The Dependence of China's Economic Growth on Exports and Investment

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Abstract
This paper analyzes the growing role played by exports and investment in China's rapid economic growth since 1978. It examines the reasons for the shift over time in China's growth model, which occurred in stages, and it questions the sustainability of the recent dependence on exports and investment. It proposes structural changes in China's growth model and considers the obstacles to such changes.
1. Introduction

China's rapid GDP growth in recent decades has been impressive, averaging 9.8% per year from 1978 to 2007. However, China's growth trajectory poses a number of serious problems including environmental destruction, rising inequality, a high degree of exploitation of the migrant labor force, and weak oversight of product safety. This paper addresses one more problem of China's growth trajectory -- its high and growing dependence on exports, and also on investment, to maintain economic growth.

China's huge export surpluses in recent years have drawn much attention. In 2008 China's export surplus was 7.9 percent of GDP, down from 8.9 percent of GDP in 2007 (China Statistical Yearbook, 2009). While such an enormous export surplus appears unsustainable, not least for political reasons, it is a relatively recent phenomenon. During 1999-2004 China's export surplus was modest, ranging from 2.1 percent to 2.8 percent of GDP. Except for two large surpluses of 4.4 and 4.2 percent of GDP in 1997 and 1998, China previously did not run large export surpluses.¹

The furor over the recent Chinese trade surplus obscures a more long-standing, and ultimately more problematic, dependence of China's rapid growth on external sources of demand in ways that cannot be measured by the size of its trade surplus. Following the adoption of its policy of "market reform" and opening to the world market in 1978, China experienced rapid economic growth. We will show that China's rapid growth was initially based on its domestic market, specifically rising consumption by households and government. However, since 2001 exports have played a major role in China's growth, along with fixed investment. We will raise questions about the sustainability of China's recent growth trajectory, one which is historically unprecedented for a large, rapidly developing country.²
Section 2 explains the methodology used in this paper for analyzing the role of the various components of aggregate demand in economic growth. It presents a case that the importance of external demand to an economy should be measured, not by a country's export surplus relative to GDP, but by the ratio of the domestic content of exports to GDP. Section 3 analyzes the evolution of China's growth trajectory from 1978-2007, which covers the period starting with the "reform and opening" initiated by Deng Xiaoping until the last year prior to the severe economic crisis of 2008. We identify four periods during those years, based on key policy and institutional developments and shifts in the growth trajectory. It is in the last period, from 2001-07, that China's growth became heavily dependent on exports and investment. Section 4 examines the reasons why a growth process that is heavily dependent on exports and investment is problematic for China. Section 5 considers how China's growth path could be altered and the potential obstacles to such a change.

2. Methodology for Analyzing the Growth Process

We regard aggregate demand as an important determinant of long-term economic growth. Conventional neoclassical analysis assumes full employment of resources and the validity of Say's Law, which lead to the conclusion that long-run growth depends entirely on supply side factors. We reject such assumptions as contrary to the actual situation normally faced by market economies. Typically significant resources are unutilized or underutilized, and a higher level of aggregate demand -- or in a dynamic context, a higher growth rate of aggregate demand -- can call forth increased output (or faster growth in output). Labor constraints can potentially be overcome by drawing on the official or disguised unemployed or by shifting labor from sectors having low output growth potential or low labor productivity to sectors that have high growth potential and high labor productivity. Investment can be increased, and with it the growth rate of the capital stock increased, without the need to squeeze additional saving by depressing another component of demand, because increased investment can raise the growth rate of output and
Dependence of China’s Growth on Exports and Investment, July, 2010

Income which generates the necessary additional saving. Furthermore, faster demand growth tends to promote faster productivity growth by stimulating innovation. This is not to say that supply side constraints cannot be binding -- rather, we argue that normally they are not for a market economy, particularly in the long-run.

Rapid economic growth requires rapidly growing aggregate demand, which can derive from rapid growth of one or more of the components of aggregate demand -- household consumption, government consumption, investment, or external demand. ³ It matters which source, or sources, of growing aggregate demand are mainly driving economic growth. There is no single best composition of aggregate demand growth for all countries and all times. However, for a particular country, facing a particular domestic and international context, one composition of growing aggregate demand may be favorable for long-run growth while another poses problems. We shall argue below that China's shift toward a very high degree of dependence on external demand and fixed investment poses serious problems of sustainability.

a. Estimating External Demand and Investment Demand

Measuring the role of external demand in economic growth is not a simple matter. The national income account categories were not designed with the measurement of external demand in mind. In traditional national income accounts, the gross domestic product (GDP) is represented as follows:

\[ Y = C + I + G + X - M \quad (2-1) \]

where \( Y \) = GDP, \( C \) = household consumption, \( I \) = gross investment, \( G \) = government purchases, and \( X \) and \( M \) are exports and imports of goods and services respectively. The term net exports, symbolized by NX, is often used to refer to X-M.⁴

It might appear that the usual national income accounting identity does offer a clear indicator of foreign demand for GDP, namely the proportion of NX in GDP. However, that is not the case. Exports represent foreign demand for goods and services whose final production takes
place in a country. However, not all of exports represent foreign demand for the output of
domestic factors of production, since exports include the value of imported inputs used, directly
or indirectly, to produce exported goods and services. Subtracting M from X subtracts all
imported intermediate inputs as well as imported final goods that are destined for consumption,
government purchases, and investment.

The appropriate measure of foreign demand for a country's output is the domestic content
of its exports \(X_d\). \(X_d\) is the value of exports less the value of all of the imported inputs that are
directly or indirectly used in the production of exported goods and services. That is, to calculate
\(X_d\), one must subtract the value of imported inputs used directly to produce exports, and also
subtract the value of imported intermediate goods used to produce domestically produced inputs
that are used to produce exports, and so on back through the chain of production. Like GDP, \(X_d\)
is a value-added concept that includes only domestic value-added.

Since GDP is a value added measure of a country's output, we can write
\[
Y = C_d + I_d + G_d + X_d
\]
where each of the above four components of GDP is the domestic content of its respective
associated traditional component of aggregate demand or GDP. Equation (2-2) simply distributes
the output attributable to domestic factors of production (which is the GDP) among the four
categories of purchasers of the GDP.\(^5\)

From equation 2-2, it is apparent that, conceptually, the best measure of the ratio of
external demand for a country's GDP to total GDP is \(X_d/Y\).\(^6\) Unfortunately, the measure that is
most conceptually appropriate is not always practical to utilize. To actually measure \(X_d\) would
require an input-output table so detailed that it tracked every imported intermediate good through
all of the successive stages of production including the final disposition of all relevant goods into
either domestic sale or export. No country compiles such detailed input-output tables. Many
countries do produce less detailed input-output tables, from which it is possible to estimate the
In recent years China has produced input-out tables annually, but most are at a relatively aggregated level. In 1997 and 2002 it produced somewhat more detailed tables, which were used in a recent study to estimate the domestic content of its exports (Dean, Fung, and Wang, 2007). That study estimated the domestic content share of China's exports to be 71.7% in 1997 and 64.1% in 2002 (Dean, Fung, and Wang, 2007, table 1). The decline in estimated domestic content share between 1997 and 2002 suggests that China's exports shifted somewhat toward an export-platform type of exports, in which relatively little local value is added to imported inputs. However, some observers of China's business development have argued that recently China has been aggressively substituting domestic for imported inputs. This suggests that one cannot assume that the trend implied by the above estimates has continued since 2002 -- it is possible that the trend has reversed.

In this paper we use the estimates of Dean, Fung, and Wang (2007) in our effort to determine the dependence of China's growth on foreign demand. However, since we want to trace the changes in China's growth model over a period of almost 30 years, since 1978, we will be forced to use rough estimates for most years.

