

# **China's Rapid Growth and Development:**

## **An Historical and International Context**

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### **Introduction**

Openness to international trade and investment is an integral part of the Chinese reform process. Within a relatively short timeframe (1978-2009) China has profoundly transformed the way in which it has been engaged with the rest of the world.

The process of domestic marketisation, a key element of Chinese reform, has been significantly enhanced by engaging with the outside world through various forms of international exchange including trade, investment flows, technology transfer, spread of knowledge and human exchange.

China's integration has brought one-fifth of the global population into the world trading system, which has increased market potential and integration to an unprecedented level. This increased scale and depth of international specialisation propelled by the enlarged world market has offered new opportunities to boost world production, trade and consumption; with the potential of increasing the welfare of all the countries involved.

Chinese integration into the global economy has also forced a worldwide reallocation of economic activities. This has increased various kinds of friction in China's trading and political relations, as well as generating several globally significant (negative) externalities. These externalities include:

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- 1) increasing competition from China's low-cost production and the accompanying rising share of Chinese-made products which are provided to the world market;
- 2) China's role in causing the global economic imbalances;
- 3) rising commodity prices, including energy and minerals prices, caused largely by China's rapidly increasing demand for the resources to fuel its development; and
- 4) rising greenhouse emissions, resulting from the rapid pace of industrialisation and increasing standard of living in China.

The challenges these situations reveal are of huge global significance and are often further complicated due to the geopolitical considerations of many of China's major trading partners. Confronting them in a cooperative and constructive way is the only sensible way to move forward in order to prevent jeopardising world economic growth and prosperity. As pointed out by Findlay and O'Rourke (2007), '[I]n the longer run, the gradual rise of India and China to their natural roles as major economic and political superpowers was not only the best news for global human welfare in a generation, but promised to raise a variety of geopolitical challenges which as yet remain unpredictable' (p. 545).

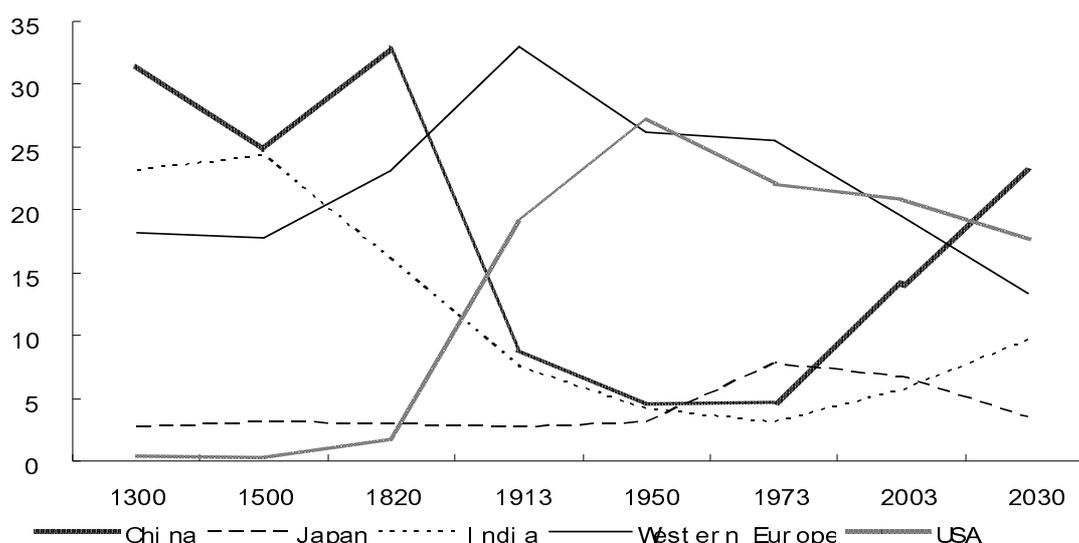
This paper discusses, from an historical perspective, the increasing importance of the Chinese economy in the global economy. It examines the emerging changes and issues in the global economic landscape, including fast growing trade and capital flows among countries and regions; the global imbalances; the increasing demand on global resources and climate change. It assesses how these emerging challenges could affect China's long-term growth and the role that China and its major trading partners can play in addressing various global issues unilaterally and multilaterally, and in global and regional cooperation initiatives. Finally, it discusses how China could better prepare for the new role it is expected to play on the world stage and the policy implications for deepening the reform and adjusting China's growth strategy.

## China's rise, fall and rise again: an historical perspective

China was the largest economy until the early period of the 19<sup>th</sup> century (Figure 1). In fact its industrial and commercial development can be traced back to even earlier. For example, Hartwell (1962, 1966, 1967, cited by Findlay and O'Rourke 2007) demonstrated the remarkable expansion in the production of iron and steel in China during the Northern Sung (960-1126).

The scale of total production, and of the levels of output and employment in individual plants, was far in excess of anything attained by England in the eighteenth century, at the time of the Industrial Revolution. Hartwell estimated that iron production in China in 1078 was of the order of 150,000 tons annually. The entire production of iron and steel in Europe in 1700 was not much above this, if at all. Furthermore, the growth rate of Chinese iron and steel production was no less remarkable, increasing twelvefold in the two centuries from 850 to 1050 (Findlay and O'Rourke 2007, p. 65).

Figure 1 Changing GDP shares in the world: China and the major economies: 1300-2030 (per cent, based on 1990 international dollar)



Source: Maddison, Angus. "Asia in the World Economy 1500–2030 AD", Heinz W. Arndt Memorial Lecture, Canberra, November 10, 2005 ([http://kisi.deu.edu.tr/yesim.ucdogruk/ECN%20232/maddison\\_Asia.pdf](http://kisi.deu.edu.tr/yesim.ucdogruk/ECN%20232/maddison_Asia.pdf))

Figure 1 shows that there has been a long term pattern of rise, fall and rise again in China's position relative to the major economies of Western Europe and North America. This U-shape trend over the past two hundred years has been dictated by a period of de-industrialisation in China since the mid 19<sup>th</sup> century, as shown by the precipitate fall of its share of GDP in the world economy, and of re-industrialisation since the late 1970s, shown by the rapid increase in its share of world GDP. Maddison has predicted that China share of world GDP will surpass that of the United States by 2030.

As shown in Table 1, China and India had enjoyed per capita industrialisation levels of between 70 and 80 per cent of Britain's in 1750, however a forty- or even fifty-fold gap had opened up by 1913. By this time, India's share was just 1.4 per cent, and China's just 3.6 per cent of world manufacturing output, Europe and her British offshoots was a staggering 89.8 per cent (Findlay and O'Rourke 2007).

Table 1 Per capita levels of industrialisation, 1750-1913

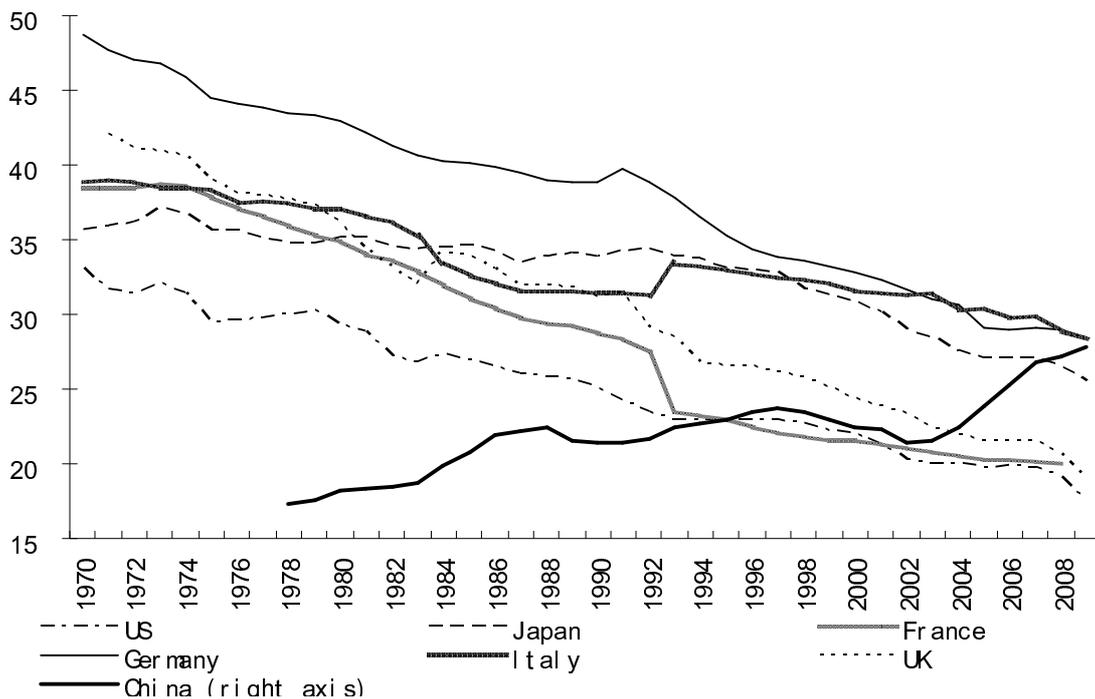
(U.K. in 1900=100; 1913 boundaries)

Country	1750	1800	1860	1913
Austria-Hungary	7	7	11	32
Belgium	9	10	28	88
France	9	9	20	59
Germany	8	8	15	85
Italy	8	8	10	26
Russia	6	6	8	20
Spain	7	7	11	22
Sweden	7	8	15	67
Switzerland	7	10	26	87
United Kingdom	10	16	64	115
Canada	N.a.	5	7	46
United States	4	9	21	126
Japan	7	7	7	20
China	8	6	4	3
India	7	6	3	2
Brazil	N.a.	N.a.	4	7
Mexico	N.a.	N.a.	5	7

Source: Bairoch (1982, p. 281). N.a.=not available.

