

China's Integration with the World

Development as a Process of Learning and Industrial Upgrading

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Abstract

The process of development is full of uncertainties, especially if it is a process of transition from a planned economy to a market oriented one. Because of uncertainties and country specificity, development must be a process of learning, selective adaptation, and industrial upgrading. This paper attempts to distill lessons from China's reform and opening up process, and investigate the underlying reasons behind China's success in trade expansion and economic growth. From its beginnings with home-grown and second-best institutions, China has embarked on a long journey of reform, experimentation, and learning by doing. It is moving from a comparative advantage-defying strategy

to a comparative advantage-following strategy. The country is catching up quickly through augmenting its factor endowments and upgrading industries; but this has been only partially successful. Although China is facing several difficult challenges—including rising inequality, an industrial structure that is overly capital and energy intensive, and related environmental degradation—it is better positioned to tackle them now than it was 30 years ago. This paper reviews the drivers behind China's learning and trade integration and provides both positive and negative lessons for developing countries with diverse natural endowments, especially those in Sub-Saharan Africa

This paper—a product of the Development Economics Vice Presidency and Finance & Private Sector Development Division, World Bank Institute—is part of a larger effort in the department to synthesize and distill lessons from China's 30-years reform experience which may be relevant to other developing countries, for the purposes of South-South Experience Sharing. Policy Research Working Papers are also posted on the Web at <http://econ.worldbank.org>. The author may be contacted at ywang2@worldbank.org.

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China's Integration with the World: Development as a Process of Learning and Industrial Upgrading

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The views expressed in this paper are those of the authors and do not necessarily represent those of the World Bank. This paper describes research in progress by the authors and is issued to elicit comments and to further discussion.

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The way to make the transition from a traditional planned economy to a market economy is just like crossing the river by groping the stones beneath the surface.

--Deng Xiaoping

I. Introduction

China has achieved unprecedented economic growth and the most rapid poverty reduction in human history in the past 30 years. Real gross domestic product (GDP) has expanded at an annual average pace of more than 10 percent.¹ China has grown to be the fourth largest economy and second largest trading nation in the world. A 2008 study by Chen and Ravallion found that using the World Bank's \$1.25 per day consumption measure, the proportion of the population living in poverty fell from 84 percent in 1981 to 15.6 percent in 2005, and more than 600 million people were lifted out of poverty (Chen and Ravallion 2008).²

China is unique in many ways. It is the largest developing country in terms of population, and it was a closed economy 30 years ago. After the country embarked on its transition from a centrally planned economy to a market economy, it had to combine the three daunting tasks of structural transformation, economic liberalization, and institutional transition into one – i.e., “three into one.” And China did it remarkably well.

China's incremental and experimental strategies for economic reform and pragmatic and gradual liberalization have been unique and unorthodox. This approach has been piecemeal, partial, incremental, and often experimental. It has not been guided by a well-founded theory or followed a pre-determined blueprint. In the late 1980s, many observers predicted that the reforms in China would lead nowhere. The success of China's approach to transition so far has produced many challenges to conventional wisdom in economic theory (Chow 1997; Perkins 2002). This approach violates almost all the basic propositions for a successful transition that were identified by many economists advising the former socialist countries in the early phase of their transition. The success has also puzzled many economists (Nolan 1995). Some economists suggest that China's success poses a challenge to the wisdom of the Washington Consensus which considers stabilization, market liberalization, and privatization as necessary components to a successful transition. The Chinese experience demonstrates the superiority of evolutionary, experimental, and bottom-up reforms over the comprehensive and top-down, big bang approach. Key questions /debates include:

¹ The World Bank, Global Economic Prospects 2009, December 2008.

² This paper uses the new PPP data (2008) and finds that though China is poorer than previously thought, it is no less successful in poverty reduction. The different of PPP conversion factor does not change the conclusion that China has had the largest and fastest poverty reduction in history (World Bank 2008).

- Why have unorthodox reform approaches and openness helped China to achieve the most rapid economic growth and poverty reduction in human history? Have these strategies, including home-grown and “second-best institutions” like Special Economic Zones (SEZs), affected the patterns of trade?
- Has China followed a comparative advantage defying (CAD) or comparative advantage following (CAF) strategy (as defined in Lin, 2007) in the transition process?
- Which positive and negative experiences and lessons from China are relevant for other developing countries?

This study aims to review and synthesize China's reform and trade integration with the world economy, with a focus on China's unique approach to reform (*gaige*) and opening up (*kaifang*) since 1978. **We argue that China's reforms follow the logic of a comparative advantage-following strategy (Lin 2003, 2007), and the logic of “development as a process of learning and innovation” (Wang 2007).**

The framework of the paper is based on the following premises:

- An economy's factor endowments, which are given at any point in time and can be changed over time, are an important starting point for an enquiry about economic development in a country. The factor endowments in an economy determine its total budget and relative factor prices – the two most important economic parameters at any given time. The structure of its factor endowments determines endogenously its optimal industrial structure.
- Development is a process that is full of uncertainties, and even more so is the process of economic transition. Because of this uncertainty and different country specificity, development must be a process of *learning, selective adaptation, and innovation*. When China started the reform, it faced tremendous uncertainty, so it is only natural that the Chinese leaders adopted a pragmatic reform strategy that allowed for nation-wide incubation, trial and error, selection of what worked, and removal of what did not.
- In the transformation from a comparative advantage-defying (CAD) strategy to a comparative advantage-following (CAF) strategy, the optimal industrial structure will upgrade according to the changes in its endowment structure. The upgrading of industrial structure requires learning in areas where it is needed the most (with greater returns). Different from *knowledge*, which is a stock concept, *learning* is a series of actions to acquire knowledge, build capacity, and adapt to new technologies, industries, and institutions. Just as growth is a *flow* concept, learning is a *flow* concept: it involves the accumulation of knowledge in a dynamic process that empowers actors, learners, businesses, local governments, and other entities to take action. Learning itself is a process of upgrading a country's human capital – key to successful industrial upgrading. Learning effort is a function of the expected rate of return in a subsector, market conditions, and the macro environment.

This paper is written for both Chinese readers who are summarizing the 30 years of economic reforms; and an international audience that is interested in understanding “the why” and “the

how” behind China’s economic success. Our special interest is in Africa. Based on our recent visit there, many countries are trying to set up export processing zones and develop industrial clusters, in part through South-South learning from China. Thus, this paper is relevant in terms of how to evaluate objectively China’s experience with trade and investment integration, which may be relevant for the particular circumstances in other countries.

The paper is organized as followings. Section II provides a historical review of China’s development strategy before the economic reforms. Section III reviews China’s dual track reform approach and opening up process, which followed the logic of learning to shift away from a CAD strategy to a CAF strategy. Section IV evaluates the causes behind the rapid trade integration and economic growth. Section V analyzes some positive and negative lessons for developing countries, in particular those in Africa. And the last section concludes with some policy implications.

II. Why Was China Closed? The High Cost of Industrialization Using CAD Strategy

In 1978 when reform started, China was a low-income country with agriculture as its largest sector in terms of employment. This structure is similar to that in many countries in Africa. The Chinese economy at that time was closed, oriented toward heavy industry, had few labor-intensive manufacturing exports, and had to export raw materials such as crude coal, crude oil, minerals, and agricultural products to earn foreign exchange.

China at that time was like other low-income countries in that its endowment structure was one of relative abundance in natural resources and/or unskilled labor, with a scarcity of human and physical capital. In these countries, only the labor-intensive and resource-intensive industries had comparative advantage in open, competitive markets (Ohlin 1967, Heckscher-Ohlin 1991; Lin 2003, Lin and Zhang 2007). Before the reform in 1979, the Chinese government adopted a comparative advantage-defying (CAD) and heavy industry-oriented development strategy. This strategy meant that the economic system in China was distorted and closed.

At the founding of the People's Republic in 1949, the Chinese government inherited a war-torn, agrarian economy in which 89.4 percent of the population resided in rural areas and the industrial sector accounted for only 12.6 percent of the national income. At that time, the heavy-industry sector was the symbol of the nation's power and economic achievement. Lack of industrialization had forced China, India, and other developing countries to yield to the colonial powers. It was natural that the Chinese government and people, like many governments and people in poor countries, would aspire to achieve industrialization. Therefore, the government set the development of heavy industries as high priority.

Heavy industry is capital-intensive. China was a capital-scarce, low-income, agrarian economy in the 1950s. Therefore, capital-intensive heavy industry was not China’s comparative advantage at that time. The construction of a heavy-industry project in a developing country requires a long gestation period, bulky investments, and imported equipment. When the Chinese government initiated this strategy in the early 1950s, the economy had limited capital, a high interest rate,

and scarce foreign exchange. Its exportable goods were limited and primarily consisted of low-price agricultural products. Because the three characteristics of the Chinese economy were mismatched with the three characteristics of a heavy industry project, spontaneous development of capital-intensive industry was impossible.

Policies, institutions, and openness were endogenous. Due to this mismatch, a set of distorted macro policies was required for the development of heavy industry. At the beginning of the first Five-Year Plan, the government instituted a policy of low interest rates and over-valued exchange rates to reduce the costs of both interest payments and imported equipment. Meanwhile, in order to secure enough funds for industrial expansion, a policy of low input prices – including nominal wage rates for workers and prices for raw materials, energy, and transportation – evolved alongside the adoption of the development strategy. The assumption was that low prices would enable enterprises to create profits large enough to repay the loans or to accumulate enough funds for reinvestment. Therefore, private enterprises were soon nationalized and new key enterprises were owned by the State so that it could secure control over profits for reinvesting in heavy-industry projects. *Trade protection was also endogenous.* In order to protect domestic industry, high import tariffs and nontariff barriers were put in place to shield the otherwise nonviable industries from international competition.³ Exporting was considered the only way to earn the foreign exchange needed to import advanced technology. In addition to providing cheap food for industrialization, agriculture was the main foreign-exchange earner. In the 1950s, agricultural products alone made up more than 40 percent of all exports. If processed agricultural products are also counted, agriculture contributed more than 60 percent of China's foreign exchange earnings up to the 1970s. Because foreign exchange was as important as capital for the CAD strategy, the country's capacity to import capital goods for industrialization in the early stages of development clearly depended on its natural resources and agricultural performance.

Low interest rates, high tariffs, and over-valued exchange rates; low nominal wage rates; and low prices for raw materials and living necessities constituted the basic macro policy environment of the CAD strategy.

The above macro policies induced a total imbalance in the supply and demand for credit, foreign exchange, raw materials, and other necessities. The government set plans and administrative controls to allocate scarce credit, foreign reserves, raw materials, and basic commodities, ensuring that the limited resources would be used for the targeted projects. Moreover, the State monopolized banks, foreign trade, and material distribution systems, and was able to mobilize and invest massive resources in heavy industries. More than three-quarters of the population earned a living in agriculture and labor-intensive light industries, which were consistent with the country's comparative advantage. However, agriculture and light industries each received less than 10 percent of State investment in the period 1953-1985, while 45 percent went to heavy

³ The thought that the government in a lagging economy needs to support the manufacturing industry in order to catch up can be traced to the writings of List (1841), the father of the infant industry argument for trade protection. List's thesis and Germany's industrialization experience impressed social elites and national leaders in India and other parts of the developing world, and shaped their thinking about trade policy and the role of government in industrialization (Dhar, 2003).

industry. As a result, the share of heavy industry in the combined total value of agriculture and industry grew from 15 percent in 1952 to about 40 percent in the 1970s.

The high cost of early industrialization. Judging from China's sector composition, the *trinity* of the traditional socialist economic structure – a distorted macro-policy environment, a planned allocation system, and micro-managed institutions – reached its intended goal of accelerating the development of heavy industry. However, China paid a high price for such an achievement. The economy was very inefficient due to low allocative and technical efficiency. The most important indicator that reflected this inefficiency was the extremely low rate of total factor productivity growth. A World Bank study shows that, even calculated using the most favorable assumptions, the growth rate was merely 0.5 percent between 1952 and 1981, only a quarter of the average growth rate of 19 developing countries included in the study (World Bank 1985a). Moreover, the total factor productivity of China's state-owned enterprises (SOEs) was in a state of stagnation or decline between 1957 and 1982 (World Bank 1985b).