The national income accounting variable for investment suffers from the same problem for our purposes as does the exports variable. The best measure of the share of investment demand in GDP is not I/Y but I_d/Y. We also use the estimates of Dean, Fung, and Wang (2007) to estimate the dependence of China's growth on the domestic content of investment. Appendices A and B explain the methodology used to estimate the domestic content of exports and investment.

b. The Concept of a Leading Component in GDP Growth

In our analysis of the role of demand in GDP growth, we use the concept of leading components in GDP growth. A component of GDP is considered to be leading GDP growth over
a period if it meets two conditions: 1) the component is growing faster than GDP over the period; 2) the component's share in GDP is large enough that its "contribution" to GDP growth over the period is a significant share of cumulative GDP growth over that period.

The "contribution" of any component of GDP -- for example, household consumption -- to GDP growth is defined as follows:

\[
CON_C = \frac{\Delta C}{C} \times \frac{C}{Y}
\]  

The sum of the contributions of all of the components of GDP over a period is identically equal to the growth rate of GDP. The contribution of each component is traditionally measured in "percentage points."

We define the "contribution share" of any component of GDP as its contribution divided by the growth rate of GDP over the period. Thus, if the GDP growth rate over a period is 10 percent and the contribution of consumption is 5 percentage points, then the contribution share of consumption would be 50 per cent -- that it, consumption would have contributed half of GDP growth over the period.

Neither the growth rate nor the contribution share by itself is a good indicator of which components are the leading components of GDP growth. If a component is growing faster than GDP, its growth can be thought of as "pulling up" the overall GDP growth rate, but if that component is a small share of GDP, then the "pull" would be very weak as would be shown by the low contribution share for that component. On the other hand, a component that is both growing and represents a large share of GDP will necessarily make a relatively large contribution to GDP growth, yet if it is growing more slowly than GDP, it would be "pulling down" the GDP growth rate. ⁷

As was noted above, there is a problem with the traditional components of GDP considered as demand for GDP. The four positive components of GDP -- C, I, G, and X -- are all
hybrids, which include demand for GDP as well as demand for imports. Despite this problem, we will examine the traditional components of GDP, since data are not available for each year for more appropriately defined components. However, since we are particularly interested in the roles of exports and investment, we will supplement the data on the traditional components of GDP with estimated series for the domestic content of exports (X_d) and the domestic content of fixed investment (IF_d).8

3. China's Changing Growth Model since 1978

During the reform and opening period, which we will analyze from 1978 to 2007, China's growth trajectory shifted from one based primarily on rapidly growing domestic consumption to one driven by exports and investment.9 This shift did not take place gradually or evenly. One can identify several stages in China's growth model during this period, based on important events and institutional or policy changes.10 In this section, we identify four distinct stages, or periods, in the evolution of China's growth model, and we examine the main events and the policy and institutional changes that underlay the shifts in the growth model.11 For each period, we will determine which component or components of GDP played the leading role in economic growth.

Figures 1 and 2 show the shares of GDP for C (household consumption), G (government consumption), IF (fixed investment), X (exports of goods and services), and M (imports of goods and services) for each year from 1978-2007.12 Figure 3 shows the annual growth rate of real GDP during that period. If the share of a component rises from one year to the next, that means it has grown faster than GDP and is a candidate for a factor that is leading growth. Table 1 provides the annual growth rates of GDP and its components including the estimated components X_d and IF_d.13 For a component whose share of GDP is rising over a period, one can consult table 1 to see how much faster it is growing than GDP as a whole.

[Insert Figures 1, 2, and 3, and Table 1 here]

and 2001-07. To supplement the information in figures 1-3 and table 1, which are based on annual data, tables 2 and 3 provide data on each of the 4 periods as a whole. Table 2 shows the average annual growth rate of GDP and of each component for the 4 periods, as well as the average rate of change over the period in the value of the RMB against the US dollar and the average value of official net exports as a percentage of GDP over the period. Table 3 provides the contribution shares of each component over the 4 periods. Note that table 3 includes the contribution share of the component "increase in inventories," a component that cannot be included in the growth rate tables since that variable can assume a negative or zero value.

[Insert Tables 2 and 3 about here]

1. 1978-88 Balanced, Domestic Market-Led Growth: This period begins with the start of the reform and opening and ends the year before the Tiananmen Square Event disrupted China's economy and society in 1989. Table 2 shows that during the first decade the three domestic components of demand grew at approximately the same rate as GDP, with household consumption rising the fastest of the three. While exports grew at 20.6% per year and estimated \( X_d \) grew at 18.5% per year, because of the relatively low share of exports in GDP this had a small impact on GDP growth, with the estimated domestic content of exports contributing only 12.3% of GDP growth over the period. This implies that the domestic content of domestic spending contributed an estimated 87.7% of GDP growth over the period. Household consumption contributed slightly over half of GDP growth over this decade.

This period of balanced domestic market-led growth resulted from the character of the early reforms, which began in the agricultural sector. In order to gain political support for the reform, the government carried out policies to increase the income of common people, especially the peasants. This was done by increasing the price of agricultural produce purchased by the state. The result can be seen in Table 4, column 2, which shows a double-digit growth rate of the net real income of rural households every year from 1979 through 1984, after which the growth
rate slowed. Urban disposable income grew even more rapidly over the period, with rapid growth continuing after 1984 (tables 4 and 5). Table 5 shows that, from 1978 to 1988, total household income grew more rapidly than GDP. This enabled household consumption to play the leading role in GDP growth. As table 6 shows, the ratio of consumption to household income was relatively stable in this period, declining slightly at less than 1% per year. The rapid increase in the income of ordinary people in this period, with their high propensity to consume, accounts for the rapid rise in household consumption.

[Insert Tables 4, 5 and 6 about here]

During this period there were important changes in China's financial system. The banking system was separated from the fiscal system, and the People’s Bank of China became the central bank, with its commercial banking functions and branches transferred to newly established state-owned commercial banks. In 1984 the government announced that the loan quota of these commercial banks would be based on the loans the banks made in the previous year, and this policy would be implemented in 1985. This caused a 49.4% increase in the money supply (M0) in 1984 (Department of Comprehensive Statistics at the China Statistical Bureau, 2005) and the consumer price inflation rate rose to 9.3% in 1985 (see figure 4). At the same time, the market mechanism was allowed and encouraged to play a more and more important role. Lifting price controls became an important item in the reform agenda. This was not only due to the pro-market direction of the reform, but also due to the budget burden of the large subsidies necessary for the price controls. In 1988, the central government partially lifted the price controls, which caused a steeper burst of inflation, with consumer price inflation reaching 18.8% and 18.0% in 1988 and 1989. This rapid inflation would play a role in setting off the Tiananmen Square Event.

[Insert Figure 4 about here]

It was in this period that the gini coefficient first began to register rising income inequality. As figure 5 shows, the gini had remained relatively stable at the low level of 0.29 to
Dependence of China's Growth on Exports and Investment, July, 2010

0.31 during 1978-82, followed by a decline to 0.24 in 1984. Starting in 1985, as marketization gathered steam and rapid inflation began, the gini coefficient reversed course and began to rise. However, it was not until the last year of this period, 1988, that it spiked above its previous range, reaching 0.38 in that year.

[Place figure 5 about here]

2. 1988-91 Investment-Led Slowdown: This short period covers the disruption and slowdown in economic growth following the Tiananmen Square Event. During this period GDP growth slowed down significantly, to a rate far below the overall period average (figure 3 and tables 1 and 2). The main factor slowing growth was a collapse in fixed investment. The share of IF fell sharply in 1989 (figure 1); the level of IF fell by 13.0 per cent in 1989 and rose only by 1.5% in 1990 before resuming rapid growth in 1991 (table 1). Table 3 shows that fixed investment contributed only 6.4% of GDP growth during this period, which was far below its contribution share before or after.

