

ECONOMIC THEORY, APPLICATIONS AND ISSUES

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Transition in Relation to Globalisation:
From Isolation to Centre-Stage?**

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CHINA'S ECONOMIC PERFORMANCE AND TRANSITION IN RELATION TO GLOBALISATION: FROM ISOLATION TO CENTRE-STAGE?

Abstract

This paper considers China's global economic situation in relation to the general process of globalisation. After discussing the general process of economic globalisation, it examines political change and transition of the former communist planned economies, especially China's, and their impact on globalisation. Then it provides measures of the recent expansion of economic globalisation and China's involvement in this process. Positive and negative socioeconomic impacts of globalisation are highlighted. China's progress in catching up with more developed economies and the dynamics of its economic growth and future prospects for this growth are examined in a global context. The question is posed of whether globalisation is likely to result in unsustainable economic growth because of adverse environmental impacts generated by it. It is argued that this is so and that fears about this will eventually result in increasing global political pressure on China to curb its global environmental impacts and reduce its natural resource use as its economy becomes large. With China's continuing economic growth, its ecological footprint will become heavier.

CHINA'S ECONOMIC PERFORMANCE AND TRANSITION IN RELATION TO GLOBALISATION: FROM ISOLATION TO CENTRE-STAGE?

1. Introduction

The process of economic globalisation has accelerated since the early 1970s. China has played a major and increasing role in maintaining the momentum of economic globalisation as a result of its open-door policies and its continuing economic reforms instigated by Deng Xiaoping. Consequently, China has become an engine for global economic growth, and a key player in the world economy. As its economy continues to grow, it can be expected to strengthen its position as a global economic powerhouse and to consolidate its status as a world political power. While these trends in China's growth can be expected to continue for much time to come, it seems unrealistic to expect them to continue forever. Eventually, the Chinese economy might be expected to catch up with the higher income economies and experience relatively slower economic growth. Whether or not another nation will eventually replace China's leadership in international economic growth, and when, is uncertain.

It is useful to consider China's global economic situation in relation to the general process of globalisation. This paper provides background on the process of economic globalisation and considers its potential social and environmental consequences, both positive and negative, as well as China's position in this process.

2. What is economic globalisation? What factors have favoured it in recent decades?

Economic globalisation involves the geographical extension of economic exchange and economic interdependence beyond national borders in a way that involves all countries (for more discussion, see Tisdell and Sen, 2004). In the present economic climate, this is mostly achieved by the geographical extension of markets to encompass all parts of the globe. At the same time, as markets have been extended internationally, the type of international transactions that can be made have widened. For example, not only has international trade in physical commodities risen greatly but so has global exchange in services, in intellectual knowledge, in capital and in finance.

Many factors have helped to foster this process. They include

- (1) Reduced man-made barriers to international trade resulting from the efforts of bodies such as the WTO, e.g., reduced tariff barriers, elimination of import quotas
- (2) Reduced natural or physical barriers to international trade due to technological progress in the transport industry
- (3) Improved communication and reduced communication costs as a result of technical progress in the telecommunication industry, e.g., electronic mail and teleconferencing
- (4) Improved institutional arrangements within nations to facilitate business, such as harmonization of property rights via legal reforms and greater acceptance of international legal conventions, such as those governing intellectual property rights.

All these factors have reduced the transaction costs involved in doing international business. They have also made it easier to arrange exchanges at a distance; they have reduced the need for buyers and sellers to meet physically to arrange economic exchanges. To a large extent, technological progress in the service industries has helped to propel the expansion of globalisation in recent decades.

3. Is economic globalisation a new phenomenon?

The process of extending the geographical distances over which commodities are exchanged and of increasing the range of commodities involved in such exchange has an ancient history. However, in the modern era, it has reached unprecedented levels, and involves all inhabited areas of the world.

For thousands of years, international trade has taken place in the Mediterranean Sea. Furthermore, the Vikings engaged in considerable international trade. Florence and Venice in Italy achieved their splendour and major cultural achievements as a result of trade involving China via the Silk Route. It seems likely that the wealth of the Tang Dynasty was enhanced by international trade and commercial exchange over considerable distances. Similarly, almost 2,400 years ago, the Mauryan Empire in India was well aware of the economic importance of commerce and international trade and Kautilya (1961), in his treatise on politics, statescraft and the science of wealth, *Arthashastra* (one of the earliest known books on political economy, written about 2,300 years ago), gave considerable attention to international trade. In northern Europe during the Middle Ages, the Hanseatic towns belonging to the Hanseatic League, which depended on international trade for their prosperity, became rich and became centres of cultural creativity. Similar examples can be found in

Africa and in the early Americas, e.g., Inca and Maya civilisations. Although the Australian Aborigines never achieved the wealth of these civilisations, it is known that they traded in some valuable commodities involving exchange over many thousands of kilometres. However, none of this early trade was truly global.

Global trade was eventually made possible by the European voyages of discovery beginning around the 1500s with Christopher Columbus and Vasco da Gama. The former opened the way to the Americas and the latter, after rounding the Cape of Good Hope, opened the sea route to Asia from Europe. Their discoveries ushered in a period of expanding economic globalisation based on imperialism. This was a pattern that persisted into the 20th century but began to unravel after World War II, although the system persisted in the Soviet Union until the end of the 1980s.

After World War II, it is claimed that the United States was keen not to allow imperial international trading and trade preference schemes of the European powers to be re-established and favoured multilateral free trade to foster its own economic interests (Svizzero et al., 2004). But soon new trading blocs began to emerge in Europe which eventually culminated in the European Union. The United States to some extent countered this development by setting up NAFTA, the North American Free Trade Association. While progress in globalisation has been made via greater free trade (multilateralism), significant expansion in international trade has also occurred in recent years via the formation of larger international trade blocs. Whether such blocs will eventually facilitate greater free trade globally or become political obstacles to it remains to be seen (Svizzero et al., 2004).

4. Political change and transition of former communist planned systems, especially China's, and their impact on globalisation

As mentioned above, both increased multilateralism and the creation of new and enlarged trading blocs have contributed to growing international economic transactions. A further influence has been political changes in countries previously pursuing communist economic systems which were based on economic planning along the lines of the former Soviet Union. These countries have become market-oriented, much more decentralised, and many have altered their political and international trading affiliations. In some cases, their borders have changed. It is only possible to sketch briefly some of the changes here and some of their consequences for international economic transactions.

For example, the Council for Mutual Economic Assistance (Comecon) was a Communist association for international exchange started in 1949 and disbanded in 1991 (Brine, 1992, pp. xi-xiv). The headquarters of the organisation was in Moscow and it consisted principally of Eastern European Communist states and the Soviet Union. Full members at the end of the 1980s were the Soviet Union, Bulgaria, Czechoslovakia, the German Democratic Republic (East Germany), Hungary, Romania, Poland, Cuba, the Mongolian People's Republic and Vietnam (Brine, 1992, p. xi). It might be noted that China was not a member but that Vietnam, which had hostile relationship with China, was.

It has been argued that Comecon was not very effective in fostering multilateral trade between its members. The following quotation from Wikipedia (2006, p. 2) underlines this point:

Asymmetries of size and differences in levels of development among Comecon members deeply affected the institutional character and evolution of the organisation. The overwhelming dominance of the Soviet economy necessarily meant that the bulk of intra-Comecon relations took the form of bilateral relations between the Soviet Union and the smaller members of Comecon.

The planned nature of the members' economies and the lack of effective market-price mechanisms to facilitate integration further hindered progress toward Comecon goals. Without the automatic workings of market forces, progress had to depend upon conscious acts of policy. This tended to politicise the processes of integration to a greater degree than was the case in market economies.

The existence of Comecon also impeded economic exchange by its member states with non-communist countries. Furthermore, the technological gap that became quite large between Comecon member states and the West was an additional barrier to expanding East-West trade. With the collapse of Communist governments in Eastern Europe in 1989 and eventually of Comecon in 1991, the scene was set for an expansion of multilateral trade between the former Comecon members and the West. The expansion of the international exchange of the former Comecon states would, however, depend on the speed and nature of their transition to market

economies. Transition was far from instantaneous, and in some respects is still incomplete. Initially, the former Comecon states were unable to make a substantial contribution to expanding world trade.

