Taiwan (steel, automobiles, shipbuilding, petrochemicals).

But East Asian SOEs were unusual in that they sometimes succeeded. Korea's POSCO and Taiwan's China Steel are arguably among the world's most efficient steel producers, and Singapore's government-linked companies (GLCs) are nearly three times as profitable relative to assets as other firms (Soon and Tan, Table 4). There are, of course, many examples of unprofitable SOEs—for example, Indonesia's and Malaysia's SOEs have generally performed poorly<sup>11</sup>—but the record is more mixed in East Asia than elsewhere.

Over time, the role of SOEs has diminished. In Taiwan, China for example, SOEs share of manufacturing output fell from 51 percent in 1955 to 19 percent in 1990 (Dahlman and Sananikone 1993, Annex Table 3). A systematic privatization program is also underway in Singapore. The complexity of this picture suggests that SOEs have neither prevented, nor most likely caused, the East Asian miracles.<sup>12</sup>

## Industrial Policy

Intense controversy also surrounds the role of industrial policy. Structuralists see the selective

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<sup>10</sup> These initiatives, developed under Malaysia's New Economic Policy in 1971, were designed to increase Malay (Bumiputera) ownership of productive assets. In effect, state holding companies assumed the ownership of enterprises on behalf of the Bumiputeras.

<sup>11</sup> On Indonesia see Pangestu and Habir (1989), and on Malaysia. Meyanathan and Salleh (1993).

<sup>12</sup> The excellent performance of many East Asian SOEs does provide models for operating such firms elsewhere. Successful firms have been operated with professional management, at arms-length from government control, and with clear incentives for profitability.

support for new industrial activities as the signature of East Asian development strategy (Amsden 1989, Pack and Westphal 1986, Wade 1990). In this view, carefully targeted (and monitored) subsidies and protection enabled entrepreneurs to enter new industries by reducing costs and risks. Thus, interventions helped to offset market imperfections (for example, in capital markets) and encouraged investments that created positive externalities for other firms both within and beyond the promoted sectors. Industrial policies became ineffective only when they became too ambitious, and tried to promote too many sectors at once (Pack and Westphal 1986).

On the other side, neoclassical writers are skeptical about the significance of industrial policies in changing economic outcomes. They argue that targeting was as likely to create losers as winners, and may have slowed the natural upgrading of industrial composition by diverting resources into inefficient uses. In addition, selective policies wasted resources by encouraging rent-seeking activity (Krueger 1974).

In the event, nearly all East Asian governments launched industrial policy schemes to upgrade their economic structure. Singapore attempted a "Second Industrial Revolution," Taiwan an "Industrial Escalation," Korea a "Heavy and Chemical Industry" (HCI) drive, Hong Kong an "Industrial Diversification" program, Malaysia a "Heavy Industrialization" push, and so on. Some of these campaigns involved large financial commitments and major shifts in incentive regimes, while others were launched primarily for political effect.

Korea's HCI drive is perhaps the most thoroughly analyzed of these initiatives. Amsden (1989) credits Korean HCI policies with a major role in technological upgrading. The World Bank (1987) and Kim and Leipziger, (1993) take a more balanced view, noting that the drive established some very dynamic industries, but also resulted in costly failures. Other retrospective analyses are mainly critical; they argue that the HCI drive diverted resources from successful, labor intensive industries into an undistinguished mix of capital intensive projects (Stern 1992, Yoo 1991). Furthermore, massive subsidized lending to HCI projects chronically weakened the financial sector and increased economic concentration. These problems continue to haunt Korean policy today, more than a decade after HCI policies were dismantled (Leipziger and Petri, 1993).

Elsewhere, industrial targeting was more modest. Taiwan succeeded in selective support for steel and petrochemicals, but failed in automobiles and shipbuilding (Dahlman and Sananikone 1993). Taiwan's most dynamic sectors (apparel, electronics, computers) received little selective support, but considerable functional support through EPZs and research institutes. Malaysia's heavy industry push lasted only five years, but left behind a troubling legacy of high-profile, low-profit enterprises in cement, steel, motor vehicles and motor cycles (Salleh, Leng, Meyanathan 1993). In Thailand, industrial policies were administered on an ad hoc basis and "approximated laissez faire ... by default" (Christensen et al. 1993), partly because efficient markets for corruption developed to allocate favorable treatment to the (presumably efficient) highest bidder.

The unambiguously successful industrial policies were those functional policies that tended to reinforce ongoing transformations in industrial structure. Korea's early, general export subsidies led to a dramatic surge in trade. Taiwan very effectively supported small scale electronics through industrial estates, export processing zones, and research centers. Singapore's investments in sophisticated infrastructure—including the first fiber-optic telecommunications systems outside the

OECD<sup>13</sup>—helped to attract a new wave of advanced services.