The very rapid inflation of 1988 and 1989 discussed above, which played a role in creating the discontent that broke out in the Tiananmen Square Event, led the government to cut state investment and use other measures to cool down the economy. At the same time, there was a temporary pullback from further economic reform. These policies were quite effective against inflation, which quickly fell to 3.1% in 1990 (figure 4). At the same time, it caused the investment-led growth slowdown in this period. Table 3 shows that increases in inventories in this period contributed 16.2 per cent of GDP growth, which suggests a significant shortage of aggregate demand relative to output, which is the expected result of a strong anti-inflation policy.16

Household consumption also rose significantly more slowly than GDP, contributing to the growth slowdown. Table 5 shows that rural net income grew at only 2.4% per year in this period. While urban income grew at 8.0% per year, total household income grew at only 4.9%
per year, below the rate of GDP growth. Table 6 shows that consumption by households grew more even slowly than their lagging income, as the ratio of consumption to income declined at almost 2% per year.

Two factors worked against the GDP growth slowdown. One was government consumption, which grew almost twice as fast as GDP during this period. However, the biggest factor working against the growth slowdown was a rapid increase in the export share of GDP, which rose from 12.7% to 18.6% of GDP in 1988-91, an increase of almost 50% in just three years (Figure 2). Exports contributed slightly over half of the reduced rate of GDP growth in this period. The estimated domestic content of exports contributed more than one-third of GDP growth. The large jump in exports during this period, which rose by 40.4% in 1990 alone, was directly and indirectly due to the government's devaluation of the RMB that year by 21.3%. This policy-driven jump in exports was the first step toward an increased role for exports in China's growth model.

3. 1991-2001 Investment-Led Growth: This period was bracketed at one end with Deng Xiaoping's famous southern tour in January 1992, in which he called for an acceleration of economic reform, and at the other with China's accession to the WTO on December 11, 2001. In this period, fixed investment played the leading role, growing almost 3 percentage points faster than GDP and contributing 39.3% of GDP growth over the decade. Household consumption grew only slightly more slowly than GDP, while government consumption grew slightly faster than GDP. Exports played a relatively small role in growth. However, the trends in several components of GDP shifted more than once over the period, reflecting changing government policies in response to concerns about inflation and the trade balance.

The investment-led growth that began in 1992 can be explained by a combination of the after-effects of temporarily conquering inflation and, more importantly, a shift in government policy. Having stopped the rapid inflation of the preceding period, the government was free to
ease its policy and promote faster GDP growth. The market mechanism began playing a more and more important role and market forces grew stronger. The state-owned and collectively owned enterprises were required more and more to follow the market mechanism, and the private sector of the economy was growing. By the end of the preceding period in 1991, private enterprises accounted for 9.8% of the industrial output, up from zero in 1978. The market forces inevitably influenced the government and academia. The demand for a liberal market economy grew stronger.

It was against this background that Deng Xiaoping gave his famous series of talks in January, 1992, during a tour of South China. He called for the establishment of a market economy and faster GDP growth. His talks gave a big shock to the Chinese society and government. Soon, the 14th CPC National Congress in October, 1992, officially adopted the market economy as the objective of the reform, which, in turn, encouraged rapid growth of the market forces in the Chinese economy. Figure 5 shows that the gini coefficient rose rapidly in the early part of this period, from 0.35 in 1991 to 0.40 in 1994, when the role of market forces and the private sector was growing, although the gini declined for a few years after 1994.

Deng’s talk and the government’s new move led to a huge increase in investment. In 1992 and 1993, the growth rate of fixed investment was over 30% and the GDP growth rate reached 14.2% and 14.0% in those two years. However, this gave rise to another round of rapid inflation in the following years, as the consumer price inflation rate surged to 14.7% and 24.1% in 1993 and 1994 (figure 4). Facing high inflation and a lot of chaos accompanying the super-fast growth, the Chinese government initiated another round of cooling-down policies in the second half of 1993 by cutting public investment, tightening the money supply, increasing interest rates, and other measures.

At the same time, exchange rate policy began to exert a strong influence on China's growth trajectory. From Figure 2 we can see that between 1978 and 1989 China had an export
Dependence of China's Growth on Exports and Investment, July, 2010

surplus on goods and services only in three years, during 1981-83. This encouraged the Chinese government to devalue the RMB, from 1.68 RMB/USD in 1978 to 3.77 RMB/USD in 1989, 4.78 RMB/USD in 1990, and 5.32 RMB/USD in 1991. Together with the sluggish economic growth and slow import demand growth in 1989 and 1990, the depreciation of the RMB led to an export surplus in 1990. The surplus lasted for three years.

However, in 1993, although the government depreciated the RMB against the USD again from 5.51 to 5.76, China suffered a serious trade deficit of around 2 percent of GDP. During 1992 and 1993 import growth far outpaced export growth, and exports actually declined in 1993 (table 1). This led the Chinese government to accept the argument that the RMB was still over-valued and might cause a dangerously high trade deficit in the following years. Therefore, the Chinese currency was sharply depreciated in 1994 to 8.62 RMB/USD. This was accompanied by export-promotion policies such as a full value-add tax rebate for exports.

These policies, along with the large depreciation of the RMB in 1994, produce a very sharp increase in exports in 1994, of 66.3%. The big depreciation of the RMB contributed to the growing inflationary pressure, which peaked in 1994. In the second half of 1995, the exchange rate of the RMB was revalued. The export tax refund rates were lowered in late 1995 and early 1996 and then the export tax refund was indefinitely delayed later in 1996. All these factors discouraged exporters and led to a slow-down of export growth. In 1996, in real terms, according to our calculation, exports even decreased by 4.6%.

As these policies took effect, fixed investment grew by only 8.2% in 1994 and 6.3% in 1995 (table 1). The GDP growth rate declined to 10.0% and consumer price inflation fell to 8.3% in 1996. In 1997, the government declared they had successfully achieved a "soft landing". In 1998-2001 fixed investment jumped back up to the 9% to 12% range of growth rates. But the Asian financial crisis of 1998 tended to further depress the GDP growth rate, which declined steadily to 7.6% in 1999, before rising slightly in the last two years of this period. Starting in
1998 China experienced a period of several years of price deflation for the first time in the reform era.19

As table 5 shows, over the whole period 1991-2001 household income grew slightly slower than GDP, although as in the preceding period, rural income growth lagged while urban income growth was very rapid. Household consumption also grew only slightly slower than GDP, as the ratio of consumption to household income remained unchanged over the period. It was noted above that government consumption grew slightly faster than GDP over the period, so that the total of private and public consumption changed little, falling from 62.4% to 61.4% of GDP over the decade.

Unlike in the preceding period, exports played a relatively small role in economic growth in 1991-2001. Unlike in the recent period, imports grew faster than exports in 1991-2001 (by 1.1 percentage points per year). While exports, and the estimated domestic content of exports, grew somewhat faster than GDP, estimated $X_d$ contributed only 15.7% of GDP growth over the period. Thus, almost 85% of GDP growth was accounted for by growth in domestic demand. Although the trend toward greater dependence of GDP growth on export growth temporarily halted in this period, exports had become a much larger share of China's GDP than it had been in the first decade of the reform and opening period. During 1992-2001 exports averaged 20.7% of GDP, more than double the 9.3% share during 1979-88.

4. 2001-07 Export- and Investment-Led Growth: This period began with the first year following China's entry into the WTO in December 2001. It was during this period that China's current pattern of growth based on a combination of external demand and investment demand was established, as fixed investment and exports became the main factors accounting for growth.