The trend of re-industrialisation taking place in China since the last quarter of the 20<sup>th</sup> century has been accompanied by the overall trend of de-industrialisation in today's developed countries. China's rise as an economic powerhouse occurs amid this historical transformation in terms of structural adjustment in those industrialised countries in relation to those emerging economies including China. This trend of de-industrialisation in developed countries and re-industrialisation of China is clearly illustrated by the shifting proportion of industrial workers in the workforce of China in comparison with those most developed countries (Figure 2).

Figure 2 Changing shares of industrial workers in the total employment in China and the industrialised countries: 1970-2009 (per cent)



Source: The data for China are taken from the China Statistical Yearbook 2010, and those of other countries are taken from Bureau of Labour Statistics at (<http://www.bls.gov/fls/#tables>)

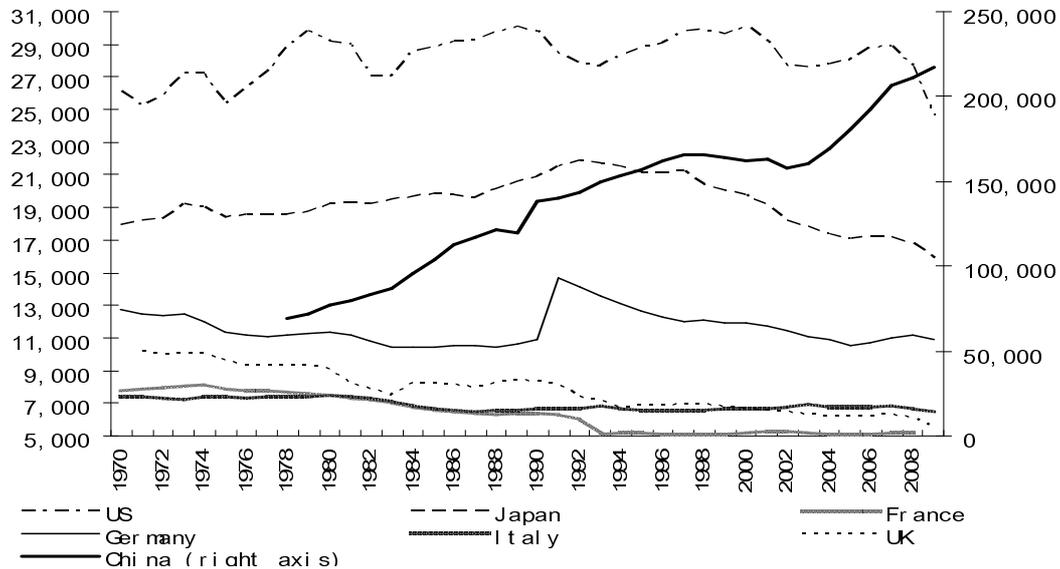
This historical industrial transformation between newly emerging economies, including China, and those industrialised countries has been enhanced by the process of globalisation. Globalisation has had a powerful impact on economic integration involving both developed and developing countries in the post World War II period. It has broadly affected all aspects of open economies ranging from production, consumption, trade, technology transfer, to the way that markets function and how the social, economic and political institutions change in responding to the requirement of the globalisation.

This is the historical context in which China embarked on the road of reform and opening beginning from the late 1970s. Globalisation has not only allowed China to pursue cheaper sources of energy and raw materials, it has provided access to markets for finished manufactured products that have been produced more cheaply by the seemingly unlimited supply of labour flowing from rural areas into the industrial sector in China (Figure 3). With more than 200 million industrial workers producing manufactured goods in China along with exports (dominated by manufactured goods) accounting for more than 30 per cent of China's total GDP, it is expected that China's rapid industrialisation will exert substantial impact on itself as well as the global economy.

China has become one of the largest economies and on its way to become the largest economy due to an annual average growth rate of 9.8 per cent for over three decades (1978-2009). This historical rise of China well illustrated by the comparison between China and the United States. According to the national account figures, China's GDP was 30.7 per cent of that of the United States in 2008, about 22 percentage points higher than the corresponding value in 1970. If Purchasing Power Parity (PPP) is used China is already very close to the United States, for example China's GDP, gross capital formation, total manufacturing output and exports of goods and services were 92, 90, 98 and 89 per cent of those of the United States in 2008 respectively. These figures clearly show that China's catching-up with the United States has been

accelerated since 2000 (Figure 4).

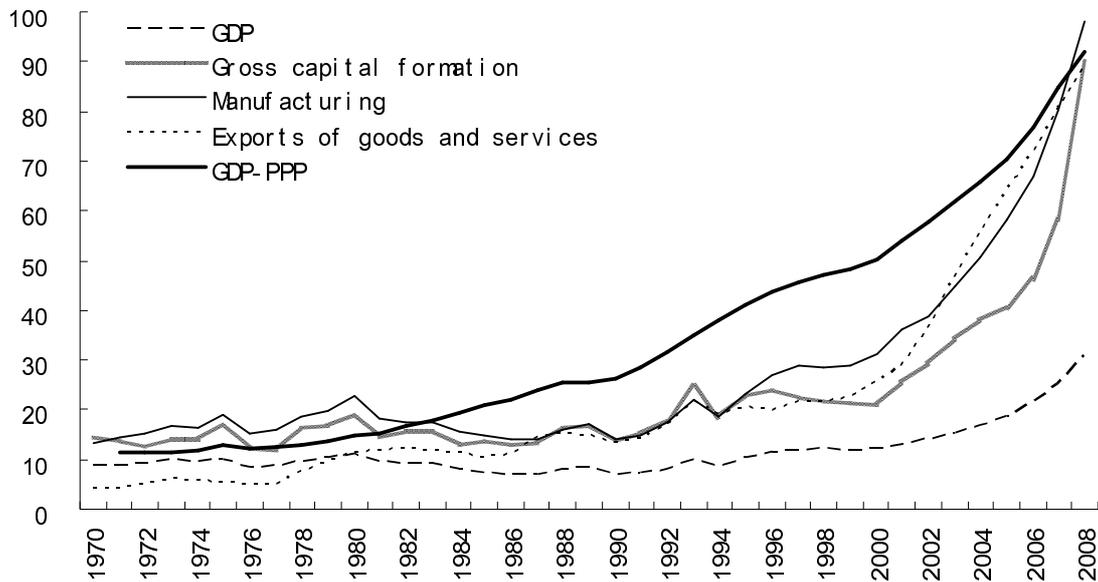
Figure 3 Total number of industrial employment in China and other major industrialised countries: 1970-2009 (thousand)



Source: The data for China are taken from the China Statistical Yearbook 2010, and those of other countries are taken from Bureau of Labour Statistics at (<http://www.bls.gov/fls/#tables>)

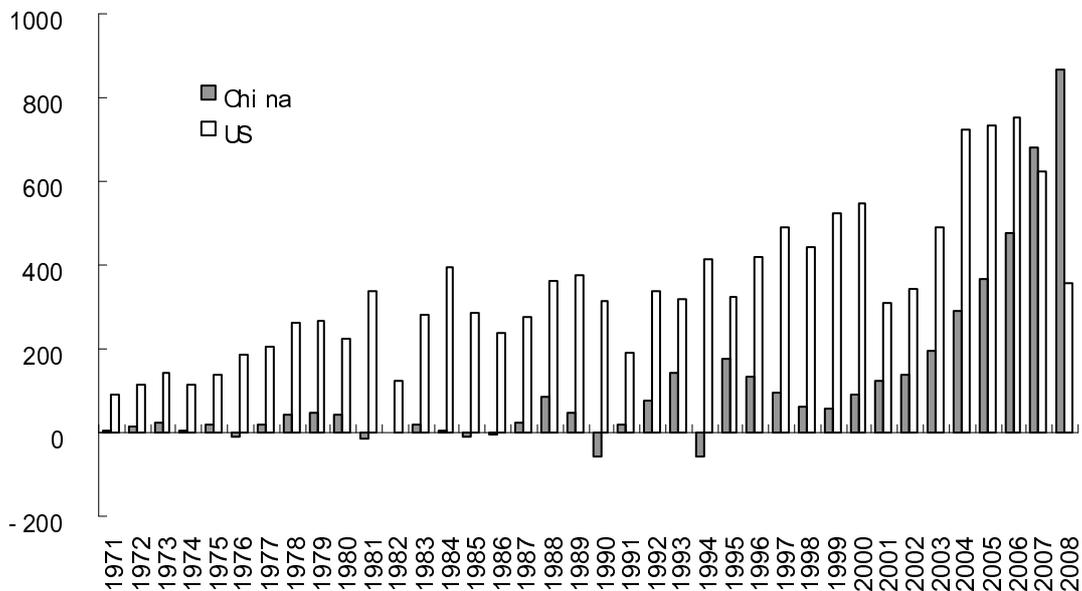
Several other key economic measures reflect the dynamism of the Chinese economy and the accelerated pace of its catching up to the United States (Figure 5). The incremental change in China's GDP in 2007 relative to 2006 was larger than that of the United States for the first time during the past 38 years. This trend extended further in 2008. If GDP-PPP, the total incremental value of China was about three times as large as that of the United States over the period 2001-2008. The concept of "total incremental value" is used to minimise the sizable fluctuation in certain years. For example, China's incremental GDP-PPP in 2008 was 18 times as large as that of the United States (Figure 6).