By contrast, many of the most ambitious and least market-conforming industrial policy initiatives were substantially scaled back or abandoned. This happened with Thailand's state enterprise program in the 1960s, Korea's HCI drive in 1979, Singapore's high wage policies in 1985, and Malaysia's heavy industry push in 1986. Thus, while selective industrial policies have been prominent at times in some East Asian countries, they have not played a consistently positive, or even important role.

### **Financial Interventions**

East Asia provides an interesting test case for the structuralist proposition that mild financial repression (as implemented through interest rate regulations and state-owned banking) can improve the efficiency of financial intermediation (Stiglitz, 1989). In early stages of development, problems of asymmetric information may be especially serious due to rapid economic change, and are compounded by a paucity of institutions for collecting and disseminating credit information. In this setting, free interest rates could rise to very high levels in order to cover default risk, making credit unavailable to relatively low-risk projects. Interest rate ceilings can solve the problem by motivating intermediaries to ration credit to lower-risk projects and to invest in information on borrowers.

East Asia's mechanisms of financial intermediation have been remarkably varied. They ranged from highly regulated, state-controlled banking systems Korea and Indonesia<sup>14</sup> to competitive, private banking in Hong Kong, Malaysia and Thailand. In between, many countries operated dualistic systems, with regulated markets providing capital for large scale industry, and unregulated curb markets financing smaller enterprise. On average, the region's economies were relatively highly monetized according to international norms (Table 4). The region's ubiquitous, cohesive extended families have also played an important role in financing small scale business.

With the exception of Hong Kong and Singapore, each of the East Asian economies imposed restrictions on financial markets and used selective credit policies. But they were not unusual among developing economies in this respect; indeed, according to a comprehensive comparative study, the typical successful East Asian country had fewer and less severe restrictions than other, less successful East and South Asian economies (Fry 1988).

Credit regulations have been especially prominent in Indonesia, Korea and Taiwan. In Korea, an unusual two-step intermediation process emerged: credit was sold wholesale to conglomerates (at low, rationed rates) which then used internal credit markets to distribute funds to the most creditworthy subsidiaries across many industries (Lee 1992). Credit regulation may have encouraged rationing, but also invited continued government involvement in the allocation of credit. One result was that banks were required to lend to highly leveraged, risky borrowers. This systematically weakened Korea's major banks, making the transition to a market-oriented system especially difficult, and led to public bailouts (Leipziger, 1988).

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<sup>13</sup> Soon and Tan 1993.

<sup>14</sup> These characterizations apply to conditions until the mid 1980s. Both Korea and Thailand have now privatized major banks, and Indonesia in particular has also deregulated most of their operations.

Other East Asian countries relied on relatively open credit markets. A combination of loosely-regulated domestic and foreign banks financed development in Malaysia, Hong Kong, Singapore and Thailand. In Thailand, private banks have even assumed a role in sectoral coordination by reconciling conflicts over protection (Christensen et al. 1993). In Taiwan, government-owned banks coexisted with an unregulated curb market of roughly equal size. This market, legitimized by an unusual Negotiable Instruments Law which required issuers to honor post-dated checks, played a central role in financing Taiwan's important small scale manufacturing sector (Dahlman and Sananikone 1993).

Thus, East Asian success is not closely associated with any specific intermediation structure. The overall evidence is inconclusive: both highly regulated public and relatively open private banking systems have seen their share of financial turmoil, and yet succeeded in financing rapid growth. Whether regulated or not, or directed or not, East Asian financial systems were typically equipped with some escape valve that enabled entrepreneurs ultimately to channel funds to efficient investment projects.

### **Elite Bureaucracies**

An important branch of the structuralist approach argues that the high quality of government institutions is ultimately responsible for East Asian success (Johnson 1982, 1987). In this view, East Asia had strong "developmental states," distinguished by (1) high-level commitment to economic objectives, (2) mechanisms for sheltering economic decisions from the political process, and (3) unusually powerful and capable bureaucracies.

In this idealized framework, the commitment to development begins with visionary leadership. Powerful, charismatic heads of state may focus on economic activity "like a laser beam" because they associate legitimacy with economic success. Their single party governments in turn shelter the bureaucracy from distributive conflict. Finally, elite super-ministries, staffed by the most capable bureaucrats, are charged with the design and high-level oversight of policy. Ideally, this chain of command will discourage rent-seeking as well as promote the effective policy implementation.

The picture of consistent, high-level, single-party leadership roughly applies to Hong Kong, Indonesia, Singapore and Taiwan, where strong leaders and a few highly placed experts controlled the principal levers of policy for most of the postwar period. There was somewhat more turnover in Korea, but here too a single, visionary leader oversaw the 19 most critical years of change (Kim and Leipziger, 1993). But the political context was much more fluid elsewhere. In order to balance complex ethnic interests, Malaysia often subordinated economic to distributional objectives and its policy directions also changed with successive prime ministers. In Thailand, with short-lived exceptions, economic policies typically took a back seat to political and military issues.

