The Long-Term Economic Growth of Taiwan

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Introduction

- We shall provide a review of the historical experience of economic growth in Taiwan.
- While there has definitely been a slow down in the rate of growth of real GDP in Taiwan, it is not so clear whether there has been a real slow down in the rate of growth of aggregate social welfare.
- What does the future hold for the Taiwan economy?

Introduction

- Taiwan has over the past sixty odd years grown into a developed economy. It is currently faced with many problems, but looking back over this long period of time, it has been a most successful experience.
- Between 1951 and 2011, the annual real GDP of Taiwan grew almost 73 times, from US$6.4 billion to US$466 billion (in 2011 prices), at an average annual compound rate of 7 percent. This is a most impressive achievement!
- The industrialisation of Taiwan has followed those of Japan and Hong Kong, and has preceded South Korea and other Southeast Asian countries as well as Mainland China.
- In 1950, the Philippines had the highest GDP per capita of any country in Asia. Today, the GDP per capita of the Philippines is among the lowest in Asia. The Philippines was, at the time, tipped to be the economy most likely to develop by development economists in the West.

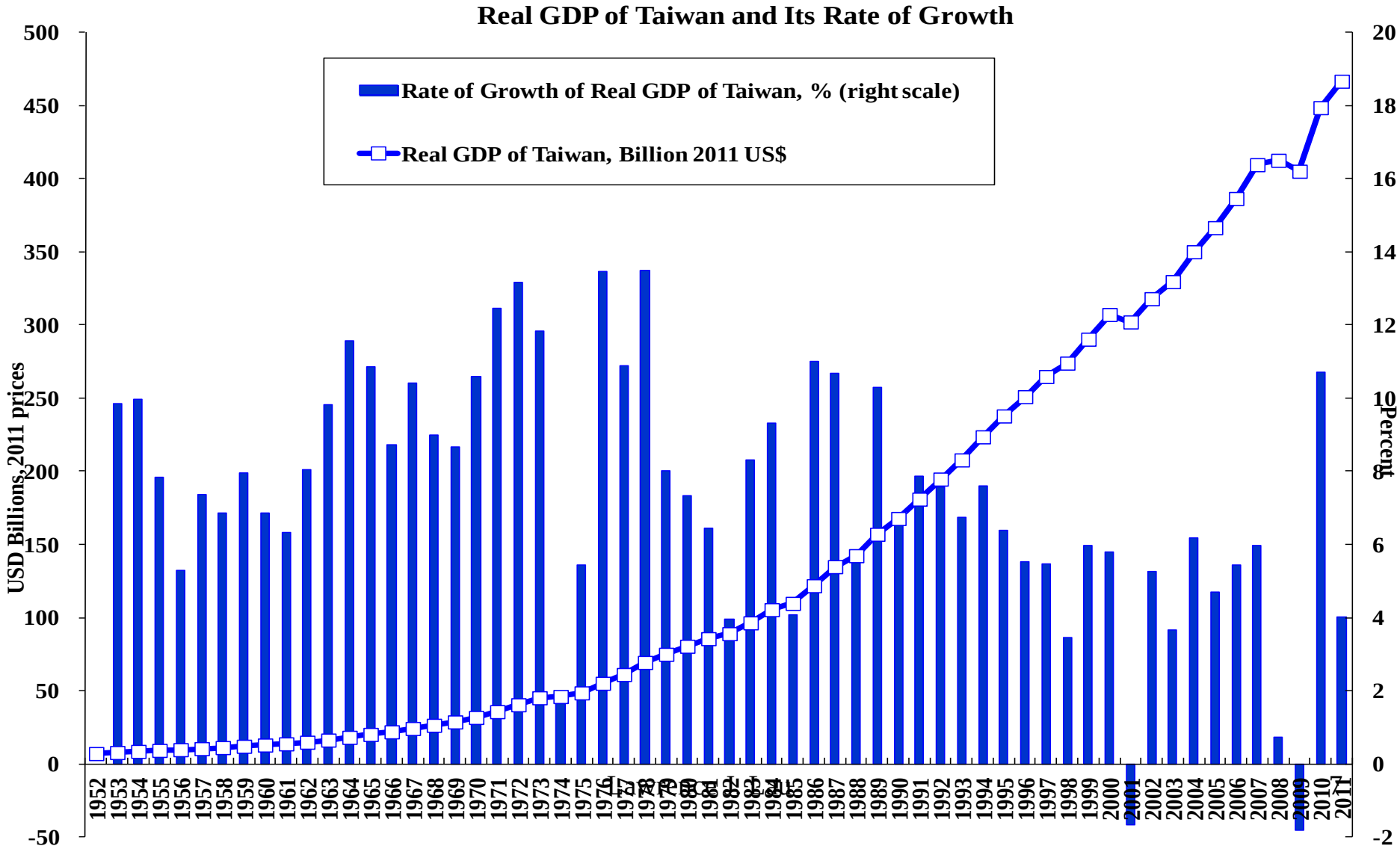
Introduction

- By comparison, during the same period, Mainland Chinese annual real GDP grew almost 106.2 times, from US$70.6 billion in 1952 to more than US$7.5 trillion (2011 prices), at an average annual compound rate of 7.8 percent, to become the second largest economy in the World, after the United States.
- We shall identify several areas of increases in aggregate social welfare that are not reflected in the conventional real GDP measurements.
- Looking ahead, we would also consider the question: From where will further economic growth come in the future?

An Overview of the Economic Growth of Taiwan

- In the following Chart, the real GDP of Taiwan and its annual rate of growth from 1951 to 2011 are presented. Despite some occasional setbacks, on the whole, the experience has been a most successful one.

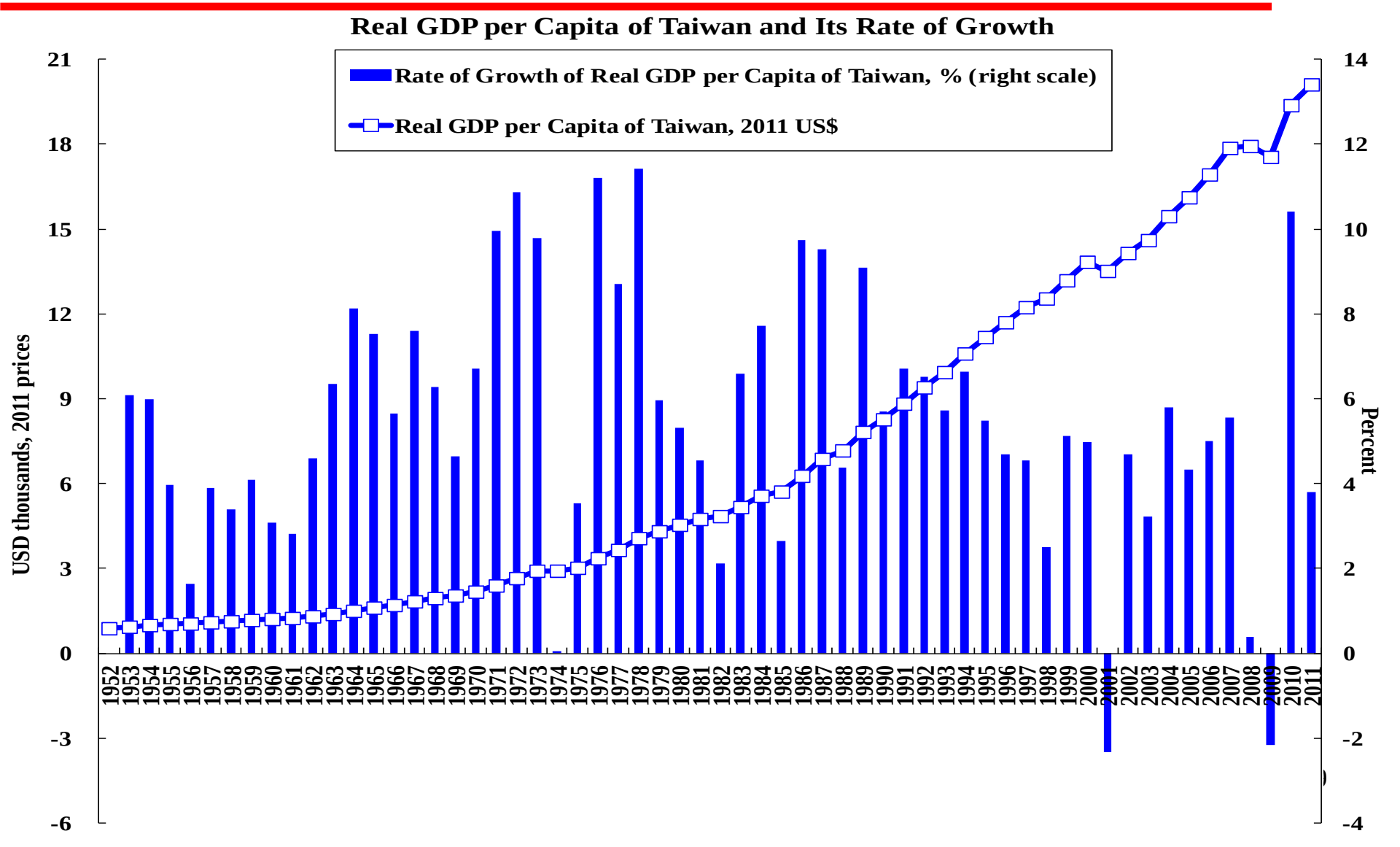
Real GDP of Taiwan and Its Rate of Growth (2011US$)



An Overview of the Economic Growth of Taiwan

- In terms of its real GDP per capita, US$20,110 (in 2011 prices), Taiwan is considered a developed economy.
- Between 1952 and 2011, Taiwan real GDP per capita grew 22.6 times, from US$890 to US$20,110, at an average annual compound rate of 5.2%.
- By comparison, the Mainland GDP per capita in 2011, US$5,555, was 45.2 times Mainland GDP per capita of US$122.8 in 1952, with an average annual compound rate of growth of 6.4% (bear in mind that the rate of growth of population has been lower on the Mainland).
- Taiwan real GDP per capita was almost four times the Mainland real GDP per capita in 2011.