Figure 4 Ratios of China to the United States of the key measurements: 1970-2008  
(per cent, taking the United States as 100)



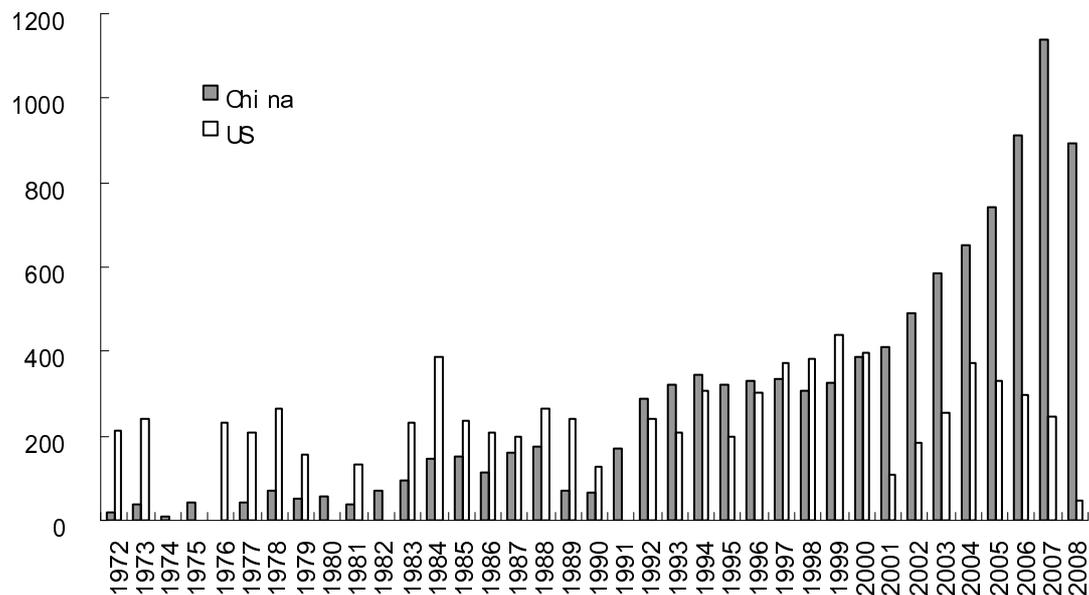
Source: United Nations (<http://unstats.un.org/unsd/snaama/dnlList.asp>); GDP-PPP are taken from "CO2 Emissions from Fuel Combustion" (<http://www.iea.org/co2highlights/>)

Figure 5 The incremental GDP of the United States and China: 1971-2008 (billion US dollar, current prices)



Source: Data are taken from the United Nations (<http://unstats.un.org/unsd/snaama/dnlList.asp>).

Figure 6 The incremental GDP (PPP) of the United States and China (billion 2000 US dollars, 1972-2008)



Source: GDP-PPP data are taken from 'CO2 Emissions from Fuel Combustion' at (<http://www.iea.org/co2highlights/>)

## Impact of China's re-industrialisation

### *Market integration and internal transformation*

The family planning policy adopted by the government in the early 1980s reduced the overall growth rate of population, but the massive migration from rural to urban China has supplied the much needed labour force to fuel industrialisation. Without internationalisation of the economy, there was no way for China to absorb the large number of rural migrant workers in its industrial sector. Therefore, a key element of China's integration into the global economy has been the absorption of a large proportion of the rural migrant workers in its booming export sector. As such, the international orientation of the economy is intrinsically linked to the process of domestic transformation. This allowed an unprecedented process of urbanisation to take place while the urban population increased by about 300 million in the past thirty years, which largely contributed to the productivity gains and rapid economic growth in China.

This pattern of development has enabled China to capitalise on its underlying comparative advantage, which has also demonstrated a pattern of dynamic change (Song 1996). As a result, China's exports have been shifting from relying predominantly on primary goods such as oil and agricultural products at the beginning of the reform period; to labour-intensive products such as textile and clothing during the first two decades of reform; to capital-intensive products such as steel, machinery and automobiles in the current phase of reform; and increasingly to technology-intensive products such as equipments, software and green technology in the future.

Similar economic transformation was taking place in other East Asian economies such as Korea and Singapore. 'What is unprecedented historically is its scale. The size of China's population, market and geography, and the dynamism that flowed from economic reform and transformation are what define its impact on the rest of the world. Despite a still relatively low per capita income, the sheer size of the Chinese economy has made China a significant player in world production consumption, trade and increasingly international finance and the environment' (Song 2010, p. 6).

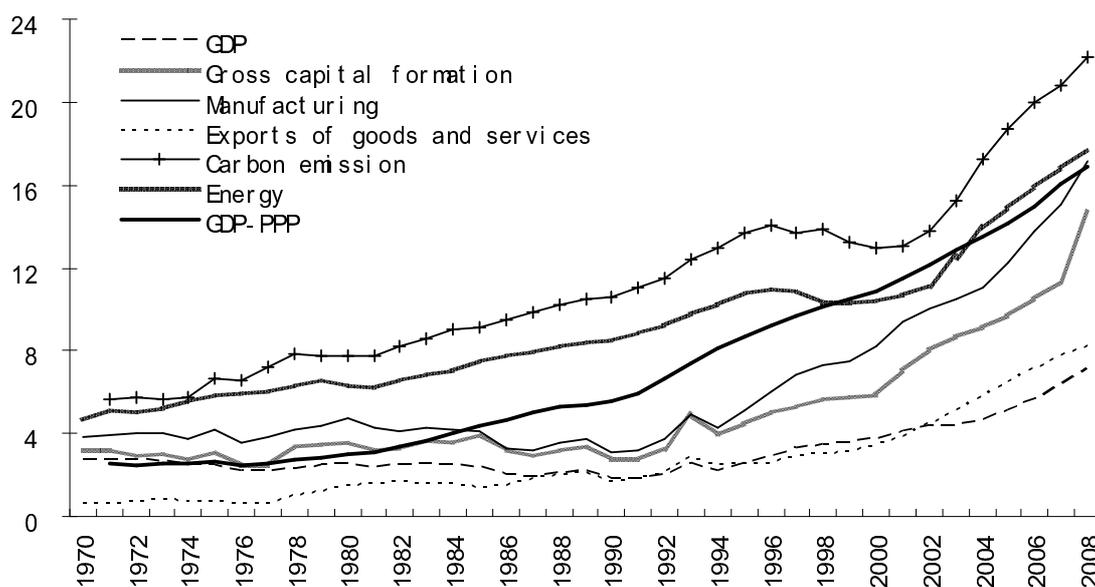
The economic transformation and the internationalisation of the Chinese economy has delivered rising income per capita in the world's most populous country for a sustained period with the scale and pace unobserved in human history. This is a significant factor contributing to global poverty reduction. Without including China and India, both inter- and intra-national inequality would show a steep rise after 1980 (World Bank 2006).

### *China's increasing role in the global economy*

The rapid economic growth has increased China's standing in the world economy. Figure 7 shows that the shares of China's GDP, gross capital formation, manufacturing, exports, energy consumption as well as GDP measured by PPP have

been increasing as global proportions since the early 1990s and the trends have been accelerating since 2002. For example, China's manufacturing share increased from about 5 per cent in the mid 1990s to over 16 per cent of the world total manufacturing in 2008, while its share of capital formation increased from 5 per cent to 14 per cent of global investment over the same period.

Figure 7 China's increasing role in the world: 1970-2008 (per cent)



Source: United Nations (<http://unstats.un.org/unsd/snaama/dnIList.asp>); GDP-PPP are taken from 'CO2 Emissions from Fuel Combustion' (<http://www.iea.org/co2highlights/>)

China's impact is particularly felt with the pressure it exerts on the trading relations with its key trading partners, the associated global structural transformation as well as on the environment, changing rapidly the global and regional economic and political landscapes. Its rising economic weight in the global economy is affecting its economic and political relations with the rest of the world. The rapid pace of industrialisation in recent years has led to China's shares of both energy consumption and carbon emissions increasing expeditiously.