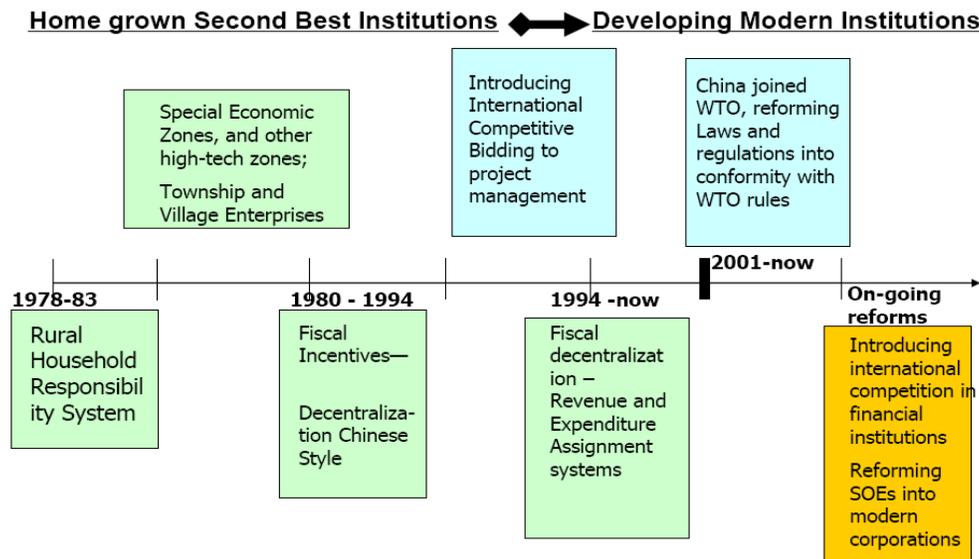
In summary, although the adoption of a CAD strategy can in some cases establish some advanced industries in developing countries, it inevitably leads to inefficient resource allocation, suppresses worker incentives, provides fertile grounds for rampant rent-seeking and corruption, leads to mushrooming nonviable enterprises, and causes deterioration in income distribution and poor economic performance. In the end, there is “more haste, less speed.” The adoption of a CAD strategy will not narrow the gap between developing and developed nations; instead, it will widen the gap.

III. Reforms Follow the Logic of Learning and Innovation

China's rapid growth and poverty reduction are attributable to its gradual market-oriented reforms, openness to trade and investment, and transformation from CAD to CAF strategies, which can be ascribed to reforms that followed the logic of learning and innovation to explore its comparative advantage. The reform started with the “easier” reforms, relying on home-grown institutions in rural areas – the household responsibility system (HRS) – followed by an expansion of township and village enterprises (TVEs), gradual liberalization of trade regimes via special economic zones (SEZs), liberalization of prices at the margin, and opening up to the global economy.

The more complex reforms started relatively late in the process: fiscal reforms (1994) and financial reforms (after 2000). (The process is illustrated in Figure 1.) “Crossing the river by groping the stones beneath the surface” became the hallmark of China's economic reform – implementing partial reforms in an experimental manner, often in a few regions, and expanding them on proven success. This gradual reform also explains the relatively stable and continuous contribution of total factor productivity to growth over the reform period.

Figure 1. Institutional Development: From Home-Grown to Modern Institutions



Source: Wang (2007).

First, China's leaders “did not have a blueprint” when they set out to reform the economic system, as Perkins (1988, p. 601) observed. Instead of being designed *a priori*, the choice of specific reform measures and the sequence of transition reflected the government’s pragmatism toward the problems or crises that emerged in the economic system and the opportunities that could be utilized to mitigate or solve the problems.

Second, retrospectively, the transition process in China followed a logical process that is predictable from the internal logic of a Soviet-type economy (Lin, Cai, and Li, 2003, Chap. 5).

The Chinese approach in essence is a “micro” first approach (McKinnon 1995), which is different from the “macro” first approach to transition. In China, the transition started with improvement of incentives through decollectivization of agriculture, improvement of governance of state-owned enterprises by expanding enterprise autonomy, improvement of resource allocation by the promotion of non-state enterprises that face hard budget constraints, and introduction of a dual-track system for prices and the exchange rate before their liberalization.

Third, the reform process in China followed the logic of learning and experimentation, in which all economic agents – including local governments and the private sector – are encouraged to try and solve the pressing issues during the transition. “Let a thousand flowers bloom” and try to solve the problems in the sectors that need it the most.

Kaufman and Wang 1995 developed a simple model for human capital production in which the gain in learning is a function of demand for and supply of sector-specific knowledge, as well as

indicators reflecting market conditions and the macro-environment. Intuitively, an economic agent, be it an individual or a firm, is motivated to learn in a specific sector if the expected rate of return from engaging in that sector is higher than the financial and opportunity costs of learning. When prices are liberalized, learning gain is the largest (rate of return highest) in sectors where the price differentials are the highest, provided there are clearly defined property rights, freedom of entry, labor market flexibility, and a stable macro environment. That is,

$$L_i = f(R_i, M_i; Macro)$$

where learning in sector i is a function of the expected net rate of return in sector i , the market conditions in sector i ,⁴ and a vector of variables reflecting the macro-environment in the country, including property rights, openness, law and order, inflation, national security, etc. The rate of return, R , in sector i would in turn depend on the level of price differentials between domestic and imported goods, cost structure, and ultimately, whether the country has comparative advantage in this sector. Where there is a large price difference, the incentive for learning would be high.

We submit the hypothesis that in China, private sector learning happened most rapidly in sectors where prices were liberalized early on, and entry and exit were allowed. And this was in the labor intensive sectors. From the following discussion, one can see that this is the main reason why China is able to catch up in these sectors and to become more successful in labor-intensive exports.

3.1 In Terms of Institutional Transition, What Happened and When?

The institutional reform and opening up processes are intertwined. This section examines the two processes separately and step by step. In terms of the sequence of China's transition, the country conducted the easier micro-management reforms first, and then moved to the more complex macro-policy environment issues at a later stage.

(a) The micro-management system reforms

The most important change in the micro-management system was the replacement of collective farming with a household-based system, now known as the household responsibility system (HRS). In the beginning, the government had not intended to change the farming institutions. Starting in a village in Anhui in late 1978, HRS was scaled up to 45 percent in 1980, and to 98 percent in 1983. The land lease was limited to only one-to-three years at the beginning, later extended to 15 years, and later to 30 years after the expiration of the first contract. Empirical estimates show that almost half of the 42.2 percent growth of output in the cropping sector in 1978-84 was driven by productivity change brought about by the reforms. Furthermore, almost all of the above productivity growth was attributable to the changes resulting from the

⁴ M could be a vector of variables reflecting the degree of freedom for entry and exit, investment climate, market size, or proximity to a large market, infrastructure, concentration, and labor market condition in that sector i .

introduction of the household responsibility system (Fan 1991; Huang and Rozelle 1994; Lin 1992; McMillan, et al. 1989; Wen 1993).

Unlike the spontaneous nature of farming institution reform, the reform in the management system of the SOEs was initiated by the government. These reforms have undergone three stages: the initial expansion of enterprise autonomy in 1984-86; a formal contractual responsibility system (1987-1992); and the “corporatization” process from 1993 to the present, in which small SOEs were sold to the private sector (according to the Zhucheng model), and large SOEs were restructured and listed in the equity market through IPOs (*zhuada fangxiao*). Production function estimates in several studies find that for industry the increase in enterprise autonomy increased productivity in the SOEs (Chen et al. 1988; Gordon and Li 1989; Dollar 1990; Jefferson et al. 1992; Groves et al. 1994; Li 1997, and Wang and Yao 2003). Therefore, the reforms in the micro-management system in both agriculture and industry have created a flow of new resources, an important feature of China's reforms.

An unexpected effect of the relaxation of the resource allocation mechanism was the rapid growth of non-State enterprises, especially the TVEs. Rural industry already existed under the traditional system as a result of the government's decision to mechanize agriculture and develop rural processing industries to finance the mechanization in 1971. In 1978 the entry and exit of TVEs were allowed in a large number of sectors, and the output of TVEs consisted of 7.2 percent of the total value of industrial output in China. In 1981-91, the number of TVEs, employment, and total output value grew at average annual rates of 26.6 percent, 11.2 percent, and 29.6 percent, respectively. The annual growth rate of TVEs in total output value was three times that of the State firms in the same period. In 1993, the output of TVEs accounted for 38.1 percent of total industrial output in China. The share of industrial output from nonstate enterprises increased from 22 percent in 1978 to more than 75 percent in 2003 (see Figure 2).

Figure 2. Rapid Development of Township and Village Enterprises in 1978-2007: Initial Form of the Private Sector



Source: Based the China Statistical Yearbook, 2008.

The rapid entry of TVEs and other types of nonstate enterprises exerted pressure on the SOEs and triggered the State's policy of delegating more autonomy to the SOEs. And the development of TVEs and non-State enterprises significantly rectified the misallocation of resources. In most cases, non-State enterprises had to pay market prices for their inputs, and their products were sold at market prices. The price signals induced non-State enterprises to adopt more labor-intensive technologies and concentrate on more labor-intensive small industries, much more so than they did on SOEs. Therefore, the production structure of non-State enterprises was more consistent with the comparative advantages of China's endowments.

(b) Reforms of the macro-policy environment

In the trinity of the traditional economic system, the distorted macro-policy environment was linked most closely to the development strategy, and its effects on allocative and technical efficiency were indirect. The reforms of the macro-policies were thus the most sluggish. We will argue later that most of the economic problems that appeared during the reforms – for example, the cyclical pattern of growth and rampant rent-seeking – can be attributed to the inconsistency between the distorted policy environment and the liberalized allocation and semi-private enterprise system.

Changes in the macro-policy environment started in the commodity price system. Material supplies were progressively de-linked from the plan, and the number of controlled items was incrementally reduced. Centralized credit rationing was also delegated to local banks at the end of 1984. The government introduced the dual-track price system that year, which allowed the SOEs to sell their output in excess of quotas at market prices and to plan their output accordingly. The aim of the dual-track price system was to reduce the marginal price distortion in the SOEs' production decisions while leaving the State a measure of control over material allocation. As the share of a commodity that was allocated under the planned price was gradually reduced due to the growth of non-state sectors and the outside-the-plan production activity of the SOEs, the government would then give up the planned price, allowing the price to converge to market prices. By 1988 only 30 percent of retail sales were made at planned prices, and the SOEs obtained 60 percent of their inputs and sold 60 percent of their outputs at market prices (Zou 1992). By 1996, with the exception of a few raw materials and coal, fuel, and transportation, the prices of most commodities and services had been liberalized.

The second major change in the macro environment occurred in the foreign exchange rate policy. In 1979-80, the official exchange rate was roughly 1.5 yuan per US dollar. The rate could not cover the costs of exports, as the average cost of earning one US dollar was around 2.5 yuan. A dual rate system was adopted at the beginning of 1981. Commodity trade was settled at the internal rate of 2.8 yuan per dollar; the official rate of 1.53 yuan per dollar continued to apply to non-commodity transactions. After 1985, the proportion of retained foreign exchange, which was introduced in 1979, was gradually raised, and enterprises were allowed to swap their foreign exchange entitlement with other enterprises through the Bank of China at rates higher than the official exchange rate. Restrictions on trading foreign exchange were further relaxed with the establishment of a "foreign exchange adjustment center" in Shenzhen in 1985, in which

enterprises could trade foreign exchange at negotiated rates. By the late 1980s, such centers were established in most provinces in China and more than 80 percent of the foreign-exchange earnings were swapped in these centers (Sung 1994). The climax of foreign exchange rate policy reform was the establishment of a managed floating system and unification of the dual rate system on January 1, 1994. By that time, 80 percent of foreign exchange had already been allocated through the swap markets. Therefore the significant devaluation at the time of unification did not produce a big shock to the economy. After the Asian financial crisis in 1997, the exchange rate was pegged to the dollar and kept stable. After July 2005, due to the large current account surplus, RMB was allowed to appreciate gradually, from 8.7 yuan to the dollar in 1994, to 6.8 yuan to the dollar in 2008. Since August 2008, due to global financial crisis and economic slowdown, the RMB appreciation has slowed and essentially stopped.