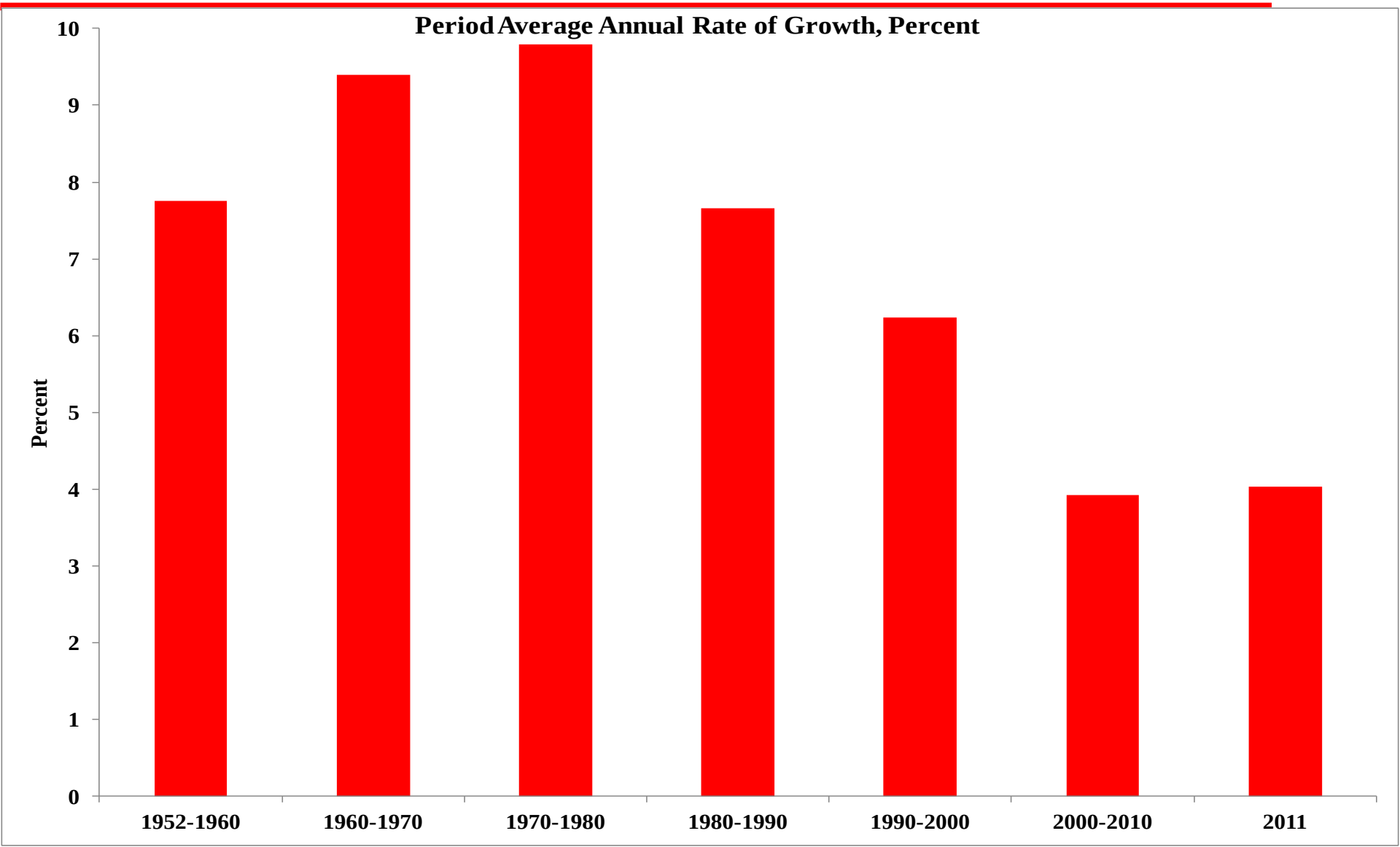
Real GDP per Capita of Taiwan and Its Rate of Growth (2011US$)



An Overview of the Economic Growth of Taiwan

- It is instructive to look at the average annual rate of growth of the Taiwan economy decade by decade. It is quite clear that the rate of growth of measured real GDP has been declining over time. The highest rate of growth occurred between the 1960s and the 1980s. The first decade of the 21st Century had the lowest rate of growth.
- There are many reasons for the slow down. Part of it is due to the fact that the real GDP as measured is not able to include the non-pecuniary improvements in aggregate social welfare. We shall present the case that increases in aggregate social welfare have been significantly higher than increases in real GDP per se.

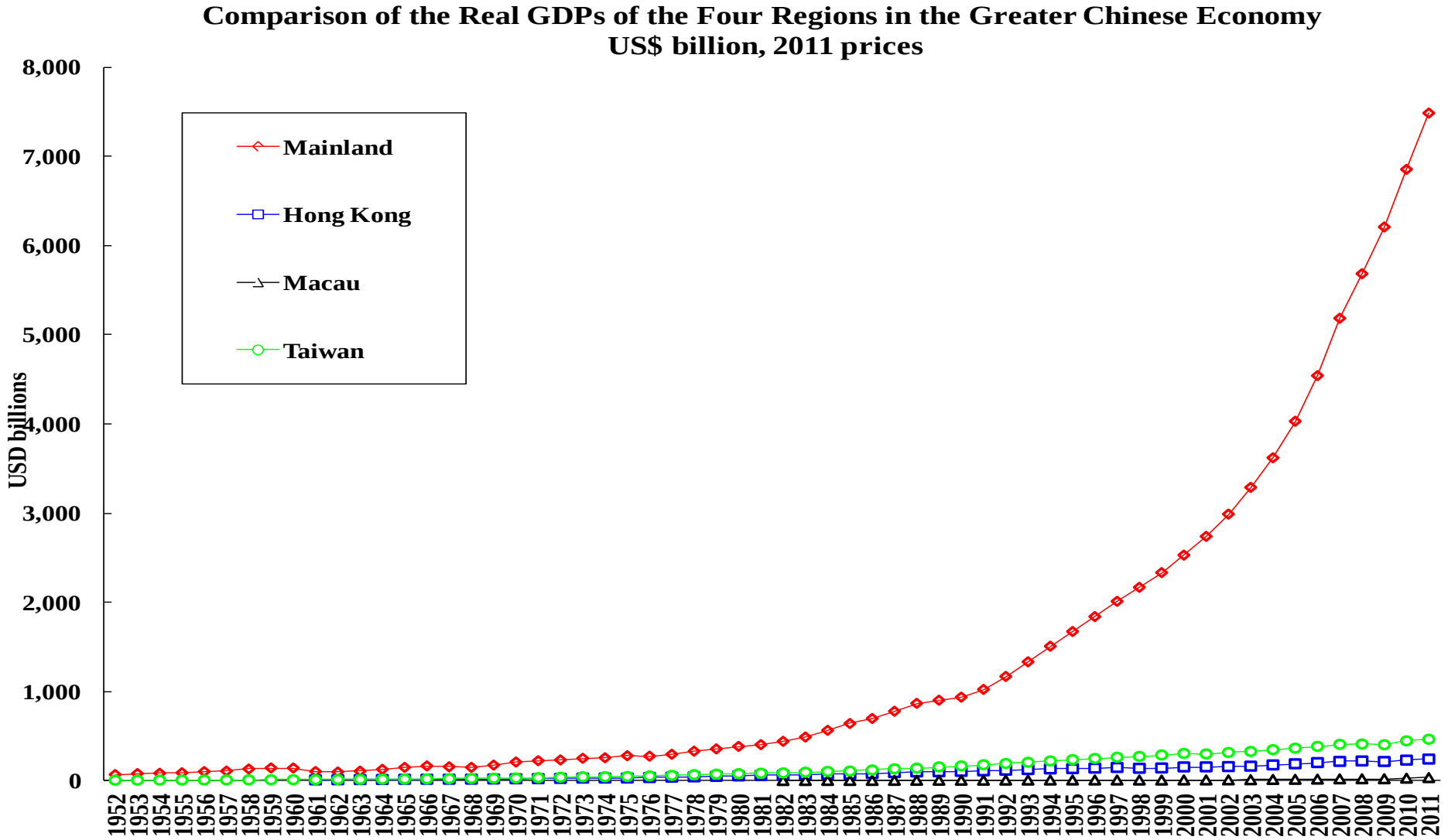
Period Average of the Annual Rate of Growth of the Real GDP of Taiwan



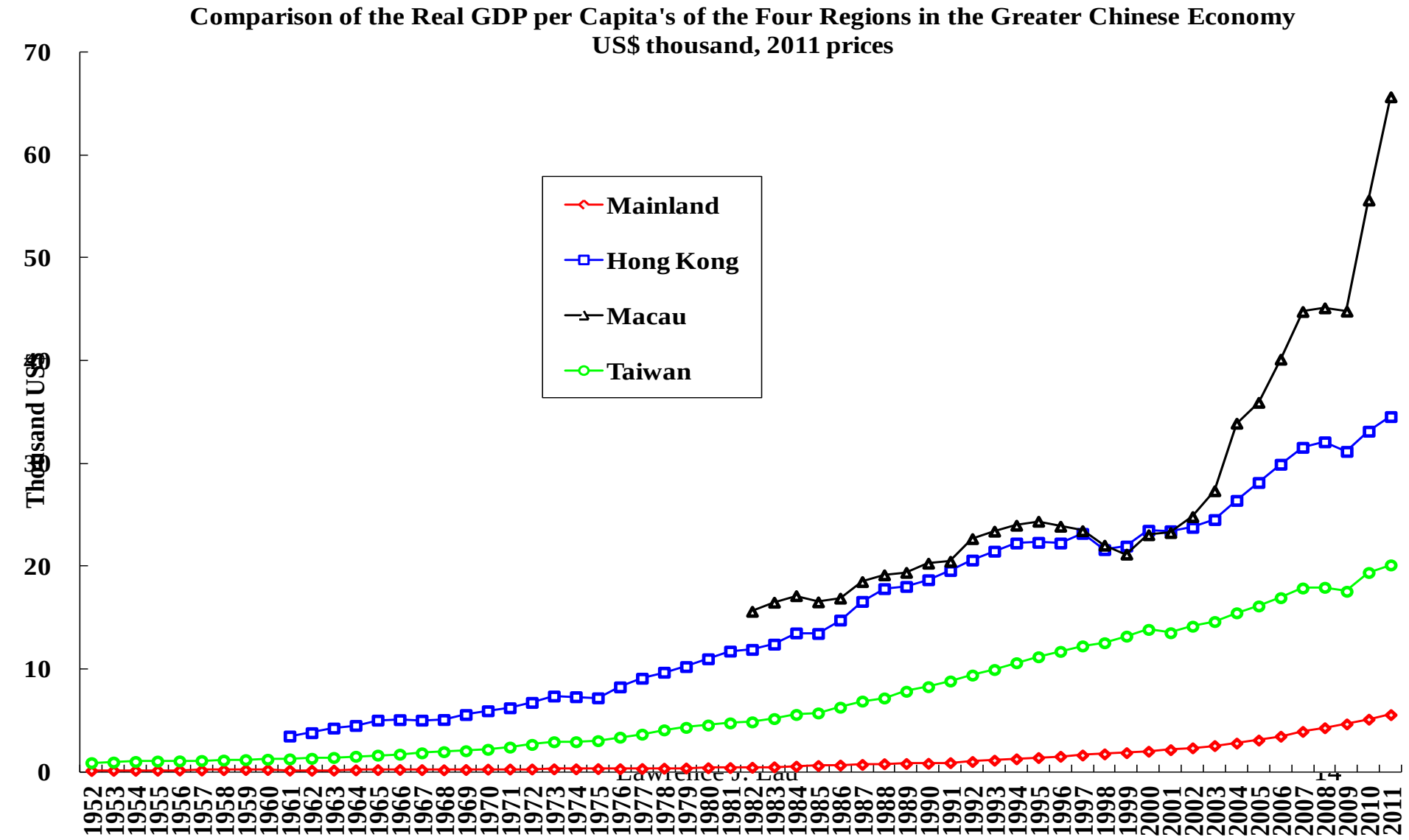
An Overview of the Economic Growth of Taiwan

- It is also instructive to compare the evolution of the real GDP and real GDP per capita of Taiwan with those of the Mainland, Hong Kong and Macau.
- Taiwan's real GDP has remained higher than those of Hong Kong and Macau over the years. However, Taiwan's real GDP per capita has lagged behind those of Hong Kong and Macau but remained ahead of the Mainland's by a significant margin. It was almost four times the Mainland real GDP per capita in 2011.