The picture of elite bureaucratic control is also partially accurate. Small, central agencies with authority over line ministries assumed major responsibilities in Korea (Economic Planning Board), Taiwan (Council for Economic Planning and Development and its precursors) and Singapore (Economic Development Board). Singapore's EDB, for example, was purposefully kept small by reassigning routine functions to other agencies (Soon and Tan, 1993). In the pattern of Japan's MITI, these agencies became competent, powerful centers of decision making, and were often equipped with the budgetary clout needed to impose their viewpoint on other ministries.

But there were no super ministries in Hong Kong or Indonesia, and the corresponding bodies in Malaysia (Economic Planning Unit) and Thailand (National Economic and Social Development Board) had no budgetary authority and concerned themselves with broad, indicative plans. In Indonesia, top level macroeconomic technocrats became so concerned about their limited microeconomic influence that they even took preemptive measures—such as the opening of the capital account, the contracting of customs to a Swiss firm, and eventually the liberalization of credit and trade—to limit discretion in other parts of government.

The institutional theory of East Asian success provides an intriguing model of policy implementation in the context of a government-led growth strategy. But the framework does not apply to most East Asian success stories. Some countries with "model" institutions used them in very limited ways. Others developed rapidly without any unusual bureaucratic capacity in the microeconomic sphere.

### **Confucian Culture**

The culturalist school attributes East Asian success to the pervasive role of Confucian traditions in much of East Asia.<sup>15</sup> Vogel (1992) sees Confucianism, in conjunction with other factors, as a very positive force because of its (i) legacy of meritocratic bureaucracies; (ii) emphasis on learning; (iii) focus on the group rather than the individual; and (iv) stress on self-improvement. These traditions were not always so positively regarded; Weber (1951) viewed Confucianism as a conservative, anti-modernizing force, and Moroshima (1982) argued that only the Japanese variants of Confucianism were conducive to development.

In the contemporary context, Confucian traditions may be manifested in high rates of human capital formation, unusual bureaucratic capacity, and harmonious business-government relations. As already noted, educational effort is high in East Asia, and especially so in the economies with the strongest Confucian traditions (Hong Kong, Korea, Taiwan and Singapore). Moreover, East Asia stands out more in educational outcomes than in educational spending, vaguely suggesting unusually high private commitment to education.

It was shown above that only a few of East Asia's miracle economies have been led by elite bureaucracies. But all of these cases involved the four core Confucian states. While other East Asian states also developed rapidly, only the core states seemed to have the exceptional bureaucratic capacities needed to pursue effective interventionist strategies.

By legitimizing authority and emphasizing groups, Confucianism is also said to facilitate cooperative relations between business and government.<sup>16</sup> In practice, the region's business-government relationships are varied and not always harmonious. Singapore came closest to the idealized relationship in its tripartite (business-labor-government) councils. Korea tried to develop

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<sup>15</sup> Hong Kong, Korea, Singapore and Taiwan directly reflect these traditions, but people of Chinese ancestry also play disproportionately important roles in the economies of Indonesia, Malaysia and Thailand.

<sup>16</sup> Frequent business-government contacts at middle levels may be especially valuable, because they facilitate the "horizontal" coordination of economic activity (Aoki 1990).

similar institutions in the 1980s, but its current business-government relations are highly contentious.<sup>17</sup> Taiwan's government initially viewed the private sector suspiciously, but later moved toward closer consultations. Business-government relations in Indonesia, Malaysia and Thailand have been more typical of developing countries in general, involving informal, symbiotic relationships between business and political elites (Yoshihara 1988).

The most difficult challenge facing the culturalist model is to explain why economies with traditions that are so conducive to development have only recently embarked on rapid growth. In addressing this issue, recent writings have emphasized interactions between Confucian traditions and other factors. Lim (1990) argues that "Sinic culture contains the potential for absorbing modern science and technology," but the realization of this potential requires a modernizing government and "the adoption of a free-enterprise system" (p. 50). Similarly, Chen (1988) finds that Confucian traditions are only beneficial in conjunction with a broad, and high level commitment to economic modernization.

Confucian traditions appear to have contributed to economic development in four of the seven East Asian states by emphasizing education and facilitating bureaucratic control. However, these traditions played a positive role only in the context of other favorable institutions and policies. Also, the absence of these cultural endowments has not hindered development in the remaining three East Asian miracles. Confucian traditions are clearly consistent with rapid development, but appear to be neither sufficient nor necessary for it.