Not only did Comecon's administrative and political arrangements for exchange between member states impede their actual gains from international exchange, but the eventual souring of political relationships between the USSR and China became a significant impediment to international exchange within the communist bloc. This had adverse economic consequences for the whole communist bloc.

In the 1950s, the People's Republic of China enjoyed cordial political relationships with the USSR and Sino-USSR trade and international exchange between the USSR and China flourished. Suddenly in 1960, Sino-USSR trade plummeted and economic cooperation between the USSR and China ceased. "In 1960, [the] USSR tore up 12 agreements [with China], recalled all the experts in China, stopped 257 technological cooperation items, refused to supply mineral resources like cobalt and nickel that China needed urgently and greatly decreased the export of machinery and important accessories. All these brought great destruction to the economy of China" (Anon, 2006, p. 2). There was virtually no economic cooperation and little trade between China and the USSR in the 1960s and 1970s. After the early 1980s some increase in China's trade with the USSR occurred but it accounted for a very small proportion of China's international trade (less than 5%) whereas in the 1960s it accounted for around 50% of China's international trade.

Eventually, China's political disagreement with the Soviet Union and its economic isolation from the USSR would prove to be an economic blessing in disguise for China. Given the dire economic consequences of such economic isolation, China made a determined effort to establish friendly relationships with the West. In February 1972, Richard Nixon, the US President, visited China, and the Shanghai Communique was issued as the basis for the development of China-US friendship. This was an important first step in the opening up of China to the outside world. However, it was not until after Deng Xiaoping became paramount leader in 1977 that major progress could be made in reforming China's economic system and in pursuing an open door policy. The stage for these new policies were set when the Third Plenum of the Chinese Government Party in 1978 declared that in order to achieve economic

development, [economic] reform and an open door policy should be followed by China (see, for example, Shawki, 1997).

By 1979, China had started on its gradual (but not so slow) process of economic reform. It, therefore, had a headstart of over a decade in its economic transformation compared to Comecon member states. It was able to move away early from centralised planning models inherited from the Soviet Union with their excessive emphasis on heavy industries and so on (Tisdell, 1993, Ch. 8). As a result, China has become a major participant in the world economy in recent times. The next section outlines trends in economic globalisation in recent times and compares these with measures of China's increasing openness and participation in the world economy.

5. Measuring the recent pace of economic globalisation and China's involvement

There are many different possible indicators of expansion in globalisation. Because the process is multidimensional, no single measure adequately captures its extent. It must be considered from many different points of view.

One indicator of the extent of economic globalisation is the proportion of global GDP traded internationally. This is graphed in Figure 1. This has been trending upwards since the 1950s, but after the 1970s showed dramatic acceleration. After World War II, many nations developed inward-looking economic policies but more and more nations began to depart from these policies beginning in the 1970s. However, it is interesting to note that even when inward-looking policies were the vogue, the trend in international trade as a percentage of global GDP was upwards.

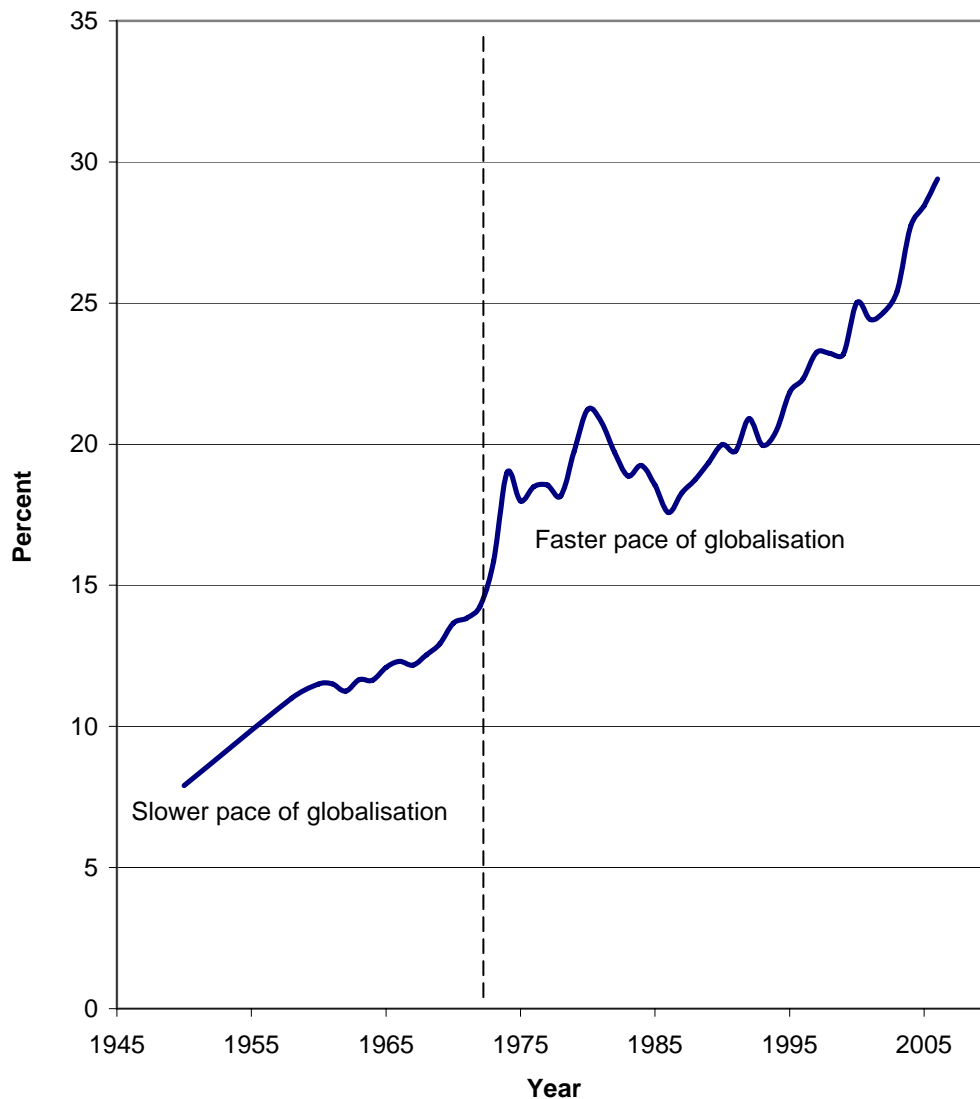


Figure 1 World Exports as a Percentage of Global GDP, 1950 – 2006

Sources: World Bank, 2006, World Development Indicators, available online at: <http://devdata.worldbank.org/dataonline/> (for 1960 – 2004); IMF World Economic Outlook Database, April 2006, available online at: <http://www.imf.org/external/pubs/ft/weo/2006/01/data/index.htm> (projections for 2005 and 2006); United Nations Statistical Yearbook 1970 (for 1958); Doha WTO Ministerial 2001 Briefing Notes (for 1950). Data are based on current US dollars.

Although inward-looking economic policies were the rule, the extent of economic globalisation still rose considerably in the 1950s, and continued to rise in the 1960s but more slowly. However, as Figure 1 illustrates, the pace and extent of globalisation increased decisively and significantly after the early 1970s, even though global exports fluctuated as a percentage of global GDP. The major upward trend in world exports, beginning in the early 1970s, is shown in Figure 2.