The Real GDPs of Taiwan, Mainland, Hong Kong & Macau (Billion 2011US$)



The Real GDP per Capita's of Taiwan, Mainland, Hong Kong & Macau (2011$)



Economic Growth with Surplus Labour

- In the 1950s, Taiwan had a supply of surplus labour, especially as a result of the increased agricultural productivity that occurred after the land reform. This provided the classic case of economic development with surplus labour as described and analyzed by the late Prof. W. Arthur Lewis, Nobel Laureate in Economic Sciences.
- It is important to remember that the principal source of economic growth during this phase is not the surplus labour itself, but the accumulation of tangible capital in the non-agricultural sector, which made it possible for the non-agricultural sector to employ the surplus labour and put it to productive use.

Economic Growth with Surplus Labour

- During this phase, tangible capital was accumulated in the non-agricultural sector and surplus labour was moved from the agricultural sector to the non-agricultural sector as complementary tangible capital became available. A relatively high domestic savings rate was critically needed, unless it was supplemented by foreign aid.
- The tangible capital–labour ratio in the non-agricultural sector remained more or less constant in real terms during this phase.
- However, this surplus labour was exhausted in the 1970s.

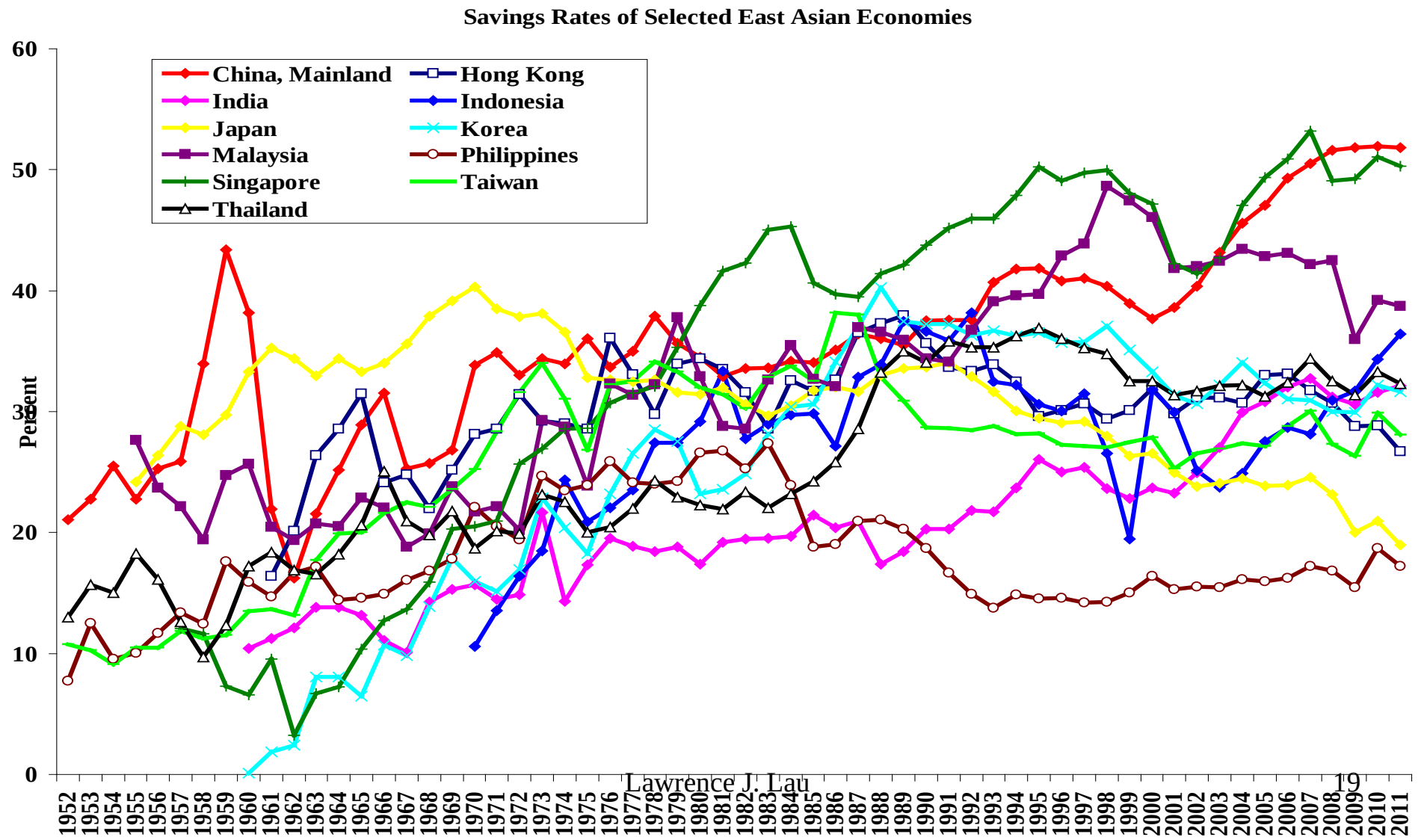
Tangible Capital-Driven Growth

- This was followed by a phase in which the tangible capital-labour ratio in the non-agricultural sector began to rise. The growth in tangible capital was therefore also the principal source of growth of the real GDP during this phase.
- This phase continued until the 1980s when the importance of intangible capital was recognised. The Hsinchu Science Park was established during this period.

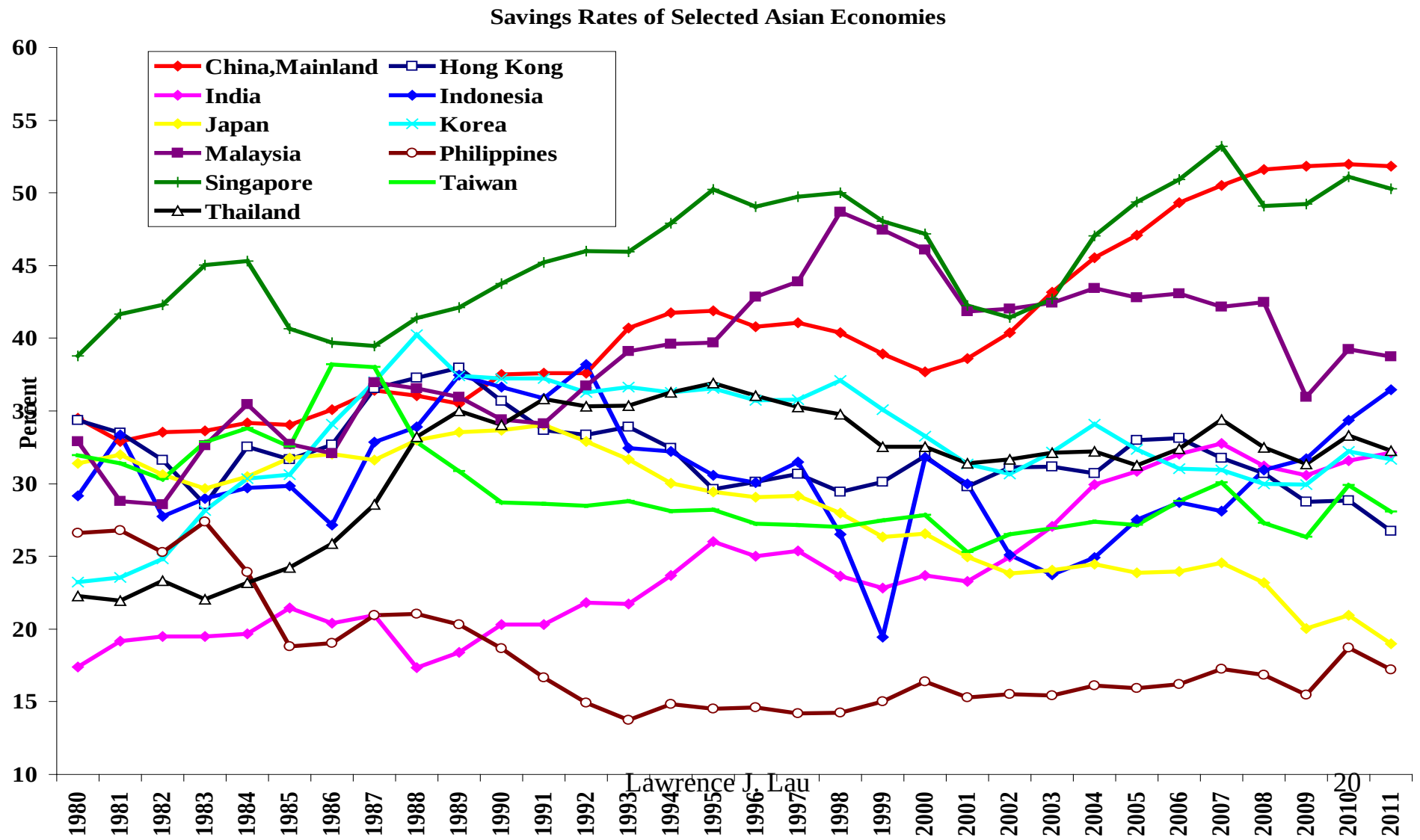
Tangible Capital-Driven Growth

- Taiwan has consistently had a high national savings rate of approximately 30% since 1970. This savings rate is more than adequate to finance all of its domestic investment needs, even as U.S. aid was phased out beginning in the mid-1960s. Taiwan has not had to depend on foreign direct investment, foreign portfolio investment, or foreign loans since then.
- The actual national savings rate of Taiwan in recent years is probably higher than the measured national savings rate because of the expensing of educational and R&D expenditures which properly speaking should have been recognised as investment rather than consumption expenditures.

