## **China Development Bank Financial Research Centre**



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### How the East Grew Rich

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#### **1. Introduction**

East Asian economic growth has been led by the industrialization of Japan in the immediate post-World War II period, followed successively by Hong Kong, Taiwan and Singapore in the late 1950s and early 1960s; South Korea in the early 1970s; and then Malaysia, Thailand and Indonesia; and then mainland China in the early 1980s. Industrialization has also spread to Vietnam, Cambodia, Laos and even Myanmar since then. The centre of gravity of the world economy has been, and still is, in the process of gradually shifting from the United States and Europe towards East and South Asia. Within East Asia itself, the economic centre of gravity has also been shifting gradually from Japan towards China, which overtook Japan to become the second largest economy in the world in 2011. East Asia is now home to both the second and third largest economies in the world.

East Asian economic development has essentially followed the dual economy model of Professor W. Arthur Lewis, Nobel Laureate in Economic Sciences, based on the effective utilization of the surplus labor in the agricultural sector in an expanding non-agricultural (manufacturing, construction and service) sector. The openness of East Asian economies to international trade and investment as well as their active participation in the world economy are also critical factors in their success.

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As a whole, East Asia has made tremendous progress in terms of real GDP. Since 1980, the rate of growth of East Asian real GDP has almost always exceeded those of the U.S. and the Euro Zone, except during the East Asian currency crisis of 1997-1998. Note that the growth rates of Japan and the other four newly industrialized economies (Hong Kong, South Korea, Singapore and Taiwan), which have begun their economic development processes relatively earlier, have gradually declined over time, and those of the newly emerging economies of Cambodia, Laos, Myanmar and Vietnam are on an upward trend.

Chinese real GDP has increased the most since 1980 amongst East Asian economies, whereas Brunei's real GDP has increased the least, followed by that of Japan. However, in terms of real GDP per capita, Brunei has fallen when compared to 1980; the Philippines and Japan have made relatively little progress; Macau, with a population of approximately half a million, has the highest real GDP per capita. Note that Chinese real GDP per capita still lags behind many East Asian economies and is ahead of only Cambodia, Indonesia, Laos, Myanmar, Philippines, Thailand and Vietnam.

In 1970, the United States and Western Europe together accounted for over 60% of world GDP. By comparison, East Asia accounted for just above 10% of world GDP. By 2012, the share of the United States and Western Europe in world GDP has declined to approximately 45%, whereas the share of East Asia has risen to approximately 25%. The Japanese share of world GDP declined from a peak of 18% in the mid-1990s to 8% in 2012, while the mainland Chinese share of world GDP rose from less than 2% in 1970 to over 11% in 2012.





The Rates of Growth of Real GDP of East Asia, the U.S. and the Euro Zone

Figure 2: Decade Average Annual Rates of Growth of Real GDP of East Asian Economies





Figure 3: The Growth of Real GDP in East Asian Economies in 1980 and 2011 (Part 1)

Real GDP of East Asian Economies in 1980 and 2011, in 2011 USD trillions

Figure 4: The Growth of Real GDP in East Asian Economies in 1980 and 2011 (Part 2)



Real GDP of East Asian Economies in 1980 and 2011, in 2011 USD billions

Figure 5: The Growth of Real GDP per Capita in East Asian Economies in 1980 and 2011



Figure 6: The Distribution of World GDP in 1970, USD

The Distribution of World GDP in 1970, in USD





#### Figure 7: The Distribution of World GDP in 2011, USD

Figure 8: China's and East Asia's Share of World GDP, 1960-present (Current Prices)



Figure 9: The Shares of East Asia, China, Japan and South Korea in World GDP, 1980-present



In 1970, the United States and Western Europe together accounted for over 60% of world trade. By comparison, East Asia and South Asia combined accounted for less than 10% of world trade. In 1990, the United States and Western Europe together still accounted for approximately 55% of world trade, while East Asia and South Asia combined accounted for just over 10% of world trade. By 2011, the share of United States and Western Europe in world trade has declined to below 45%, whereas the share of East Asia and South Asia has risen to 30%.