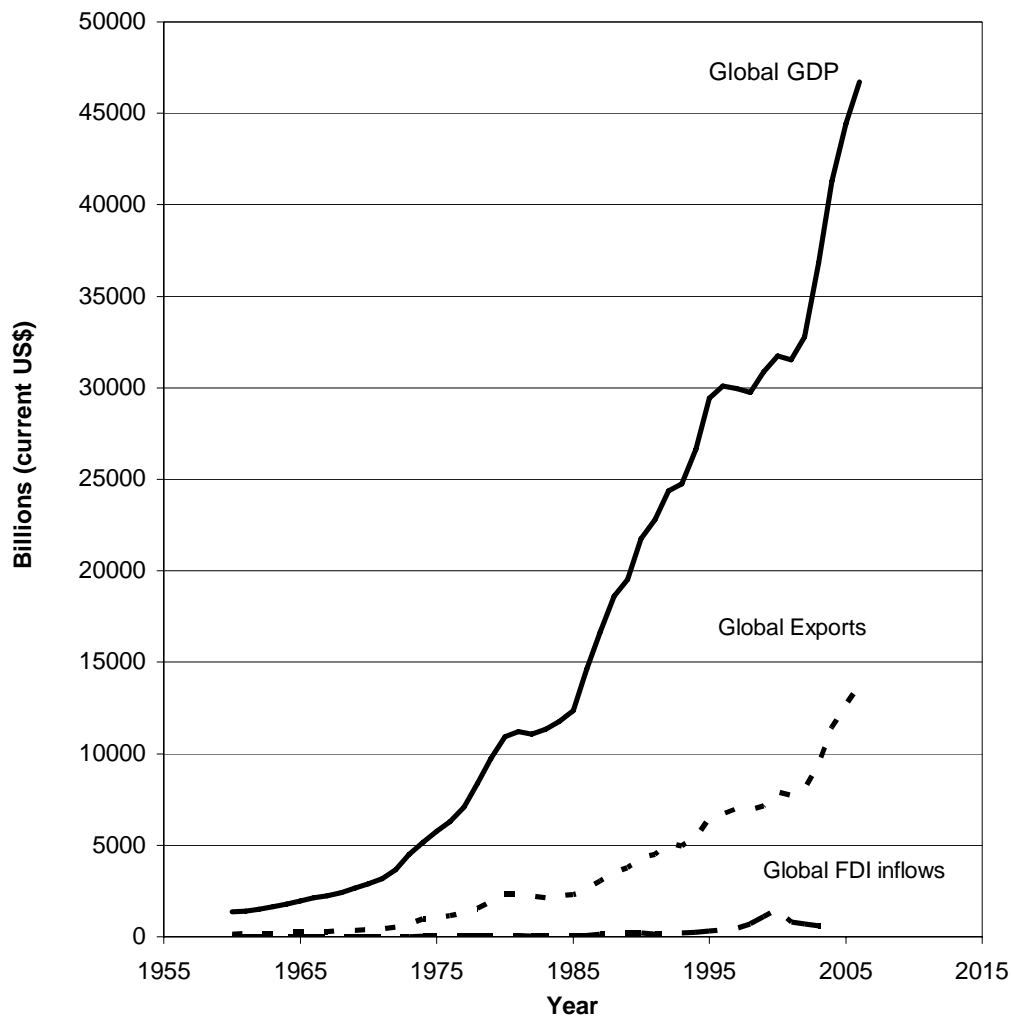


Figure 2 World Economic Indicators, 1960 – 2006*

Sources: For global GDP and global export -- World Bank, 2006, World Development Indicators, available online at: <http://devdata.worldbank.org/dataonline/> (for 1960 – 2004); IMF World Economic Outlook Database, April 2006, available online at: <http://www.imf.org/external/pubs/ft/weo/2006/01/data/index.htm> (projections for 2005 and 2006).

*For global FDI inflows, the data presented are from 1970 to 2004 -- World Bank, 2006, World Development Indicators, available online at: <http://devdata.worldbank.org/dataonline/>.

Policies on foreign direct investment began to be relaxed by many nations, including China, in the latter part of the 20th century. However, the process did not progress as quickly as international trade liberalisation. Nevertheless, from 1970 onwards there was a general tendency for global foreign direct investment inflow as a percentage of gross global domestic product to rise, with a spike occurring in 2000 (Figure 3). Despite the fall after 2000 in global FDI as a proportion of global GDP, there appears to have been a permanent rise in FDI inflows globally.

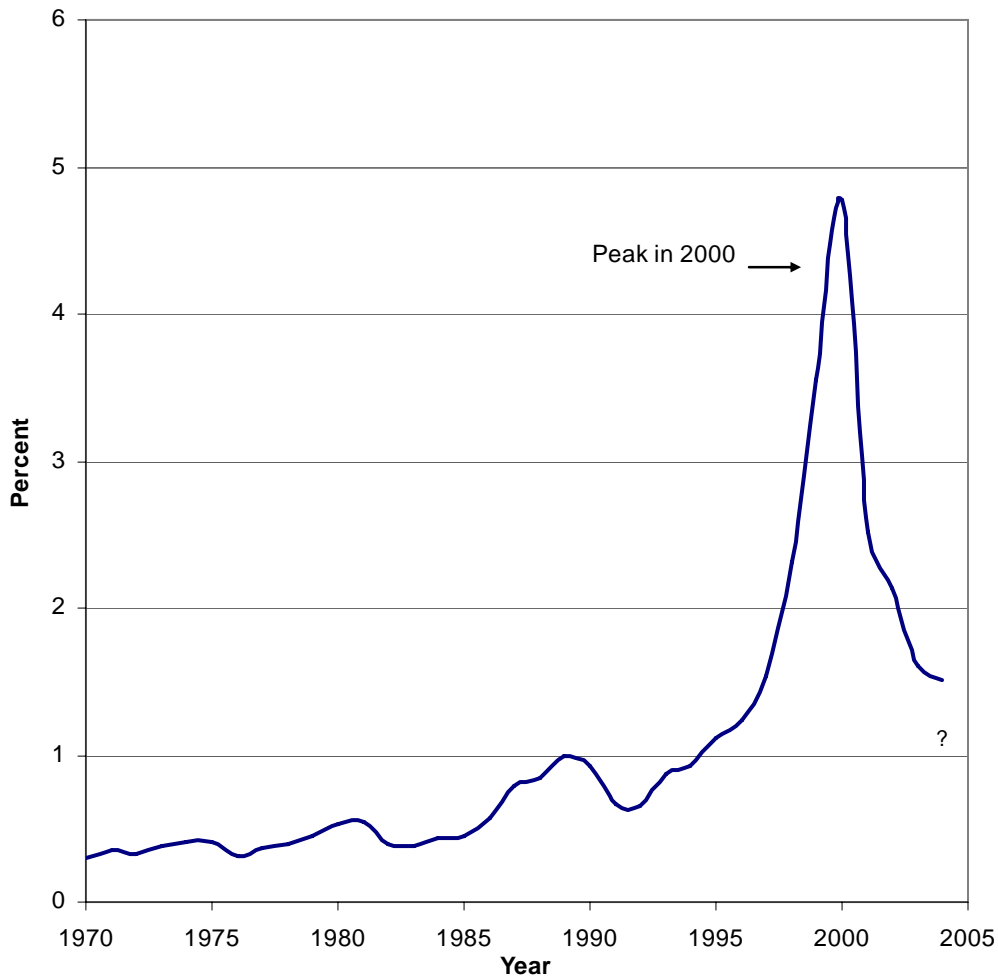


Figure 3 Global FDI Inflow as a Percentage of Global GDP, 1970 – 2004

Source: World Bank, 2006, World Development Indicators, online at: <http://devdata.worldbank.org/dataonline/>. Data are based on current US dollars.

Figure 4 shows China's exports as a percentage of her GDP. These display a massive increase following the commencement of China's economic reforms. Prior to China's economic reforms beginning in 1979, China's exports as a percentage of its GDP were of the order of 5% or less but by 2003 had reached almost 35% (Figure 4). Furthermore, from the late 1970s onwards, the value of China's exports in current US dollars accelerated as is illustrated in Figure 5.