Savings Rates of Selected Asian Economies (1952-present)



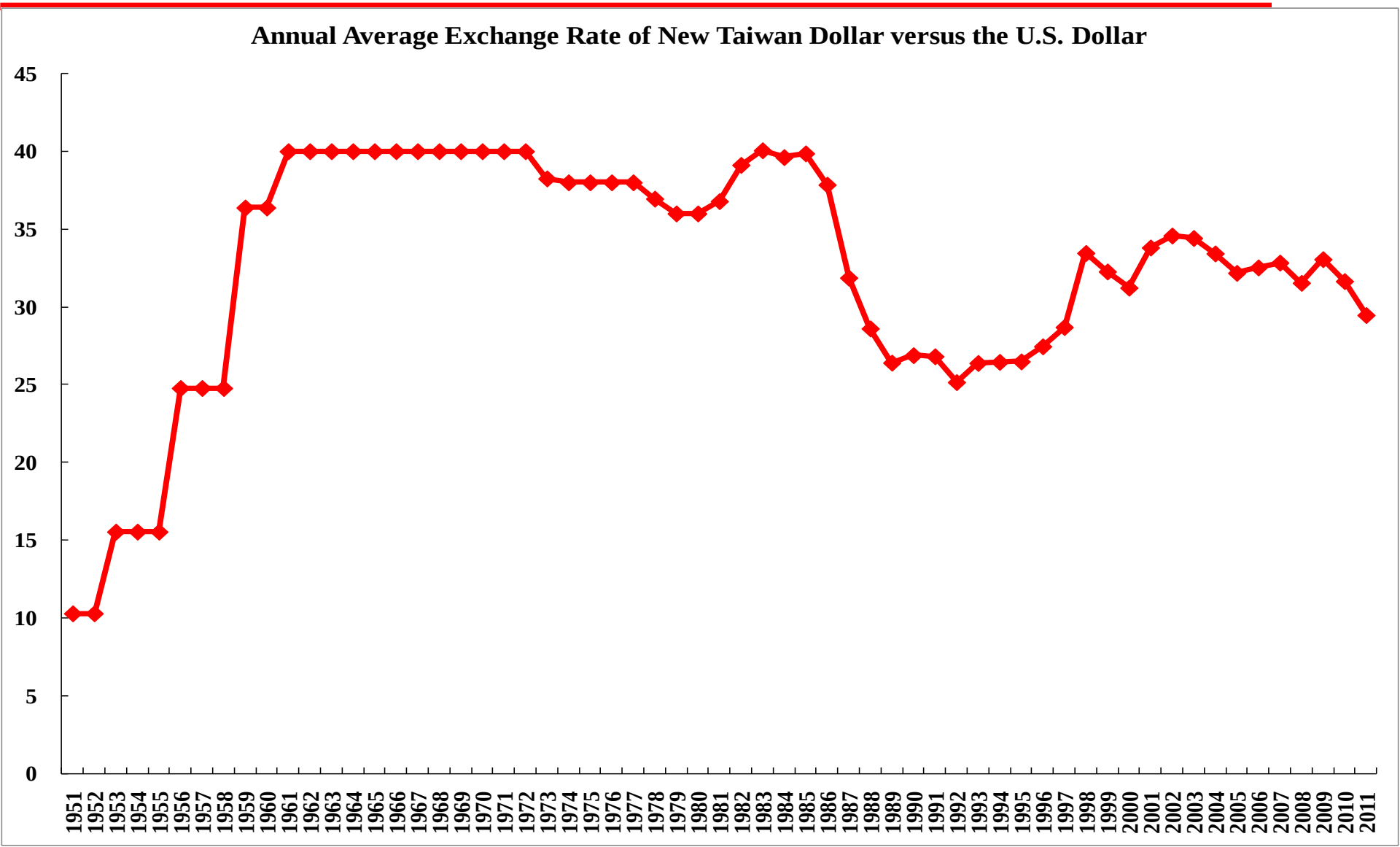
Savings Rates of Selected Asian Economies (1980-present)



The Role of International Trade

- The shift from an import substitution to an export promotion strategy, pioneered in Taiwan, played a critical role in its economic development. This shift occurred in the 1950s, when the New Taiwan Dollar was successively devalued from NT$10 per US$ in 1952, to NT$24 in 1956, NT$36 in 1960 and finally NT40/US$ in 1961 (see the following Chart).
- However, the benefits of international trade go beyond the macroeconomic effects of export surpluses. Even if international trade is balanced or in deficit, it still brings significant benefits, some of which are not reflected in the conventional measurements of the Gross Domestic Product (GDP).

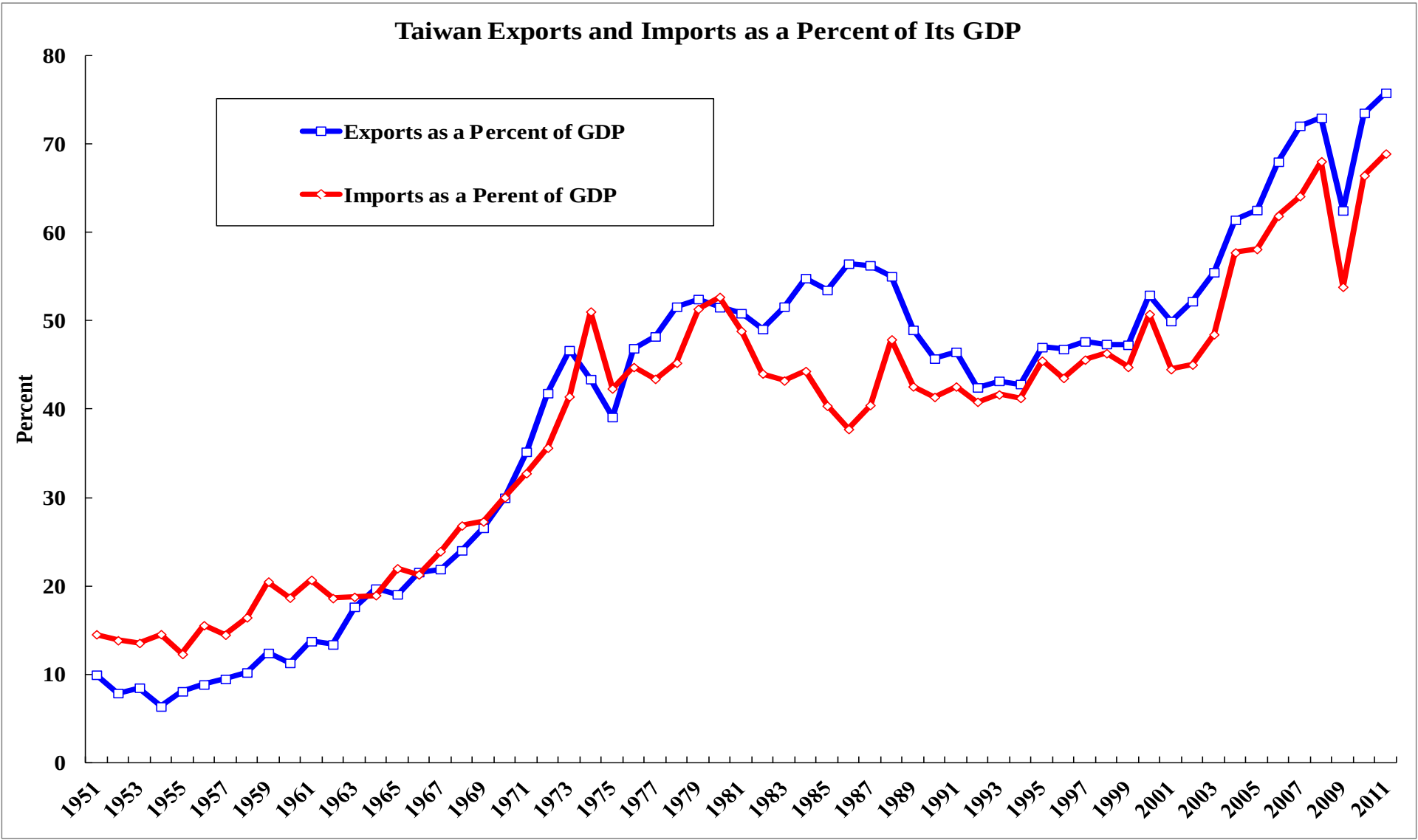
The New Taiwan Dollar/U.S. Dollar Exchange Rate, Annual Average



The Role of International Trade

- The exchange rate adjustments triggered a significant increase in the share of exports to GDP, from less than 10 percent in 1951 to almost 50 percent in 1973, when the first oil shock occurred. Then beginning in 2001, the share of exports in GDP resumed its climb to more than 75 percent in 2011, helped by the entry of Mainland China into the World Trade Organisation (WTO).
- Similarly, the share of imports in GDP also increased from 15 percent in 1951 to almost 70 percent in 2011, consisting mostly of fuel, raw materials, components and parts, and semi-finished goods.
- The increases in both export and import shares in GDP indicate that the economy of Taiwan is increasingly specialised and benefits from such specialisation. They also reflect the rapid growth of international trade in the World.

Exports and Imports as a Percent of Taiwan GDP



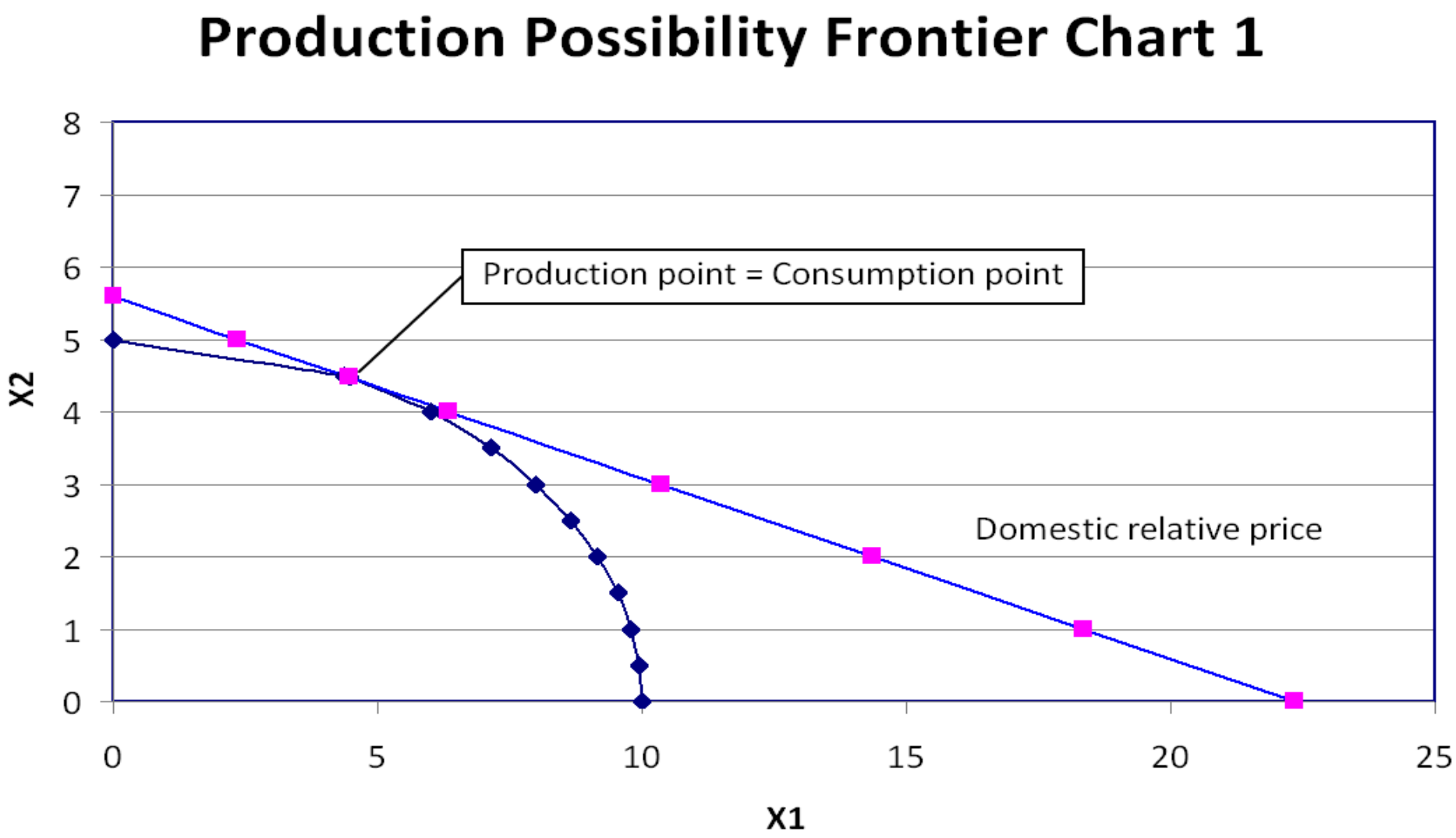
The Role of International Trade

- However, conventional measurements of real GDP understate the increases in aggregate social welfare due to international trade. This is because GDP merely measures the actual outbound movement of the frontier of the domestic production possibilities set but not the actual outbound movement of the frontier of the domestic consumption possibilities (including present and future consumption) set.