#### Figure 10: The Distribution of Total International Trade in Goods and Services in 1970

#### Figure 11: The Distribution of Total International Trade in Goods and Services in 2011



The Distribution of Total International Trade in Goods and Services in 2011

The East Asian share of world trade rose from 10% in 1970 to just below 25% in 2011. The mainland Chinese share of world trade rose from 1% in 1970 to 10% in 2011.

Mainland Chinese international trade accounted for more than 40% of East Asian international trade in 2011.



Figure 12: The Rising Share of East Asian Trade in Total World Trade, 1960-present

Figure 13: The Share of China in Total World Trade, 1950-present

The Share of Chinese Trade in Total World Trade, 1950-present





TheShare of Chinese Trade in Total East Asian Trade, 1952-present



#### 2. The Commonalities among East Asian Economies

The fast-growing East Asian economies have a few characteristics in common: a high domestic saving rate, the existence of surplus labor, active participation in the world economy and investment in basic education.

#### 2.1 A High Domestic Saving Rate

The saving rate of an East Asian economy typically started out low when its GDP per capita was low and near the subsistence level. However, the saving rate rose quickly as GDP per capita rose (see the following chart).

It is, however, sometimes necessary to have a jump-start with an initial supply of savings to support the initial investment, for example, from a good agricultural harvest, land reform, foreign aid, credit or investment, and in mainland China's case, the agricultural reform and the introduction of special economic zones to attract foreign direct investment (FDI).



Figure 15: The Savings Rate and Real GDP per Capita: East Asian Economies

With the possible exception of the Philippines, the saving rates of East Asian economies have been consistently high once their real GDP per capita exceeds the subsistence threshold. This is in contrast to Latin American economies, where the saving rates are typically low. The recent saving rates of Japan, Korea and Taiwan may appear low because of the statistical practice of expensing of educational and research and development (R&D) expenditures, which, properly speaking, should have been recognized as investment expenditures rather than current expenditures. These investments should be recognized as accumulations of intangible capital such as human capital and R&D capital.





Figure 17: Savings Rates of Selected Asian Economies, 1980-present



A high domestic saving rate means that the economy can maintain and sustain a high domestic investment rate without depending on the more fickle inflows of foreign aid, credits,

loans as well as direct and portfolio investment, enabling the tangible capital stock of the economy to grow continuously.

#### 2.2 The Existence of Surplus Labor

East Asian economic development has proceeded along the lines of Professor W. Arthur Lewis's celebrated model of surplus labor, first introduced in his 1954 article, "Economic Development with Unlimited Supplies of Labour", published in the Manchester School. In almost every successfully developed East Asian economy, from Japan to Hong Kong, Taiwan, South Korea, mainland China and Southeast Asia, development began with the expanded employment of the surplus labor from the agricultural sector in the nonagricultural sector, enabled by the continuing investment in tangible capital in the nonagricultural sector.

During this surplus labor phase, tangible capital was accumulated in the nonagricultural sector, and surplus labor moved from the agricultural sector to the nonagricultural sector as complementary tangible capital became available in the non-agricultural sector. For such movement of labor to be sustainable, a relatively high domestic saving rate would be needed, both as a source of wage goods (food) and as a source of investable funds in the non-agricultural sector, unless they could be supplemented by imports and inflows of foreign capital. It is important to realize that the principal source of economic growth during this phase is not the surplus labor itself, but the accumulation of tangible capital in the nonagricultural sector, which made it possible for the surplus labor to move from the agricultural to the non-agricultural sector to be productively employed.

One important implication of economic development with surplus labor is that as the economy develops, the shares of GDP and employment originating from the non-agricultural sectors will rise, and the corresponding shares of the agricultural sector will fall. In addition, increased urbanization is likely to accompany the growth of the non-agricultural sectors. Of course, eventually the surplus labor in the economy will run out, and continuing economic growth will have to be driven by a rising tangible capital per unit labor ratio in the economy and also eventually by investment in intangible capital such as human capital and R&D capital. A high domestic saving rate continues to be important in providing dependably the resources necessary for these investments.