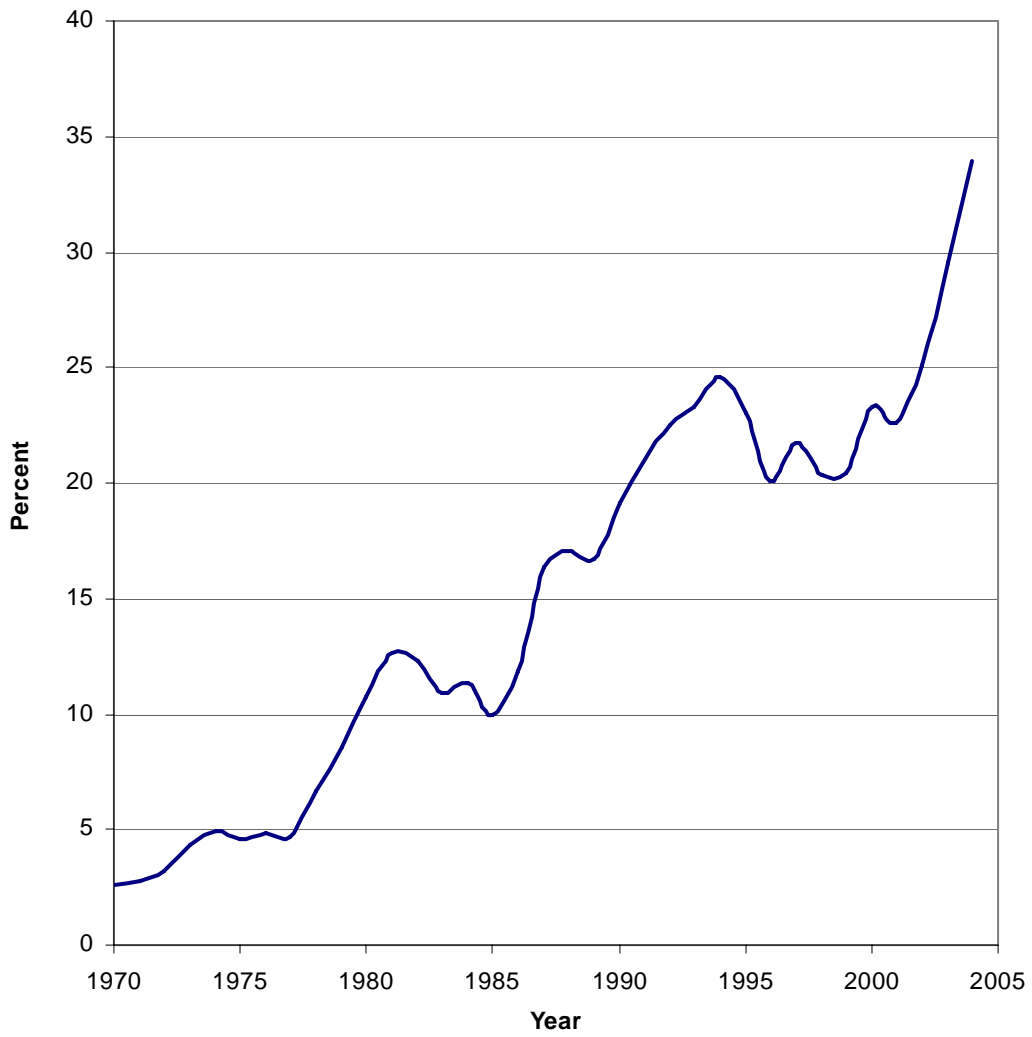


Figure 4 China's Exports as a Percentage of its GDP, 1970 – 2004

Source: As for Figure 3. Data are based on current US dollars.

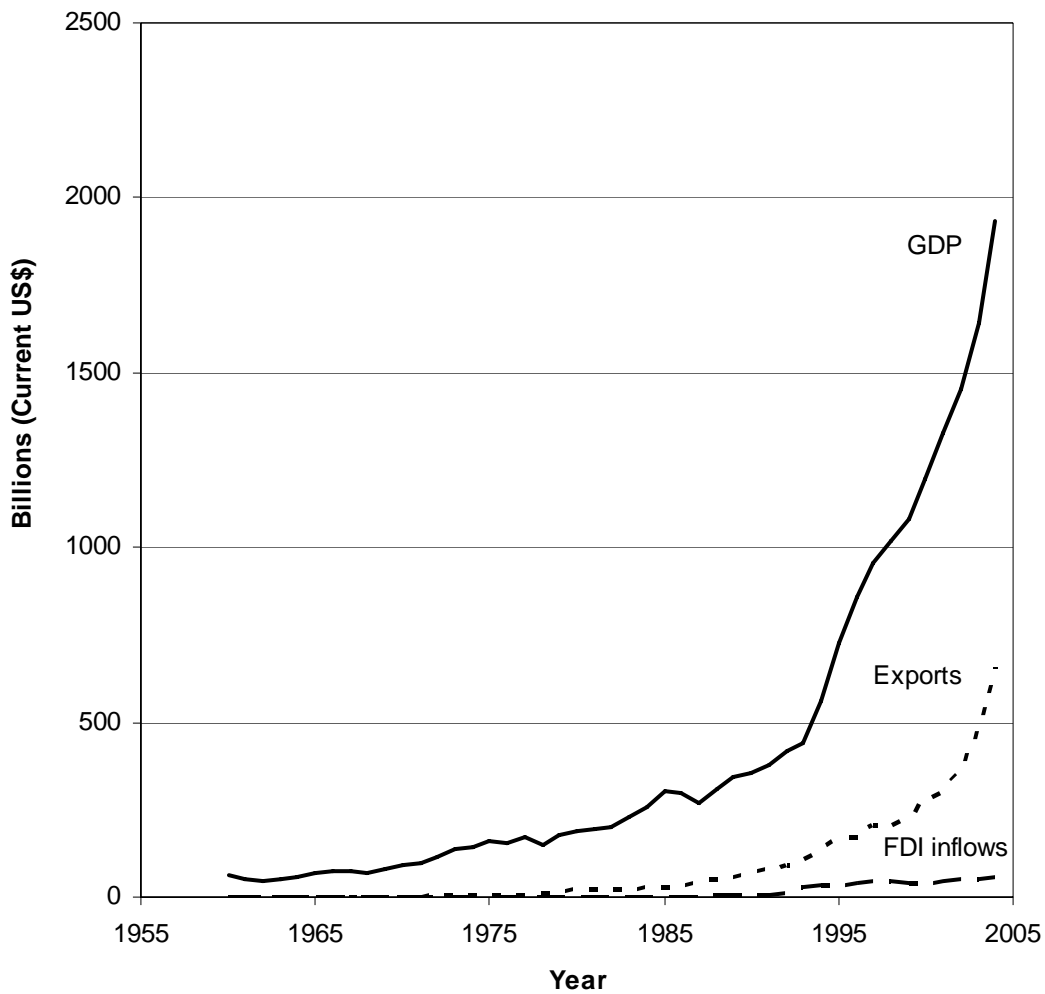


Figure 5 China's Aggregate Economic Indicators (GDP, Exports and FDI Inflows), 1960 - 2004

Source: As for Figure 3

Figure 6 compares China's export to GDP ratio with that for the world as a whole. It shows how this ratio has progressed from being below that for the world as a whole to exceeding it. It indicates that China has increasingly become an export-led economy. The year 1990 marks an important cross-over point for China.