### *Trade imbalances*

With the rapid structural transformation in the world economy, there has not been the same tendency for trade to balance between the emerging economies and the developed countries. This is different to the experience of persistent trade surplus in East Asian trade with developed countries during the periods of rapid growth in Japan, Korea and Taiwan, and Singapore (Table 2).

Table 2 China's imports and exports and balance of trade: 1978-2008

Year	(US dollar 100 million)			
	Total Imports & Exports	Total Exports	Total Imports	Balance
1978	206.4	97.5	108.9	-11.4
1980	381.4	181.2	200.2	-19.0
1985	696.0	273.5	422.5	-149.0
1990	1154.4	620.9	533.5	87.4
1991	1357.0	719.1	637.9	81.2
1992	1655.3	849.4	805.9	43.5
1993	1957.0	917.4	1039.6	-122.2
1994	2366.2	1210.1	1156.1	54.0
1995	2808.6	1487.8	1320.8	167.0
1996	2898.8	1510.5	1388.3	122.2
1997	3251.6	1827.9	1423.7	404.2
1998	3239.5	1837.1	1402.4	434.7
1999	3606.3	1949.3	1657.0	292.3
2000	4742.9	2492.0	2250.9	241.1
2001	5096.5	2661.0	2435.5	225.5
2002	6207.7	3256.0	2951.7	304.3
2003	8509.9	4382.3	4127.6	254.7
2004	11545.5	5933.2	5612.3	320.9
2005	14219.1	7619.5	6599.5	1020.0
2006	17604.0	9689.4	7914.6	1774.8
2007	21737.3	12177.8	9559.5	2618.3
2008	25632.6	14306.9	11325.6	2981.3

Source: Data in 1978 were taken from the Ministry of Foreign Trade; and data since 1980 are taken from China Customs statistics.

China was running trade deficits continually in the early years of reform (1978-1985)

mainly because it exported primary products and imported industrial products. Since 1990 China began running trade surpluses due to its increasing reliance on labour-intensive exports, largely due to the low cost of labour. Processing trade also played an important role in contributing to China's rising trade surpluses.

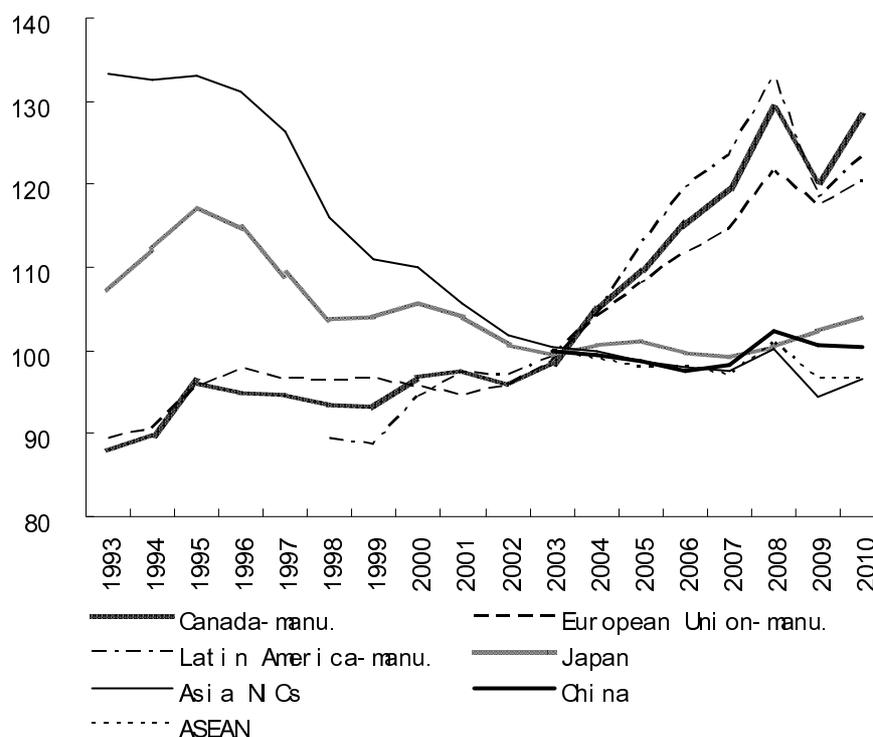
Processing trade and attracting foreign direct investment has allowed China to develop a unique pattern of specialisation with respect to its relations with other East Asian economies on the one hand and developed countries on the other. China imports a lot of intermediate goods and materials from other East Asian economies to develop its processing trade, thus China has consistently been running trade deficits with these economies including Japan, Korea and ASEAN countries. Among them Taiwan has had largest trade surplus with mainland China. China then exports the final products to the US, European, and Hong Kong markets, enjoying trade surpluses with these economies. This emerging pattern, which centers on China's role to both developing and developed countries, is transforming the structure of world trade.

Because of the low cost of producing those final goods in China, the import prices of goods to developed countries' markets have remained low. In the US market for example, there have been different import prices marked by its imports from different countries and regions (Figure 8). For imports from Canada, European Union and Latin America, the import prices have increased by about 25 per cent from 2003 to 2010. In contrast, the prices for China imports have been kept low and almost unchanged over the same period.

The relative low prices of Chinese imports have forced other countries to keep their prices low in order to maintain their market shares. For example, the prices of the imports from Japan, ASEAN and Asia NIEs (including Hong Kong, Singapore, South Korea and Taiwan) to the US market were also unchanged over the same period. Thus China and its neighbours have kept the general price level low in the United States, through this kind of unique pattern of specialisation and trade. This, in turn, has

contributed to an increase in consumption in the US, through the improvement of households' real income

Figure 8 U.S. import price indexes by locality of origin  
(December 2003=100, 1993-2010)



Source: Data are taken from the US Bureau of Labour Statistics,  
([http://www.bls.gov/web/ximpim.supp.toc.htm#long\\_tables](http://www.bls.gov/web/ximpim.supp.toc.htm#long_tables))

Note: Asia NIEs means Asian Newly Industrialised Economies, which include Hong Kong, Singapore, South Korea and Taiwan.

However, this beneficial effect on price has been overshadowed by the more contentious issue of trade imbalances between China and the United States which leads to the current debate on the exchange rate policy in China. While China's running trade deficits with other East Asian economies, its bilateral trade surplus with the United States have been increasing, especially after China's entry to the WTO in 2002 (Table 3).

China's share of the total US trade deficit has risen rapidly from 21 per cent in 2002 to 43 per cent in 2009. One of the reasons for such a jump is that the rapid increase of

Chinese imports since the turn of the new century. For example, the US imports from China increased from 11 per cent in 2002 to about 20 per cent in 2009, while its export shares to China have also doubled from 3 per cent to 6 per cent over the same period. This ever-increasing trade imbalance between the United States and China has been the main contributing factor to the global economic imbalances; these need to be dealt with using a structural approach.

Table 3 The United States' bilateral trade with China: 2002-2010 (US dollars, 100 million and per cent)

Year	Imports		Exports to China	Export shares	Trade deficits	Share of deficits
	from China	Import shares				
2002	1334	11.12	220.5	3.18	-1114.4	21.97
2004	2105	13.8	347.2	4.24	-1758.1	24.87
2006	3057	15.94	555.2	5.32	-2505.6	28.48
2008	3563	16.42	714.6	5.49	-2848.6	32.8
2009	3095	19.28	695.8	6.58	-2399.8	43.75
Jan.-Aug. 2010	2292	18.48	558.1	6.78	-1734	41.55

Source: Calculated using the data taken from China Customs at <http://www.customs.gov.cn/default.aspx?tabid=400> and the US Bureau of Economic Analysis at [http://www.bea.gov/international/bp\\_web/list.cfm?anon=71&registered=0](http://www.bea.gov/international/bp_web/list.cfm?anon=71&registered=0)

### *Impact on commodity prices and terms of trade*

With its per capita income increasing more than five times during the period 1978 to 2000, China has entered the so-called mid-phase of industrialization. This is characterised by the increasing share of the manufacturing industry in the total economy. Within the industries those capital-intensive and heavy industries such as steel, machinery and chemicals started playing a more important role in the economy. These industries rely more heavily on energy and minerals as inputs of production, as compared with the early phase of industrialization, which were characterised by labour-intensive production. This is the fundamental cause for the sudden surge in China's demand on energy and resources since 2002.