As figure 2 shows, after 2001 the export share began a rapid and consistent rise. Over the period, the export share rose from 22.7 per cent to a remarkable 38.6 per cent of GDP, despite a fixed exchange rate for the RMB relative to the US dollar from 2001-04 followed by an 8.9%
strengthening of the RMB relative to the dollar in 2004-07. Exports grew at an average rate of 20.9 per cent per year. Imports also grew rapidly, by 17.8 per cent per year. After 2004 a growing export surplus emerged, rising to 7.4 per cent of GDP in 2007. Exports contributed 57.4 per cent of GDP growth, and the estimated domestic content of exports contributed 31.7 per cent of GDP growth, over the period. Thus, our favored measure of external demand indicates that close to one-third of GDP growth over the period was accounted for by growth in foreign demand for China's output.

Fixed investment also grew rapidly in this period. The IF share rose from 34.7 per cent to a truly remarkable 41.0 per cent of GDP from 2001-05, then declined slightly to 40.1 per cent of GDP in 2005-07. IF grew 2.7 percentage points faster than GDP growth, and it contributed 46.5 per cent of GDP growth. Our estimated domestic content of fixed investment contributed 37.7 per cent of GDP growth. Thus, exports plus fixed investment, measured by our estimate of domestic content, together contributed 69.4 per cent of GDP growth.

The share of household consumption fell sharply during this period, from 45.2 per cent to a remarkably low level of 35.6 per cent of GDP. (By comparison, in the USA household consumption is about 70 per cent of GDP.) The share of government expenditure also declined, from 16.2 per cent to 13.4 per cent of GDP. Since we noted above that the estimated domestic content of exports plus fixed investment together contributed almost 70 per cent of GDP growth over the period, we can infer that the estimated domestic content of total consumption, by households and government, contributed only just over 30 per cent of the growth in GDP.

The period 2001-07 had the fastest average rate of GDP growth -- 10.7% -- of the four periods. Also, the GDP growth rate increased every year in the period, reaching 13.0% in 2007. China's export and investment led growth trajectory produced rapid and accelerating GDP growth.

What explains the growing dependence of China's growth model on exports and
investment in 2001-07? In 2001, although the GDP growth rate was still high by international standards, it had been below the long-term average since 1998. Consumer prices had fallen or barely increased since 1998, indicating insufficient demand. The authorities felt pressure to take steps to speed up economic growth.

Facing losses on the part of the state-owned and urban collectively owned enterprises since the early 1990s, the government had initiated a wave of layoffs and privatizations starting in the mid-1990s. At first the layoffs were small, but in 1997 employment fell by more than 3 million in those two sectors and by a remarkable 29.1 million in 1998. The job loss in those two sectors continued at a rate of over 3 million each year through 2005, after which they tapered off. Over the period of big layoffs from 1997 through 2005, employment in state and urban collective enterprises fell by 69.6 million, which was equal to 25% of total urban employment in 2005. During that same period, total urban employment rose by 74.1 million due to rising private sector employment.21 This led to the informalization of the Chinese labor market and sluggish wage increases. As the privatization movement gathered momentum, most of the public enterprises fell into the hands of private owners.

These factors had a fundamental and lasting impact on income distribution. As figure 5 shows, the gini coefficient rose from 0.40 in 2001 to 0.46 in 2006.22 While GDP growth averaged 10.7% per year, the growth rate of household income slowed to 8.7% per year, with rural income growth falling to only 3.4% per year (table 5). Furthermore, the high level of income inequality, accompanied by the growing burden of privatized healthcare, education, and housing, led to a rising saving ratio. As table 6 shows, the ratio of consumption to household income fell at a 2.2% per year rate during 2001-07. All these factors contributed to the low and decreasing household consumption share in GDP in this last period.

With a falling household consumption share after 2001, the Chinese economy could continue to grow rapidly only by relying on rapid increases in other components of demand --
and this requirement has been met by rising export and investment shares after 2001. How was this accomplished? First, in 2001 China joined the WTO. This encouraged international trade, especially exports, and China's manufacturing sector was increasingly drawn toward the export market in the following years. Second, starting in 2002 a real estate bubble developed in China. This promoted more investment in the economy. Third, a huge government infrastructure investment program that had begun in 1998, which entailed building ports, airports, subways, and a new highway system, continued to raise the investment share after 2001. At the same time, the government carried out policies to commercialize the healthcare and education systems and develop the commercial real estate industry, apparently believing these would increase consumer spending. However, these caused the costs to households of health care, education, and housing to grow rapidly, which is widely believed to at least partly account for the rising saving ratio.

Considering the whole period 1978-2007, it appears that China's leaders did not have a detailed plan at the start. Each set of policies and institutional changes had consequences that led to further changes in policies and institutions. For example, marketization made it difficult for state enterprises, with their costly social obligations to their employees, to compete with private enterprises, leading to losses and growing state subsidies, creating pressure to privatize them. By the end of the period, China's economy had not only been transformed from one based on state and collective property and central planning to one based primarily on private property and market forces. China's economy had also been shifted from dependence of economic growth on rising domestic consumption, household and public, to one dependent on exports and investment. By 2007 the sum of exports and fixed investment constituted 78.7% of GDP, and our estimate of the sum of the domestic content of exports plus fixed investment equaled 56.0% of GDP.

4. Why is Growth Dependent on Exports and Investment a Problem for China?

It is widely agreed that China's very large export surplus represents a serious problem and is probably not sustainable for very long. However, it is our contention that, even if China
attains balance in its external account, its high ratio of exports to GDP represents a serious problem. Intuitively it would seem that there should be a problem if a very large country is growing at about 10 per cent a year heavily dependent on exports when the markets to which it exports can be expected to grow at no more than 2-3 per cent per year.

However, it is not so obvious why China's large export share should be a problem if its imports equaled its exports. If one large country has exports that become very large relative to the rest of the world's GDP, as long as that country is buying an equal value of imports from the rest of the world, it can be argued that this just means a high (and rapidly growing) degree of economic integration, and division of labor, have developed between that country and the rest of the world.

In our view, such a high, and growing, degree of economic integration poses both short-run and long-run problems for China. Both kinds of problem stem from the fact that nation-states remain relevant entities in the world as it is. Even in the globally interconnected economy of today, major economic events, and the policy responses to those events, typically originate within countries and states. States make economic policies based on government officials' perception of the interests of the constituencies they serve.

The short-run problem of high export-dependence is that the impact of a serious global recession on a country's economy, transmitted through a decline in the demand for the country's exports, is an increasing function of the share of exports in the country's GDP. It can be shown, based on a simple model, that the multiplier effect of a given percentage decrease in a country's exports on its GDP growth rate is an increasing function of the country's export share in GDP. This potential problem became a real one in 2009, when China's exports plummeted by 15.8% through November of that year due to the severe global recession (General Administration of Customs of the PRC, 2009 -- the Chinese government's response is discussed in the following section).
Apart from the short-run problem of a high export multiplier in time of recession in China's export markets, there is a long-run problem that stems from the following conditions: 1) China has a large economy that has been growing very rapidly; 2) the world economy to which China exports has been growing, and is likely to continue to grow, at a rate far below China's recent growth rate; 3) despite China's shift toward a capitalist economy, there remain significant economic and political differences between China and the developed capitalist countries that have long dominated the global economy; 4) the particular way in which China has become inserted into the world division of labor, as an exporter primarily of manufactured goods and increasingly as an importer of raw materials, poses threats to the interests of the dominant capitalist powers.

A country, large or small, can grow more rapidly than the world economy for a long time without running into problems if its growth is based primarily on its internal market. Rapid growth brings both rising output and rising income. If the output is largely sold within the country, the rising income can buy the rising output. However, even if trade is balanced, a problem will eventually arise for a rapidly growing economy if the country's exports represent a significant share of world trade.