The Role of International Trade

- Consider a simple two-good example. In the absence of international trade, the production possibilities set of an economy is the same as its consumption possibilities set. A necessary condition for aggregate social welfare to be at a maximum is that the economy operates on the frontier of its production possibilities set. Note that it is not necessary to assume the existence of a social utility or social welfare function for this statement to be valid.
- The point of tangency of the production possibilities set to the domestic relative price line marks the optimal combination of the two goods to be produced in the absence of international trade. It is also the consumption point of an economy without international trade.

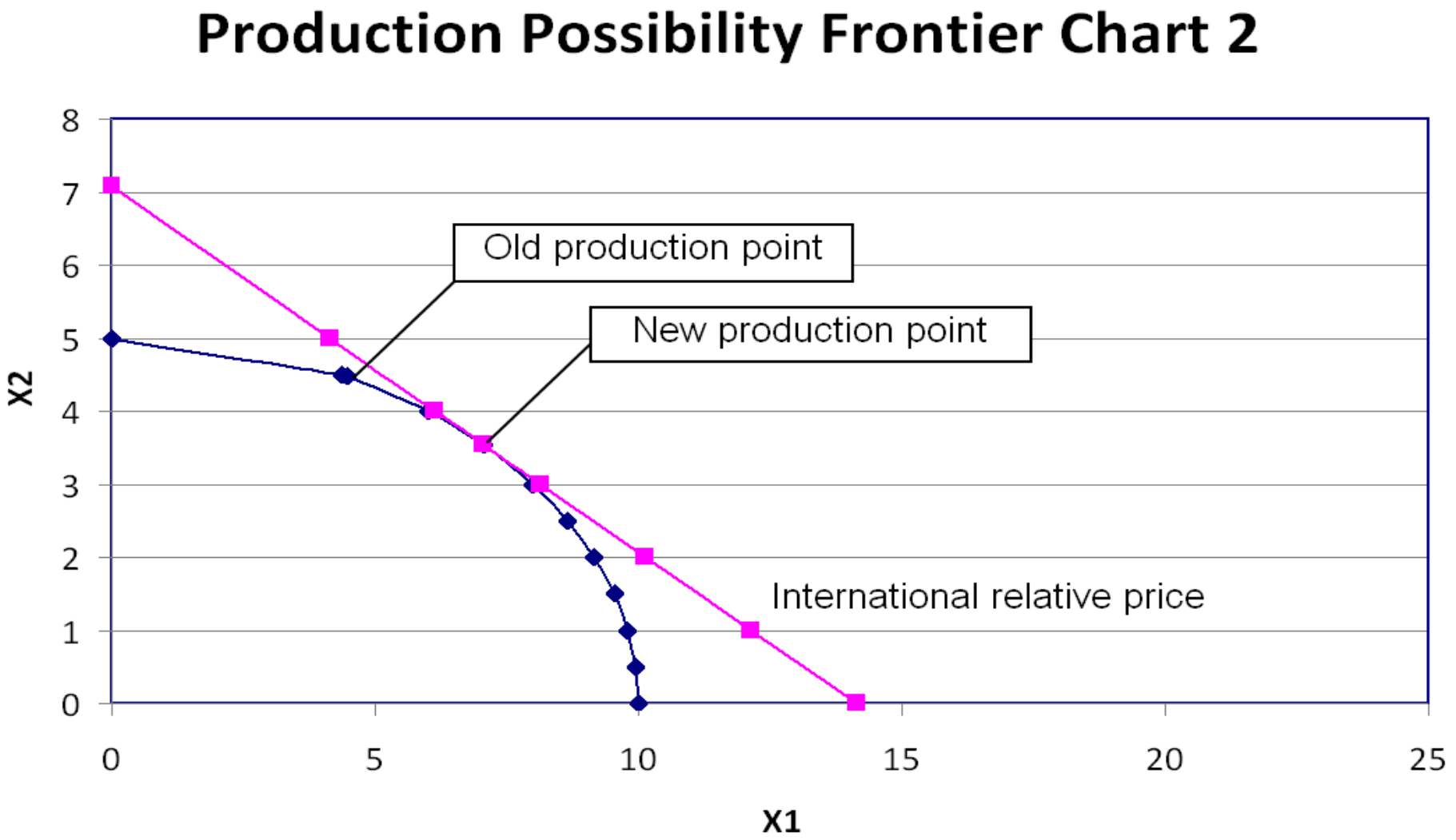
The Domestic Production Possibilities Set (=Consumption Possibilities Set w/o Trade)



The Role of International Trade

- Now suppose there is the possibility of international trade. While the domestic production possibilities set remains unchanged, the domestic consumption possibilities set is expanded with international trade.
- The consumption possibilities set in the presence of international trade is given by the entire area of the triangle bounded by the international relative price line and the two axes. Since the old consumption possibilities set is completely contained in the new consumption possibilities set, domestic aggregate social welfare must increase, even in the case that the international relative price is the same as the domestic relative price in the absence of international trade.

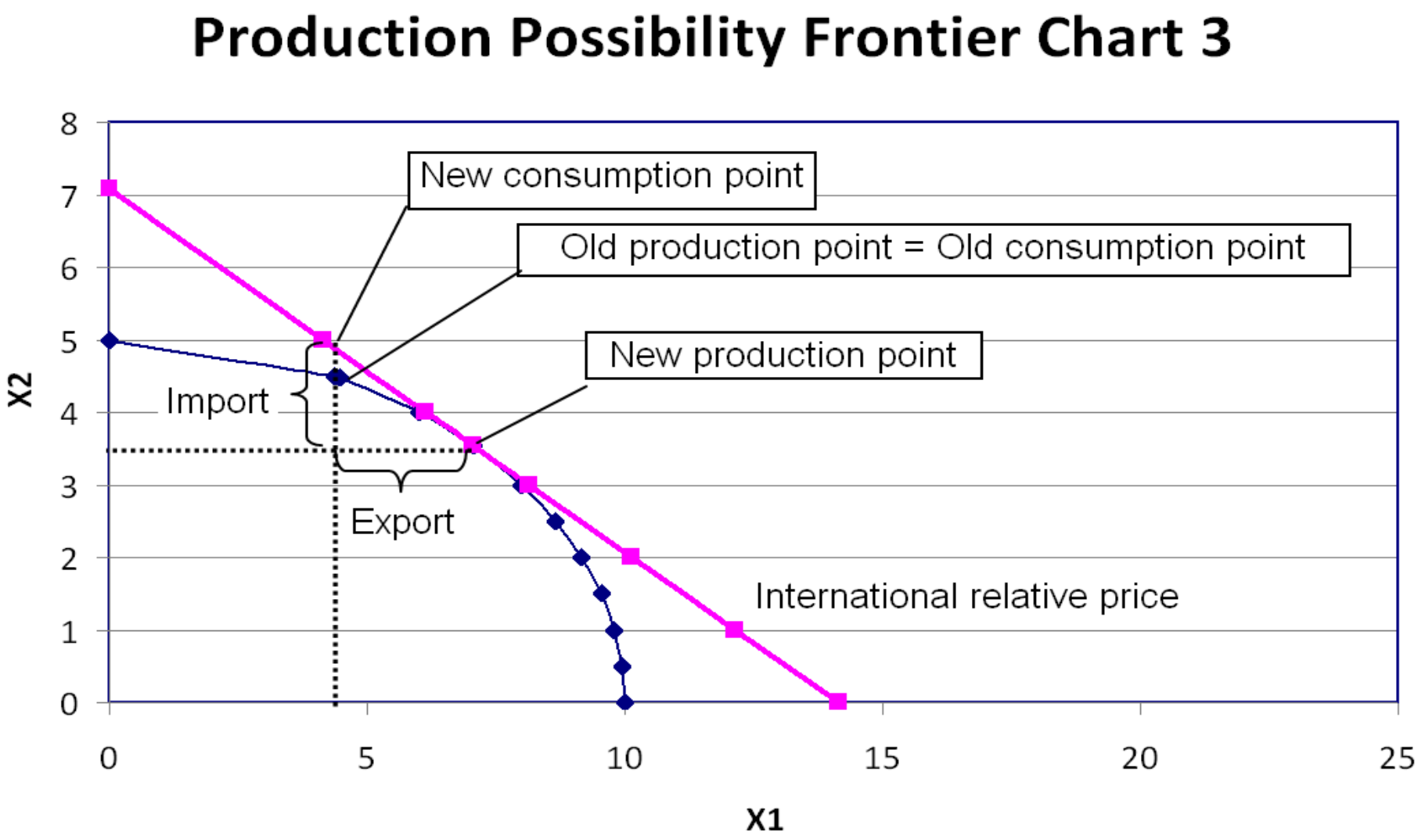
The Domestic Consumption Possibilities Set with International Trade



The Role of International Trade

- If the international relative price is the same as the domestic relative price in the absence of international trade, the optimal combination of the goods to be produced remains the same with or without international trade. However, with the possibility of international trade, the consumption point can be different from the production point, and the resulting aggregate social welfare may well be higher with international trade.
- The following Chart makes it clear. Any point on the international relative price line is a possible consumption point. At the new consumption point selected in the Chart, it is clear that aggregate social welfare must have increased as the same quantity of good 1 and a higher quantity of good 2 are now being consumed with international trade.