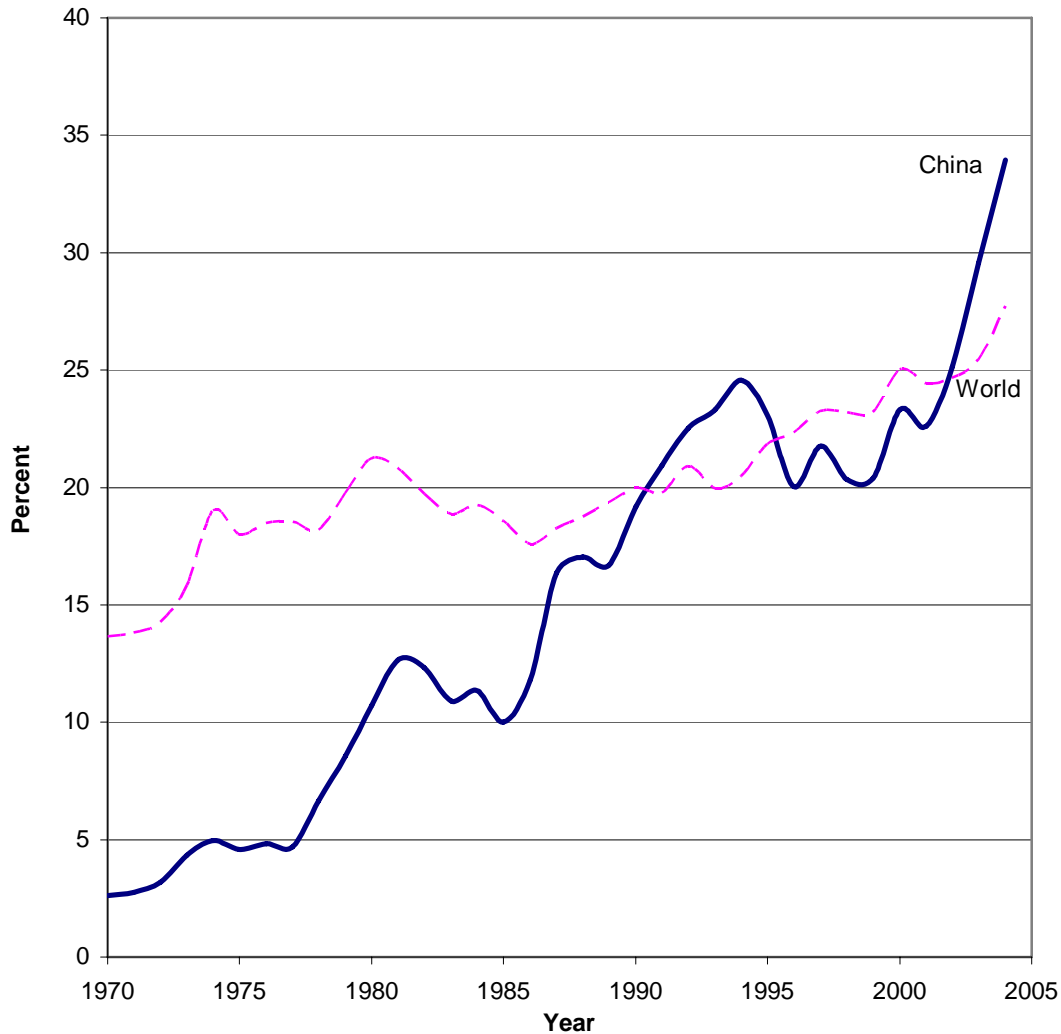


Figure 6 China's Exports as a Percentage of its GDP compared to Global Exports as a Percentage of Global GDP, 1970 – 2004

Source: As for Figure 3. Data are based on current US dollars.

Inflows of FDI to China, after beginning from negligible levels prior to 1979, began to grow. They have followed the pattern shown in Figure 7 as a proportion of China's GDP, and in US current dollars, the pattern illustrated in Figure 4. Note that the trend in FDI in China was almost stationary in the period 1989-1990. This was a result of social disturbances and pro-democracy demonstrations in China in April and May 1989 culminating in early June in the Tiananmen Square tragedy. These led to international uncertainty about the future political and economic direction of China. However, FDI in China increased markedly after 1990 (see Figure 8). Possibly this was a result of the assurance given by Deng Xiaoping that China's economic reforms would continue and because of the concrete steps taken in 1991 in this regard (Tisdell, 1993, p.12).

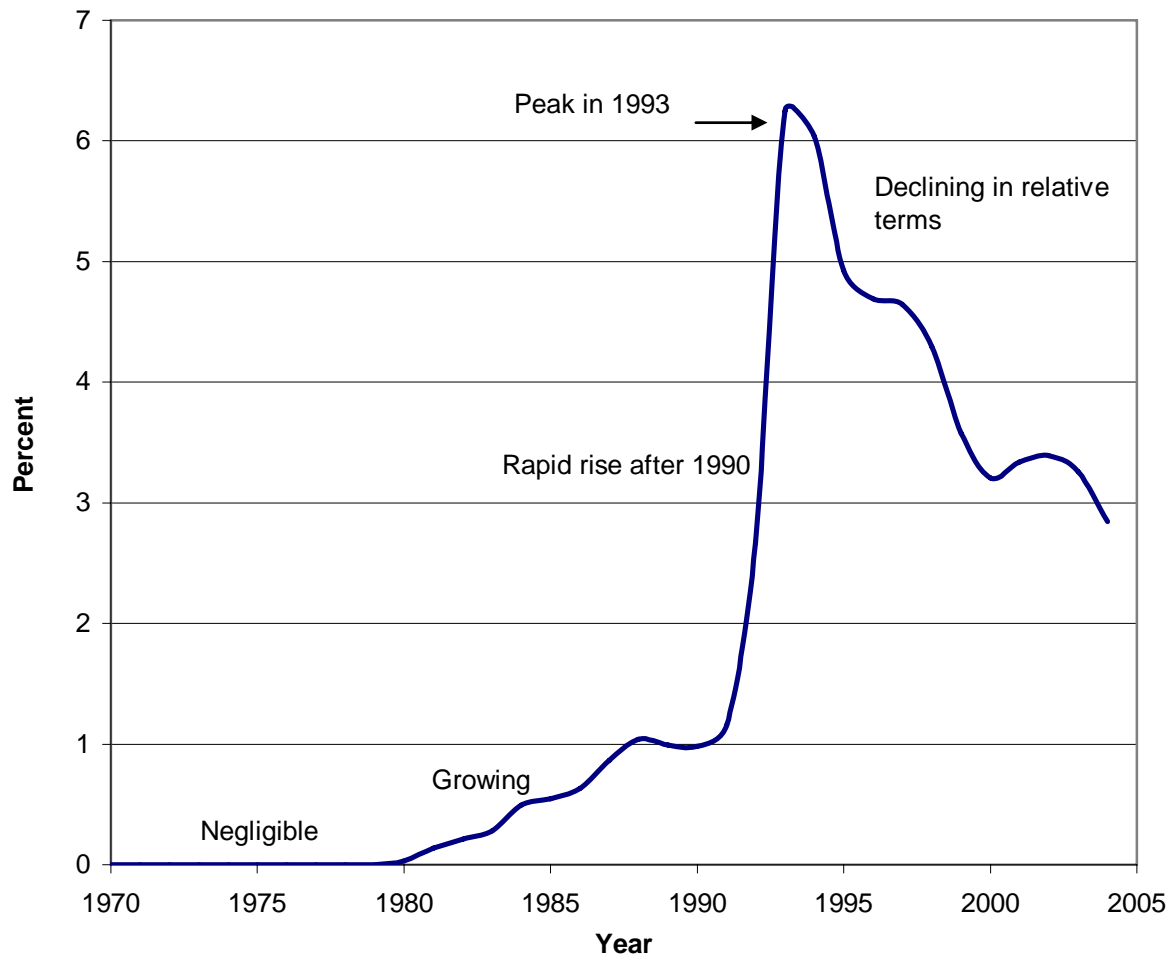


Figure 7 China's FDI Inflow as a Percentage of its GDP, 1970 – 2004

Source: As for Figure 3. Data are based on current US dollars.