China's exports now are about 2% of the rest of the world's GDP. If China continues to grow much faster than the rest of the world economy, while maintaining its current high export ratio relative to its GDP, China's exports will grow rapidly relative to the GDP of the rest of the world. A simple model based on China's current growth rate and export ratio would project that, after ten years, China would surpass the USA as the largest exporter of goods and services in the world. It seems unlikely that the rest of the world would be willing to absorb Chinese exports at such a high level relative to their GDP within a decade.

As was noted above, such a large increase in the share of China's exports relative to world GDP would imply a significant increase in the degree of economic integration and mutual
interdependence between China's economy and that of the rest of the world, including the leading capitalist powers. There are two reasons why that is likely to be a problem.

First, a very high degree of economic integration and mutual dependence between politically independent countries is unproblematic only if the countries involved have similar economic and political institutions. If that is not the case, then the high degree of mutual economic dependence that would arise with such a trading relationship may be seen as unacceptable by the rest of the world. While China has dismantled central planning, and private companies now produce a majority of its output, it remains a country in which a Communist Party controls the state, the state plays a very active role in guiding the economy, and state enterprises continue to play an important role in key sectors. This has led the capitalists in the developed capitalist countries to have a contradictory attitude toward China. On the one hand, the transnational corporations and banks are enthusiastic about investing in China and reaping the potential profits from such investments. On the other hand, the still existing institutional differences between the Chinese system and that of the leading capitalist countries make the capitalists leery of excessive interdependence with China. In the U.S. the current degree of economic dependence, due to the high and rising share of imports from China in consumer purchases, has already generated a political backlash. If that share continues to grow, it is almost certain that protectionist sentiments toward Chinese imports will become politically dominant.

Second, the nature of the exchange between a country and the world market makes a difference. If goods moving back and forth across a country's border are a relatively diverse subset of all goods, a problem would be less likely to develop. However, China mainly exports manufactured goods, particularly consumer goods. In 2007 94.9% of China's total exports were manufactured goods (Ministry of Commerce of China, 2008a). As is well known, China has a huge reserve of very low wage, relatively healthy, and relatively skilled and well-educated labor. This has enabled China, with suitable accompanying state-directed investments, to rapidly
displace other sources of manufactured goods in many parts of the world. Manufactured goods are a smaller share of China's imports, making up 74.6% of imports in 2007 (Ministry of Commerce of China, 2008b). China has increasingly imported raw materials while exporting finished products. Also, China appears to be rapidly moving up the ladder from relatively low-wage, low-technology sectors of manufacturing toward more technologically sophisticated production processes.

This configuration of exports and imports is likely to be particularly threatening to the interests of capital in the leading capitalist powers. Traditionally the dominant capitalist countries have exported manufactured goods, particularly the most technologically sophisticated ones, while importing raw materials and less technologically sophisticated goods. China's rising exports threaten to disrupt the conventional trade patterns of the global capitalist system, which form part of the basis of the economically dominant position of today's leading capitalist states. In light of the realities of China's export-dependent growth model, in the world as it exists, it is difficult to avoid the conclusion that China is on a path that cannot be sustained in the long-run.

As we have seen, China's growth has recently become dependent on a very high investment rate as well as a very high export rate. Fixed investment has been more than 40 percent of GDP since 2004. Based on a simple model of investment and GDP growth which assumes a fixed capital-output ratio, a 10% GDP growth rate for China would require a 30% ratio of gross fixed investment to GDP. This suggests that fixed investment in China has been about 10 percentage points too high for China's roughly 10% growth rate.

China's very large infrastructure investments would elevate the estimate of a reasonable investment rate above that suggested by a simple fixed capital-output ratio model, since infrastructure capital is very long-lived. However, a large part of capital formation in China does go into creation of new plant and equipment. The likely explanation of why the planners have pushed investment to such a high share of GDP is to provide the demand needed to maintain a
high rate of GDP growth, in the face of a steady decline in the share of consumption in GDP. Another factor may be the effects of China's recent asset bubble in the real estate sector, which has been spurring investment in construction.

If this analysis is correct, then China's very high investment ratio spells trouble ahead. It means that excessive productive capacity is being created and/or there is a very low efficiency of investment. It could lead to an economic crash at some point.

5. Concluding Comments

While China's growth model has brought very rapid growth for thirty years, the direction in which the model has changed over time has made it unsustainable. Export growth must be slowed down. Indeed, the current global recession has already caused a sharp drop in China's exports, which, as was noted above, declined by 15.8% in the first 11 months of 2009 compared to the same period in 2008 (General Administration of Customs of the PRC, 2009). However, part of the government's response to the recession has been an effort to increase incentives for export, such as increasing the tax rebate to exporters.26

The second problem of China's growth model considered here is the increasing dependence on investment. The response of China's government to the sharp drop in exports due to the global recession has centered around a program aimed at further increasing fixed investment. This program has been remarkably successful in the short-run. Despite the big drop in exports, which led to a drop in the GDP growth rate from 9.0% in the third quarter of 2008 to 6.1% in the first quarter of 2009, the stimulus program that was quickly introduced and implemented in early 2009 appears to have succeeded in re-establishing rapid growth. However, the reliance of this program chiefly on accelerating the growth of fixed investment will only worsen the problem discussed above of excessive fixed investment.

Given the constraints on exports and the limits to investment-led growth, if consumption cannot increase to play a much larger role in aggregate demand, then China's rapid growth will
slow down or even stop at some time in the future. Therefore, the growth model of China has to be changed to rely more on domestic consumption, especially when the bursting of the real estate bubble becomes more evident.

In order to encourage consumption, first of all the income of ordinary people should be increased and income inequality reduced. This can be done mainly in the primary and secondary stages of the income distribution process. In order to improve the primary distribution, the Chinese government could, first of all, nationalize or renationalize private and foreign firms, and secondly promulgate, and enforce, stricter regulations in the labor market. The former policy can prevent the surpluses from falling into the hands of a small group of individuals or being sent abroad, instead distributing them to the working people. The latter can secure decent wages and other benefits for the workers, including the large numbers of internal migrant workers who face very low wages and harsh working conditions. Together, these measures would improve the workers’ bargaining power and increase their income. At the same time, the government should increase taxes so that it will have enough revenue to transfer to the people. The share of government revenue in GDP is still low by comparison to international standards, which leaves room for it to grow.

Second, the government should take steps to lower the saving ratio. Or, in other words, it should make the people confident about consuming. To accomplish this, the welfare system should be improved, the health care and education systems should be de-commercialized, and the system for providing housing for the population should be much less profit-oriented. Today many people regard the cost of health care, education, and housing as “three new mountains” on top of them. Therefore, they have to save for possible health problems of themselves and their family members, for their children’s education, and for a decent place to live. Although apparently the Chinese government already recognizes these problems, the policies carried out so far have either not been effective enough, or too slow. The Chinese leadership has stressed
that measures to address these problems are necessary to quell the dissatisfaction of the people and to attain a "harmonious society," but resolving these problems is also necessary for maintaining economic growth.

If the common households have enough money to spend and are sufficiently confident to consume, then consumption will grow faster and the consumption share will recover. More consumption, with appropriate investment and exports, could provide sufficient demand and could potentially lead to a balanced growth model, with an adequate consumption share, in China.28

However, such measures would face serious challenges. The analysis in section 3 above showed that the current growth model arose in response to obstacles to continuing rapid growth that resulted from the basic features of the reform and opening policy as it evolved in an increasingly capitalist direction. Shifting to a different growth model of the type suggested above would require challenging the direction of the structural changes since 1978.

The most serious opposition would come from those groups that have been benefiting the most from the current growth model. Both domestic and foreign capitalists would resist a nationalization policy to defend their ownership and control of the means of production and their right to take the surpluses. They would resist the implementation of strong regulations in the labor market to keep their dominant bargaining position and their freedom to extract as much surplus value as possible. They would try their best to evade taxes to defend their already extracted surpluses. Those people getting rich from the health care, education, and housing sectors would try their best to defend their profits. And those officials enjoying spending government revenue on the so called “administrative expenditure” would resist devoting the revenue to improving the public welfare.