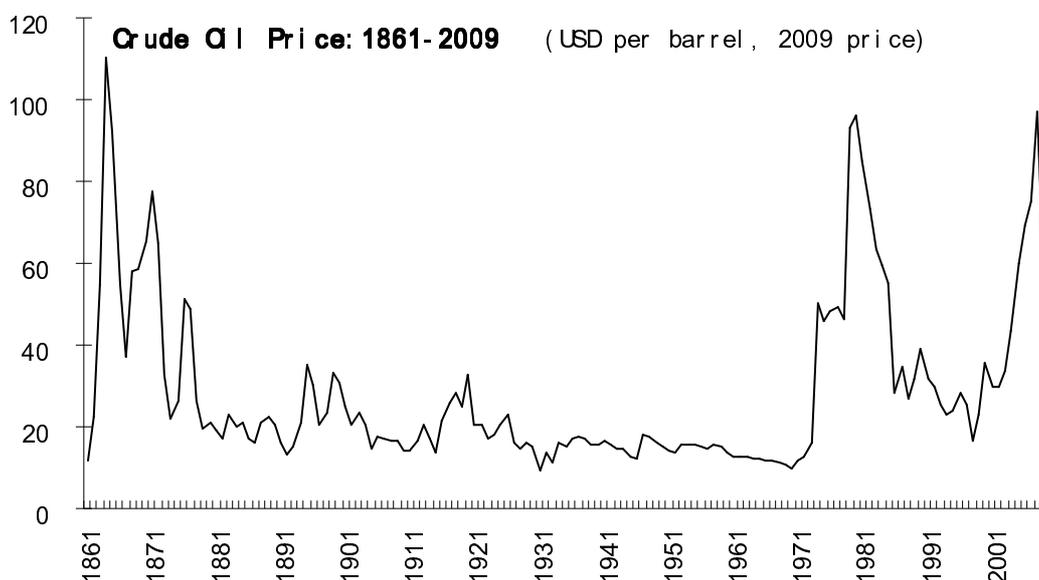
Given the size and the momentous development of China's industry, its rising

demands on energy and minerals are enormous. This has led to the third resource boom in the post-war period, characterised by expeditious rises in commodity prices, including those for energy (Figure 9) and raw materials such as iron ore and metals.<sup>1</sup>

Despite its own rich resource endowments, in per capita terms China is well below the world average for most of the key resources. This has pushed China to rely on the overseas supplies of energy and minerals to meet its growing demand on resources.

In terms of China's per capita energy consumption it appears close to the world average (Table 4). However, by excluding coal China's per capita consumptions of all other energy products are far below the world averages, this is especially true for both nuclear power and natural gas. This is one of reasons why China has been rapidly developing its nuclear power along with domestic production and imports of natural gas.

Figure 9 Crude oil prices: 1861-2009



Source: Taken from the BP Statistical Review of World Energy (June 2010).

<sup>1</sup> The first two resource booms were related to the periods of rapid growth of Japan, Korea and other East Asian economies back to the 1970s and 1980s.

Table 4 International comparison of energy consumption per capita: 2009 (tonne of oil equivalent)

	Oil	Natural gas	Coal	Nuclear power	Hydro electric	Total
United States	2.75	1.92	1.62	0.62	0.20	7.11
France	1.36	0.60	0.16	1.44	0.20	3.76
Germany	1.38	0.85	0.86	0.37	0.05	3.52
Japan	1.55	0.62	0.86	0.49	0.13	3.65
United Kingdom	1.20	1.26	0.48	0.25	0.02	3.21
China	0.31	0.06	1.16	0.01	0.11	1.64
World average	0.57	0.39	0.48	0.09	0.11	1.65

Source: Energy consumption data are taken from BP Statistical Review of World Energy (June 2010); population data are from US Census Bureau, International Data Base (<http://www.census.gov/ipc/www/idb/informationGateway.php>).

Table 5 reports the latest data on China's consumption of the key energy and metals and their shares in the world total. These figures illustrate the immense size of the rising demand for resources from China. China became a net importer of oil in 2003 and a net importer for coal in 2009 despite the fact that China has been the largest coal producer in the world. In 2009, China consumed 10, 47 and 48 per cent of the world oil, coal and steel respectively.

Table 5 China's consumption of key energy and metals and their shares in the world

	2009	2009	2009	2008	2008
	Oil (Million tonnes)	Coal (Million tonnes of oil equivalent)	Steel (million metric tonnes of finished steel products)	Copper ( 10 thousand tonnes )	Aluminum (10 thousand tonnes)
China	405	1537	542	481	1260
World	3882	3278	1121	1803	3817
China's share in the world (%)	10.4	46.9	48.4	26.7	33.0

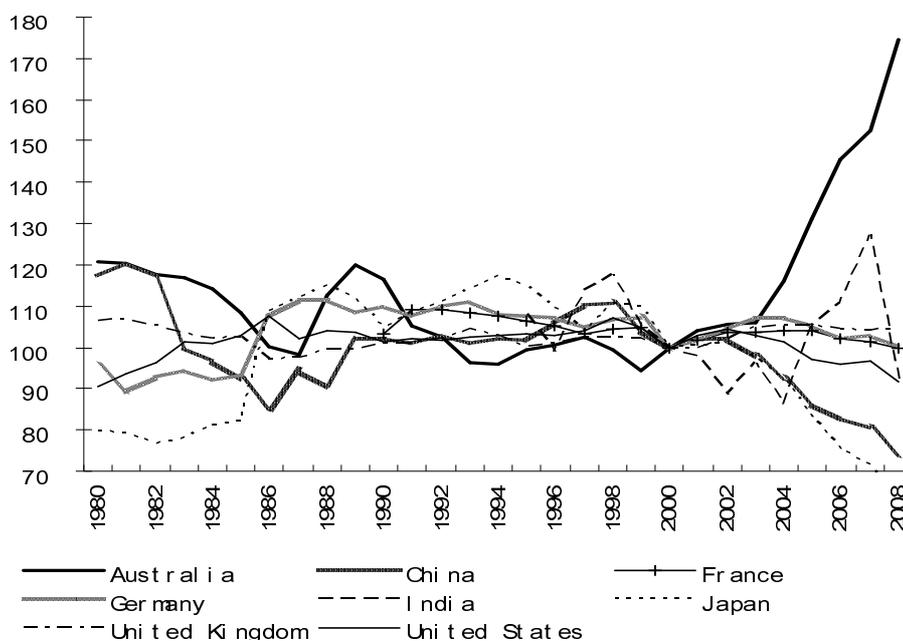
Source: Oil and coal data are taken from BP Statistical Review of World Energy (June 2010); steel data are taken from <World Steel in Figures 2010> by World Steel Association; China data for

copper and aluminum are from [http://www.mlr.gov.cn/zljc/201008/t20100819\\_742459.htm](http://www.mlr.gov.cn/zljc/201008/t20100819_742459.htm); global data for copper and aluminum are from <http://www.smm.cn/information/newsdetail.aspx?newsid=14403>.

With the various constraints on the supply side, rising demand for resources from China has been raising the world prices for key commodities to levels which surpass those reached during previous resource booms. As a result, the commodity terms of trade are moving in favour of resource exporters including Australia and Russia and against importers of resources including China and Japan (Figure 10).

Changes in commodity terms of trade have also affected developed countries, but to a much less extent compared with the impact on emerging countries. Like the consequences of the previous resource booms, including the oil shocks in the 1970s, the current trend of changing commodity terms of trade carries with it the important implications for global macroeconomic changes and economic development.

Figure 10 Net barter terms of trade index (2000 = 100)



Source: <http://data.worldbank.org/indicator/TT.PRI.MRCH.XD.WD?page=5>

Will the current resource boom last? The answer to this question will depend on how one projects the future trajectory of the Chinese industrialisation. According to the study by McKay, et al. (2010), the turning point (the peak level in terms of its steel use on per capita term) of China's own Kuznets curve for steel (the KCS) was estimated at US\$15,449 GDP per capita – a point that on its post-1980 trajectory of 7 per cent compound growth China would reach around 2024. At that time, China's per capita steel demand is predicted to be between 700 and 800 kg, but closer to the latter. This is higher than the peak level reached in the United States, much higher than those reached by the CIS and Europe, but lower than the peaks seen in Japan and Korea.

A simple calculation provides a sense of how much difference this range of peak levels can make with respect to the total demand for steel. With the projected total population reaching 1.45 billion (by UNDP 2010) by 2020, reaching the peak level of 700 kg will mean that China needs to produce one billion tonnes of steel while 800 kg means that 1.2 billion tonnes of steel are needed to meet the demand (the current level of steel production is about 600 million tonnes).

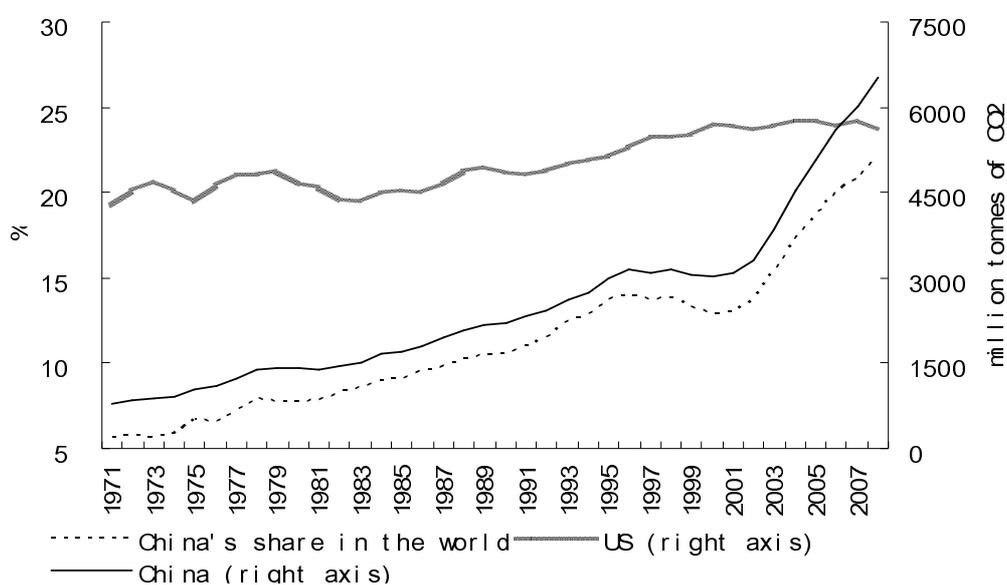
It is still possible for China to sustain a relatively high level of intensity for a certain period similar to the pattern of change in Japan and Western Europe even after China has reached the peak level of steel intensity. This means the current resource boom will last even longer. The projected trajectory will have important implications for both supply of and demand for resources as well as for the long-term global macroeconomic development. It also raises several concerns about its impact on the environment.