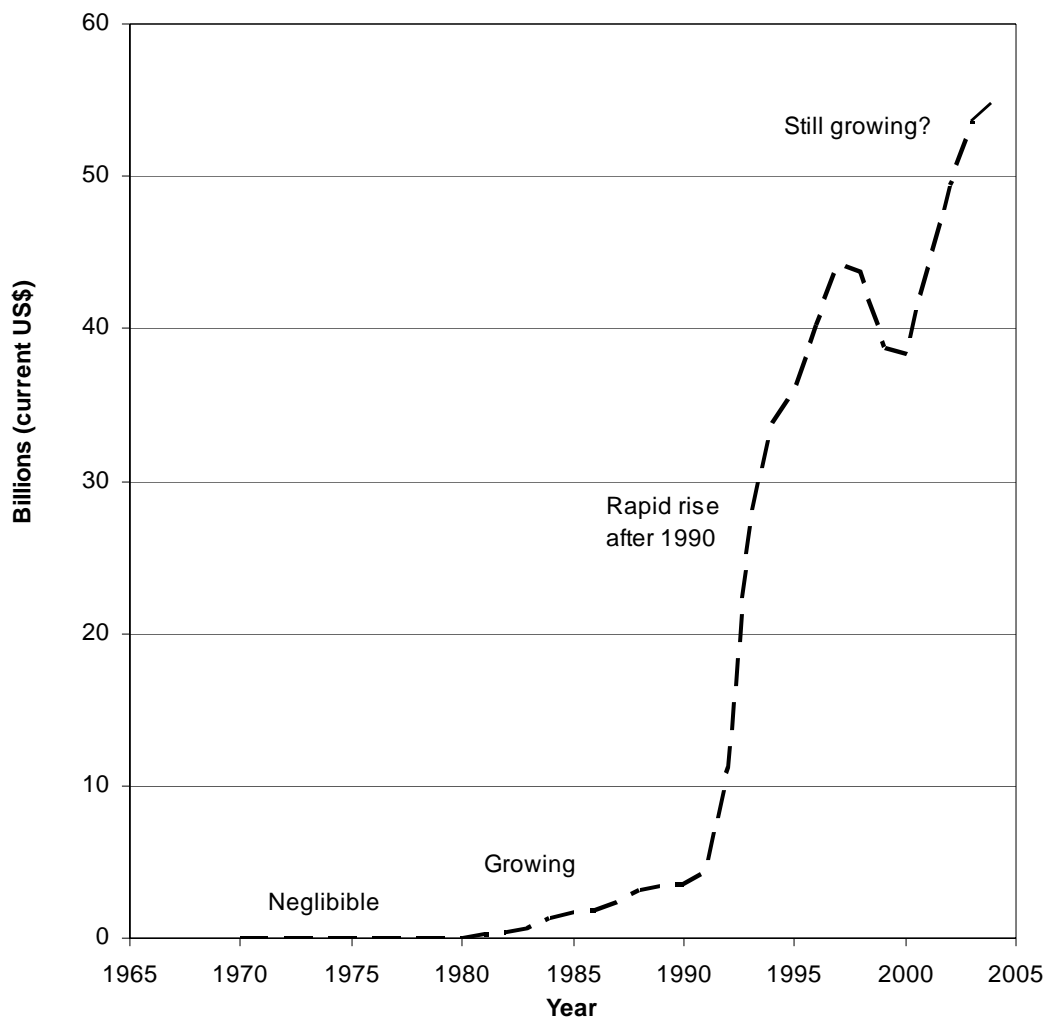


Figure 8 China's FDI Inflow, 1970 – 2004

Source: As for Figure 3

Figure 9 compares China's inflow of FDI as a percentage of its GDP with global FDI inflows as a percentage of global GDP. This percentage grew rapidly for China during the 1980s, and since 1984, has exceeded the global percentage in most years, the year 2000 being the exception. This is a further indication of China's increased economic openness and its incorporation into the global economy. It can also be deduced from Figure 9 that FDI inflows to China have also been much more sustained than in the rest of the world.

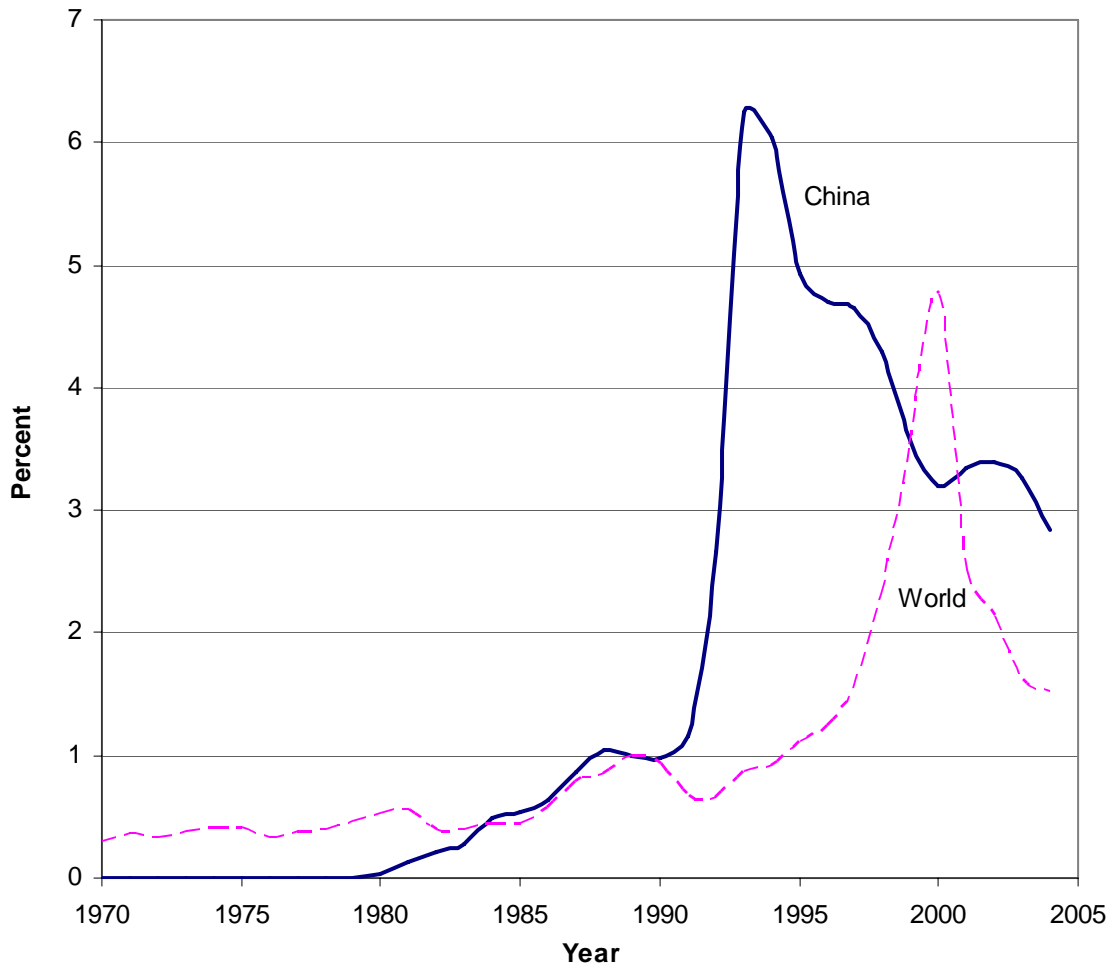


Figure 9 China's Inflow of FDI as a Percentage of its GDP compared to Global FDI Inflows as a Percentage of Global GDP, 1970 – 2004

Source: As for Figure 3. Data are based on current US dollars.

There has also been a massive increase in the amount of short-term international financial flows in recent times. These exceed by many times the amounts needed to finance international commerce. These movements are activated by large banks and financial institutions, and to some extent, are speculative. Other indicators of the pace of globalisation include the extent of growth in global telecommunications traffic (Tisdell, 2005a, p.9), the growth in international tourist arrivals as a proportion of the world's population (Tisdell, 2005b, p.427), and increased global media exposure (Tisdell, 2005a). All have accelerated in recent decades, even though terrorist activities have dampened international growth in tourism.

It should be observed that the extent to which different types of economic resources have been able to participate in the globalisation process is uneven. International population and

labour movements continue to be restricted but nevertheless considerable international movements of labour and population are occurring in response to economic disparities. While barriers to international movement of skilled labour are less substantial than for unskilled labour, large short-term movements of relatively unskilled labour can also be observed.

6. Positive and negative socioeconomic impacts of economic globalisation

Both Western classical economic theory (Adam Smith, 1913, 1st edn. 1776; Ricardo, 1817) and neoclassical economic theory have extolled the economic benefits of international free trade. Adam Smith supported it on the grounds that it would result in reduced production costs by promoting the increased division of labour. The increased division of labour could provide economies of scale in industrial production. David Ricardo argued that international trade would allow countries to specialise in production in accordance with their comparative advantage, thereby adding to their economic abundance. Neoclassical economists refined this theory. For example, the Heckscher-Ohlin theorem supported the proposition that nations are likely to have a comparative economic advantage in producing commodities that use most intensely their relatively most abundant factor of production. It was also shown that countries may gain from international trade even when none has a comparative advantage in production provided that the tastes of their citizens differ. However, the theory was based on static considerations rather than on dynamic analysis.

Schumpeter (1942) pointed out that static analysis does not capture the essence of contemporary corporate capitalism which is better modelled by taking into account dynamic forces motivating innovation in the economy. The dynamics of globalisation require account to be taken of foreign direct investment, technology transfer, R&D and innovation, and the economic motives of multinational enterprises. In the latter respect, neotechnology theories of international trade and investment are particularly relevant (Posner, 1961; Tisdell, 1981; pp.42-46). Companies which develop superior intellectual knowledge compared to others stand to gain considerably from the process of globalisation provided their knowledge can be legally (or otherwise, such as via secrecy) protected. Both they and countries which purchase their products, or host their subsidiaries, may gain economically from their activities.