The most serious challenge is that it is the beneficiaries of the current growth model who currently control the most political, economic, and cultural resources and have important
influence on the making and implementation of laws and policies. Therefore, in order to secure the necessary changes in the growth model, a more democratic political, economic, and cultural system would be required. If our analysis is correct, it would appear that China faces a choice. Either significant changes will take place in China's current political and institutional structure relatively soon, or the thirty years of rapid economic growth will come to an end. The latter outcome would itself be likely to result in new political pressures for a change in China's direction of development. Thus, one way or another, it would seem that significant political and economic changes lie in China's future.
A. Estimating the Domestic Content of Exports

The domestic content of exports ($X_d$) for a country is the part of the value of exports that is added by domestic factors of production. As was noted in the text, $X_d$ can be estimated using a relatively detailed input-output table for a country. Dean, Fung, and Wang (2007) estimated the import content of exports ($X_m$) for China for two years, 1997 and 2002, when relatively detailed input-output tables were available. They found $X_m/X$ for China to be 29.3 per cent in 1997 and 35.9 per cent in 2002. Hence, $X_d/X = 1 - X_m/X$ was 70.7 percent in 1997 and 64.1 per cent in 2002 according to their estimate.29

To estimate the value of $X_d/X$ for the other years during 1978-2007, we followed a several-step procedure. Total domestic expenditure $E$ is

$$E = C + I + G$$

(A1)

Total imports, which include both final goods and intermediate goods, are distributed among the components of domestic expenditure and exports. It is reasonable to assume that, for a developing country such as China, the import content share of exports, defined as $X_m/X$, is greater than the import content share of domestic expenditure, since exports presumably must meet a higher standard than goods produced for the domestic market, and hence it is likely that exports rely more on imported inputs. We can check this assumption for the years 1997 and 2002 by utilizing the identity

$$X_m + E_m = M$$

(A2)

where

$E_m =$ import content of domestic expenditure. Equation A2 is an identity because all of imports either become part of a component of domestic expenditure or part of exports.

Having an estimate of $X_m/X$ for 1997 and 2002, we can calculate the estimated value of $E_m/E$ and compare the two ratios. It can be shown that
Utilizing equation A3, we find the following:

$$\frac{X_m}{E} \times \left( \frac{M}{Y} - \left( \frac{X_m}{X} \times \frac{X}{Y} \right) \right)$$

(A3)

As expected, the import share of exports was much greater than the import share of domestic expenditure, by an average factor of 2.5 for the two years. What is useful in this result is that, despite the significant difference between $X_m/X$ in the two years -- a difference of 22.5 percent, the ratios of the import content shares above are very close, differing by only 5.0 per cent.

To estimate the import content of exports in the remaining years, we assumed that the above ratio was 2.5 in every year during 1978-2007. This assumption is probably closer to the mark in the years close to the two years above. For the early part of the period, when China was less developed, the ratio is likely to have differed significantly from 2.5. Hence, our estimates are probably better for the later part of the period than for the earlier part.

Based on the above assumption of a constant ratio of 2.5 for the import content of exports to the import content of domestic expenditure, one can derive the following expression:

$$\frac{X_m}{X} = \left( \frac{1}{1 + \left( \frac{2.5}{E/Y} \times \frac{X}{Y} \right)} \right) \times \left( \frac{2.5}{E/Y} \times \frac{M}{Y} \right)$$

(A4)

Since $X_d/X = 1 - X_m/X$, from A4 it is simple to calculate the estimated domestic content of exports for every year in our period.
B. Estimating the Domestic Content of Fixed Investment

To estimate \( IF_d \) (the domestic content of fixed investment), we assume that the ratio \( IF_m/IF \) is the same as the ratio \( E_m/E \). Using that assumption and the methodology explained in Appendix section A above, we have

\[
IF_m/IF = \left( \frac{1}{2.5} \right) \frac{X_m}{X} \tag{A5}
\]

where

\( IF_m = \) import content of fixed investment.

As above, \( IF_d/IF = 1 - IF_m/IF \).

C. Series for the Components of GDP and for Household Income

1. Exports and Imports

The National Bureau of Statistics of China provides series for GDP, household consumption, government consumption, fixed investment, changes in inventories, and net exports in current RMB, from which the shares of the domestic components of GDP were calculated. However, it does not publish separate series for exports and imports of goods and services as part of the national income accounts. The United Nations Conference on Trade and Development (UNCTAD, 2009) provides series for exports and imports of goods for 1978-2007 and for exports and imports of services for 1982-2007 for China. The authors calculated series for \( X/Y \) and \( M/Y \) (including goods and services) using the UNCTAD series. The ratios for 1978-81 were estimated. Due to differences in definitions of variables between foreign trade series and national income accounts, our series for \( X \) and \( M \) are likely to have some differences from the unavailable national income account values of \( X \) and \( M \). We checked our series for net exports as a percentage of GDP from the UNCTAD data against the series for net exports as a percentage of GDP from the official national income accounts data. The difference between the two series was less than 1% of GDP every year during 1978-2002 and between 1% and 1.5% of GDP during 2003-07.
2. Calculating Growth Rates of Components of GDP

The National Bureau of Statistics of China provides growth rates for GDP in constant RMB but does not provide such growth rates for the components of GDP nor does it provide price indices for components of GDP. We derived the implicit price deflator for GDP and used that price index to calculate series for the growth rate of each of the components of GDP in constant RMB. This is a reasonable procedure for conducting an aggregate demand analysis.

3. Household Income

The National Bureau of Statistics of China does not provide a series for disposable personal income that is comparable to its series for GDP and its components. However, it does provide separate series for the per capita disposable income of urban households and the per capita net income of rural households, as well as population series for urban and rural residents (China Statistical Yearbook, 2008). From these series we calculated aggregate series for household income for rural residents, for urban residents, and for the two combined, which are used in tables 4, 5, and 6. It is likely that the total household income series which we derived would not be identical to a series for disposable personal income based on the national income account conventions, if such a series were available. To obtain real growth rates for our aggregate household income series (used in tables 4 and 5), we deflated the current RMB series using the GDP deflator. Since the resulting real household income growth series is constructed using the GDP price deflator rather than a consumer price index, these real series do not accurately reflect changes in consumer welfare, but they can reasonably be compared to real GDP growth for the purposes of aggregate demand analysis.

To obtain a series for the ratio of household consumption to household income, we used C (household consumption) from the national income account data and our aggregate household income series explained above, both in current RMB. We refer to this as the ratio of consumption to household income, rather than using the common term "propensity to consume,"
since the consumption and household income series are compiled differently. Our series for the ratio of consumption to household income is not an ideal measure, but it was the best available one for analyzing the effects on the share of C in GDP coming from changes in our variable C relative to household income.
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Figure 1. Components of Domestic Expenditure as Shares of GDP

Figure 2. Exports and Imports as Shares of GDP

Figure 4. Rate of Change in Consumer Price Index

Note: Retail price index for years prior to 1985.