Nevertheless, there is a striking difference in the bureaucratic capacities of the region's Confucian and non-Confucian states. There are surely examples of non-Confucian bureaucracies with capacities as impressive as those in Korea, Singapore and Taiwan. Be that as it may, the other East Asian economies did not succeed in developing such bureaucracies, but instead adopted strategies that placed more modest demands on the bureaucratic competence.

### **Imitation of the East Asian Model**

According to the contagion theory previously advanced, East Asian countries benefitted from each other's success in a variety of ways, including the imitation of their neighbors' winning policies. Such imitation—initially of Japan's industrial strategy, and later of the outward oriented policies of the NIEs—was an explicit objective of government in Korea, Singapore and Malaysia and several other East Asian countries. In some cases, borrowing paid off handsomely. Korea's General Trading Companies, patterned on Japan's, spearheaded the country's export drive in the 1970s and 1980s. Korea's duty drawback and export financing schemes in turn attracted attention in several ASEAN countries and eventually throughout the world. Taiwan's and Singapore's early innovations in Export Processing Zones were also extensively replicated.

There is less evidence for the wholesale imitation of strategies. Different countries typically focused on those aspects of foreign experience that fit their own strategy: Korea looked to Japan to build international scale companies, Malaysia focused on launching heavy industry, and Taiwan and Singapore on ways to boost knowledge-intensive production. There was general skepticism about the

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<sup>17</sup> Jones and Sakong (1980) provide an excellent survey of Korean government-business relations in the early postwar period.

applicability or desirability of the Japanese model in most of the region's economies, including especially in the southern context (Soesarto 1985).

Thus, while much copying of institutions took place, there is little evidence that countries could replicate each other's successes merely by copying policies. Institutional borrowing was not always successful; for example, while Japanese-style trading companies thrived in Korea, they could not be successfully replicated in Thailand.<sup>18</sup> More important may have been the recognition of the general success of outward-oriented development. While the region's technocrats followed each other's experiments closely, they had to develop and adapt institutions to meet the special requirements of their own economies.

### **Favorable External Environment**

Theories of East Asian success typically mention favorable external conditions, but the different strategies implicit in these theories rely on the outside environment in somewhat different ways. All types of outward oriented strategies benefitted from the expanding and increasingly open world markets of the 1960s and 1970s. But certain other features of this early period of miracle growth especially favored structuralist approaches. Due to their still modest role in the world economy of the 1970s, East Asian producers were not penalized for export subsidy programs that would be unacceptable today. Also, they could still enter and make profits in large scale, capital-intensive industries such as steel, which would not be possible under today's conditions.

Today East Asian exporters are increasingly pressured to follow trading rules negotiated by developed countries. Even when they do, if their exports of particular products achieve significant market penetration, they are likely to face quantitative restraints. Negotiating an increasingly complex system of restrictions requires a great deal of agility, and often favors the smaller, entrepreneurial companies associated with a neutral trade regime.

The increasing sophistication of East Asian industry has also made it difficult to pursue strategies that rely on importing technology through licensing rather than foreign investment. International competition increasingly favors multinational firms with networks of complimentary production subsidiaries (Weidenbaum 1993). Also, firms in advanced countries are increasingly reluctant to transfer technology outright to East Asian companies because they see them as potential competitors. In contrast to the 1960s, the international environment now strongly favors strategies that welcome foreign investments and joint ventures.

What has not changed is the attraction of East Asia as a production location. Various positive externalities are involved. East Asian late comers can acquire knowhow from similar, nearby countries, without bearing the risks associated with pioneering investments. They can also "plug into" marketing and sourcing networks established in earlier trade contacts between developed countries and East Asian suppliers. Increasingly, such contacts are facilitated by entrepreneurs from advanced East Asian economies, including Hong Kong and Taiwan. These intermediaries have substantial production and marketing knowhow, but can no longer compete from their home base due to rising costs.

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<sup>18</sup> See the case of Thailand (Christensen et al. 1993).

Developed country trade policies are also helping to spread industry across East Asia. For example, the U.S. repeatedly imposed quantitative restrictions on the products of more advanced East Asian exporters (initially Japan, but later also the NIEs), creating special opportunities for new entrants. Korean, Taiwanese and eventually Indonesian, Thai and Chinese producers of garments, shoes, television sets, automobiles and other products took advantage of these episodes to establish initial market positions (Petri 1989).

The external environment for East Asian growth was and is favorable. Developed country markets continue to be important to East Asia, and the region is even better positioned in the most dynamic market of the future--its own. But the implications of the environment are changing: while both neutral and interventionist outward oriented strategies worked well during the early East Asian miracles, relatively open investment and trade policies seem to be generating the best results today.