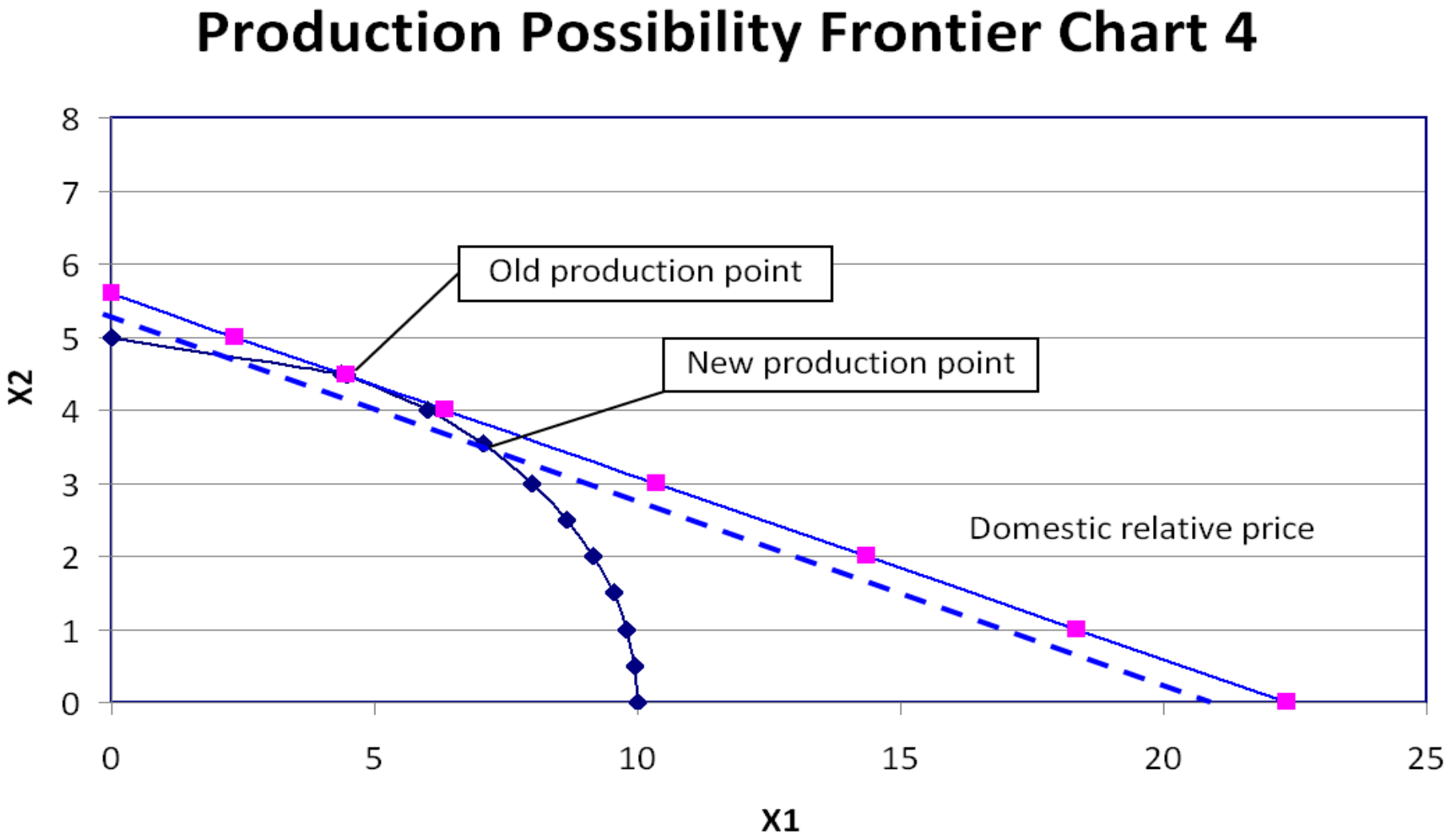
Consumption (and Aggregate Social Welfare) is Increased with Trade



The Role of International Trade

- We can see from the previous Chart that the possibility of export and import implies that every point on the international relative price line is a possible combination of domestic consumption. Thus, with international trade, aggregate social welfare must be higher than without trade.
- However, if the values of outputs in both periods are evaluated at the old relative price (the base period relative price), say, in units of good 1, then clearly output is higher in the base period than in the new period during which international trade is possible. This cannot be correct, as measured real GDP moves in the opposite direction as aggregate social welfare..

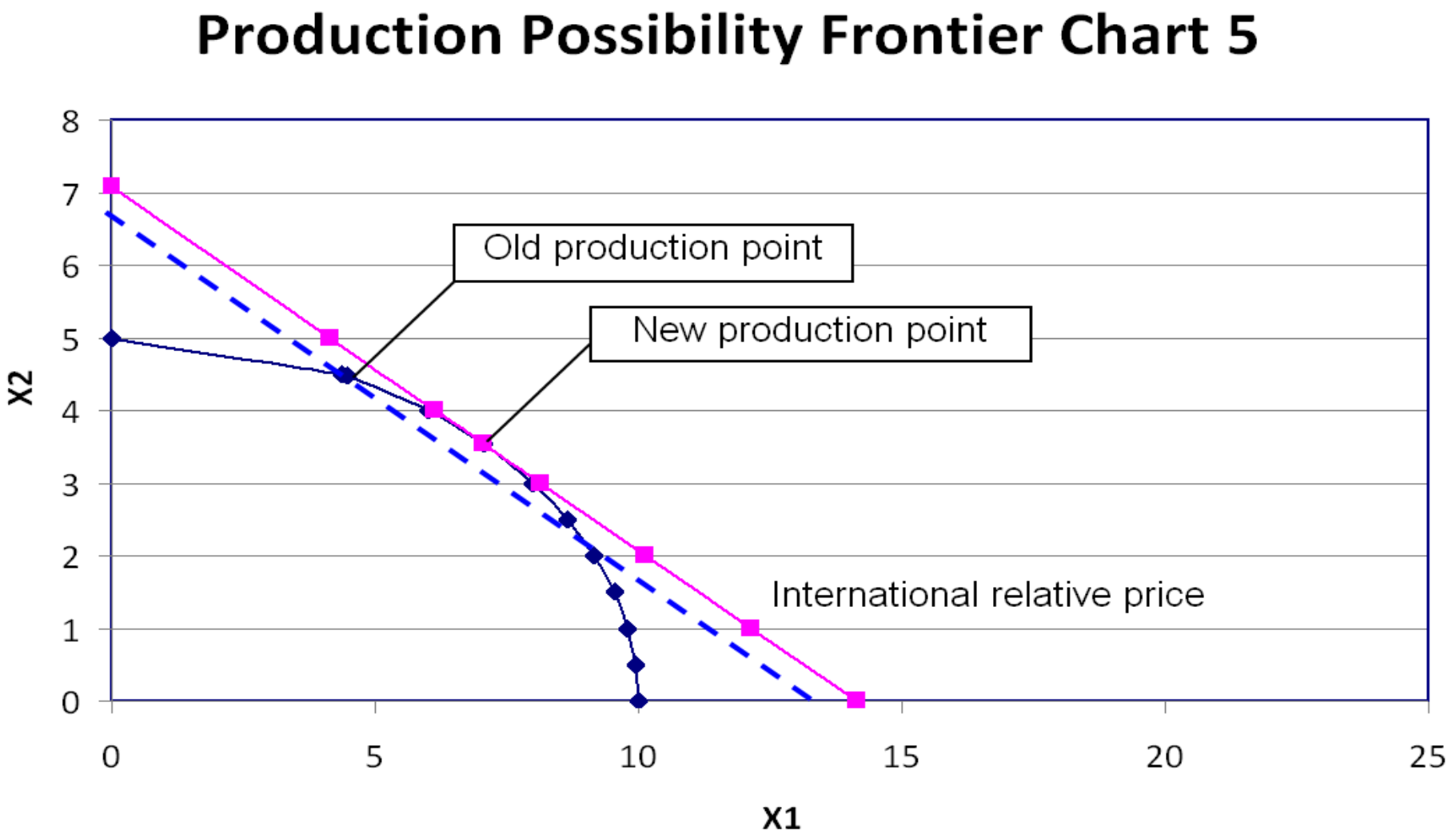
Valuation of the Old and New Production Points at the Old Relative Price



The Role of International Trade

- If instead of the base period relative price we use the new period relative price to value the outputs of both periods, then the results will show that the value of output in the new period is higher than the value of output at the base period, again, in units of good 1. This makes more sense: measured real GDP moves in the same direction as aggregate social welfare.
- Note the importance of the "small open economy" assumption—the participation of Taiwan does not change the international relative prices—otherwise the international relative price--the frontier of the new consumption possibilities set--will not be a straight line (or a hyperplane).

Valuation of the Old and New Production Points at the New Relative Price



The Role of International Trade

- However, this increase in aggregate social welfare is not reflected in the conventional measurement of real GDP. In fact, if the constant prices of the period before the introduction of international trade is used, the measured real GDP may actually show a decline, as we have demonstrated graphically above.
- One partial remedy for this problem is to use the new relative price in the valuation of both the old and new combinations. This will lead to a new convention in the chained calculation of time-series real GDP. It remains to be seen how much difference such a modification will make.
- Note that the argument presented above on the benefits of international trade does not depend on the number of countries and the benefits for the domestic economy are larger the more countries participate in world trade.

The Role of International Trade

- Moreover, we should note that aggregate social welfare can be increased even if the production possibilities set remains unchanged. (Is real GDP a good or adequate measure of aggregate social welfare?)
- The growth and globalisation of world trade will further shift the international relative price. For example, it will lower the price of light manufactured consumer goods relative to the price of capital goods. This will create additional room for further specialisation and division of labour and bring further benefits to the economy. All of this can occur without any change in the domestic production possibilities set.

The Role of International Trade

- But as the shares of exports and imports in GDP of Taiwan have continued to rise, the implication is that the new relative price is quite different from the old relative price, and that the new combination of goods is quite different from the old combination of goods. Moreover, they are constantly changing too.
- Furthermore, comparative advantage depends not only on natural endowments but can be created, through investment in intangible capital such as human capital, R&D capital and goodwill (reputational capital).