Interest-rate policy is the least affected area of the traditional macro-policy environment.

Under the heavy industry-oriented development strategy, the interest rate was kept artificially low to facilitate the expansion of capital-intensive industries. After the reforms started in 1979, the government was forced to raise both loan rates and savings rates several times. However, the rates were maintained at levels far below market-clearing rates throughout the reform process. Three development banks were established in 1994 to finance long-term projects, imports and exports, and agricultural infrastructure at subsidized rates. The promulgation of the Central Bank Law and the Commercial Bank Law in 1995 and 1996 strengthened the authority of People's Bank of China (PBoC) and provided commercial banks with a legal framework for operation. However, interest rates have been tightly controlled by the PBoC, until recently. The mentality of the heavy industry-oriented development strategy is deeply rooted in the mind of China's political leaders. To accelerate the development of capital-intensive industry in a capital-scarce economy, a distorted macro-policy environment – at the very least in the form of a low interest-rate policy – is essential. The inter-bank lending rate was liberalized first, and then after several years in the WTO and foreign bank competition was introduced, the lending rate has been gradually made flexible.⁵ Until 2003, the state sector received a disproportionate share of credit but only produced 23 percent of GDP, whereas the private sector produced 52 percent of GDP but accounted for 27 percent of outstanding loans (McKinsey Global Institute, May 2006). Currently lending rates to small and medium enterprises are more flexible, but the prime lending rate and deposit rate are not yet liberalized. This low interest rate policy has played an important role in the expansion of China's capital-intensive industries.⁶

3.2 Terms of Trade Reforms and Export Upgrading: What Happened and When?

In contrast to the institutional reforms (*gaige*), the opening up (*kaifang*) process in China's trade and investment can be divided into four stages:

⁵ For post-WTO financial sectors reforms, See, for example, Allen, Qian, Qian, and Zhao 2008, Lardy, B Wang 2006, Yi 200x, Yao, Han and Feng 2008, and Zhao and Wang 2008.

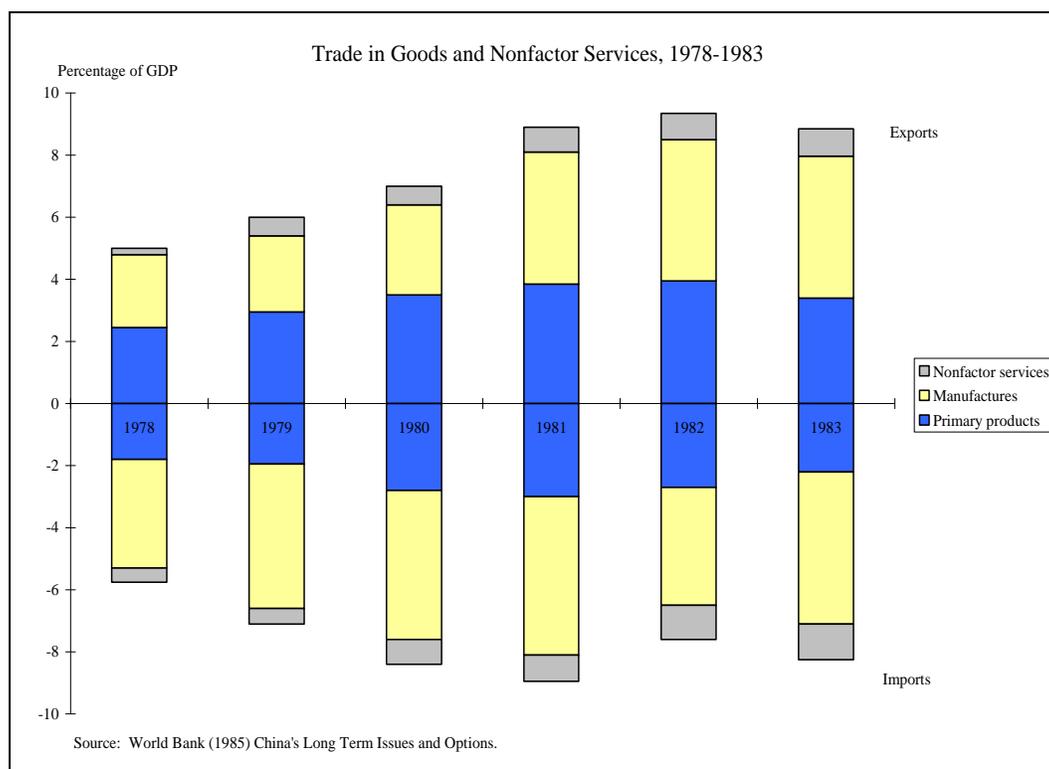
⁶ On distortion in financial structure and industrial structure, see Lin 2008 on "Rebalancing equity and efficiency for equitable and sustainable growth".

- 1979-1987: Reforms aimed to break the State monopoly in trade, to experiment with Special Economic Zones (SEZs), and to provide incentives for exporters. Foreign borrowing and direct investment were encouraged, but FDI was small and mainly (85 percent) from Hong Kong and Taiwan, located in SEZs.
- 1988-1993: Reforms fostered market development, introduced the responsibility system and the shared foreign exchange revenue system to promote export at all levels – the center, local, and enterprises – and the dual exchange rate system was implemented at this stage, and import tariffs were beginning to be reduced.
- 1994-2001: Reforms established the market oriented international trade system, unified the foreign exchange rate in 1994, reduced tariffs unilaterally from an average of 40 percent to 16 percent, and actively prepared for WTO accession.
- 2001-present: There has been rapid growth in trade and foreign investment as a result of China joining the WTO, locking-in liberalization of trade in goods and in services, making China's laws and institutions conform with international standards, and providing a more certain policy and legal environment for investors. Total trade has been expanding at an annual average rate of more than 35 percent, and export structure has been upgrading rapidly since China's accession (Figures A1 and A2).⁷ Total trade value exploded from \$510 billion in 2001 to \$2,174 billion in 2007. China became the third largest trading nation in the world in the same year.

In the late 1970s and early 1980s, China's exports were concentrated in resource-intensive raw materials and primary products, such as coal, crude oil, minerals, grains, and food and vegetables. This was consistent with China's natural endowment at that time (Figure 3 from the World Bank 1985), despite of the government's efforts at building heavy industries. But differing from other low-income countries, China did have some manufacturing exports, and machinery accounted for 5 percent of total exports (Table A1). This was a result of many years of Soviet-type CAD strategy. However, China did not have sufficient home-grown knowledge and skills that were consistent with its comparative advantage, such as how to make labor-intensive textiles, clothing, shoes, and toys that were exportable. Thus, foreign investors, including overseas Chinese, brought this practical know-how about the international market and taught Chinese workers and engineers hands-on skills.

⁷ National Bureau of Statistics and Ministry of Commerce of China.

Figure 3. Initial Conditions: China Was an Exporter of Primary Products in the 1970s
 Manufacturing exports increased after the initial opening of SEZs



It is noteworthy that China's two parallel processes of reforms and opening up have been intertwined, one after another, and mutually reinforcing. The first line of action established four "Special Economic Zones" in the late 1970s, where regulations streamlined for trade promotion and preferential treatment were provided to attract foreign direct investment. The second parallel line of action is domestic fiscal decentralization, which began with a fiscal contract system in which local governments entered long-term fiscal contracts with higher-level governments and retained some of the incremental revenues at the margin ("fiscal reform, Chinese style").⁸ This system, albeit imperfect and eventually replaced by a tax assignment system in 1994, provided large incentives for local governments to develop local economies by opening to trade and foreign investment and learning from them, so that local revenue would grow. The autonomy assigned to local governments included foreign exchange revenue sharing, fiscal revenue retention, approval of investment projects under a certain amount, and expenditure decisions, which gave local governments more opportunities to engage in initiatives promoting the local accumulation of capital via trade, FDI, and development of TVEs (semi-private).

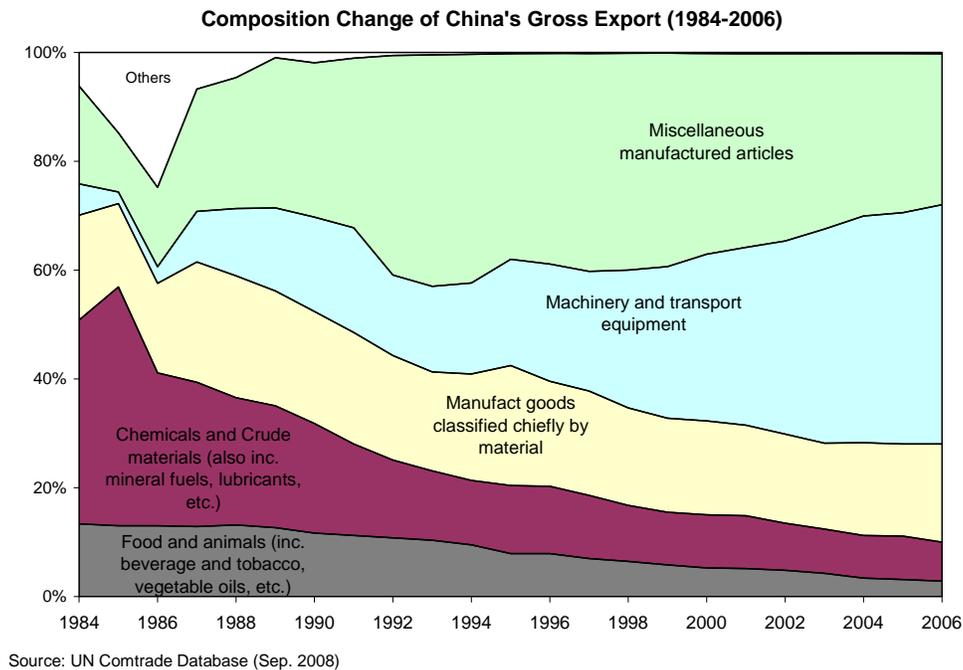
⁸ This argument has been supported by many empirical studies. See for example, Qian and Weingast 1997, Cao, Qian and Weingast 1999, and Qian 2000.

From 1979 to 1991, foreign borrowing dominated FDI. After the establishment of four SEZs, setting up joint ventures and joint cooperation companies were the main mode of cooperation.⁹ During that period, 85 percent of foreign capital came from Hong Kong, Macau and Taiwan, and other Asia countries. Foreign investors played a vital role in providing the market connections on what types of products were needed by the international market, and how to get orders for exports, and how to get access to the technology that is suitable for the development stage of the country. Thus labor-intensive industries were able to expand rapidly.

- The first industrial upgrade happened in 1986, when exports of textiles and clothing exceeded crude oil. This point in history signified China's transition from exporting resource-intensive products to labor-intensive textile and clothing products, which is consistent with China's comparative advantage.
- The second upgrade happened in 1995, when China's export of machineries and electronics exceeded textiles and clothing. This indicated that China started the transition from exporting traditional labor-intensive exports to non-traditional labor-intensive products.
- The third upgrade happened after China's accession to the WTO, when high and new tech exports grew rapidly, and the level of product sophistication increased. The central and local governments conducted regulatory reforms to improve the investment climate, and provided incentives for FDI, export expansion, and private sector development. Many exporters have become an integral part of the global supply chains of multinationals in automobiles, computers, and airplanes (Figure 4). There is, however, a myth on the level of export sophistication, which will be discussed later.

⁹ However, a substantial amount of foreign investment was "round-tripping" investment from domestic sources, trying to take advantage of preferential treatment for foreign investors, and avoid polity uncertainty toward the private sector.