#### IV. TOWARD A SYNTHESIS

Each of the factors examined in the previous section offers insight into the causes of East Asian success. Some--including especially outward orientation and macroeconomic discipline--apply quite broadly, but ultimately none of the factors provides a satisfactory explanation of all of the region's diverse success stories. This review of theories and country experiences suggests that there is no single, definitive East Asian recipe for success. Rather, successful outcomes have been achieved under a spectrum of policies and circumstances.

In order to reflect this diversity of experiences, the lessons of the East Asian miracles must specifically structured to admit multiple recipes for success. This requires a new logical framework for understanding East Asian strategies. In previous "single factor" approaches, the region's success has been typically attributed to some single cluster of determinants. In the synthesis developed below, a "multi factor" explanation will be proposed. This approach views certain different policies not as alternative causes, but as substitute causes for accomplishing some basic developmental objective.

Since this synthesis offers not just a different model, but a different logical approach to the problem, its main features are explained in formal terms in Annex I. In identifying structural differences among alternative explanations of East Asian success, the Annex shows that other recent, comprehensive models of economic development (proposed in World Bank World Development Reports 1990, 1991) have also tended to take a multi factor explanatory approach.

##### **A Spectrum of Strategies**

Korea and, to a lesser extent, Taiwan built their success on activist industrial policies patterned on Japan's earlier experience. They maintained control over the financial sector, relaxed trade barriers strategically, and directly targeted industries with government investments and/or subsidized credit. While these interventions veered off track at times, leading to numerous failures as well as successes, the overall performance of Korea and Taiwan establishes the feasibility, if not the necessity, of an activist strategy. The strong performance of these economies reflects, of course, a host of external, economic, cultural and institutional variables. Thus the effects of intervention need to be evaluated in conjunction with other environmental and policy factors.

Hong Kong and Singapore, and to a lesser extent the southern coastal provinces of China, have succeeded by eliminating or ignoring barriers and by opening their economies to trade, investment and entrepreneurship from many sources. Endowed with strong trading traditions, these small states attracted business and external resources by offering relative stability and good access to productive factors appropriate to their stage of development (low cost labor at one time, sophisticated telecommunications at another). Interestingly, this general strategy was implemented with *laissez faire* policies in Hong Kong, and with substantial intervention in Singapore. Yet Singapore's involvement, while extensive in the fields of labor, housing and infrastructure, generally worked in tandem with market forces, acting to enhance the island's business environment.

Malaysia, Indonesia and Thailand have pursued strategies in between, combining aspects of stability and business orientation with varying degrees of intervention. Relatively well endowed with natural resources, they initially focused on raw material extraction and processing. Subsequently, their export-oriented manufacturing sector was developed in cooperation with foreign trade and direct investment—most recently from other East Asian countries. While these economies did protect and stimulate certain industrial sectors, the critical elements of their policy approach included openness to foreign trade and investment, political stability, and macroeconomic stability. Factors such as the quality of the bureaucracy were less important in the context of this strategy.

There is no obvious way to rank the effectiveness of these different strategies. Korea and Taiwan grew more rapidly than the others, but they did so in an external environment in which government leadership was more tolerated and perhaps more necessary. But Hong Kong and Singapore also did very well over a similar period of time, and seem equally well prepared for their next phase of growth. More recently, parts of China, Malaysia, Indonesia and Thailand have emerged as the most rapidly growing economies, and their success was predicated on a very different mix of policies and economic characteristics. In the investment environment of the 1980s, a stable and open economic strategy provided an ideal framework for attracting investment from Japan and the NIEs.

### **Multiple Solutions to Key Functions**

What lessons be drawn from such varied experience? Underneath the enormous range of East Asian policies and institutions, certain important, common aspects of economic management emerge. For example, Korea and Singapore appear to have followed very different strategies with respect to ownership: Korean development was spearheaded by private, domestic firms, Singapore's by foreign subsidiaries and government-linked enterprises. Both of these ownership strategies, however, satisfied the common requirement for entrepreneurship, in ways particularly suited to Korea's and Singapore's initial endowments. In effect, these countries developed different, but exceptionally dynamic entrepreneurial engines of growth.

The relationship between actual policies and certain underlying requirements of the development process helps to illuminate the common foundations of East Asian success. Using the (somewhat forced) analogy of an automobile race, the three fundamental objectives of development can be likened to the requirements for a "smooth track," "efficient steering," and a "powerful engine."

Development requires a smooth track to facilitate economic growth, consisting of stable macroeconomic conditions, adequate infrastructure, and market-oriented institutions. It also requires

an efficient steering mechanism to guide resources into economically productive industries instead of wasteful projects, speculation and rentseeking. Finally, dynamic growth also requires a powerful engine—leadership from a vital sector or entrepreneurial class that helps to transform economic opportunity into rapid development. East Asia's miracle economies met all three requirements, and did so with a remarkably wide range of institutions and policies.