To take a simple case, suppose a company develops a unique product for which it is able to obtain a patent and, as a result, secure a monopoly. Assume that there is sufficient demand in the home market (Market I) to make production of the commodity profitable. Its production

for the home market will benefit buyers and add to consumers' surplus at home, and yield a monopoly profit for the company. If this product can be profitably sold abroad, and possibly produced abroad, this will further add to company's profit, assuming that its intellectual property rights can be protected. Consumers abroad will also benefit from the sale of the product. So a win-win situation may occur. On the other hand, such processes in the absence of adequate institutional arrangements in peripheral countries can result in their increasing economic dependence on corporations in centre countries. To avoid this, a degree of economic and scientific self-reliance needs to be maintained by host countries.

The process of growing economic globalisation appears to stimulate economic growth in the short to medium term. If the Kuznets hypothesis about the relationship between economic development and the distribution of incomes being a reversed U-shape applies (Kuznets, 1963), one might expect that growing globalisation would be associated with reduced inequality of income, at least in more developed countries (Kuznets, 1963). However, in more developed countries growing globalisation has been associated with rising income inequality because the income of the skilled or better educated has risen relative to that of the less skilled or educated. In the United States, for example, income inequality after having fallen from the 1930s through to the 1960s has risen and its income inequality is reported to be as great in 1930s. The pattern that has emerged is like the reclining S-pattern shown in Figure 10 (Tisdell and Svizzero, 2004).

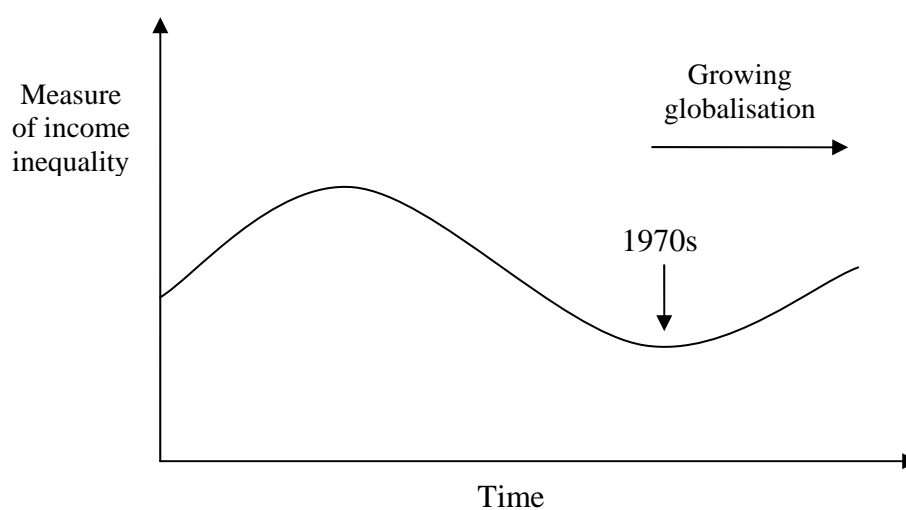


Figure 10 A Kuznets income distribution curve modified to reflect the recent experiences of more developed countries

It has also been observed (Costa, 1998) that while the income of skilled persons has risen relative to the less skilled in higher income countries such as the US, so have the hours of work of the skilled. Their higher income has been purchased to some extent by a reduction in their leisure time.

Several explanations have been advanced as to why income inequality has increased in recent decades, particularly between skilled and unskilled labourers. This increase in inequality came to be noticed in the late 1970s and has coincided with accelerating economic globalisation. One school of economic thought attributes it to the Stolper-Samuelson effect (Stolper and Samuelson, 1941). According to this point of view, freer world trade has made it easier for unskilled or low-skilled workers in less developed countries to compete through imports of labour-intensive products with their counterparts in more developed countries (Wood, 1998). Another school of thought argues that the root cause is rapid technological progress which has increased demand for skilled labour relative to unskilled labour or labour with little skill (Aghion and Williamson, 1998). To a considerable extent, new technologies have resulted in substituting capital for labour with little or no skill.

It is interesting to note that as early as 1977, Joan Robinson pointed out that technological progress could be a powerful force making for income inequality; it increases the demand for skilled workers relative to the unskilled. She states: “It is characteristic of modern industry to require highly trained personnel, while it has no use for the labor power of a great mass of unskilled workers” (Robinson, 1977, p. 1333). Svizzero and Tisdell (2002) have suggested that growing globalisation has stimulated non-neutral technological change which has increased demand for skilled labour relative to unskilled labour, and that growing income inequality has also been partly due to the operation of the Stolper-Samuelson effect as well as other factors associated with growing globalisation (Tisdell and Svizzero, 2005, pp. 235-238).

With growing globalisation, income inequality has risen in less developed countries (Ghosh, 2004) as well as higher income ones. It is, however, difficult to disentangle how much of this rising inequality is due to their being in the early phases of economic growth and how much should be attributed to the globalisation effect. Both effects may be present and may reinforce one another.

7. The catching-up phenomena and the evolutionary dynamics of economic growth

It has been suggested that the normal pattern of development of economies may follow a pattern like that of a logistic growth curve (Figure 11). Less developed countries that are experiencing economic take-off, such as China, are in the strong growth phase of it, developed or mature economies are in its slow growth phase, whereas stagnant less developed countries show little or no economic growth. Professor Lim Chong Yah (2005) has described the latter as turtle economies, the fast growing economies, such as China, as horse economies, and the mature economies, such as Japan and the US, as elephant economies.

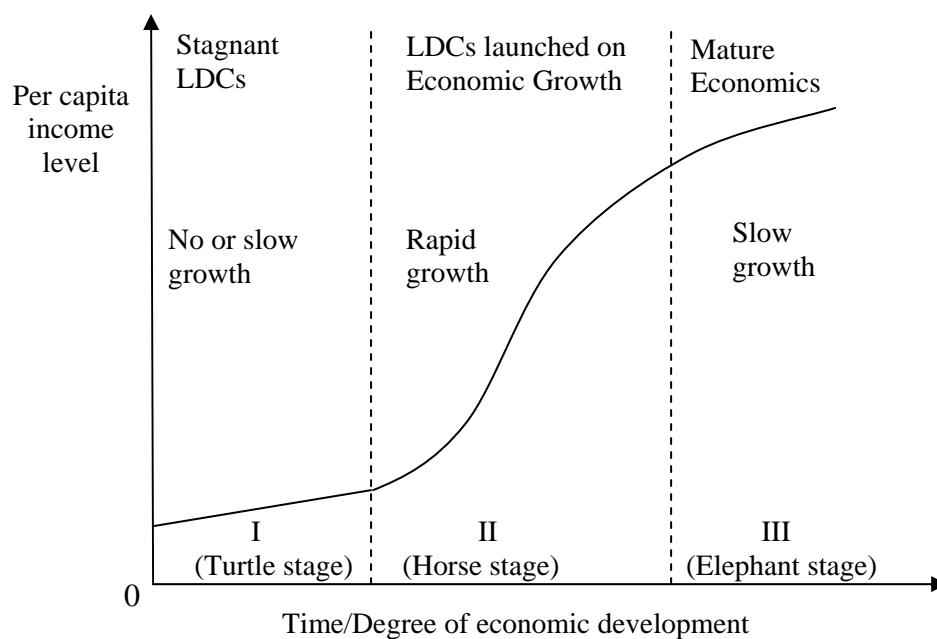


Figure 11 Possible stages in the economic growth of nations.

Not all LDCs are able to escape from economic stagnation but those that do enter a catching up phase (Phase II in Figure 11) in relation to more developed economies, largely adopt and imitate technologies developed in the mature economies, as, for example, Japan did, then Korea did, and as China is doing now. Their technology gap in the beginning is usually large but progressively narrows, and as such countries approach the global technology frontier, their rate of economic growth slows. Eventually they also become mature economies and their economic growth is then determined, to a large extent, by the global rate of technological progress.