Figure 19: The Distribution of Japanese GDP by Sector Since 1970













Figure 22: The Distribution of Korean Employment by Sector Since 1970







Figure 24: The Distribution of Chinese Employment by Sector Since 1952





#### **2.3 Active Participation in the World Economy**

Economic growth in a typical East Asian economy is also accompanied by its increasing active participation in the world economy. Active participation in the world economy implies opening the domestic economy to FDI, foreign loans and often foreign portfolio investment as well. It also implies the promotion of exports, which often requires the relaxation of import restrictions so that the necessary equipment, raw materials, components and parts and other intermediate production inputs can be imported. Finally, it also implies the rationalization of the exchange rate so that it properly reflects the productivity of the domestic export sector compared to competitors and potential competitors in the rest of the world.

#### 2.3.1 Foreign Investments and Loans

Foreign aid, foreign investment and foreign loans can augment domestic savings. They are sometimes essential to jump-start the economic development process because the initial level of GDP per capita may be too low to provide sufficient domestic savings to finance the necessary investment. FDI brings with it not just capital, but also technology, know-how, markets, new business models and methods. FDI also directly augments aggregate demand and increases domestic employment. However, FDI and foreign loans are not sustainable as foreign direct investors and lenders must eventually repatriate their capital and profits, if any.

#### **2.3.2 Export Promotion**

Most of the East Asian economies switched from a purely import substitution development strategy to an export promotion development strategy (while ensuring the sufficiency of the domestic food supply a priority) at the start of their successful economic development drive. Barriers to the imports of equipment, raw materials, components and parts and other intermediate inputs used in the export industries were removed, thus enabling the growth of exports. The export processing zone, pioneered by Taiwan, is an often used device to facilitate the imports of inputs critical to the export industries through bypassing the customs formalities, and hence also making unnecessary the rebating of customs duties and value-added taxes paid on the imported contents of goods that are subsequently exported. A trade surplus augments the domestic aggregate demand and increases domestic employment.

Exports also allow the expansion of the scale of production beyond the domestic market, and thus the realization of the economies of scale in manufacturing. The scale of the potential market is also essential for the maximization of the benefits of investment in intangible capital such as R&D capital and reputational capital (branding and goodwill). Exports can generate the foreign exchange revenue that can be used to import equipment, raw materials, components and parts and other intermediate inputs needed for production that are not available in the domestic economy. Exports and imports can generate readily collectible government revenue through export taxes and import duties that can be used to finance the construction of infrastructure and basic education.

Exports can also generate the foreign exchange needed by foreign direct investors and lenders to repatriate their capital and profits eventually (the transfer problem). Thus, exports can enhance the ability of an economy to attract FDI and foreign loans. However, the macroeconomic benefits of international trade go beyond the stimulative effects of export surpluses. Even if international trade is balanced or in deficit, it still brings significant benefits, some of which are not adequately reflected in the conventional measurements of gross domestic product (GDP).

It is therefore not an accident that the share of exports to GDP would rise significantly at the start of the economic development process of almost every East Asian economy. In most of the East Asian economies, the share of exports in GDP rose significantly, especially after the rationalization of the exchange rate. However, the export share is smaller when the size of the economy is larger. In addition, for East Asian economies that do not have a natural resource base (oil, minerals, cash crops such as palm oil and rubber), there would be significant trade deficits in the first few years after the adoption of an export promotion policy, reflecting the need to import equipment, as well as raw materials, components and parts and other intermediate inputs not produced domestically.



Figure 26: Exports of Goods and Services as a Share of GDP in East Asian Economies

Figure 27: Exports of Goods as a Percent of GDP: East Asian Economies



Exports of Goods as a Pecentage of GDP of Selected East Asian Economies



Figure 28: Exports of Goods and Services as a Percent of GDP: East Asian Economies

Figure 29: Exports of Goods as a Percent of Japanese GDP since 1950





Figure 30: Exports of Goods as a Percent of GDP: Mainland China and Japan

Figure 31: Exports of Goods as a Percent of GDP: Mainland China, Japan, South Korea and Taiwan





## Figure 32: Exports of Goods as a Percent of GDP: Four Newly Industrialized Economies

Figure 33: Exports of Goods as a Percent of GDP: China, Indonesia, Malaysia and Thailand