### **Smooth Track**

East Asia's economic environment was generally conducive to market-oriented activity. Policies favored macroeconomic stability, competitive labor markets, relatively free entry into small-scale business activities, and vigorous investment in human and physical capital. To be sure, stable macroeconomics and reasonably competitive markets did not always lead to rapid growth, and growth spurts sometimes occurred without large investments in education or infrastructure. The correlation between the economic environment and East Asian growth is strong enough to suggest an essential linkage, but not so strong as to make the environment the single, sufficient cause of rapid growth.

The value of a market-oriented environment was enhanced in many East Asian economies by the exceptional flexibility of economic agents. Chau (1993) argues that Hong Kong's entrepreneurs were not committed to any particular business or technology, but true to their merchant traditions, floated from sector to sector to find niches of profitable activity. Kim and Leipziger (1993) note similar tendencies in Korea's middle-sized firms, which spanned several industries and rapidly changed product mix to exploit market trends. War, the collapse of colonialism, and shifting political and economic ties all helped to undermine traditional power structures in East Asia (with the notable exception of the Philippines), paving the way for exceptional microeconomic flexibility.

Market-oriented macroeconomic environments evolved in the context of many different government institutions and philosophies. In Korea and Taiwan, strong governments imposed conservative fiscal and monetary policies by design; in others, such as Indonesia and Thailand, stable policies resulted from self-imposed constraints on budgetary procedures and/or international financial commitments. Korea created competitive labor markets by suppressing unions; Singapore by co-opted organized labor into tripartite governmental councils. There was no single recipe for creating a "smooth track" for enterprise; rather, a range of policies evolved, with each emphasizing the strengths and avoiding the weaknesses of a country's institutional framework.

### **Efficient Steering**

East Asian economies excelled at steering entrepreneurial and other resources into economically efficient activities. This happened in large part because outward oriented development strategies focused enormous attention on international competitiveness as a yardstick of economic success. Even state enterprises, though less exposed to market pressures, were often directed to become internationally competitive, and thus pursued economic rather than political goals.

International prices affected East Asia's domestic incentive systems in different ways. In Hong Kong, Singapore and Malaysia, levels of protection were low, and all firms faced international prices. In Korea, the government used export performance to determine access to subsidized credit and other privileges. In Taiwan and several other countries, export-oriented firms were exempted from import duties and thus faced essentially international prices, while smaller domestically-oriented firms operated under conditions of intense competition.

While state-owned enterprises provided greater opportunities for avoiding market discipline, they were still often held accountable on economic criteria. In Korea, Singapore and Taiwan, public companies were directed by professional managers isolated from political pressure. Several public enterprises were designed to produce exports and thus had to meet international competitive standards. Over time, as their private sectors matured, East Asian economies also moved to reduce the role of public enterprises. Taiwan systematically divested its extensive industrial holdings. As more typical inefficiencies developed in the public sectors of Indonesia and Malaysia, these governments also embarked on large-scale privatization programs.

The responsiveness of microeconomic agents to incentives was enhanced by the relative stability of macroeconomic conditions and policy directions. East Asian economies undertook roughly one large shift in policy focus per decade, but these major policy reforms generally conformed to underlying changes in economic structure and comparative advantage. Thus, most economies shifted their incentive programs from promoting labor-intensive import substitution to labor-intensive export production, and eventually skill-intensive manufacturing. One departure from this market-conforming pattern was the rash of heavy industry drives in the late 1970s. Most of these programs ended rapidly, however, with a return to more neutral policies.

### **Engines of Growth**

The most dramatic chapters of East Asian growth were closely associated with specific sources of entrepreneurial energy. Indeed, while a smooth track and efficient steering were essential facilitators of the East Asian miracles, the special engines associated with hyperspeed growth were the most proximate causes of exceptional results.

These engines differed widely across East Asia. Hong Kong's miracle began with a large influx of capitalists from Shanghai. Experienced in textile manufacturing, these entrepreneurs diverted machinery and intermediate goods shipments bound for China, and set up relatively large manufacturing operations. Their successes eventually became a model for Hong Kong's own "merchant entrepreneurs." Four decades later, Hong Kong capitalists found a new niche as intermediaries between China and world markets, and incidentally also became the engine for southern coastal China's economic takeoff. By 1990, three million workers in China's Pearl River Delta were employed by Hong Kong entrepreneurs (Chau 1993).

Korea's dynamism derived from a handful of large conglomerates financed by low cost, government-controlled credit. Initially selected on the basis of personal connections, the list of promoted firms was constantly pruned according to economic performance. Government policies thus tended to amplify market signals; successful firms not only earned handsome profits, but also won access to fresh capital and lucrative investment opportunities (Petri 1990). By allocating capital across a wide range of business activities, these conglomerates also helped to mitigate inefficiencies in capital markets.