### *Carbon emissions and international cooperation*

The Intergovernmental Panel on Climate Change calls for cutting global greenhouse gas emissions at least in half by 2050 in order to avoid potentially dangerous climate change. China is playing a crucially important role in achieving this global target on

emissions. This is because China's total carbon emission and China's share in the world total emissions have kept increasing since 1971, and its total carbon emission has been accelerated since 2002 (Figure 11). As a result, China's incremental carbon emission surged as well. Since 2002, the incremental carbon emission of China has become very close to or larger than that of non-China (Figure 12). Since 2007, China surpassed the United States becoming the largest country in terms of carbon emission.

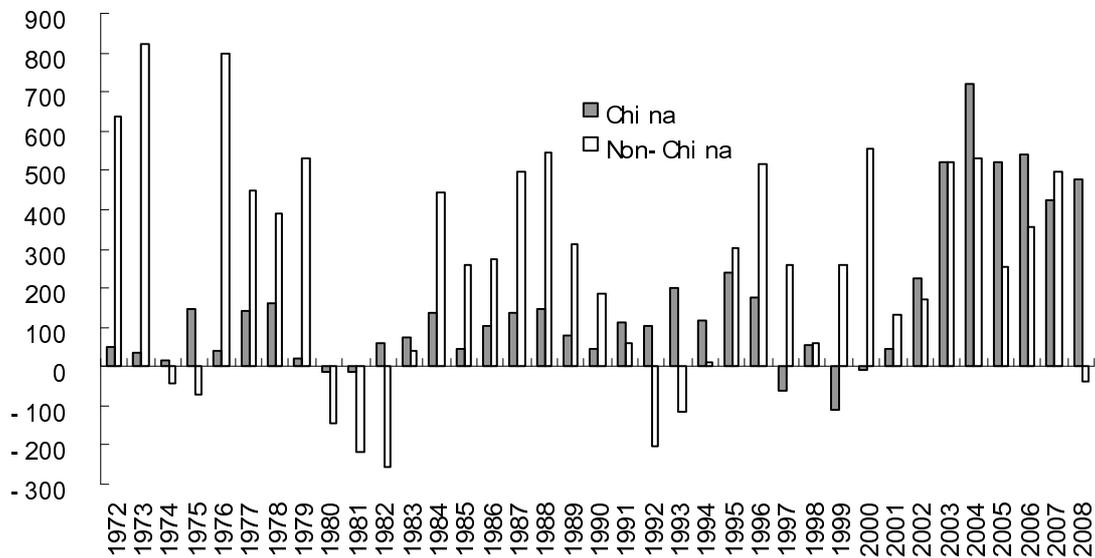
Figure 11 China's carbon emission and share in the world: 1971-2008 (per cent and million tonnes of CO<sub>2</sub>)



Source: It was taken from CO<sub>2</sub> Emissions from Fuel Combustion, Sectoral Approach (<http://www.iea.org/co2highlights/>)

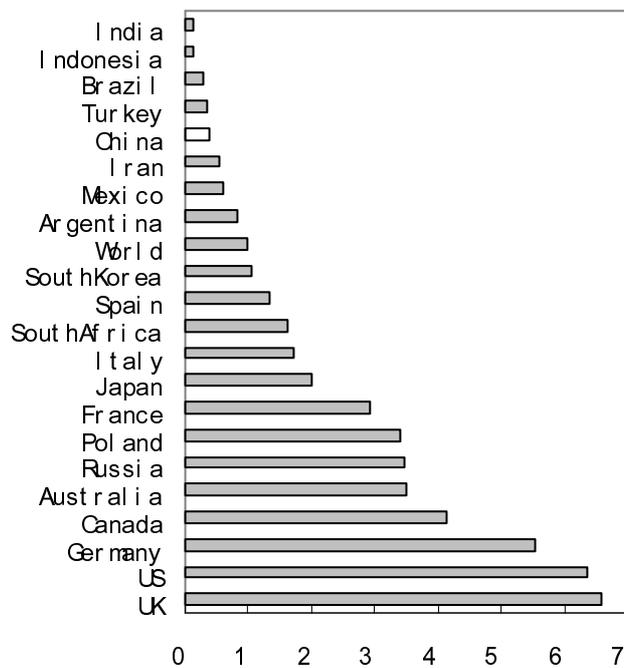
However, in contrast to the total amount of emission and its increasing trend, China has a relatively low level of emission based on per capita terms. China's emission per capita was 4.91 tonnes in 2008, only 26.7 per cent of that of the United States, and close to the world average level. If the indicator of the 'cumulative carbon emission per capita' is used, China was just 5.8 per cent of that of the United States and 37 per cent of the world average level in 2002 (Figure 13) reflecting the fact that the accelerated phase of industrialisation in China has only happened relatively recently.

Figure 12 Incremental carbon emissions: 1972-2008  
(Million tonnes carbon dioxide)



Source: It was taken from CO2 Emissions from Fuel Combustion, Sectoral Approach  
(<http://www.iea.org/co2highlights/>)

Figure 13 Cumulative carbon emission per capita  
(from fossil fuels & cement manufacture, world average=1, 1850-2002)



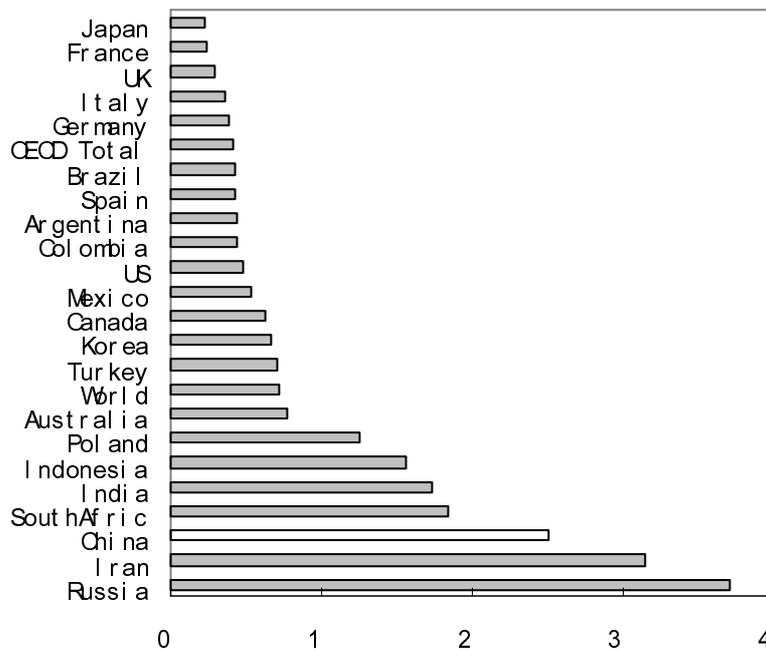
Source: Calculated using the population data and cumulative emission data. Population data

correspond to the year 2002 and come from U.S. Census Bureau, International Data Base (<http://www.census.gov/ipc/www/idb/informationGateway.php>). Cumulative emission data are from Baumert, Kevin A. et al. (2005).

The low per capita emissions of China can be related to the relatively low GDP per capita. China's emission per unit of GDP calculated using the current exchange rates is one of the highest in the world, just below the level of Russia and Iran and more than five times that of the United States in 2008 (Figure 14). If GDP-PPP is used, the difference between China and other countries turns out to be much smaller, only 26.4 per cent higher than that of the United States in 2008 (Figure 15).

Given the scale, pace and future trajectory of China's industrialisation, it is expected that China's total emissions, as well as its emission per capita (both accumulative and incremental), will continue to grow. An encouraging sign is that China has planned to reduce the carbon intensities of production and adopted various measures in achieving this goal. It is in China's interest to do so as the country is paying high prices for the environmental degradation caused by its drive for industrialisation.