Figure 4. China Has Been Following Its Comparative Advantage: From Raw Materials in the 1980s, to Labor Intensive Manufacturing Products in the Mid-1990s



Source: Based on UN COMTRADE data.

From this process of upgrading, one can see clearly the importance of learning: initially learning from overseas Chinese and foreign investors, and learning by importing, and later, learning by exporting. This is consistent with the theory of CAF strategies. Why?

Since industrial structures are endogenous to the endowment structure of a country, the goal of a government's development strategy should aim to upgrade the endowment structure. Upgrading the endowment structure requires capital to accumulate faster than the growth of labor and natural resources. With the upgrading of the endowment structure, the industrial/technology structure of the economy also needs to be upgraded. As the upgrading of industrial/technology is an innovation by nature, it requires learning and accumulation of knowledge. That is, learning and knowledge accumulation are an integral process in the upgrading of an economy's endowments, technology, and industry.

IV. Why Was China Able to Achieve Rapid Growth?

Both China and Vietnam have been able to maintain rapid growth during the transition process. The above discussion provides us some explanations for the success.

First, micro-institutional reforms have provided the incentives in the SOEs and farms to produce more efficiently, and the macro-management environment has been gradually opened /liberalized, allowing the market price to play a role *at the margin*.

Second, market reforms have allowed prices to better reflect the scarcities in the economy (except in a few cases regarding the interest rate, land, and other resources, and the exchange rate), which in turn allows firms to specialize according to comparative advantage and to compete in the international market. The power of specialization is endless, and China is a living example of it.

The question is, how best to explain the dramatic trade expansion and upgrading of the industrial sector? Has China really followed its comparative advantages? This section will discuss some misunderstandings about China's trade pattern and export sophistication.

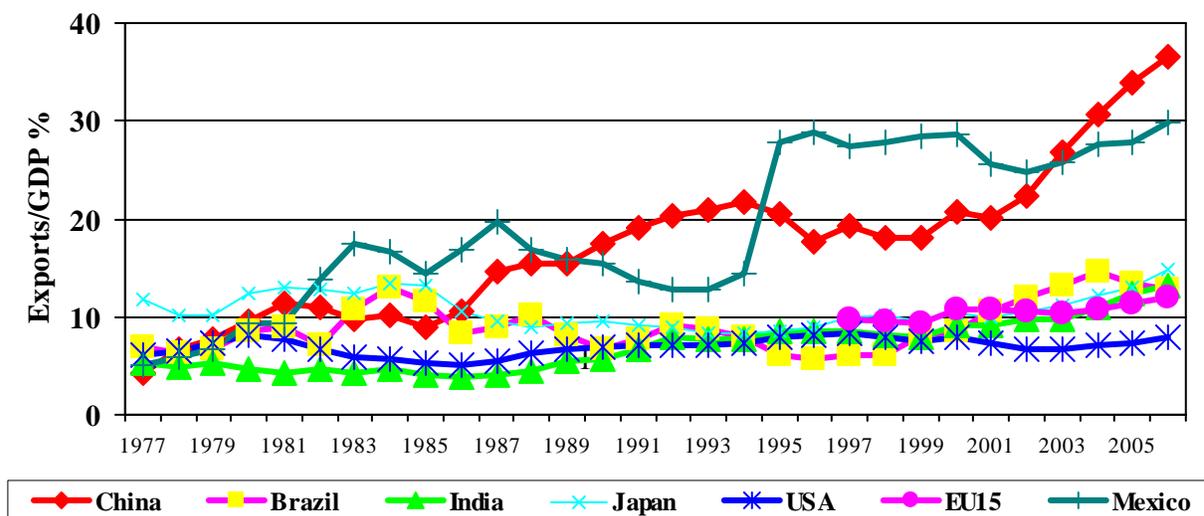
4.1 Measurement Issues of Trade Integration

A commonly used measure for trade integration is the exports-to-GDP ratio. According to this ratio, China is extremely successful: its exports-to-GDP rose from only 9 percent in 1980 to over 36 percent in 2006. However, this ratio may be a misleading indicator of an economy's actual dependence on trade in the presence of processing trade. This is due to the geographical segmentation of world production: Intermediate goods may cross country borders many times before they become exports of final products. This is also why world trade growth has been much faster than global GDP growth in past three decades (Yi, 2003). The fundamental reason is that exports and GDP are measured by different accounting standards. The size of an economy is measured by GDP, which is a net or value-added concept, while exports are still measured in gross terms containing both domestic and imported content.

Figure 5 shows two interesting points. First, the exports-to-GDP ratio for China and Mexico, at 36.7 and 29.8 percent, respectively, in 2006, are extraordinarily high for large economies. This compares with 7.9 percent for the United States, 12.1 percent for the EU, 14.9 percent for Japan, 12.9 for Brazil, and 13.2 percent for India in the same year. Second, the exports-to-GDP ratio of Mexico and China increased dramatically when major trade liberalization packages were implemented: NAFTA in 1994 for Mexico, and China's WTO accession at the end of 2001.

Figure 5 Exports-to-GDP Ratio

(Exports/GDP for large economies in the world, 1977-2006)



Source: Koopman, Robert, Zhi Wang and Shang-jin Wei, 2008a.

Related to the fragmentation of global production, there is a rapid expansion of processing trade in developing economies, especially China. Based on China's customs statistics, processing exports accounted for more than 55 percent of manufacturing exports to the world during past decades. This type of exports is characterized as "importing for export" – firms import parts and other intermediate materials from abroad, duty free, and then re-export the processed or assembled final products to the international market. Ignoring such a difference in production structure will overestimate the domestic value-added share in gross exports for economies that are heavily involved in the global supply chain and processing trade, such as China and Mexico (Koopman, Wang, and Wei, 2008).

4.2 Upgrading Factor Endowments

The third reason for China's success is that it has continuously upgraded its factor endowments by learning and capital accumulation. Capital has accumulated at a faster pace than growth of labor and natural resources, which allows the factor endowments to be upgraded. One of the reasons is improved incentives for reforms in micro management and resource allocation. Productivity and saving have increased dramatically. A second key factor is the inflow of foreign direct investment (FDI). Along with improvement in the investment climate in 1992-2001, FDI exceeded indirect financing, and the number of solely foreign-owned firms increased rapidly. There was a remarkable growth among foreign investors from Europe and North America in the manufacturing sector.

Table 1 shows clearly that China has been augmenting its endowments intensively, both physical and human capital. The accumulation of physical capital has been more rapid than the economic growth rates in both reform periods I and II. Total factor productivity grew more rapidly in reform period I, reflecting rapid institutional change and reallocation of resources to more productive sectors. More recently, physical capital stock grew dramatically in reform period II (2000-2005), although human capital accumulation slowed in the post-reform period. However, unskilled labor is still more abundant, as reflected in the low relative wages for unskilled workers. However, growth accounting analysis also shows that in the recent years, China has been overly reliant on physical capital accumulation, while productivity gains (TFP growth) have declined (Wang and Yao 2003, and OECD 2005).

Table 1. Sources of China's Growth: Augmenting Physical and Human Capital in Addition to Productivity Growth, 1953-2005

<i>Item</i>	Pre-reform (1953-77)	<i>Reform period I</i> (1978-1999)	<i>Reform period II</i> (2000–2005)
<u>Average annual growth rate</u>			
Output	6.12	9.56	9.17
Physical capital stock	6.14	8.97	<u>12.47</u>
Labor	2.24	2.13	1.00
Human capital stock	5.46	2.14	1.28
Total factor productivity	-0.80	2.94	1.79
<u>Contribution to GDP growth (percent)</u>			
Physical capital stock	50.2	56.9	<u>68.0</u>
Labor	18.3	11.1	5.5
Human capital stock	<u>44.6</u>	<u>11.2</u>	<u>7.0</u>
Total factor productivity	-13.1	<u>30.7</u>	<u>19.5</u>

Source: Wang, Yan.and Yao Yudong (2003) and updated by Wang, Yan..

Labor Reallocation and Human Capital Augmentation: Learning Must Be in Sectors Where Prices Have Been Liberalized and Comparative Advantage Exists

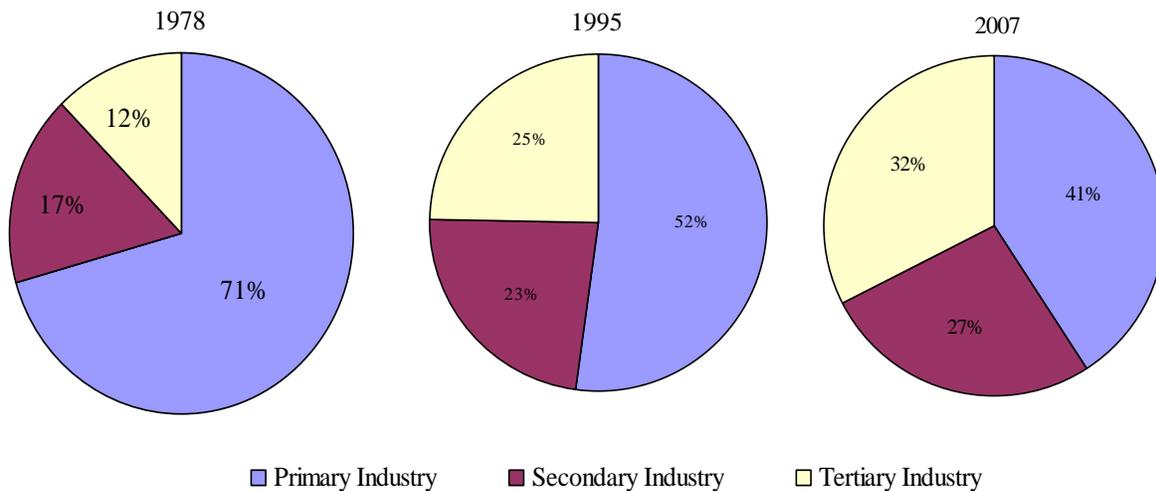
China has invested in the health and education of its population since the founding of the Republic. At the end of the 1970s, the human development indicators of the Chinese population were higher than those of developing countries at the same income level. However, investment in human capital has not exceeded the pace of physical capital accumulation.

The most remarkable feature is the private sector-led learning and catch-up. Since prices in labor intensive sectors were liberalized early in the reform process, learning first happened in those sectors where the cost advantage (or rate of return of learning) is high. In those sectors in the early 1980s, TVEs and small private firms started to learn from the SOEs to meet domestic demand much before they were able to export. This could be considered the stage of “learning for import substitution.” Examples include the better designed clothing produced in Shenzhen, goods for sale in the domestic market, and the upgrading of bicycle companies into motorcycle companies. When domestic prices of these manufactured goods are higher than international prices, there is a huge incentive for private sector firms to learn to produce to meet domestic demand.

Several remarkable features are particularly noteworthy.

- First, private sector development was most rapid in the labor-intensive sectors where prices were liberalized early on, and entry and exit were allowed. New private firms mushroomed in the early stage of reforms, and they were able to learn initially from SOEs and to attract their technological know-how. The SOEs could not compete with the private firms in those sectors, and became nonviable.¹⁰ Between 1981 and 1991, TVEs' annual growth rate in total output value was three times that of the state firms in the same period. By 1993-95, thanks to the famous "Zhucheng model," local governments sold most of the small-to-medium size loss-making SOEs or privatized them without causing large displacement of workers.
- Second, there was a massive reallocation of labor, along with human capital, from public to private and export sectors, from capital-intensive to labor-intensive sectors where the rate of return to learning is higher. Cadres and fresh graduates "plunged into the sea" to seek higher salaries in those sectors where prices and wages are liberalized – which are labor intensive sectors. In particular, there was a massive reallocation of labor from the primary sector to the secondary and tertiary sectors, which are more labor intensive (see Figure 6). Today there is still a huge potential for China to develop its service sector, which is labor-intensive and underdeveloped; the tertiary sector accounted for only 40 percent of GDP in 2007.