Figure 34: Exports of Goods as a Percent of GDP: Selected ASEAN Economies

Figure 35: Exports and Imports as a Percent of Japanese GDP, 1952-present





Figure 36: Exports and Imports as a Percent of Hong Kong GDP, 1961-present

Exports and Imports as a Percent of Hong Kong GDP, 1961-present

Figure 37: Exports and Imports as a Percent of Taiwan GDP, 1951-present







Figure 38: Exports and Imports as a Percent of Singapore GDP, 1957-present

Figure 39: Exports and Imports as a Percent of Korean GDP, 1953-present



Exports and Imports as a Percent of Korean GDP, 1953-present



Figure 40: Exports and Imports as a Percent of Chinese GDP, 1957-present

Figure 41: Exports and Imports as a Percent of Malaysian GDP, 1955-present





Figure 42: Exports and Imports as a Percent of Thailand GDP, 1950-present

Figure 43: Exports and Imports as a Percent of Indonesian GDP, 1967-present



#### 2.3.3 Exchange Rate Rationalization

Rationalization of the exchange rate means setting it at a level that reflects the relative productivity of the export sector when compared with competitors and potential competitors in the rest of the world. This often requires a devaluation of the domestic currency at the initial stage of the economic development drive. Such devaluations are common to almost all East Asian economies. It also involves the unification of pre-existing multiple exchange rates, if any, and the adoption of current account convertibility. The devaluations made possible the export promotion policy that also turned out to be attractive to foreign direct investors and lenders. In the following charts, examples of the devaluations undertaken by selected East Asian economies in the early phases of their respective economic development processes are presented. The exchange rate adjustments triggered significant increases in the shares of exports in GDP in the respective economies.



Figure 44: Nominal Exchange Rate of the Japanese Yen, Yen/US\$, 1949-present



Figure 45: Nominal Exchange Rate of the Hong Kong Dollar, HK\$/US\$, 1949-present

Figure 46: Nominal Exchange Rate of the New Taiwan Dollar, NT\$/US\$, 1951-present





Figure 47: Nominal Exchange Rate of the Singapore Dollar, S\$/US\$, 1948-present

Figure 48: Nominal Exchange Rate of the Korean Won, Won/US\$, 1948-present





Figure 49: Nominal Exchange Rate of the Renminbi, Yuan/US\$, 1957-present

Figure 50: Nominal Exchange Rate of the Renminbi, Yuan/US\$, 1978-present





Figure 51: Nominal Exchange Rate of the Malaysian Ringgit, Ringgit/US\$, 1948-present

Figure 52: Nominal Exchange Rate of the Thai Baht, Baht/US\$, 1948-present



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# Figure 53: Nominal Exchange Rate of the Indonesian Rupiah, Rupiah/US\$, 1967-present

#### 2.4 Investment in Basic Education

In almost all of the East Asian economies, compulsory basic education (kindergarten through sixth grade) became the norm quite early in the process of economic development. Over time, compulsory education expanded first to nine years and then to twelve years. Tertiary education has become almost universal in the more developed East Asian economies such as South Korea and Taiwan.

#### 3. The Evolving Sources of East Asian Economic Growth

Professors Jong-II Kim and Lawrence J. Lau found that the high rates of economic growth of the East Asian newly industrialized economies (Hong Kong, South Korea, Singapore and Taiwan) in the post-World War II period up to 1990 were mostly the results of the growth of tangible inputs (tangible capital and labor) and not technical progress or equivalently the increase in total factor productivity. By contrast, the economic growth of the developed Group of Five (G-5) countries (France, West Germany, Japan, the United

Kingdom and the United States) during the same period was mostly attributable to technical progress.

These empirical results, as well as those of Alwyn Young's, form the basis of Professor Paul Krugman's (1994) provocative article on the "The Myth of Asia's Miracle". Professor Krugman's interpretation of these results is very pessimistic: According to him, because of the absence of technical progress, economic growth in these East Asian newly industrialized economies (NIEs) is bound to slow down and come to a halt eventually as a result of the diminishing returns to additional tangible capital accumulation.