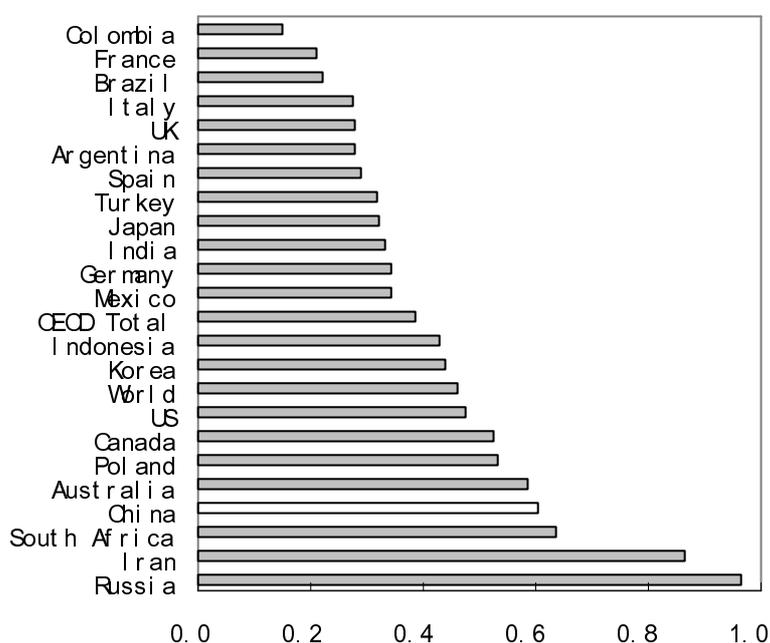
Figure 14 Carbon emission per unit of GDP using exchange rates in 2008  
(kg CO<sub>2</sub> per US dollar, 2000 prices)



Source: CO<sub>2</sub> Emissions from Fuel Combustion (<http://www.iea.org/co2highlights/>)

China had been singled out by Western politicians and media for dragging its feet on the international climate change negotiations at Copenhagen; these accusations have previously always targeted on the US (Zhang, 2010). In contrast to this criticism, Garnaut (2010) argues that the Chinese domestic commitment to reduce the emissions intensity of production to 40 to 45 percent from 2005 levels by 2020 is the most ambitious, and the most important to the global climate change mitigation effort, that has been accepted by a major economy.

Figure 15 Carbon emission per unit of GDP using PPP in 2008  
(kg CO2 per US dollar, 2000 prices)



Source: CO2 Emissions from Fuel Combustion (<http://www.iea.org/co2highlights/>)

Facing the pressure of structural changes against the rising costs of production including land, labour, energy and minerals as discussed, China will be compelled to upgrade its industries in producing more valued added products. In so doing, it will shift its out of date industries to those relatively backward interiors or offshore in a similar fashion that those industries had been transferred to China from Japan, Korea, Taiwan and Hong Kong in the early years of development. This process has started and will accelerate with rising labour costs.

This trend has important implications for the overall reduction of emissions. For example, if to meet the emission target, the central government imposes strict environmental standards requiring all regions including those poor provinces to comply. Under these circumstances more industries will be forced to move to other countries, which are less developed including those in South Asia, the central Asia, Latin America and Africa.

Without imposing the environmental standards for those out-flowing industries by China or for those industries to face tough environmental regulation by the recipient countries (both are unlikely to happen), then China's achievement in reducing its total emissions (or intensity) will not help to reduce the total emissions globally. 'By using stricter environmental standards, a government drives capital out of the country. The domestic emissions reduction is accompanied by an increase in foreign emissions. If the capital moves to a pollution haven, the net effect may actually be an increase in emissions and, thus the unilateral policy addressing the international environmental problem may even be counterproductive' (Rauscher 1997, p. 231). This suggests that a more comprehensive international approach is needed (for example, an agreement on the environmental regulation imposed on out-flowing direct investment).

There is an issue regarding the potential economic impact of climate change on the future pattern of growth in China (McKay and Song 2010). The question here is to what extent will any Chinese commitment to low carbon growth alter the future structure of the Chinese and global economies. The issue is significant as the earlier adopters of industrial strategies were not subject to any self-imposed constraint on growth. Further, China's relatively recent engagement with an industrial led growth path, and its immense backwardness prior to this engagement, means that the middle phase of industrialisation, characterised by rapidly growing energy and emission intensities and ongoing increases in global market share, is still ahead of it. This is an uncomfortable reality for both China and the world. The importance of relative price signals, industrial structure, strategic leadership and technology transfer are all

emphasised.

With the prospect that a global framework for emission mitigation will move forward strongly in the next few years, coupled to the observation that material conflict between industrial led growth and the biosphere is already starkly evident in China, such constraints may become increasingly binding.

### **China and global adjustments and ways forward**

Confronting the rising China is probably the most challenging task facing the world community in the 21<sup>st</sup> century. The formidable forces of competitiveness still unfolding have been underscoring the rising China as the largest manufacturing powerhouse in the world. 'Changes in competitiveness redistribute profits as well as income and employment between countries, for given aggregate demand conditions' (Blecker 1999, p. 141). This is the main cause for the rising anxiety among the countries involved in trading with China. The solution to overcoming this problem is to go through structural adjustment in China and its trading partners. However, for this approach to work, it needs time for structural adjustment to take place and the institutional arrangements which accommodate the tasks of adjustments.

For China, the strategy is diverting from its current industrialisation path - that exhibits a modest but not overwhelming bias towards external demand - to a strategy of domestic market integration and internally driven development (McKay and Song 2010). This re-orientation will be shaped by the unique constraints that China faces relative to its predecessors. One of these is that China has moved beyond self sufficiency across the gamut of resources at a low relative income level, and is thus expected to pressure the global demand supply balance in a fashion that is essentially without precedent.

There is also an issue as to what extent will the current trajectory of industrialisation

have to be altered when China becomes more actively engaged in dealing with structural issues at home and abroad against the background of the unwinding of global imbalances. This latter issue has profound implications for Chinese economic strategy. Although structural changes will take time, China should now move towards achieving more balanced trade not by exporting less but by importing more (Table 6).

Adjusting its exchange rate policy is surely an important part of the strategy of dealing with the imbalance problem, but more important task for China from the structural point of view is to boost its domestic demand. The way in which China has been integrated with the global economy may be termed as asymmetrical in that the adjustment on the supply side is much quicker and thorough than the demand side adjustment which is very much lacking. This asymmetrical development between supply and demand has been causing the problems of weak domestic demand and rising income inequality. As a result, China has to rely heavily on exports to vent its supply capacity worsening trade imbalances as its imports are not likely to match with the rapid growth of exports for the same reason (lack of domestic demand). Domestic demand in the short term can be increased through domestic institutional reform, for example by urbanising those large number of migrant workers in order to change their consumption behaviour (Song, et al. 2010).

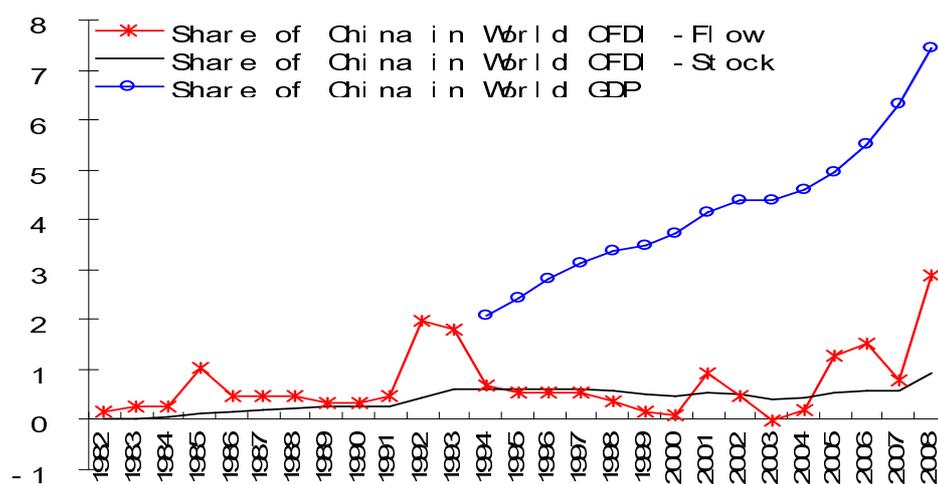
Table 6 Import shares of consumer products by the selected countries and regions: 2006-2009 (per cent)

Countries	2006	2007	2008	2009
China	1.29	1.48	1.67	2.08
United States	21.38	19.59	17.88	18.54
European Union	13.93	14.05	13.93	15.2
Japan	4.72	4.23	4.23	5.16
Korea	1.01	1.05	1.02	1.07
Hong Kong	2.85	2.76	2.74	3.07
ASEAN	2.09	2.07	2.36	2.36

Source: Calculated using the data taken from the United Nations' Comtrade.

This new strategy will also lead to more out-flowing direct investment from China so that China import more goods from other countries who have more comparative advantage in producing these goods. China may lose some employment in the short term, but employment will be boosted by the enlarged domestic market. The rapidly increasing in China's OFDI in recent years from a very low base is only the beginning of the process (Figure 16). Again, similar to the way that the world accommodates the rising trade shares by China, discords and frictions will occur in accommodating the rising of China's OFDI. This is another part of adjustments that both China and its trading partners need to confront with.