Figure 6. The Composition of Employment in China, 1978, 1995, 2007

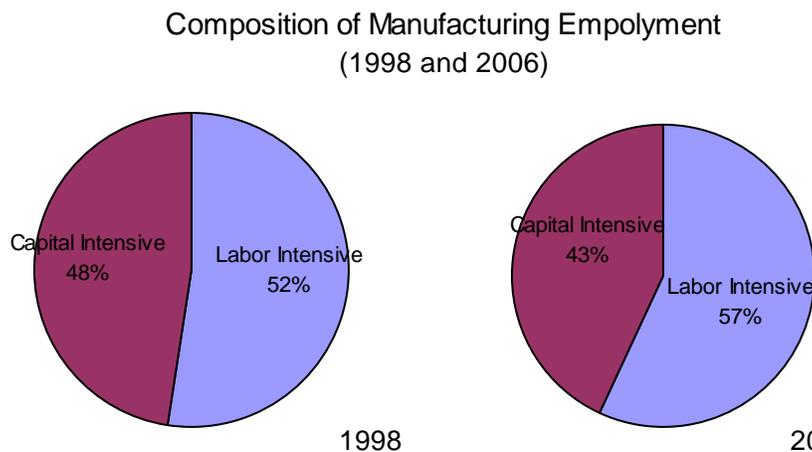


Source: based on data from China Statistical Yearbook 2008

¹⁰ Liberalizing entry and exit is crucial to learning based on comparative advantages, similar to Schumpeter's idea of creative destruction (1942) which stresses new products and new services; and the endogenous growth model where monopolistic rents provide the payoff for research, and better products /services render previous one obsolete (Aghion and Howitt 1992). New entrants with better products /services drive the old firms out, which is good for productivity. (Melitz 2003, etc)

- Third, in the manufacturing sector, there is labor reallocation from capital to labor-intensive subsectors. Figure 7 shows that even when the entire manufacturing industry has shed labor in the recent years (1998-2006), the labor-intensive subsectors – such as apparel, footwear, leather, sporting goods, and furniture – are still expanding rapidly, and gaining larger shares in total manufacturing employment. The share of employment in the labor-intensive sector rose from 52 to 57 percent in total manufacturing. In this period, employment in the manufacturing sector decreased by 1.55 percent, whereas, for apparel, footwear, leather, sporting goods, and furniture, it grew more than 6.5 percent annually. Employment in communications and computer assembly grew remarkably, at 11.6 percent annually. For detailed growth rates by subsector, see Table A3 in the Annex.

Figure 7. Composition of Manufacturing Employment: Labor or Capital-Intensive Sectors



Source: China Labor Statistical Yearbook, various years from 1998 to 2007.

- In addition to labor reallocation, China has been investing in formal education as well as on-the-job learning. Each year, China sends many official delegations for study-tours, although data is sketchy. For example, in order to learn the technology related to the high-speed trains from Siemens, 97 delegations or groups with 580 technicians were sent to Germany between 2006 and 2007, a contract on technological cooperation was signed. On April 11, 2008, China produced its first CHR3 high-speed rail motor-cars, now used between Beijing and Tianjin with a top speed of 350km per hour.¹¹
- Since 1979, when Deng Xiaoping visited US President Jimmy Carter and agreed to expand the student exchange programs, more than 1.2 million students have studied in

¹¹ People's Daily (Overseas edition), page 8, November 24, 2008.

more than 100 countries. According to UNESCO, China has the largest number of students studying abroad, accounting for 1 out of 7 foreign students in the world. In 2007 alone, 144,000 went abroad, of which 129,000 are studying at their own expense.¹² There are also many who joined the “work-study” training programs in Japan. According to the Ministry of Commerce, more than 450,000 work-study students (*Yan-xiu sheng*) went to Japan, received apprenticeship / vocational training, and came back to China. These trained workers and returned scholars have played an important role in China’s rapid growth and export development.

Rapid Physical Capital Augmentation: Market-Driven or Government-Driven?

One special example is the significant investment in infrastructure. The Chinese government’s proactive fiscal policy and public investment have played an important role in infrastructure improvement. During the past 20 years, investment in public infrastructure increased rapidly. For example, in transportation, investment in fixed assets increased from RMB 33.37 billion in 1990 to RMB 1122.45 billion in 2006. Since 1998, total expenditure on transport infrastructure has exceeded 5 percent of GDP annually (World Bank 2007a).

After 30 years of intensive capital augmentation, China now has

- The second longest expressways in the world
- Six out of ten of the largest ports in the world (Table A2).

Better infrastructure has significantly reduced the transportation cost for manufacturing exports, creating a new comparative advantage that other developing nations do not have. This rapid development of infrastructure is partially market-driven and partially government driven, since there is market pressure to lower transportation costs for various localities to be able to export to the international market. Thus, the local governments have an incentive to meet this market demand and build infrastructure for reducing the cost of trade. China’s fiscal decentralization has provided great incentives for provincial and local governments to augment physical infrastructure.

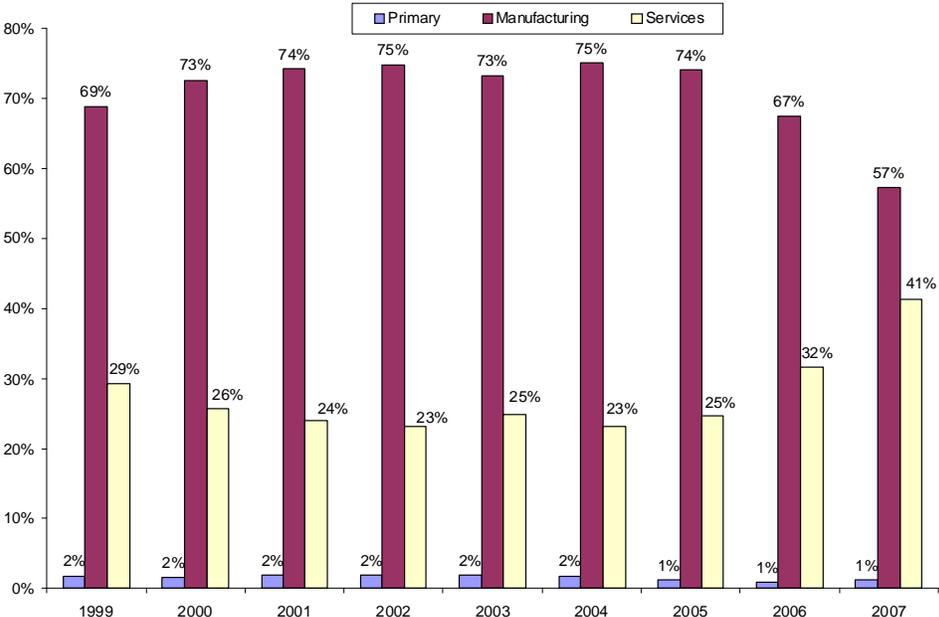
Augmentation by Foreign Direct Investment and Technology

Figure 8 shows that foreign direct investment has been concentrated in the area of manufacturing, while the primary and tertiary sectors have been largely ignored. This pattern of FDI inflow is consistent with China’s comparative advantage, since foreign investment attempts to utilize China’s low-cost labor in order to compete in the international market. China does not have comparative advantage in land-intensive agriculture or most other resource-intensive sectors; thus, the primary sector is not attractive for FDI. And the service sector was protected until recently.

¹² People’s Daily (Overseas edition) page 6, November 28, 2008.

Openness and competition are crucial for learning and knowledge transfer, as there are at least three channels of knowledge transfer: a) technology could be embodied in imported equipment; b) entry of more efficient (foreign) firms could lead to exit of less efficient firms; and c) foreign investors bring not only capital, but also better products/services and practical sector-specific skills. They have the incentives to train workers and managers through apprenticeships and on-the-job training. Following the same logic of learning as described above, when prices are liberalized and entry and exit are allowed, learning gains from foreign investors for the export market are high, and there is a strong incentive for the private sector to learn from foreign investors via joint ventures and learning-for-exporting.

Figure 8. Sector Composition of FDI Stock in China: Concentration in the Manufacturing Sector



Source: based on data from China Statistical Yearbook 2001-2008.

As mentioned earlier, from 1992 to 2001, FDI inflows to China exceeded indirect flows, and the number of solely owned foreign firms rose rapidly. Multinational manufacturing firms from the OECD countries moved into China on a large scale, bringing advanced technology. After China joined the WTO in 2001, this trend continued. Governments at all levels attach more importance to attracting high-tech firms, managerial know-how, and talent. China has become an integral part of the global supply chain, and the manufacturing center of the world.

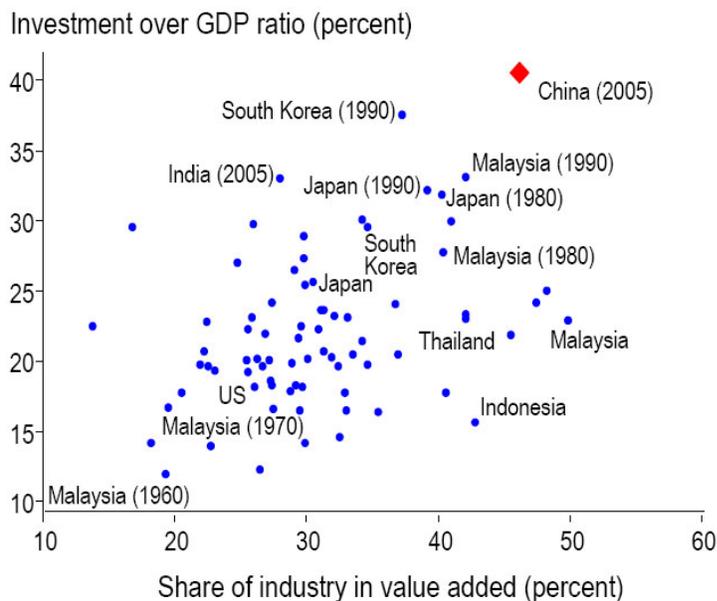
4.3 Caveats: Overinvesting in Physical Capital and Under-Investing in Human and Natural Capital?

However, China's investment is generally considered to be at a higher level than is desirable or sustainable, and many domestic and international observers argue that in order for growth to be sustainable, it needs to be rebalanced away from an excessive reliance on investment and exports, and toward consumption (Aziz and Dunaway 2007).

Currently, a key concern is that the low cost of capital (the real rate of interest is less than half the level of the real GDP growth rate), together with the low cost of other inputs, such as energy and land prices, and externalities such as pollution, have contributed to excessive levels of investment. High levels of investment raise the risk of excess capacity in some sectors, contributing to price declines that in turn could lead to increases in nonperforming loans and associated economic and financial disruptions. Moreover, the low cost of capital has shifted production toward capital intensive methods that entail relatively little job creation, as is evident in the negative job growth in the manufacturing sector.

Figure 9 shows that China is one of the most industry-led economies in the world, second only to Malaysia in terms of share of industry in value added, and its capital intensity is rising, as measured by investment over GDP. The service sector accounts for about 40 percent of GDP, and is stagnating. This pattern of development creates few jobs, and is inequitable and unsustainable, as shown below.

Figure 9. China's Capital-Intensive and Industry-led Economy in the International Perspective



Source: He and Kuijs 2007.

4.4 China's Economic Growth is Too Capital Intensive and Imbalanced

The gross investment share of the economy increased from about 35 percent at the beginning of the decade to a record high of 45 percent of GDP in 2006. Compared with Japan and Korea, China has an unusually high share of investment.¹³ In contrast to the investment share, the private consumption share of GDP declined to less than 40 after the WTO accession.