And among the tangible inputs, the growth of tangible or physical capital was the most important source. This has been enabled by the high domestic saving rates of the East Asian economies. Foreign aid, FDI and foreign loans were also helpful in augmenting the domestic savings at the beginning stage of the economic development of the East Asian economies. The initially low domestic saving rates of the East Asian economies rose quickly as real GDP per capita increased, providing the resources for continued investment in their respective own economies.

The absence of measured technical progress in the East Asian developing economies is the result of the lack of investment in intangible capital (including human capital and R&D capital). Investment in intangible capital has risen sharply in some of the East Asian economies. This is reflected in rising enrollment rates at all levels of education as well as the ratios of expenditures on R&D to GDP. Beginning in the mid-1980s, evidence of positive measured technical progress can be found in the East Asian NIEs, and that the measured technical progress can be largely attributed to the growth of the stocks of human capital and R&D capital in these economies.

|                                  | Tangible<br>Capital | Labor | Technical<br>Progress |  |
|----------------------------------|---------------------|-------|-----------------------|--|
| (1) Full Sample : 4 NIEs and G-5 |                     |       |                       |  |
| Hong Kong                        | 74.46               | 25.54 | 0.00                  |  |
| South Korea                      | 78.20               | 21.80 | 0.00                  |  |
| Singapore                        | 64.80               | 35.20 | 0.00                  |  |
| Taiwan                           | 84.04               | 15.96 | 0.00                  |  |
| Japan                            | 49.90               | 4.84  | 45.26                 |  |
| Non-Asian G-5 Countries          | 38.71               | 2.77  | 58.52                 |  |
| Hong Kong                        | 74.61               | 25.39 | 0.00                  |  |
| South Korea                      | 82.95               | 17.05 | 0.00                  |  |
| Singapore                        | 63.41               | 36.59 | 0.00                  |  |
| Taiwan                           | 86.60               | 13.40 | 0.00                  |  |
| Indonesia                        | 88.79               | 11.21 | 0.00                  |  |
| Malaysia                         | 66.68               | 33.32 | 0.00                  |  |
| Philippines                      | 66.10               | 33.90 | 0.00                  |  |
| Thailand                         | 83.73               | 16.27 | 0.00                  |  |
| China                            | 94.84               | 5.16  | 0.00                  |  |
| Japan                            | 55.01               | 3.70  | 41.29                 |  |
| Non-Asian G-5 Countries          | 41 51               | 1 97  | 56 53                 |  |

## Table 1: Growth Accounts: Contributions of the Sources of Growth (Two-Input Model)

#### 3.1 Change from Tangible to Intangible Capital-Driven Growth

In the late 1980s and early 1990s, the growth of intangible capital (human capital and R&D capital) has begun to be an important source of economic growth of South Korea, Singapore and Taiwan, supplanting the growth of tangible capital. After taking into account the effects of human capital and R&D capital, no additional technical progress or increase in total factor productivity can be found in South Korea, Singapore and Taiwan, in contrast to the G-5 economies, including Japan.

|                         | Sample<br>Period | Tangible<br>Capital | Labor | Human<br>Capital | R&D<br>Capital | Technical<br>Progress |
|-------------------------|------------------|---------------------|-------|------------------|----------------|-----------------------|
| South Korea             | 67-95            | 60.12               | 14.23 | 1.75             | 23.90          | 0.00                  |
| Singapore               | 77-95            | 50.44               | 23.90 | 1.30             | 24.35          | 0.00                  |
| Taiwan                  | 78-95            | 55.85               | 11.25 | 1.14             | 31.76          | 0.00                  |
| Japan                   | 64-94            | 42.40               | 5.24  | 0.72             | 17.08          | 34.56                 |
| Non-Asian G-7 Countries | 65-94            | 32.52               | 3.72  | 1.16             | 14.90          | 47.69                 |

 Table 2: Growth Accounts: Contributions of the Sources of Growth (Percent)

 (Four-Input Model with Human Capital and R&D Capital)

#### 4. The Rising Importance of Intangible Capital

The principal sources of East Asian economic growth have therefore gradually evolved from the growth of tangible inputs such as tangible capital, enabled by the high saving rates of the East Asian economies and labor, to the growth of intangible inputs such as human capital, R&D capital and reputational capital (branding and goodwill), especially in the more developed East Asian economies. Sustained investment in human capital and R&D are essential for the occurrence of technical progress or growth in total factor productivity in an economy. The East Asian economies have been stepping up their respective investments in R&D as a percent of their GDPs.