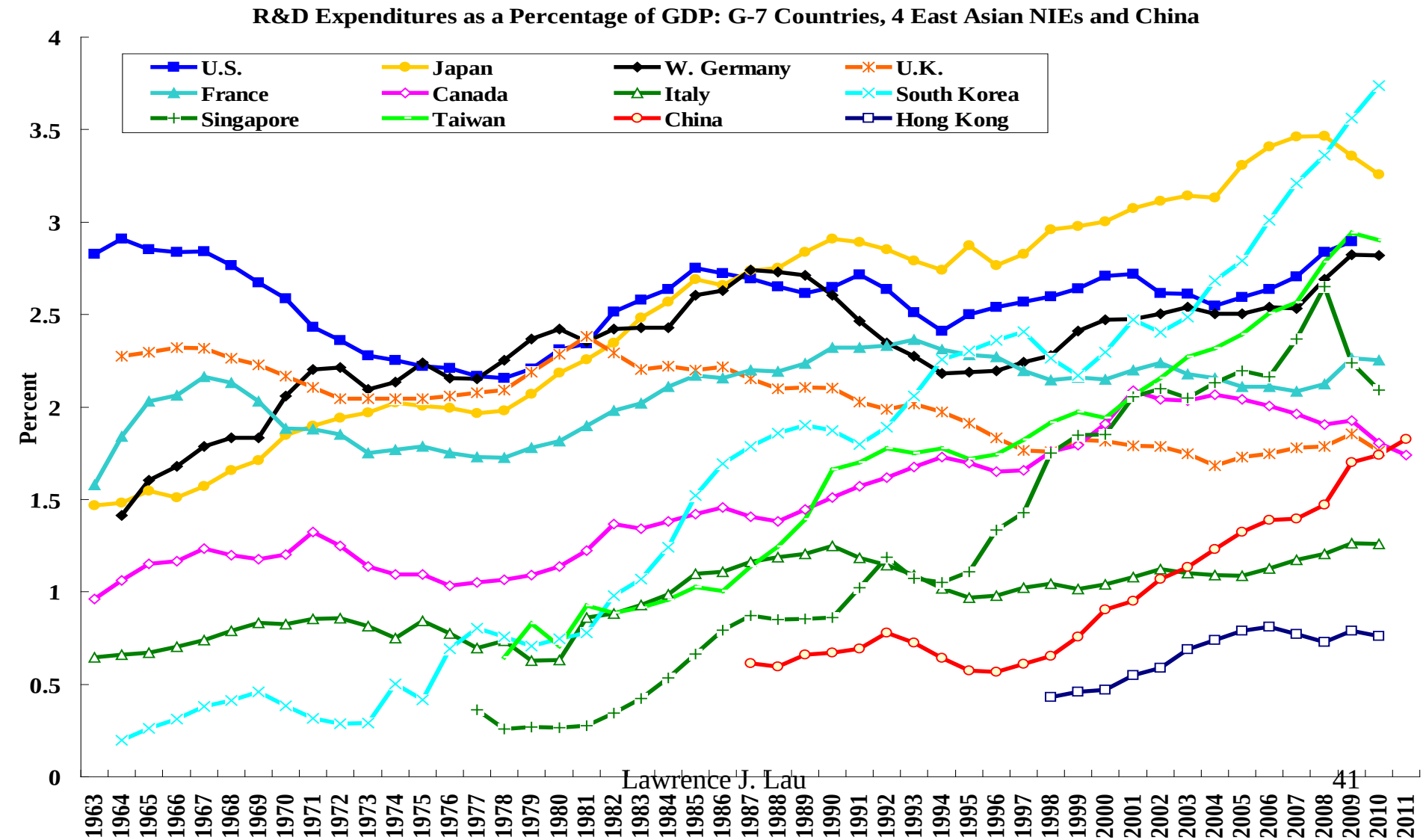
Intangible Capital-Driven Growth

- Beginning in the late 1980s and early 1990s, the principal source of economic growth of Taiwan has begun to change from the growth of tangible capital to that of intangible capital. Intangible capital includes human capital, R&D capital and goodwill (reputational capital). Advertising and brand-building are examples of investment in reputational capital.
- This period also coincided with the gradual change from "original equipment manufacturing (OEM)" to "original development and manufacturing (ODM)" on the part of Taiwan firms.

Intangible Capital-Driven Growth

- Sustained investment in research and development (R&D) is essential for technical progress in an economy. Beginning in the late 1980s, Taiwan began to increase its investment in research and development (R&D). Expenditure on R&D has been rising rapidly, both in absolute value, and as a percentage of GDP. The Taiwan R&D Expenditure/GDP ratio has exceeded 2.5%, comparable to that of the U.S. and other developed economies but behind that of Japan and South Korea.
- By comparison, the Mainland Chinese R&D Expenditure/GDP ratio is targeted to reach 2.2% only in 2015.

R&D Expenditures as a Ratio of GDP: G-7 Countries, 4 East Asian NIES & Mainland



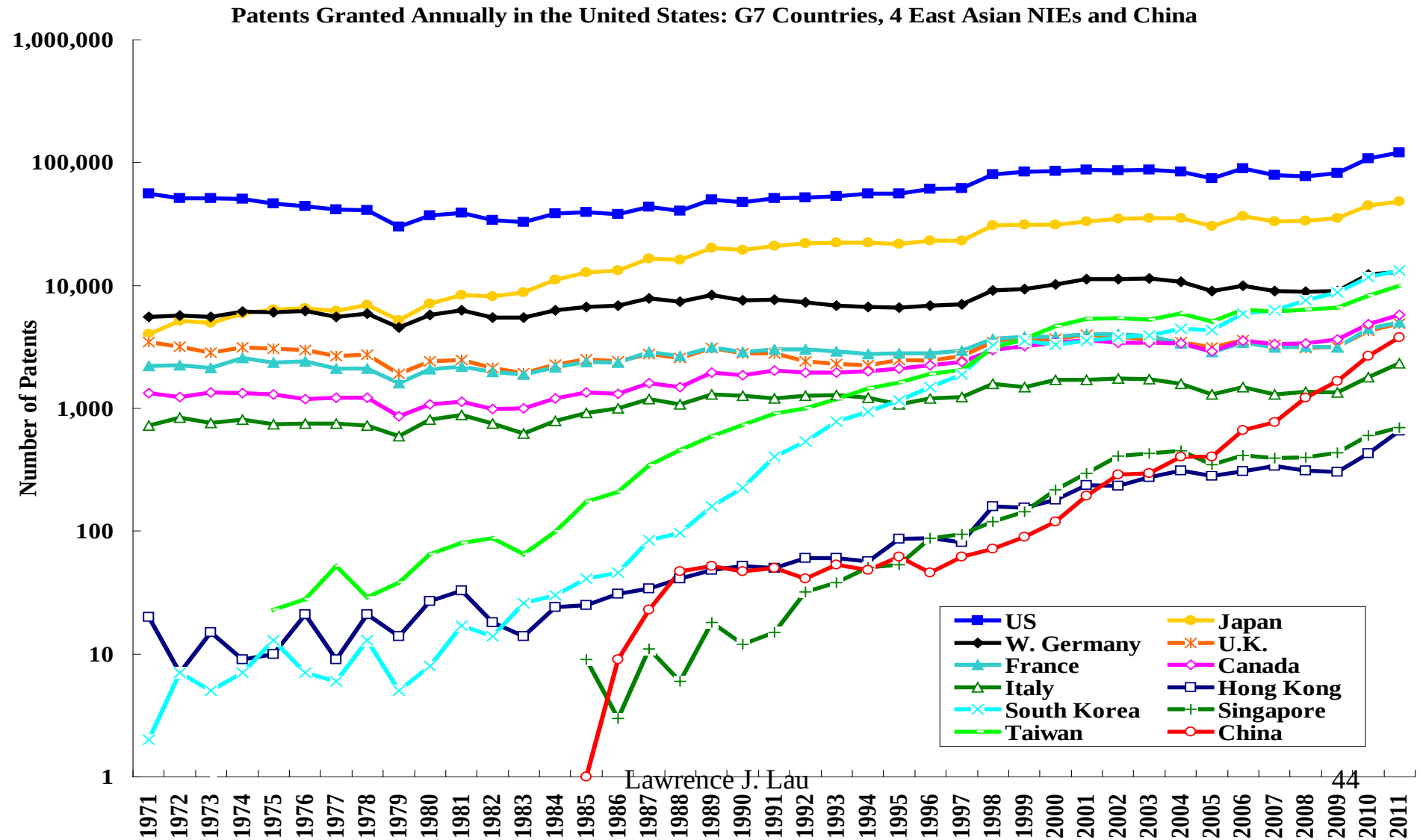
Intangible Capital-Driven Growth

- 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 more than 120,000 patents granted in 2011, followed by Japan, with approximately 48,000. (Since these are patents granted in the U.S., the U.S. may have a home advantage; however, for all the other countries, the comparison across them should be fair.)

Intangible Capital-Driven Growth

- The number of U.S. patents granted to Taiwan applicants has been averaging close to 10,000 each year lately (9,907 in 2011). Taiwan is now behind only the U.S., Japan, Germany and South Korea in terms of U.S. patents granted each year and is ahead of Canada, France, Italy and the U.K.
- By comparison, Mainland China was granted only 3,786 U.S. patents in 2011.

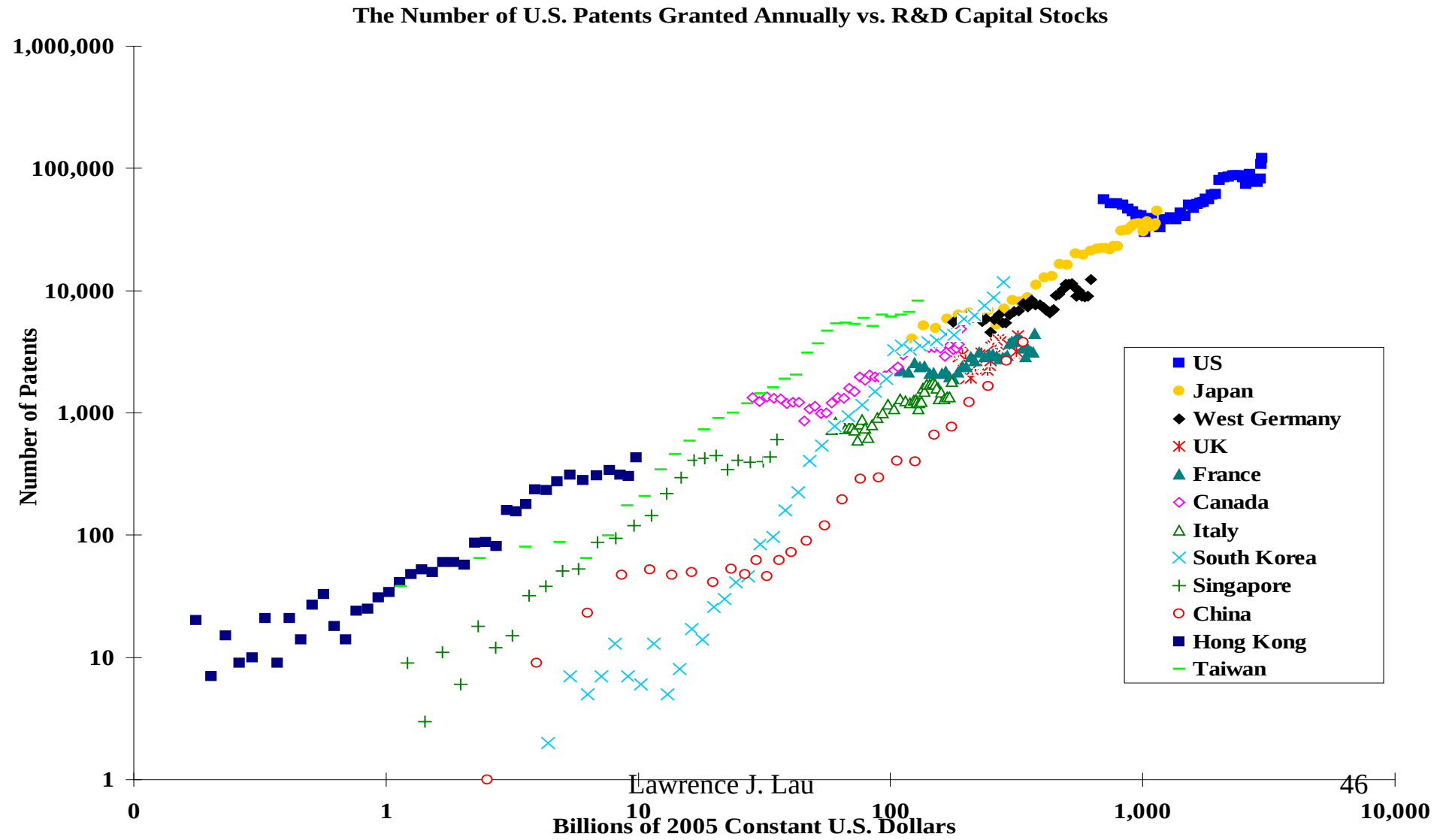
Patents Granted in the United States: G-7 Countries, 4 East Asian NIEs & China



Intangible Capital-Driven Growth

- 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 number of patents granted is plotted against the R&D capital stock for each country and each year).
- Taiwan's R&D capital lags behind all other economies except Hong Kong and Singapore. However, Taiwan's efficiency in the generation of patents in the U.S. leads those of other economies in terms of the number of U.S. patents granted for given levels of the stock of R&D capital.