Singapore relied on foreign firms to spearhead its development. The island's initial attraction was based on low cost labor, tax concessions and location along major shipping lanes into the Pacific Ocean. Over time, Singapore's advantages shifted to skilled labor, transport and communications infrastructure, and a reputation for stable, open economic policies. These trends, in turn, caused foreign activities to shift from labor intensive manufacturing to technologically advanced industries and regional financial and business services. Singapore achieved its goals for upgrading its economic

base with little control over its industry and minimal sectoral interventions.

The developmental engines of Malaysia, Indonesia and Thailand have changed sharply in recent years. Natural resources and effective agricultural development programs—rice in Indonesia and Thailand, metals and oil crops in Malaysia—were initially important in all three economies. More recently, manufacturing has emerged as the most dynamic sector, fueled by sudden gains in competitiveness against the region's more advanced economies. In all three countries foreign direct investment has become an important catalytic factor, spurring exports and the acquisition of knowhow, and demonstrating the profitability of a wide range of manufacturing operations.

The fit between these engines of growth and their economic environment is often remarkable. In the context of the relatively free-wheeling economic systems of Malaysia and Thailand, for example, it would have been difficult to imagine any model that required disciplined government-business cooperation, as practiced in Korea. In the context of Korea's institutions, in turn, it would have been just as difficult to imagine the development of harmonious relationships between the bureaucracy and foreign firms, as enjoyed in Singapore. The mechanisms that led to the invention and adaption of these mechanisms to country circumstances are thus central to understanding the roots of East Asian success.

### **Fitting the Model to the Environment**

In the synthesis proposed here, East Asian experience offers alternative ways for fulfilling basic developmental requirements, rather than a rigid recipe. A key implication of this view is that policy options must be closely fitted to a country's circumstances. East Asia has succeeded in constructing effective policy packages partly out of necessity, and partly because of its unusual capacity for pragmatic, experimental governance.

The hand of necessity is evident in the beginnings of several East Asian miracles. Korea and Taiwan both adopted equilibrium exchange rate policies and aggressive export promotion when their primary source of foreign exchange—aid flows from the United States—suddenly slowed. Hong Kong and Singapore also had little choice but to emphasize exports when their historical entrepot trade was disrupted by political breaks with traditional trade partners. Much later, the collapse of oil prices similarly pushed Indonesia toward more realistic exchange rates and outward-oriented trade policies.

Other major policy choices resulted from experimentation, learning and adjustment. East Asian policy directions have generally evolved through steady, incremental adjustments, as in the case of decades of trade liberalization and investment incentive measures in Korea, Taiwan and Thailand. At the same time, East Asian economies have been very prompt in recognizing serious policy mistakes and adopting corrective measures. Important examples include the reversal of heavy industry initiatives in Korea, Malaysia and Singapore.

Two characteristics of East Asian governance helped to make the process of policy adaptation effective. One was the longevity of East Asian governments. Facing indefinite tenures, governments were more willing to impose some short term sacrifice in order to gain long-term benefits. Second, the administrative setup in many East Asian countries left considerable authority to bureaucracies in the design and execution of policy. Often, policies were implemented through informal pressures on the private sector. While the general directions of policy were stable, implementation processes were inherently flexible, and helped to generate a continuous exchange of information between business and

government on the consequences of policy.

## V. CONCLUSIONS

No simple generalizations can capture either the diversity or complexity of East Asian success. The Korean government purposefully led the market with clearly articulated policies for shifting resources toward advanced branches of industry. Hong Kong, by contrast, pursued open trade and non-intervention. In between lies a full spectrum of intermediate cases, ranging from relatively open markets in Malaysia and Singapore to moderate interventions in Indonesia, Taiwan and Thailand. These orderings change on other dimensions; for example, both Hong Kong and Singapore undertook extensive, early investments in public housing, while Korea and Taiwan neglected social infrastructure at their initial stages of development.

According to the synthesis proposed in this paper, the commonalities in East Asian development strategy must be sought not in policies, but in deeper, functional aspects of the development process. Rapid development does not call for any specific policy package, but it does require policies that achieve certain fundamental goals. These include creating an environment that encourages market-oriented investment, establishing mechanisms for steering resources into economically efficient activities, and finding some engine of growth to generate dynamism and leadership.

How these objectives are best achieved depends on a country's institutions and external environment. At a time when world markets were willing to tolerate infant industry subsidies, countries with forward-looking leaders and effective, elite bureaucracies could spur development by investing in new industries and publicly financing large scale enterprise. But other countries also achieved excellent results by relying on small scale or foreign enterprise as the engine of growth, and international competition as the steering mechanism.