One indicator of the potential for technical progress (national innovative capacity) is the number of patents created each year. In the following chart, the number of patents granted in the United States each year to the nationals of different countries, including the U.S. itself, over time is presented. The U.S. is the undisputed champion over the past forty years, with 121,026 patents granted in 2012, followed by Japan, with 50,677 patents. Since these are patents granted in the U.S., the U.S. may have a home advantage; however, for all the other countries and regions, the comparison across them should be fair. The number of patents granted to mainland Chinese applicants each year has increased from 1 in 1985 to 4,637 in 2012. The economies of South Korea and Taiwan were granted 13,233 and 10,646 U.S. patents respectively in 2012; they have been averaging approximately 10,000 patents a year each.

Figure 55: Patents Granted in the United States: G-7 Countries, Four East Asian NIEs and China



The stock of R&D capital, defined as the cumulative past real investment in R&D less depreciation of 10% per year, can be shown to have a direct causal relationship to the number of patents granted (see the following chart, in which the annual number of patents granted is plotted against the R&D capital stock of that year for each country or region). The chart shows that the higher the stock of R&D capital of an economy, the higher is the number of patents granted to it by the U.S.

## Figure 56: Patents Granted in the United States and R&D Capital Stocks: Selected Economies



#### 5. The Partial De-Coupling Hypothesis

Throughout the 2007-2009 global financial crisis, as well as the subsequent European sovereign debt crisis, the East Asian economies and the economies of the BRICS countries (Brazil, Russia, India, China and South Africa) continued to do reasonably well. China, in particular, has been able to maintain its real rate of growth above 7.5% since 2007, lending credence to the "Partial De-Coupling Hypothesis", that is, the Chinese and East Asian economies can continue to grow, albeit at slower rates, even as the U.S. and European economies go into economic recession. This partial de-coupling can occur because of the gradual shift of the economic centre of gravity of the world from the United States and Western Europe to Asia (including both East Asia and South Asia) over the past three decades.

A particularly interesting development is the rise in intra-East Asian international trade. The share of East Asian trade destined for East Asia has risen to over 50% in the past decade. This is a sea change compared to 30 years ago when most of the East Asian exports

were destined for either the United States or Western Europe. Similarly, the share of East Asian imports originated from East Asia has remained above 45%.



Figure 57: The Share of East Asian Exports Destined for East Asia

Figure 58: The Share of East Asian Imports Originated from East Asia





Any doubt that the Chinese economy can be partially de-coupled from the world economy should be resolved by an examination of the following three charts. Even though Chinese exports and imports fluctuate like those of all other East Asian economies, the rate of growth of real GDP of the Chinese economy has been relatively stable compared to those of the other East Asian economies.

Figure 59: Quarterly Growth Rates of Exports of Goods: Selected East Asian Economies



## Figure 60: Quarterly Growth Rates of Imports of Goods: Selected East Asian

#### Economies



Figure 61: Quarterly Rates of Growth of Real GDP: Selected East Asian Economies





#### 6. Concluding Remarks

The economic centre of gravity of the world has been gradually shifting to East and South Asia, and that of East Asia has been gradually shifting to China. The Chinese and East Asian economies have been partially de-coupled from the United States and Europe.

The growth of tangible capital, supported by high domestic saving rates, was the principal source of early East Asian economic growth. Intangible capital (human capital and R&D capital) has been gradually supplanting tangible inputs (physical capital and labor) as the most important source of growth in the more developed East Asian economies such as Japan, South Korea, Singapore and Taiwan.

The expansion of the non-agricultural sectors through the utilization of surplus labor and active participation in the world economy are common features of the development experience of successful East Asian economies.