A World Bank study found that **China's growth pattern is increasingly capital intensive**, with increasingly high levels of saving and investment (He and Kuijs, 2007). China's gross fixed capital formation—in factories, buildings, and infrastructure—has always been relatively high. It increased further from 35 percent of GDP in 2000 to an estimated 45 percent of GDP in 2006. This was combined with a rise in (gross domestic) saving from 37 percent of GDP in 2000 to an estimated 51 percent in 2006. In contrast to conventional understanding, the bulk of China's investment is financed domestically, much of it by enterprises. Conventional wisdom has long held that enterprise investment was largely financed by household savings, and many studies of China's high saving still focus mainly on household savings. However, much of China's high savings is done by enterprises, while the government also saves considerably. With household income around 60 percent of GDP, and with households now saving 25-30 percent of their income, down from more than 30 percent a decade ago, household saving has not been the driving force behind the impressive increase in China's domestic saving rate over the last decade.

A recent IMF Working Paper found that the **decline of household income is the main reason for the decline in the consumption share** (Aziz and Cui, 2007). Despite the remarkably high national economic growth, the share of Chinese household incomes declined across all major sub-categories of wages, investment incomes, and government transfers.¹⁴ In China, wage income consists of more than 86 percent of the total household disposable income. The share of wage income is estimated to have dropped from about 67 percent of GNP in the early 1980s to the current level of 56 percent (Figure A3 and A4). The share of investment income is very small and falling due to several reasons. First, ownership of Chinese firms is not widely held by households. Second, even listed firms did not distribute dividends, but instead reinvested most profits. Third, state-owned enterprises (SOEs) did not pay dividends to the government until recently. Lastly, bank deposits are the main savings vehicle of Chinese households. However, the interest rate on household deposits has been kept very low by the government.

Job creation in China has been relatively slow in contrast to the soaring GDP growth in recent years. In addition to the problem of underemployment in the countryside, unemployment of the urban population is rapidly growing. China's urban unemployment stems from two sources: one is the continuously enlarging urban labor supply due to the combination of the current increase in population and rural-to-urban migration; another is massive layoffs from the restructuring and downsizing of SOEs that are mostly located in urban areas. China's official numbers on unemployment soared to 8.4 million in 2005. However, independent estimates, by

¹³ Lardy, 2006.

¹⁴ Government transfer is part of government expenditure directed to support the poor and vulnerable households such as conditional cash transfers, unemployment benefit, medicare and social security.

Chinese economists using measures similar to those used in market economy countries, suggest that China's urban unemployment rate has been 11 to 12 percent in recent years, almost three times more than the official rate.¹⁵ Low employment leads to low disposable household income.

Income inequality has been rising. While economic growth has brought unprecedented prosperity to China, income inequality has experienced a significant increase. China's Gini coefficient, a standard measure of a country's overall income inequality, increased from 0.30 in 1981 to 0.43 in 2002, and rose to 0.45 in 2005 (Ravallion and Chen 2004, World Bank 2007). This figure represents an inequality level that is higher than that of the United States and Russia. A World Bank report showed that China's income inequality has grown wider in comparison with some other countries (Figure A5). The rapid increase in inequality is in part related to the distortions caused by the partially liberalized price system and the lack of competition in many sectors (Lin 2008). As discussed above, China has been following a low-interest rate policy for a long time, and over 80 percent of low-interest loans have been obtained by the state sector, which is more capital intensive. These low interest loans represent a capital subsidy to make capital cheaper for the state sector, providing incentives for developing capital-intensive products. Fewer jobs are being created in such a capital-intensive industrial structure, and income inequality is higher in part because subsidies are given to owners of capital, not to labor, and in part because of the dual structure farmers are not able to share equally in the benefits of pro-industry and pro-urban growth.

4.5 A Myth about China's Export Structure: CAD or CAF?

Six years after WTO accession, some economists argue that that China's export bundle resembles that of a country with an income per-capita level three times higher than China's (Rodrik 2006). Using another approach, Schott (2008) finds that the overlap between China's exports to the US and those of OECD countries to the US increased from 15 percent in 1994 to 21 percent in 2005. These studies, however, neglect two important caveats.

One caveat is that **foreign invested enterprises** (FIE) have played a very important role in China's trade expansion and industrial upgrading. From 1985 to 2007, the share of FIE's exports and imports increased from less than 10 percent to about 60 percent today (Figure A6). In the trade of certain advanced technology products (ATPs), the share of FIE is even higher. Recently, the United States International Trade Commission (USITC) conducted a study on China's trade in advanced technology products. The results showed that while China ran a \$41-\$49 billion surplus with the US in 2006 based on the US Census ATP definition, a huge gap still exists between Chinese ATP exports to the US and US ATP exports to China. In addition, more than 95 percent of China's ATP exports were processing exports during 1995-2006, more than 90 percent of China's ATP exports to the US were produced by FIEs in China, and about 65 percent of China's ATP exports to the US were from various policy zones in 2006 (Ferrantino et. al., 2007).

¹⁵ Bergsten et. al, 2006.

Another caveat is the practice known as **processing trade**. A large and increasing share of China's exports involve assembling duty-free imported inputs for export, a practice known as processing trade. The share of processing trade in China's exports has risen from 47 percent in 1992 to 55 percent in 2007.¹⁶ The share of processing trade varies across industries. In the high export growth machinery sector, most of this growth is indeed due to growth in processing trade (Amiti and Freund, 2008). Ferrantino et al. (2007) find that 90 percent of China's expanding ATP exports to the US are in processing trade.

The role of processing trade in the upgrading of skills is debatable. Amiti and Freund (2008) calculated the skill content of only those exports that exclude processing trade. Interestingly, they found that, for China's non-processing exports, there was no change in the skill content between 1992 and 2005. Thus **all the skill upgrading observed in total exports was due to the high skill content in the processing trade**. An implication of this finding is that China has a great distance to go before the skill content in its non-processing exports comes even close to that of processing trade.

A recent study has methodologically calculated the total domestic value added in China's exports (Koopman, Wang, and Wei, 2008). It shows that the shares of domestic and foreign value added in total exports are about 50:50, but domestic value added is much lower than foreign value added in processing trade (Figure A8).

- First, the authors estimate that the level of foreign content in Chinese exports is close to 50 percent, almost twice as high as what another group of authors found.
- Second, they find interesting heterogeneity across sectors: those sectors that are likely to be labeled as sophisticated or high-skilled, such as computers, electronic devices, and telecommunication equipment, tend to have an especially low share of domestic content.
- Conversely, many sectors that are relatively intensive in low-skilled labor, such as apparel, are likely to exhibit a high share of domestic content (Koopman, Wang and Wei, 2008b).
- Again, this study reveals that China has gone a long way in upgrading, but it has been only partially successful. China has yet to become competitive with industrial countries in high-tech sectors. In other words, China still has a long way to go in climbing the technological ladder. **This confirms that China's export structure is still consistent with its comparative advantage, if one looks carefully beneath the surface, and differentiates between domestic and foreign value added.**

¹⁶ It is noteworthy that processing exports which are particularly sensitive to the global trade cycle, have been particularly badly affected by the current global downturn, whereas "normal" exports have been holding up better.

V. Lessons Learned from China's Experience

China has experienced dramatic expansion in its trade, and changes in its export composition. In manufacturing, it has moved from labor intensive goods, such as apparel, textiles, footwear, and toys, to more sophisticated manufactured machinery and equipment. What lessons can be learned from China's experience? Are these lessons relevant for Africa?

1. Liberalizing imports alone is not sufficient to jump-start exports. China's average tariffs were not significantly lowered until the mid-1990s, although effective tariffs were reduced for processing trade and SEZs. The Chinese strategy consists of two equally important parts: economic system reform and the gradual opening of its markets to the outside world. Neither one is dispensable for achieving stability and dynamic growth. This is relevant in Africa, as imports are liberalized in many countries but exports have yet to expand. There are many issues related to the development stage the country is in and what comparative advantage the country has, which requires country-specific analysis. In general, a country cannot go beyond its development stage and export in sectors where there is no comparative advantage. In addition, regulatory reforms to reduce entry barriers and institutional reforms to provide incentives for the private sector to invest, learn, and produce for the domestic market must be implemented, before it is possible to export to neighboring countries.

2. Import substitution vs export promotion? It depends on a country's development stage and its comparative advantages. China has experimented with Special Economic Zones and opening to FDI, which allowed the transformation from a heavy-industry and primary goods exporter to labor-intensive manufacturing exporter, consistent with its comparative advantages. Price liberalization and entry and exit played an important role in this process. Many export processing zones (EPZs) have been established in Africa, which is the right step. However, the incentive structure must be in place for the private sector to produce where there is a cost advantage or comparative advantage.

In many African countries, we see large price differentials between imported goods at home and those on the international markets. One example is motorcycles, which offer relatively low-cost transportation and greatly expand the market size for farmers and other producers. Whereas in other countries in Africa, motorcycle use has been minimal with cost prohibitively high, demand for motorcycles has grown in Nigeria in recent years. A roadside assembly operation could generate income of \$9 per motorcycle sold for \$400 to \$700 depending on the model. This is where the learning gain could be large for the country's growth and development. A similar example where there is also a large price difference is water pumps. A country may have to go through a period of "import substitution" in order to meet domestic demand and promote private sector growth, before it can be successful in meeting international demand.

Another example is the computer assembly cluster in Nigeria, with a firm in Lagos importing components, assembling them, and selling them in the domestic market. Having begun with desktops, the firm is now assembling laptops too. Again, it is labor-intensive work with the potential for incremental technological upgrading over time. The computer cluster is now able

to export computers to neighboring countries. (See also Zeng, 2008, on cluster-based growth in Africa.)

3. What African countries should avoid is price distortions over the long run. One of the lessons from China's partial and piece-meal reform is that some distortions were kept for too long, including low interest rates and controlled prices for energy, water, electricity, and land. As discussed earlier, a low interest rate has distorted the financial and industrial structure toward more capital-intensive industries. This could also lead to higher income inequality, as discussed above. Low and subsidized prices for energy have encouraged high energy consumption, low-energy efficiency, and high emissions and pollution.

China has paid a high social and environmental cost for its rapid growth, which arguably could have been avoided. This can be seen most clearly in excessive energy consumption and serious environmental degradation and pollution. A recent World Bank study found that the health cost of air and water pollution in China amounts to about 4.3 percent of its GDP. Adding the non-health impacts of pollution, estimated at about 1.5 percent of GDP, brings the total cost of air and water pollution to about 5.8 percent of GDP (World Bank 2007b). Fully aware of this issue, the Chinese government set up targets for saving energy and reducing pollutant emissions in its eleventh Five-Year Plan. This is of vital importance in efforts to change the pattern of economic growth and to increase energy conservation and environmental protection. However, China fell short of the targets set at the beginning last year for cutting energy consumption per unit of GDP by about 4 percent and total discharge of major pollutants by 2 percent. Energy efficiency declined from the 1980s to the 2000s but rebounded after 2003. To make growth more sustainable, China needs reduce subsidies to energy, water, and land, and rebalance away from heavy and energy-intensive industries toward the service sectors. Fiscal policy can be used to spend more on providing public goods and social services, and encouraging the development of green technology (See Lopez, Thomas and Wang 2008, for details).

VI. Conclusion

"Comparative advantage still explains much, perhaps most of world trade.

However, both traditional location theory and recent work in economic geography generally assume away inherent differences between locations, and instead explain regional specialization in terms of some kind of external economies."

Paul Krugman 1995

One does not need to look far in order to understand China's rapid trade integration with the world. As acknowledged by Paul Krugman, trade between countries with different endowment structures due to different stages of development can be better explained by the Heckscher-Ohlin model. Krugman's own model assumes that the endowment structures are the same across countries (and regions). In a sense, he assumes away the inherent difference in factor endowments. Therefore, in his model trade is determined by (regional) specialization. In fact,

most trade occurs between countries at a similar stage of development, which have a similar endowment structure. That is why Krugman's contribution to trade theory won Nobel Prize. However, his theory is not intended to explain trade among countries with different endowment structures and at different stages of development.

In addition to CAF, what more can China's experience tell us? Market-based learning.¹⁷

China has been a proactive and selective learner. The entire 30 years of reform can be rightly described as a process of learning, selective adaptation/acquisition, augmentation, and industrial upgrading. Experimentation, trial and error, incubation, and innovation have played important roles in its success.