Table 1. Growth Rate of GDP and its Components in Constant RMB

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<th>Year</th>
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<th>C</th>
<th>G</th>
<th>IF</th>
<th>X</th>
<th>M</th>
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<td>18.4%</td>
<td>9.0%</td>
<td>21.3%</td>
<td>12.1%</td>
</tr>
<tr>
<td>2006</td>
<td>11.6%</td>
<td>7.4%</td>
<td>7.6%</td>
<td>10.8%</td>
<td>17.3%</td>
<td>10.9%</td>
<td>19.1%</td>
<td>11.2%</td>
</tr>
<tr>
<td>2007</td>
<td>13.0%</td>
<td>10.7%</td>
<td>11.2%</td>
<td>11.3%</td>
<td>14.2%</td>
<td>9.8%</td>
<td>16.5%</td>
<td>12.0%</td>
</tr>
</tbody>
</table>

Table 2. Average Annual Growth Rate of GDP and its Components over Four Periods

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP</th>
<th>C</th>
<th>G</th>
<th>IF</th>
<th>X</th>
<th>M</th>
<th>Xd</th>
<th>IFd</th>
<th>RMB Exchange Rate Growth</th>
<th>Average NX/Y Official*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-88</td>
<td>10.1%</td>
<td>10.6%</td>
<td>9.6%</td>
<td>10.3%</td>
<td>20.6%</td>
<td>20.8%</td>
<td>18.5%</td>
<td>9.6%</td>
<td>-7.63%</td>
<td>-0.54%</td>
</tr>
<tr>
<td>1988-91</td>
<td>5.7%</td>
<td>3.1%</td>
<td>11.2%</td>
<td>1.3%</td>
<td>20.1%</td>
<td>9.9%</td>
<td>19.5%</td>
<td>1.1%</td>
<td>-11.24%</td>
<td>1.43%</td>
</tr>
<tr>
<td>1991-2001</td>
<td>10.3%</td>
<td>9.8%</td>
<td>11.3%</td>
<td>13.2%</td>
<td>12.6%</td>
<td>13.6%</td>
<td>11.5%</td>
<td>12.8%</td>
<td>-4.32%</td>
<td>1.97%</td>
</tr>
<tr>
<td>2001-07</td>
<td>10.7%</td>
<td>6.4%</td>
<td>7.2%</td>
<td>13.4%</td>
<td>20.9%</td>
<td>17.8%</td>
<td>18.7%</td>
<td>12.8%</td>
<td>1.42%</td>
<td>4.85%</td>
</tr>
</tbody>
</table>

* The column for "Average NX/Y Official" is an average, not a growth rate. It is based on the official series for net exports of goods and services.

### Table 3. Contribution Shares of Components of GDP to GDP Growth over Four Periods

<table>
<thead>
<tr>
<th>Period</th>
<th>Average GDP Growth</th>
<th>C</th>
<th>G</th>
<th>IF</th>
<th>X</th>
<th>M</th>
<th>Change in Inventories</th>
<th>Xd</th>
<th>IFd</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-88</td>
<td>10.1%</td>
<td>52.59%</td>
<td>12.50%</td>
<td>31.03%</td>
<td>17.40%</td>
<td>-19.62%</td>
<td>5.28%</td>
<td>12.28%</td>
<td>26.63%</td>
</tr>
<tr>
<td>1988-91</td>
<td>5.7%</td>
<td>27.49%</td>
<td>26.44%</td>
<td>6.48%</td>
<td>51.60%</td>
<td>-25.87%</td>
<td>16.17%</td>
<td>36.52%</td>
<td>5.08%</td>
</tr>
<tr>
<td>1991-2001</td>
<td>10.3%</td>
<td>43.75%</td>
<td>17.00%</td>
<td>39.28%</td>
<td>25.22%</td>
<td>-24.75%</td>
<td>-1.80%</td>
<td>15.70%</td>
<td>33.38%</td>
</tr>
<tr>
<td>2001-07</td>
<td>10.7%</td>
<td>24.17%</td>
<td>10.00%</td>
<td>46.54%</td>
<td>57.44%</td>
<td>-42.75%</td>
<td>2.36%</td>
<td>31.70%</td>
<td>37.67%</td>
</tr>
</tbody>
</table>

Note: The sum of the contribution shares do not add exactly to 100% because the series for X and M, which are from trade data, do not exactly match the national income accounts definitions of those variables. See Appendix C-1.

### Table 4. Annual Growth Rates of Urban Household Income, Rural Household Income, and GDP (percentage)

<table>
<thead>
<tr>
<th>Year</th>
<th>(1) Disposable Income of Urban Households</th>
<th>(2) Net Income of Rural Households</th>
<th>(3) Total Household Income</th>
<th>(4) GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>19.9%</td>
<td>13.7%</td>
<td>15.9%</td>
<td>7.6%</td>
</tr>
<tr>
<td>1980</td>
<td>17.3%</td>
<td>15.5%</td>
<td>16.2%</td>
<td>7.8%</td>
</tr>
<tr>
<td>1981</td>
<td>6.6%</td>
<td>13.2%</td>
<td>10.7%</td>
<td>5.2%</td>
</tr>
<tr>
<td>1982</td>
<td>11.3%</td>
<td>18.5%</td>
<td>15.9%</td>
<td>9.1%</td>
</tr>
<tr>
<td>1983</td>
<td>9.0%</td>
<td>15.1%</td>
<td>13.0%</td>
<td>10.9%</td>
</tr>
<tr>
<td>1984</td>
<td>21.1%</td>
<td>11.0%</td>
<td>14.4%</td>
<td>15.2%</td>
</tr>
<tr>
<td>1985</td>
<td>9.0%</td>
<td>3.5%</td>
<td>5.5%</td>
<td>13.5%</td>
</tr>
<tr>
<td>1986</td>
<td>20.4%</td>
<td>0.7%</td>
<td>7.9%</td>
<td>8.8%</td>
</tr>
<tr>
<td>1987</td>
<td>11.5%</td>
<td>4.9%</td>
<td>7.6%</td>
<td>11.6%</td>
</tr>
<tr>
<td>1988</td>
<td>8.3%</td>
<td>5.5%</td>
<td>6.7%</td>
<td>11.3%</td>
</tr>
<tr>
<td>1989</td>
<td>11.0%</td>
<td>3.1%</td>
<td>6.5%</td>
<td>4.1%</td>
</tr>
<tr>
<td>1990</td>
<td>4.4%</td>
<td>7.2%</td>
<td>6.0%</td>
<td>3.8%</td>
</tr>
<tr>
<td>1991</td>
<td>8.9%</td>
<td>-2.9%</td>
<td>2.3%</td>
<td>9.2%</td>
</tr>
<tr>
<td>1992</td>
<td>15.0%</td>
<td>4.0%</td>
<td>9.2%</td>
<td>14.2%</td>
</tr>
<tr>
<td>1993</td>
<td>11.5%</td>
<td>0.4%</td>
<td>5.9%</td>
<td>14.0%</td>
</tr>
<tr>
<td>1994</td>
<td>16.2%</td>
<td>10.6%</td>
<td>13.5%</td>
<td>13.1%</td>
</tr>
<tr>
<td>1995</td>
<td>11.1%</td>
<td>14.2%</td>
<td>12.6%</td>
<td>10.9%</td>
</tr>
<tr>
<td>1996</td>
<td>12.4%</td>
<td>13.3%</td>
<td>12.8%</td>
<td>10.0%</td>
</tr>
<tr>
<td>1997</td>
<td>11.9%</td>
<td>6.6%</td>
<td>9.4%</td>
<td>9.3%</td>
</tr>
<tr>
<td>1998</td>
<td>12.8%</td>
<td>4.0%</td>
<td>8.7%</td>
<td>7.8%</td>
</tr>
<tr>
<td>1999</td>
<td>15.9%</td>
<td>3.1%</td>
<td>10.2%</td>
<td>7.6%</td>
</tr>
<tr>
<td>2000</td>
<td>12.6%</td>
<td>0.5%</td>
<td>7.6%</td>
<td>8.4%</td>
</tr>
<tr>
<td>2001</td>
<td>12.2%</td>
<td>1.4%</td>
<td>8.1%</td>
<td>8.3%</td>
</tr>
<tr>
<td>2002</td>
<td>15.9%</td>
<td>1.6%</td>
<td>10.7%</td>
<td>9.1%</td>
</tr>
<tr>
<td>2003</td>
<td>11.4%</td>
<td>1.0%</td>
<td>7.9%</td>
<td>10.0%</td>
</tr>
<tr>
<td>2004</td>
<td>8.0%</td>
<td>3.3%</td>
<td>6.5%</td>
<td>10.1%</td>
</tr>
<tr>
<td>2005</td>
<td>8.2%</td>
<td>2.4%</td>
<td>6.4%</td>
<td>10.4%</td>
</tr>
<tr>
<td>2006</td>
<td>9.3%</td>
<td>3.6%</td>
<td>7.6%</td>
<td>11.6%</td>
</tr>
<tr>
<td>2007</td>
<td>14.8%</td>
<td>8.4%</td>
<td>13.0%</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