Figure 16 Shares of China's overseas direct investment and its GDP in world total overseas investment (flow and stock) and world GDP: 1982-2008



Source: Calculated using the data from the Statistical Yearbook of China and UNCTAD.

The issue of global imbalance is essentially a payment issue which is caused by the structural changes in the world economy. Historically, there were parallel cases of the persistent deficits in the exchange of Western goods with the East caused by more exports of porcelains, tea, silk and spices from China and India to Western Europe during 14<sup>th</sup> and 15<sup>th</sup> centuries. This payment problem (trade deficits) was settled with silver obtained increasingly from the Americas. '[I]t was the flood of silver released around the globe by the mines of the New World that was the lifeblood of the

‘circulatory system of the world economy’ (Findlay and O’Rourke 2007, p. 212). As Braudel (1975), with ‘a steady flow of gold and silver coins of every description, travelling from west to east, following the rotation of the Earth, carrying along with them a wide range of commodities as a kind of supplementary currency, and losing in the opposite direction a rich and varied stream of different commodities and precious goods from east to west’ (p. 212 cited in Findlay and O’Rourke 2007). The current problem of the persistent trade deficits of the United States with China is essentially the same kind of payment problem. Unfortunately, the flood of declining dollars (unlike the flood of silver six hundred years ago) will not help in resolving the balance of payment problem. It could make it worse.

The attention on the imbalances is unfortunately focused almost exclusively on the issue of revaluing the currency of the surplus country in order to address the trade balances. This approach tends to sidetrack the task of dealing with those more fundamental structural issues which have been complicated by the exchange rates volatility and misalignment occurring in the post-Bretton Woods era. History also tells us that strong currencies (with or without the backing of precious metals) are associated with the strong and rising economies. China as a rising economic player is far from being ready in playing the role in reshaping the current global currency system, but there is potential because the global financial and currency system needs an anchor for maintaining the much needed stability.

For the United States, domestic adjustments are very much needed too for dealing with the global imbalances. Fighting the global financial crisis (GFC) is absolutely necessary, but the United States should not lose sight on the tasks of dealing with those more fundamental structural issues including its deficits problems. What China has done in the direction of change proposed will surely help the United States dealing with its problem, vice versa. In the sense that the United States and China share some common interests in dealing with the global imbalances to the benefit of both and beyond. Both countries also share common interests in maintaining an open

trading regime for those structural adjustments to work. Geopolitically the cooperation between the two countries will help in maintaining regional and global security and thereby reducing the fiscal burden of the United States. In the end, the ultimate aim is to prevent the unpredictability and uncertainties from becoming the real obstacles to achieving the objectives of the continuous growth and prosperity in the world economy in the 21<sup>st</sup> century and beyond.

For those tasks to be successful, the world community needs to respond strategically to the challenges of readjustment by guarding against the rising protectionism and the most effective way of doing so is to improve the global governance system, including the multilateral trading system. The leadership role for championing globalisation by the rising power is needed (Garnaut and Song 2006). As warned by Findlay and O'Rourke (2007) 'If anything, history suggests that globalisation is a fragile and easily reversible process, with implications not just for international trade, but for the international division of labour and economic growth as well' (, p. 535). They also provided the suggestion, '[a]s history shows, income distribution matters not just in its own right, but because of the political reactions it can provoke. The implication is that those wishing to maintain an open trading system also need to propose a range of complementary domestic policies, including but not limited to educational, training, and welfare programs, if they are to maintain political support for liberal trade policies' (p. 538).

## **Conclusions**

This paper discusses the significance of China's emergence as one of the largest economies in the world and considers the ways of reducing the unpredictability and uncertainties associated with the tasks of confronting the challenges of rising China. The paper makes the point that what the world community is confronting now and in the foreseeable future are not short-term, but structural issues with a pattern of change carrying with it some historical significance. Therefore, what is needed is a structural

approach in dealing with the structural issues, countries involved need to be aware that there will be substantial adjustment cost associated with this kind of approach. Any attempts which seek quick fixes in resolving these issues, including the call for revaluating the surplus countries' exchange rates (though the realignment of exchange rates is one of the key elements of the structural approaches) in dealing with the global imbalances, are not likely to succeed.

It is also unwise to simply try to maintain the status quo with a hope that the solutions will be found down the track one way or the other. This is because such an attitude is likely to lead to more conflicting outcomes such as economic disintegration resulting possibly from the rising protectionism, which will eventually benefit no one. The paper argues that addressing these concerns and externalities requires an understanding of the ever-increasing degree of economic interdependence among countries but especially between the surplus and deficit countries; and of the importance of adopting both individual and collective actions in dealing with the structural problems.

In practical terms, it also requires that tremendous adjustments take place in many parts of the world. These adjustments are not only required for individual countries, especially China and its major trading partners, but also for the institutions governing the international political and economic system. This is because maintaining a relatively open, multilateral political and trading system in which China is expected, together with other major countries, to play a leadership role is the only effective way in which the behaviour of the rising powers are framed in, or constrained by, the rules-based system. Those of incumbent powers become more accommodating and cooperative. This multilateral framework provides an important institutional basis on which the expansion of international trade continues to be a positive-sum rather than a zero-sum game, and the global common goals such as poverty reduction, climate change and regional and international security can be achieved with success.

## References

- Bairoch, P., 1982, 'International industrialisation levels from 1750 to 1980', *Journal of European Economic History*, No. 11, pp. 269-331
- Bleker, Roberts, 1999, 'Kaleckian macro models for open economies', chapter 5 in Johan Deprez and John T. Harvey (eds), *Foundations of International Economics: Post Keynesian Perspectives*, Routledge: London and New York, pp. 116-150
- Braudel, F. 1975, *The Mediterranean and the Mediterranean World in the Age of Philip II*, Volume 1, Collins: London
- Garnaut, Ross and Ligang Song, 2006, 'Truncated globalisation: the fate of the Asia Pacific Economies?' Chapter four in Hadi Soesastro and Christopher Findlay (eds), *Reshaping the Asia Pacific Economic Order*, Routledge: London, pp. 46-81
- Garnaut, Ross (2010). 'China as a Great Power: Some Implications for Australia'. An address to the Australia China Business Council, Victoria Division, 13th May 2010, Melbourne at ([http://www.acbc.com.au/deploycontrol/files/upload/acbc\\_vic\\_event\\_RossGarnaut\\_luncheonaddress.pdf](http://www.acbc.com.au/deploycontrol/files/upload/acbc_vic_event_RossGarnaut_luncheonaddress.pdf))
- Findlay, Ronald and Kevin, H. O'Rourke, 2007, *Power and Plenty: Trade, War, and the World Economy in the Second Millennium*, Princeton University Press: Princeton and Oxford.
- Hartwell, R. 1962, 'A revolution in the Chinese iron and coal industries during the Northern Sung, 960-1126 A.D.', *Journal of Asian Studies*, Vol. 21, pp. 153-62
- Hartwell, R. 1966, 'Markets, technology, and the structure of enterprise in the development of the eleventh-century Chinese iron and steel industry,' *Journal of Economic History*, Vol. 26, pp. 29-58
- Hartwell, R. 1967, 'A cycle of economic change in imperial China: coal and iron in northeast China, 750-1350', *Journal of the Economic and Social History of the Orient*, Vol. 10, pp. 102-59
- McKay, Huw and Ligang Song, 2010, 'China as a global manufacturing powerhouse: strategic considerations and structural adjustment', *China and World Economy*, Vol. 18, No. 1, February, pp. 1-32
- McKay, Huw, Yu Sheng and Ligang Song, 2010, 'Chinese metal intensities in

comparative perspective’, Chapter 5 in Ross Garnaut, Jane Golley and Ligang Song (eds), *China: The Next Twenty Years of Reform and Development*, the Australian National University Press: Canberra and the Brookings Institution Press: Washington, pp. 73-98

O’Brien, Robert and Marc Williams, 2004, *Global Political Economy: Evolution and Dynamics*, Palgrave and Macmillan: New York

Song, Ligang, 1996, ‘Institutional change, trade composition and export supply potential in China’, in Manuel Guitian and Robert Mundell (eds), *Inflation and Growth in China*, International Monetary Fund, Washington, pp. 190-225

Song, Ligang, 2010, ‘The scale of China’s economic impact,’ *East Asia Forum Quarterly*, Vol. 2, No.1, January-March, pp. 6-8

Song, Ligang, Jiang Wu and Yongsheng Zhang, 2010, ‘Urbanisation of migrant workers and expansion of domestic demand’, *Social Sciences in China*, Vol. 31, No. 3, August, pp. 194-216

Rauscher, Michael, 1997, ‘Environmental regulation and international capital allocation,’ Chapter 7 in Carlo Carraro and Domenica Siniscalco (eds), *New Directions in the Economic Theory of the Environment*, Cambridge University Press: Cambridge and New York, pp. 193-238

Zhang, Zhongxiang (2010). ‘Copenhagen and Beyond: Reflections on China’s Stance and Responses’. East-West Center Working Papers, Economics Series, No.111, June 2010.

World Bank, 2006, *World Development Report 2006: Equity and Development*, Washington, DC, World Bank.