Three more takeaways:

First, the learning process that we stress here should be used to help a country specialize in certain industries that **are consistent with its comparative advantages** so that it can trade not only with countries having different endowment structures, but also with countries having a similar endowment structure. The argument should not be used to support a country that attempts to go against its comparative advantages, determined by its endowment structure, to develop certain capital-intensive or technology-intensive industries to compete with high-income countries. This is because the specialization in a capital-intensive good that a capital-scarce low-income country can reach, a capital-abundant high-income country can also reach easily. With a similar specialization, the capital-intensive good produced by a high-income country will be cheaper than that produced by a low-income country.

Second, to achieve export competitiveness, it is crucial to liberalize prices, and reduce barriers to entry and exit in most sectors, so that private sector firms can select the right subsector and products where they have true comparative advantage. Providing subsidies to certain export industries would make them nonviable and vulnerable to shocks in the external environment. Learning would happen when and where the expected rate of return is high and uncertainty in the macro environment is low. Consistent with the theory of creative destruction (Schumpeter 1942), firms armed with new products and services will drive out firms with obsolete products, and hence gain from learning and innovation. This is the true driver of industrial upgrading.

Third, the pace of reforms, adaptation, and innovation should be commensurate with a country's development stage and regulatory capacity. China certainly did not do everything right during the trials and experimentations of the past 30 years of reforms. It paid dearly in high "tuition." But, as a good student, China has been learning, selectively, from the experiences of other developed and developing countries – learning well and fast. Through learning-by-doing, China is catching up at a pace that is consistent with its institutional capacity and national objectives. It is noteworthy that the pace of reforms has seldom been allowed to go beyond institutional and regulatory capacity. In other words, China has been engaging in experiments that are controllable – one example is China's cautious attitude toward capital account liberalization and financial innovations including securitization (e.g. the initiate-and-distribute model in mortgage

¹⁷ As described in the simple model in Section 2, market-based learning happens when and where there is a cost advantage or comparative advantage. Market is a benchmark for selection.

backed securities). The government has been reluctant to go along with a policy reform that is too complex to be able to be fully understood and controlled by regulators. With the benefit of hindsight, this cautious attitude toward certain complex reforms /financial instruments (such as Credit Default Swaps, CDS and Collateralized Debt Obligations, CDOs) is wise and prudent.

Looking forward, China is now better positioned than it was before to meet complex development challenges by drawing on its own experience as well as the experience of others, and by continuing to combine openness (*kaifang*) with institutional reform and capacity building (*gaige*). Recently there are signs of an accelerating pace of reform: in announcing the \$586 billion dollar stimulus package for growth, policymakers have shown a strong determination to reform fiscal policies to correct the remaining price distortions, including subsidies for water, fuel, and other natural resources. It is thus transforming fiscal policies from aiming for industrialization to focusing on public service provision, in order to build a people-centered and harmonious society. Many new reform measures have been announced to make the growth pattern more equitable and more sustainable. It is for this reason that researchers are confident that over time, the strong commitment to continuous openness and institutional reforms will allow China to make greater inroads in its own national objectives as well as to influence others positively, most notably through South-South learning and exchange of experiences.

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Annexes

Table A1. Initial Conditions: Share of Manufactures in Total Merchandise Export, 1960 and 1981 (Percent)

Country of origin	All manufactures		Machinery and transport equipment	
	1960	1981	1960	1981
United States	63	70	35	44
Germany, Fed. Rep	87	86	44	45
France	73	73	25	34
Japan	79	97	23	57
Yugoslavia	37	79	15	29
Uruguay	29	30	(.)	2
Hungary	66	65	38	31
Brazil	3	41	(.)	18
Chile	4	10	0	2
South Korea	14	90	(.)	22
Thailand	2	27	0	5
Sri Lanka	(.)	21	0	(.)
China	..	53	..	5
India	45	59	1	8
Burma	1	..	0	..

Source: World Bank (1985) China's Long Term Issues and Options

Table A2: Ranking of the World's Largest Ports

TOTAL CARGO VOLUME, MILLIONS OF TONS				
RANK	PORT	COUNTRY	MEASURE	TONS
1	Shanghai	China	MT	537.0
2	Singapore	Singapore	FT	448.5
3	Rotterdam	Netherlands	MT	378.4
4	Ningbo	China	MT	309.7
5	Guangzhou	China	MT	302.8
6	Tianjin	China	MT	257.6
7	Hong Kong	China	MT	238.2
8	Qingdao	China	MT	224.2
9	Busan	South Korea	RT	217.9
10	Nagoya	Japan	MT	208.0

Abbreviations: MT=Metric Ton FT=Freight Ton. RT = Revenue Ton.

Sources: Shipping Statistics Yearbook 2007; Containerisation International Yearbook 2008; U.S. Army Corps of Engineers, Waterborne Commerce of the United States CY 2006; AAPA Surveys; various port authority internet sites.

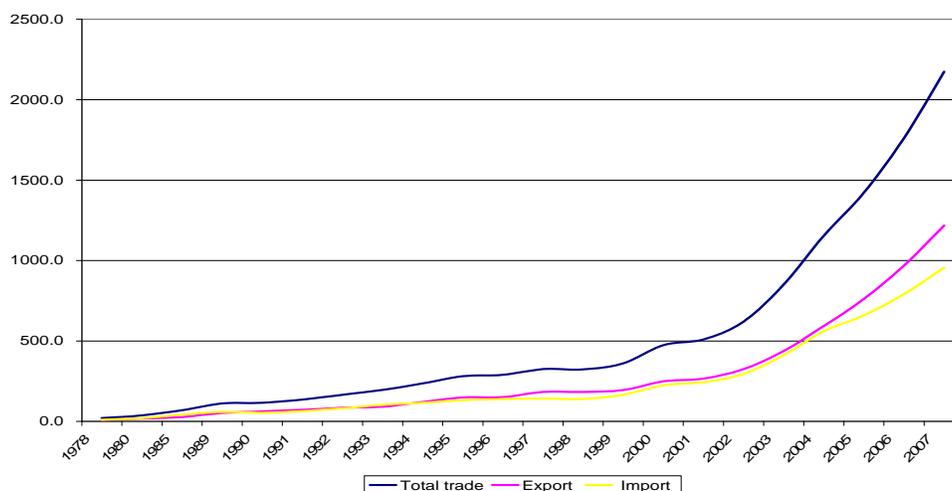
Table A3. Average Annual Change in Manufacturing Employment, and its Labor-Intensive Subsectors (1998-2006)

Average Annual Change in Manufacturing (and subsectors) Employment (1998-2006)

Sector	Average Annual Change
Manufacturing	-1.55%
Processing Food from Agricultural Products	-2.63%
Food Manufacturing	-0.68%
Beverage	-2.90%
Tobacco	-5.13%
Textile	-3.53%
Apparel, Footwear	6.53%
Leather, Fur, Feather Products	6.60%
Wood, Bamboo, Rattan, Palm, and Straw Products	-1.53%
Furniture	8.14%
Paper and Paper Products	-3.62%
Printing and Recording Media	-5.08%
Products for Culture, Education and Sport Activity	5.76%
Medicines	0.81%
Synthetic Fiber	-5.82%
Rubber Products	-3.07%
Plastic Products	0.49%
Non-metallic Mineral Products	-3.34%
Communication Equipment, Computer and Other Electronic Equipment	11.60%
Equipment for Leisure & Office Use	2.13%
Others, (incl Handicraft, Recycling and Disposal of Waste, etc.)	-3.32%

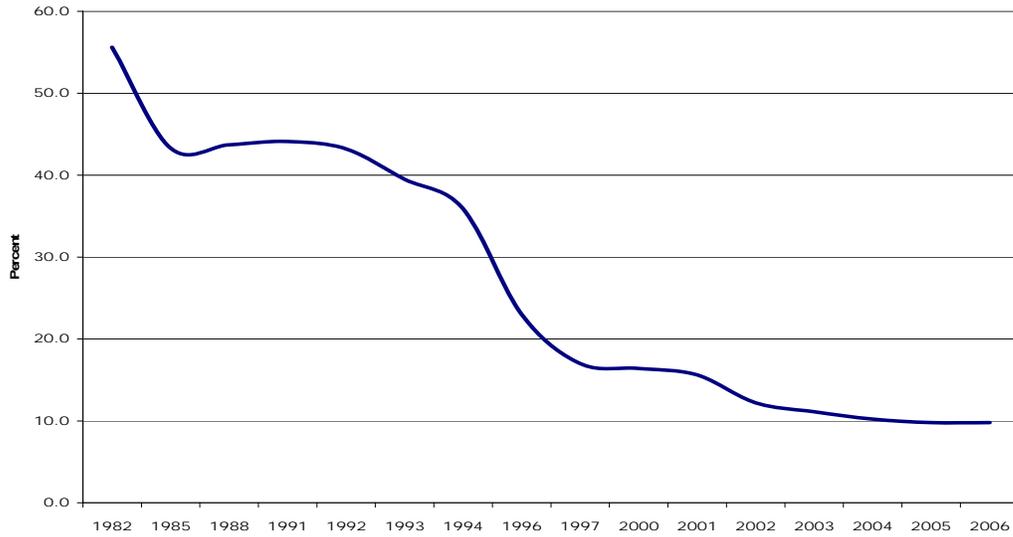
Source: China Labor Statistical Yearbook 1999-2007.

**Figure A1. China's Merchandise Trade from 1978 to 2007
(Billion USD)**



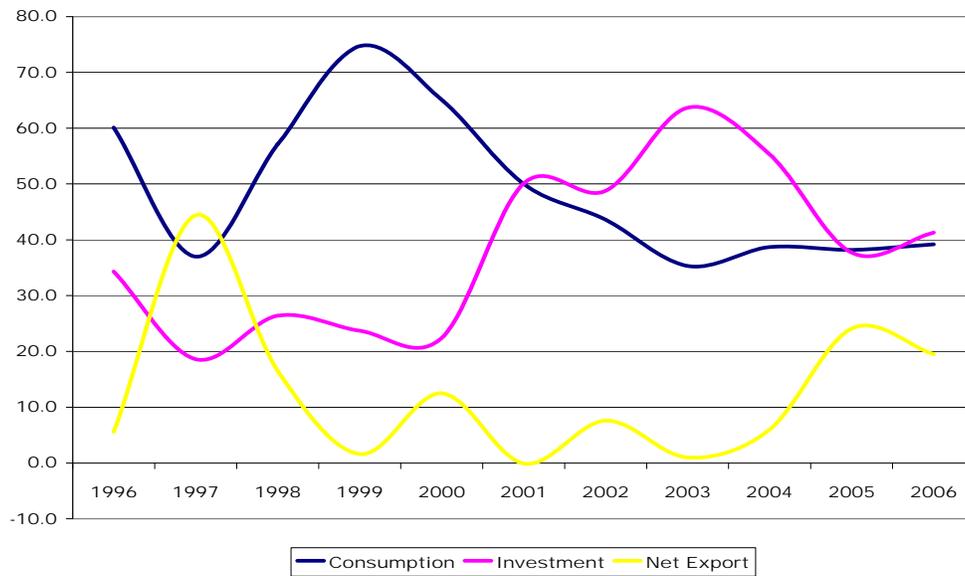
Source: National Bureau of Statistics of China.