Table 5. Compound Average Growth Rates of Real Urban Household Income, Rural Household Income, and GDP over Four Periods

<table>
<thead>
<tr>
<th>Year</th>
<th>Aggregate Disposable Income of Urban Households</th>
<th>Aggregate Net Income of Rural Households</th>
<th>Total Household Income</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-88</td>
<td>13.3%</td>
<td>10.0%</td>
<td>11.3%</td>
<td>10.1%</td>
</tr>
<tr>
<td>1988-91</td>
<td>8.0%</td>
<td>2.4%</td>
<td>4.9%</td>
<td>5.7%</td>
</tr>
<tr>
<td>1991-2001</td>
<td>13.2%</td>
<td>5.7%</td>
<td>9.8%</td>
<td>10.3%</td>
</tr>
<tr>
<td>2001-07</td>
<td>11.2%</td>
<td>3.4%</td>
<td>8.7%</td>
<td>10.7%</td>
</tr>
</tbody>
</table>


Table 6. Annual Average Rate of Change in the Ratio of Consumption to Household Income over Four Periods

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Rate of Change in the Ratio of Consumption to Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-88</td>
<td>-0.7%</td>
</tr>
<tr>
<td>1988-91</td>
<td>-1.7%</td>
</tr>
<tr>
<td>1991-2001</td>
<td>0.0%</td>
</tr>
<tr>
<td>2001-07</td>
<td>-2.2%</td>
</tr>
</tbody>
</table>

Notes

1. The figures cited for China's export surplus are for goods and services.

2. In this paper, by sustainability we are referring to the economic and political viability of China's export and investment led growth model. As was suggested above, several other problems, such as environmental effects, also call into question the sustainability of China's current growth process. Addressing the other problems of China's growth model is beyond the scope of this paper.

3. Rapidly growing external demand has the advantage of earning the foreign exchange that may be needed to permit efficient increases in the other components of aggregate demand by loosening the balance of payments constraint (McCrombie and Thirlwall, 2004).

4. Imports must be subtracted because the other components of GDP include purchases of imported final goods as well as value indirectly attributable to imported inputs. GDP includes only the output attributable to domestic factors of production.

5. From equations 2-1 and 2-2, it can readily be shown that \( NX = X_d \) if and only if the import content of \( C + I + G \) is zero -- that is, if all of imports go into the production of exports.

6. Larudee (2006) also argues for the use of domestic content to measure the impact of trade on an economy, although her interest is the degree of openness rather than the assessment of a particular growth model. She proposes a methodology to estimate the domestic content of exports, called "value added destined for export."

7. The underlying relations here are identities. The GDP growth rate is a weighted average of the growth rates of its components, which underlies the concept that a component whose growth rate rises above the GDP growth rate is "pulling up" that rate. Secondly, as was noted in the text, the GDP growth rate is the sum of the contributions of its components. One cannot infer causality from identities. Strictly speaking, our procedure is a kind of growth accounting.

8. For the investment variable, we use fixed investment rather than total investment. Total investment includes changes in inventories, which are determined by different forces from those determining fixed investment.

9. Starting in 2008 a severe financial and economic crisis began in global capitalism, which has had a significant effect on China and which may lead to significant changes in the global economy. For that reason, the year 2007 seems to be an appropriate ending year for our analysis.

10. The use of the term "growth model" is not meant to imply that the leadership had a clear, complete, and consistent plan for promoting rapid growth throughout the period. Indeed, it appears that the "growth model" evolved over time in response to unforeseen developments and problems that emerged over time.

11. Not all of the important institutional and policy changes affecting China's growth model fell perfectly into our periodization scheme. For example, mass layoffs of state owned enterprise employees began in the mid 1990s, which falls in the middle of one of our periods rather than at the start of a period. However, we believe that our particular periodization effectively captures the distinct stages of China's growth model.

12. Since \( G \) covers only government current consumption while \( IF \) includes both private and
public investment in China's national income accounts, we have changed the traditional order of the components to place G before IF in figures and tables, since C and G together indicate total current domestic consumption.

13. See Appendix section C2 for the methodology used to obtain series for the growth rates of the components of GDP.

14. For growth analysis we follow the convention of dating a period starting with the base year. For example, the period 1978-81 includes growth in variables starting with 1979 relative to 1978. Growth during the first year listed is not included in the period's growth. Using this convention, each successive period has the same beginning year as the ending year of the preceding period and each year's growth is counted only once. We calculated all "average annual growth rates" of variables as the compounded annual rate of growth over the period.

16. During 1989-91 changes in inventories averaged 9.7% of GDP, far above the share before or after that period. While this suggests a shortage of aggregate demand leading to involuntary inventory accumulation, it is possible that the official figures for changes in inventories in those years may be overstated – they might have included what should have been listed as errors and omissions.

17. The figures given for the export share of GDP are from the data that underlie Figure 2.

18. The dollar value of exports rose by 18.9% in 1990, while the RMB devaluation that year caused that increase to represent 40.4% more constant RMB worth of exports.

19. The change in the consumer price index was negative, or positive but less than 1%, from 1998-2002. The change in the GDP price deflator was negative from 1998-2000.

20. The official figure for net exports of goods and services was 8.9% of GDP in 2007.

21. These numbers are calculated by the authors with data from various years of the China Statistical Yearbook.

22. Our gini coefficient series, which comes from a special study, goes only through 2006.

23. Assuming trade balance, the relationship is complex, since a higher export share also means a higher import share, and a higher marginal propensity to import reduces the export multiplier. However, the positive effect of a high export share outweighs negative effect on the multiplier from the high marginal propensity to import.

24. This is reflected in the generally critical treatment of China in the mainstream mass media in the US.

25. The model, based on recent macro data for China, assumes a capital-output ratio of 2 and a depreciation rate of 5% of the capital stock.


27. For such a policy to be successful, it would be necessary to find ways to promote effective economic performance on the part of state owned enterprises. There have been problems in the performance of state owned enterprises in China in the past, and these problems would have to be averted if a new round of nationalizations were to be successful.

28. A balanced growth model would eliminate the problems of an export and investment led
growth model that have been considered in this paper. As we noted at the beginning of this paper, China faces other problems with its growth model, particularly its environmental costs. We cannot address this enormously important problem here.

29. Dean et al. (2007) also utilized data on processing trade in making their estimates. Other studies using different methodologies have produced different estimates of \( X_d \), ranging from 52.3% to 84.5% for 1997 and from 53.9% to 79.0% in 2002 (Ping, 2005; Koopman, Wang, and Wei, 2008). The estimates by Dean et al. (2007), which we used, made the least restrictive simplifying assumptions of the studies cited, and their estimates fell in between the other estimates. See also Dean et al. (2008) for an assessment of the various methodologies used in these studies.

30. The import share of some parts of fixed investment, such as machinery, may be higher than the share for domestic expenditure as a whole. However, there were no data available to make a reasonable estimate of the possible difference between the import shares of fixed investment and of the other parts of domestic expenditure.

31. The UNCTAD and Chinese Trade Ministry series for goods trade were identical.