Can the East Asian miracles be replicated in other countries? The answer depends on how one views the roots of East Asian success. Those who attribute East Asian success to specific policies, such as outward orientation, tend to be optimistic about replicability, while those who emphasize deeper cultural and institutional causes tend to be pessimistic. This paper argues a middle ground. Replication will not be easy: there is no single policy that can be copied in order to guarantee success. Yet replication should be possible in many circumstances: the fundamental elements of East Asian success have been achieved, in different countries and at different times, with a wide range of policies.

The availability of alternative strategies means that close attention must be paid to matching strategy with institutional capacity and other aspects of an economy's environment. In East Asia, the match between policies and endowments was not usually the result of lucky or particularly insightful choices. Rather, over time, unsuccessful approaches were reformed or abandoned. A pattern of search, experimentation and adjustment was essential to success, and may itself have been the product of East Asia's unusual propensities for stability, pragmatism and authoritarian leadership.

East Asia's experience shows that rapid catchup can be achieved in various ways. A market-oriented environment is a key ingredient, but interventionist approaches were also prominent. Evidently, the range of policies compatible with rapid growth is broader than neoclassical economics admits. But intervention was neither sufficient nor necessary for rapid progress—indeed, the region's most interventionist policies were generally unsuccessful and had to be abandoned. The real issue is not whether the policy environment is generally interventionist or laissez faire, but whether policies are properly structured to address the basic requirements of growth, and whether they fit the economy's capacities and environment.

## ANNEX

### Formal Structure of Alternative Explanations

Alternative explanations of the East Asian miracles can be best classified using simple, formal notation. Suppose that economic performance is explained by a "performance function"<sup>19</sup> written in terms of a list of determinants:

$$(1) \quad g = f(x_1 \dots x_k)$$

where  $g$  = economic performance  
 $x_i$  = contribution of  $i$ th determinant

Explanations will be classified in terms of the relationships they propose among different determinants, and between the determinants and economic performance.

- Single-factor explanations propose that only the  $k$ th component is critical, so that the relationship is really  $g=f(x_k)$ .
- Multi-factor explanations recognize that several factors may be important.

Multi-factor explanations can be further categorized as "independent" and "interdependent." An independent multi-factor explanation assumes that each determinant makes a separate, additive contribution to performance. For example, such an approach may see success as the result of a combined list of factors, such as outward orientation, macroeconomic stability, appropriate cultural traditions, etc.. Different cases of success may thus be associated with different combinations of positive factors. Formally,

$$(2) \quad df/dx_i > 0 \text{ for several } i,$$

while independence implies that:

$$(3) \quad d^2f/dx_i dx_j = 0 \text{ for all } i \text{ not equal to } j.$$

Two recent studies have proposed interdependent multi-factor explanations. The World Development Report 1991 argued that there are positive interactions among four aspects of economic policy: outward orientation, human capital investment, macroeconomic stability, and domestic competition. In this context, East Asia's success is attributed to reinforcing feedbacks, or formally, positive interactions among policies:

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<sup>19</sup> Jefferson and Rawsky (1993) use a similar formal framework to examine the structure of economic reform in transitional economies.

(4)  $d^2f/dx_i dx_j > 0$  for  $i$  not equal  $j$ .

No single variable needs to be perfectly correlated with success, but high values in several contributing dimensions will be very effective.

A similar model was proposed by World Development Report 1990, which argued that success involves not getting any policies badly wrong. This implies that the weakest policy limits performance:

(5)  $g = f(\min x_i)$  over all  $i$ ,

and focuses attention on "mistakes" or endowment gaps.

The synthesis proposed in this paper also follows an interdependent multi-factor approach. In this framework, performance depends on how well the economy executes certain general functions (say, how well the economy steers resources into efficient uses). Success in these functions in turn depends on the extent to which any one of several, substitute policies are implemented (say, domestic competition, foreign competition or competitively assigned government rewards). Formally:

(6)  $g = f(y_1, y_2, \dots)$   
where  $y_i = h(x_{i1}, x_{i2}, \dots)$ , etc.

Successful economies will have high values for  $y_1$ ,  $y_2$  and so on (and perhaps for combinations of the  $y$ 's if interactions are important), but these high values for intermediate functions could be the result of very different settings for specific policies  $x_{ij}$ .

The formal structure of an explanatory strategy has implications for testing. Single factor approaches are the easiest to test; there either is or isn't a relationship between the presence of a policy and performance in the sample. Only a single relationship (or set of parameters) needs to be examined at a time. Independent multifactor explanations are the next easiest to test—the number of their parameters is proportional to the number of potential determinants. Interdependent multifactor approaches are the most difficult to test. The number of parameters required in such models is exponential in the number of determinants, since additional parameters are needed to fix the effects of interactions among policies.

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