Figure A2. China's Simple Average Applied Import Tariff Rate (1982-2006)



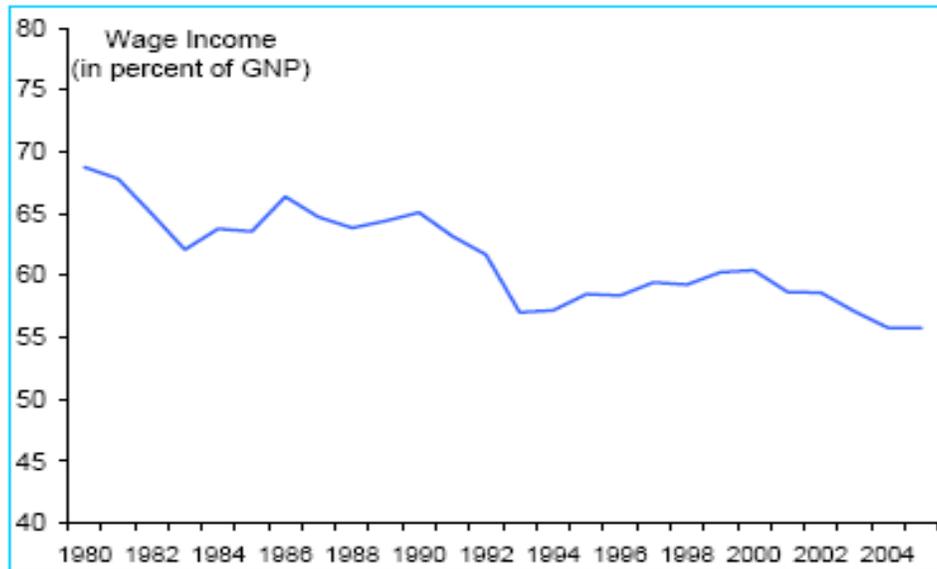
Source: China's Ministry of Commerce.

**Figure A3. China's consumption declined consistently (1996-2006)
(Percent of GDP)**



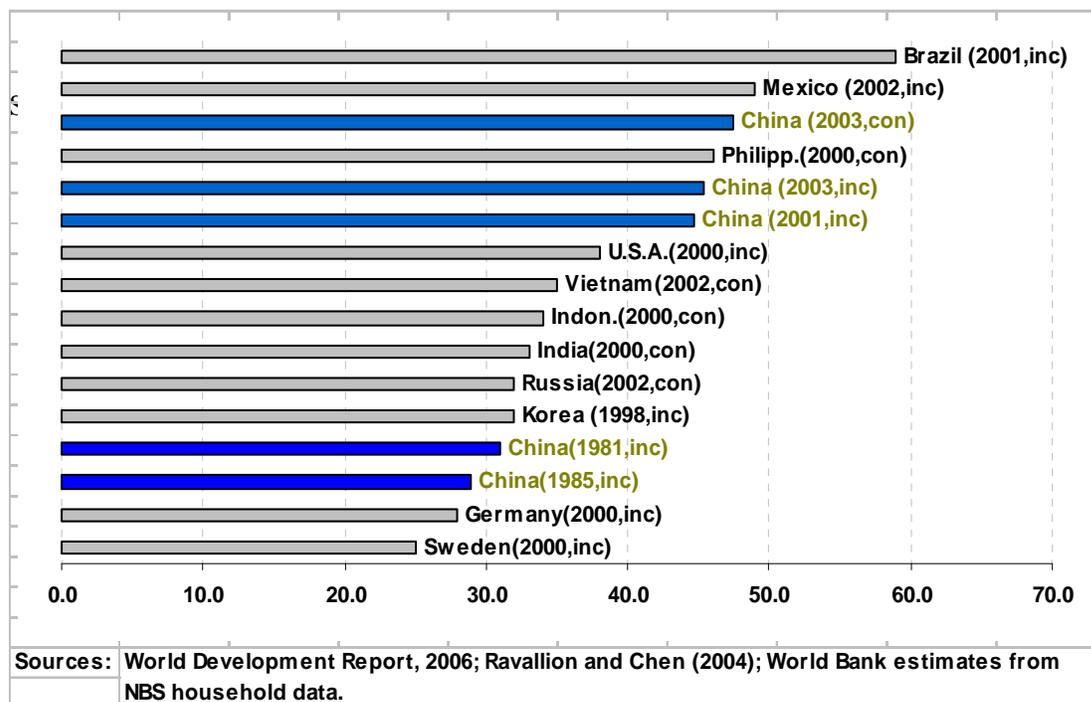
Source: *China Statistics Yearbook 2007*, National Bureau of Statistics of China.

Figure A4. China's Wage Income Share of GNP (Percent)

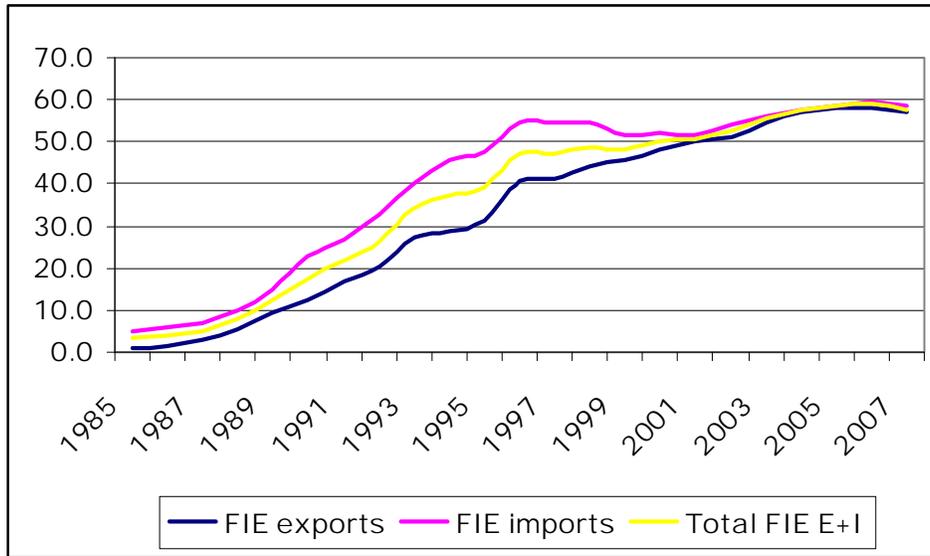


Source: Aziz and Cui, 2007.

**Figure A5. A cross-country perspective on inequality in China
... Gini indices across a range of countries**

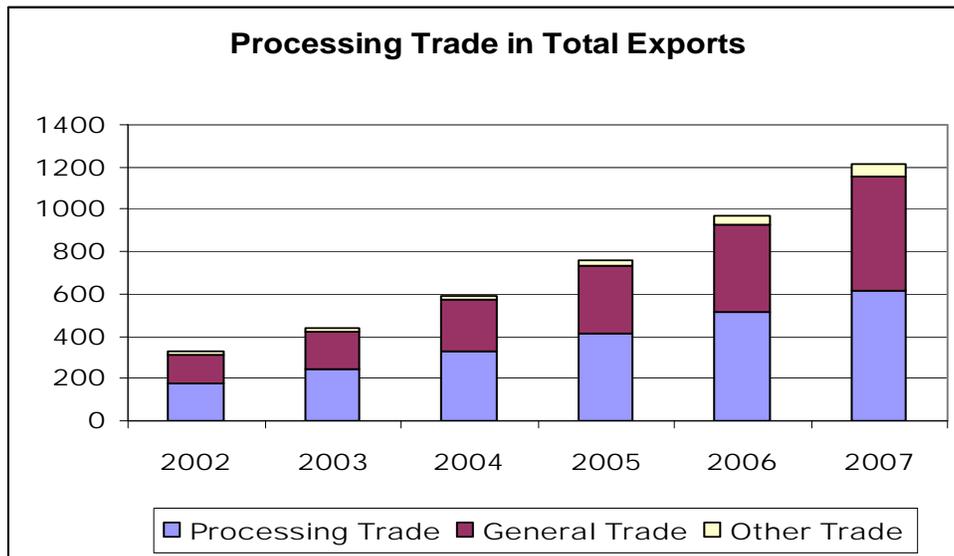


**Figure A6. Trade Share of Foreign Invested Enterprises (1985-2007)
(Percent)**



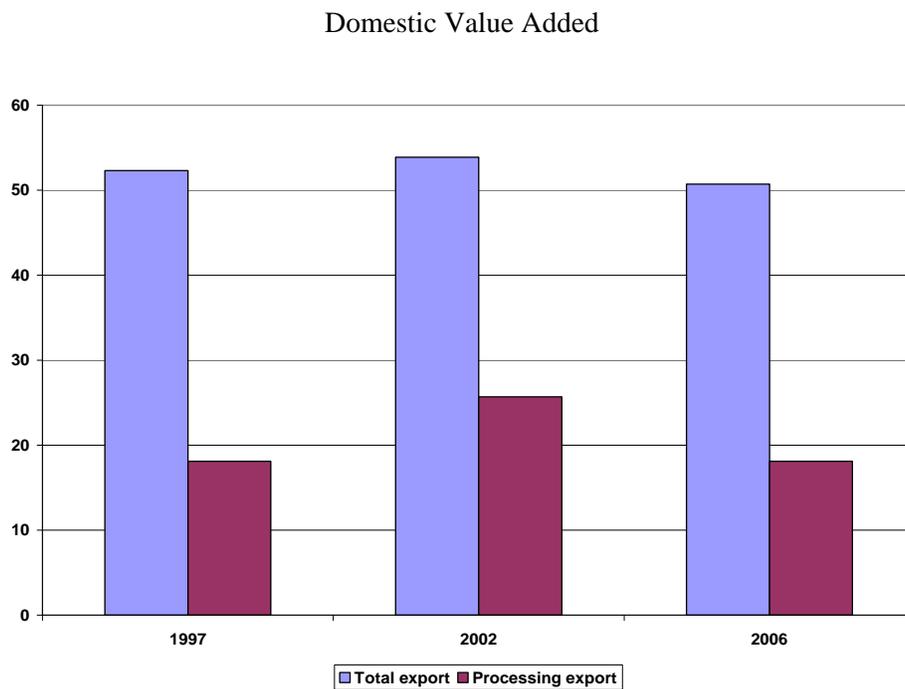
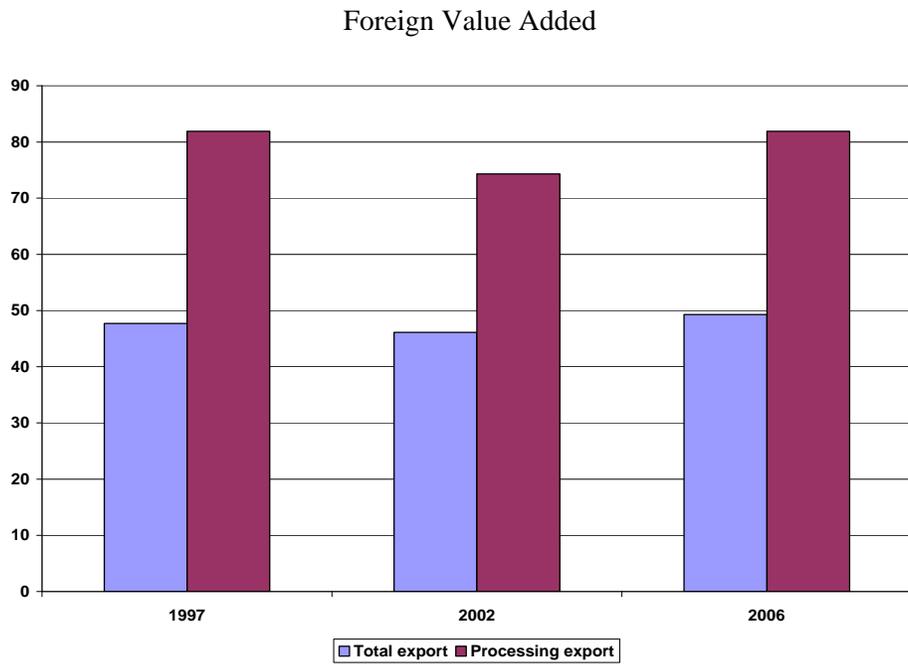
Source: National Bureau of Statistics of China.

Figure A7. The Share of Processing Trade in China (2002-2007)



Source: Ministry of Commerce, China.

**Figure A8. Shares of Domestic and Foreign Value Added:
Total Export vs. Processing Export**



Source: Koopman, Wang and Wei. 2008b.