Patents Granted in the United States and R&D Capital Stocks, Selected Economies



Intangible Capital-Driven Growth

- Taiwan's success in shifting from tangible-capital driven economic growth to intangible-capital driven economic growth is due to the abundance of human capital (from the immigration in 1949 and the almost 100% college enrolment rate), the investment in R&D capital, the strict protection of intellectual property rights, and the close relationship with the high-technology industry in the U.S. and in the Silicon Valley in particular.

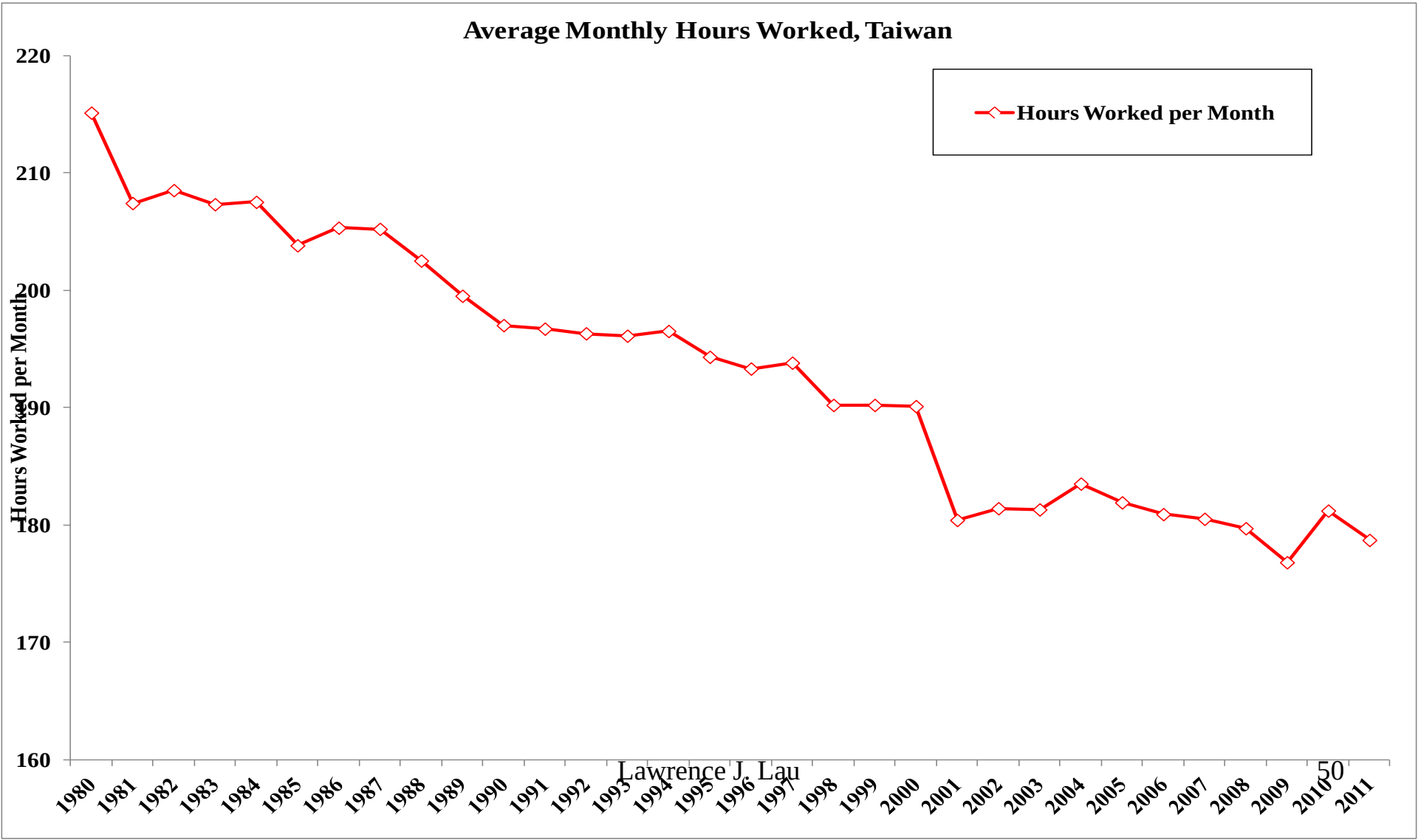
The Value of Leisure and Public Goods

- The value of voluntary leisure is not recognised in national income accounts. Similarly, the value of public goods is normally not recognised or not fully recognised in national income accounts.
- The measurement of GDP should be modified by pricing the increase in individual voluntary leisure and in the improvement in the quality of life (green GDP) appropriately. With such modifications, the value of measured GDP should be higher than otherwise.

The Value of Leisure and Public Goods

- In Taiwan, the average monthly number of hours worked has been declining continuously (see the following Chart). Since 1980, the number of hours worked has declined by almost 40 hours a month to just below 180, or more than 20 percent. If these increased hours of leisure are valued at the standard hourly earnings, it should boost real GDP thus measured by 20 percent times the labour share of GDP, which is approximately two-thirds, or a total of approximately 14 percent between 1980 and 2011. This amounts to an increase of almost half a percentage point per annum in the measured rate of growth of real GDP.

Average Monthly Hours Worked, Taiwan



The Value of Leisure and Public Goods

- Moreover, such voluntary leisure should be included in a measure of real consumption as well. Real consumption and real consumption per capita are therefore likely to have experienced much higher rates of growth if the imputed value of voluntary leisure is also included.
- The expectation is that the quantity of voluntary leisure (or voluntary unemployment) is likely to increase in the future. Any measures of real GDP and real consumption that fail to take this into account underestimate the improvement in aggregate social welfare.

The Value of Leisure and Public Goods

- In addition, Taiwan has also already taken a major step in developing a set of "Green National Income Accounts“.
- It may also be necessary to take into account the depletion of natural resources. At the same time, it should also be recognised that pure appreciation of assets such as unimproved land is not value-added and hence should not be included in GDP.

The Value of Leisure and Public Goods

- Public goods have two important characteristics—first, the provision of public goods is subject to significant economies of scale: once provided, the marginal cost of an additional individual enjoying the public good is low or zero; second, public goods are often provided free (marginal cost is zero) or not fully priced to reflect the external benefits. Thus, traditional measurements of GDP may not recognise the full social value-added of the provision of public goods, for example, a mass-transit system may contribute to aggregate social welfare positively by reducing pollution and congestion and saving time but may be making a net loss in monetary terms.

The Value of Leisure and Public Goods

- Thus, a slowdown in the rate of growth of GDP as traditionally measured does not necessarily imply that aggregate welfare is no longer increasing or increasing as fast.

What Does the Future Hold?
Trends of the Future

- Rising degree of globalisation and economic integration;
- Increases in automation and use of robots in manufacturing and services;
- Increases in life expectancy and decreases in birth rate;
- Rising inequality in income distribution (resulting from globalisation as well as advances in information and communication technology);
- The continuing rapid growth of the Mainland and Asia ex Japan, the stagnation in Europe and the slow recovery of the United States.

The Opportunities and Challenges for Taiwan

- At this time, Taiwan has the advantage of its intangible capital. We have already discussed the importance of R&D capital. However, Taiwan also has a significant lead in reputational capital (also known as goodwill). It should capitalise on it to build a lead especially in retail services on the Mainland (and elsewhere), taking advantage of the Economic Cooperation Framework Agreement (ECFA).
- Taiwan firms such as Kang Shifu, Wang Wang, Tianfu and Giant have been extraordinarily successful in building their brands in Mainland China, capturing large market shares. Other Taiwan firms, especially those with their own technologies, should be able to do the same.

The Opportunities and Challenges for Taiwan

- However, brand-building is a pre-requisite for Taiwan firms to take advantage of the huge Mainland market. It is true that brand-building requires resources, but it also enables the owners of brand names to have much more pricing power and higher profit margins than enterprises that do only OEM (original equipment manufacturing) business.

The Opportunities and Challenges for Taiwan

- The huge potential Mainland market of 1.34 billion consumers not only enables the realisation of economies of scale but also greatly enhances the productivity of intangible capital (e.g., R&D capital, goodwill). The fixed research and development costs of a new product or process can be easily amortised over a large market. The benefits of investment in goodwill, e.g., brand-building, are also much greater in a large market.
- Active participation in the huge potential Mainland market by Taiwan firms also enables them to take part in the setting of product and technology standards, for example, fourth-generation (4-G) standards for telecommunication, and share the benefits of such standard-setting.

The Opportunities and Challenges for Taiwan

- The advances in information and communication technology and globalisation have also meant that all jobs that can be moved away to a lower-cost location will be moved away. This has happened to the U.S., Japan, Hong Kong and even the Mainland. Taiwan is no exception.
- Tourism generates job opportunities for the unskilled and low-skilled. These visitors generate demands for hotels, restaurants, retail, and transportation and through these demands create many job opportunities that cannot be moved away. Hong Kong has been a major beneficiary of the "Individual Visit Scheme" for tourists from the Mainland. Taiwan can do the same.
- Non-local students at the tertiary level can also be a major source of revenue and jobs (as, for example, in Massachusetts).

The Opportunities and Challenges for Taiwan

- There is some concern about the over-dependence of the Taiwan economy on the Mainland. The key is to make the relationship inter-dependent. As long as there is continuing innovation in the Taiwan firms, for example, through continued investment in R&D, the dependence is mutual--while the market is on the Mainland, the technology is from Taiwan. It is only when innovation stops that the dependence turns into one-way.

Concluding Remarks

- This is the time for the Taiwan Government to launch some major public infrastructure projects, financing them through the sale of shares in companies like TSMC that are held by the Government.
- Examples of such projects can include a high-speed rail link between Kaohsiung and Pingtung, or between Taipei and Hualien, which will help to integrate the economy of Taiwan. By using the shares to finance these projects, the Government can avoid enlarging the deficit of the recurrent budget.
- Major public infrastructural projects can change expectations about the future of the economy and hence encourage investment and consumption.

Concluding Remarks

- Taiwan's direct investment on the Mainland in the 1990s was critical to the initial success of the Mainland's economic reform and opening to the World.
- The European and U.S. economies will be recovering very slowly so that Taiwan will need to look to elsewhere for sources of export demand. The Mainland can provide some help through increased imports from Taiwan, increased tourists to Taiwan, and increased investment from both state-owned and non-state-owned enterprises from the Mainland to Taiwan.

Concluding Remarks

- What would benefit Taiwan the most would be "green field" investments as opposed to the purchase of existing assets by Mainland or other entities. This is because the former creates new aggregate demand and would increase employment whereas the latter only benefits the owners of the existing assets. This can justify a policy of encouraging greenfield investments from the Mainland to Taiwan.