This technology-driven view of LDCs launched on successful economic growth can be illustrated by Figure 12. There, *ABC* represents the global frontier of productivity determined by intellectual knowledge. A nation may follow the logistic type of curve shown by *DEB* in its catching up phase. At first, the economic growth of the nation is not so fast but it accelerates as the country assimilates foreign technologies, before decelerating as the nation approaches the global productivity frontier determined by global technological progress.

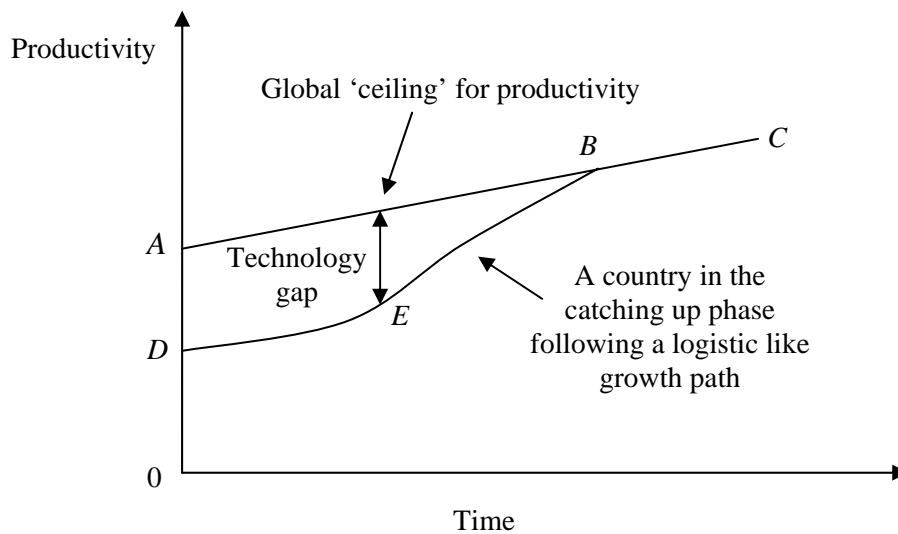


Figure 12 Possible growth path of a nation catching up with mature economies as a result of transfer of technologies in its opening up process. The difference between line *AB* and curve *DEB*, the productivity gap, reflects a technology gap

It is possible that China may catch up more quickly with the mature economies than did countries that began their catching up phase earlier, such as Japan. This may be due to globalisation technology transfer occurring at a faster rate than in previous times (Gao and Tisdell, 2005).

Economies in their catching up phase, especially if large or potentially so (such as the economies of China, of India and Russia), can add substantially to global economic growth and provide economic benefits to mature economies that otherwise might not be available. However, as the above theory suggests, the rapid economic growth of nations in a catching-up phase is unlikely to last forever. After nations currently catching up complete their catching up, will other LDCs also go through a similar phase, and if so, when? Will the whole global economy approach a mature phase? If so, will corporate capitalism in its mature phase

then fall into the type of economic stagnation and social deterioration envisaged by Schumpeter (1942)?

A major challenge for the former planned economies has been the reform of their science and technology systems. Although it was common in the West to attribute deficiencies in economic performances in the planned economies mostly to misallocation of resources as a result of centralised bureaucratic regulation of production, possibly a more serious problem was the failure of the system to stimulate technological progress and innovation adequately, particularly in relation to consumer goods. For example, it has been said that “in the 1970s, Comecon member states became aware of the technological gap between their economies and [those of] the West. They realised that there was a need for intensive rather than extensive growth” (Beata, 2004). Yet because to address the matter would require major institutional change these economies were unable to address the matter effectively until their Communist Planned system was dismantled.

China too had a centralised state-controlled research and development system when it embarked on its economic reforms in 1979. A feature of such a system was the separation of research bodies from production units. Research was driven by the desires of bureaucrats rather than those of users, buyers or consumers of commodities. It was not at all market-driven, and economic incentives for creating economically valuable inventions and for innovating were weak.

The above meant that when China embarked on its market reforms in 1979, its science and technology system was not designed to complement the use of the market system in guiding the availability of commodities. It was not until 1985 that China took the first steps to reform its science and technology system to make it more market-oriented (Gao and Tisdell, 2004). As discussed by Gao and Tisdell (2004), China confirmed in 1985 support for market-oriented reforms in science and technology systems as recommended by the State Science and Technology Commission. There were moves to treat research results as marketable commodities and the view became common that revenue received could be used to provide incentives for further research. The practical steps for this commercial transition in technology started in the mid-1980s and are still ongoing. The establishment of a unified, open technology market has been seen as a significant shift in China’s science and

technology system (World Bank, 1995), helping to break vertical and horizontal institutional barriers and accelerate technology transfer and diffusion (Gao and Tidell, 2004, p. 321).

In accordance with the philosophy of Deng Xiaoping, reforms to China's science and technology system have been carefully planned and paced. These reforms were intended to tailor China's science and technology system to its market system for commodities. Furthermore, the reforms would have undoubtedly facilitated China's transfer of technology from abroad by increasing its capacity to select the required technology and absorb it. In the future, as China draws nearer to the international technology frontier, its reformed science and technology system will become more important for generating inventions and new technologies in China and therefore, for its future pace of economic growth.

8. Could globalisation result in economic growth that is unsustainable because of adverse environmental impacts generated by it?

Economic growth is heavily dependent on the use of the environment and natural resources both as a source of raw materials, e.g., for producing energy, and as a sink for wastes from economic production and consumption. While technological progress is often resource-saving and frequently reduces wastes, total resource use has continued to rise with global economic growth (Tisdell, 1997). Natural resources are being converted into economic commodities at a growing rate and greenhouse gas emissions continue to rise. There is considerable scientific evidence that the latter is triggering climate change and may generate sea-level rises. There is speculation that changes in the natural environment caused by human economic activity will eventually undermine global economic prosperity.

This is the opposite scenario to that suggested by the environmental Kuznets curve. This type of Kuznets curve is hypothesised to be of a reverse U-shape; the intensity of environmental pollution/degradation is portrayed as first rising with the economic growth of a nation and then declining. The optimistic conclusion may be drawn that economic growth will eventually solve all environmental problems. However, the environmental Kuznets curve scenario is too simplistic and of doubtful validity when the natural environment is assessed from a global point of view, as is pointed out in Tisdell (2001).

Although greater economic globalisation may stimulate global economic growth in the short to medium term, such growth could be unsustainable in the long run for environmental

reasons. Joan Robinson in pointing out that economic growth may not be the solution to major economic problems also mentions that “the consumption of resources, including air to breathe, has evidently impoverished the world” (Robinson, 1977, p. 1336).

China has become a major world user of the globe’s natural resources and a large contributor to global pollution and environmental change. As China’s economy continues to grow, these effects will magnify. The self-interest of the West has helped foster China’s economic growth by FDI and trade. As time goes on, it will become more evident that China is a strong international competitor for the use of environmental and natural resources, and this may lead to conflict with other countries. Political pressure may, for example, mount on China to curb its emissions of greenhouse gases (which it is not presently required to do under the Kyoto Protocol) and China may come into conflict with other countries in securing its oil imports and international economic interests. China’s economic growth has not only enhanced its international political power but may increasingly require, or result in, the exercise of that power.

9. Concluding comments

Naturally, the further into the future we try to predict economic conditions, the more uncertain we must be about our outlook. This is particularly so when predictions are made about economic globalisation, its economic and social consequences, and the pattern of future global economic development. That is made even more difficult because the operation of natural biophysical systems and levels of economic activity are becoming increasingly interdependent. This means that the future development of the global economy cannot be predicted without taking into account the biophysical consequences of economic growth. It is unlikely that the global economy can continue growing as it has done in modern times without experiencing major biophysical crises. While China might have justifiably ignored such issues in the past, in its new and emerging global economic position it can no longer do so. It must be part of the solution to global problems.

China’s economic growth in recent decades as a result of its economic reforms and opening up to the outside world has been remarkable. A strong incentive for China’s opening up was to overcome its adversity cause by the Soviet Union’s decision in 1960 to abandon its economic co-operation with China, although this was not the only reason. The economic havoc cause by the Cultural Revolution played a part. As a result of its early adversity, China

started earlier than other planned Communist economies on its economic reforms. As a result, it has already secured itself a strong economic and political place globally.

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