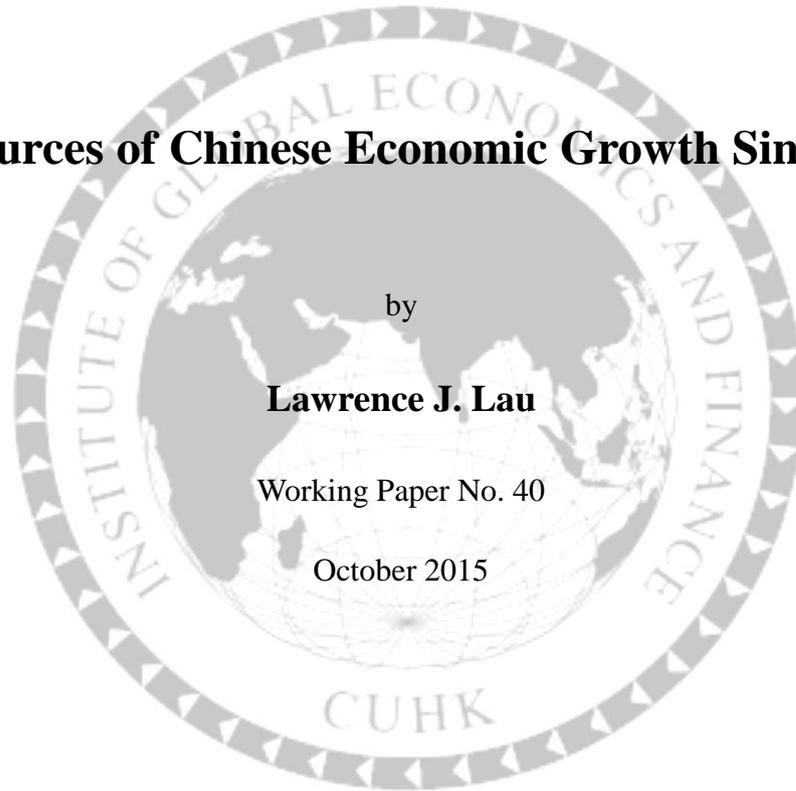


# **The Sources of Chinese Economic Growth Since 1978**



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# The Sources of Chinese Economic Growth Since 1978

Lawrence J. Lau <sup>1</sup>

July 2015

**Abstract:** China has made tremendous progress in its economic development since it began its economic reform and opened to the World in 1978. It is currently the fastest growing economy in the World—averaging 9.72% per annum over the past 36 years. What are the sources of this Chinese economic growth? Chinese economic growth since 1978 may be attributed to the following sources: (1) The realization of the surplus potential output from the initial economic slack that resulted from the mandatory central planning prior to 1978 (12.65%); (2) The growth of tangible capital (55.71%) and labor (9.67%) inputs; (3) Technical progress (growth of total factor productivity (TFP)) (7.97%); and (4) The effect of economies of scale (13.99%). In the context of China, an important way in which self-fulfilling expectations can be created and changed is through the pronouncement of policy changes and actual actions by a government with credibility. Episodes in which the government was instrumental in changing both the direction and the magnitude of public expectations, and thus enhancing the growth of aggregate demand, are identified and presented.

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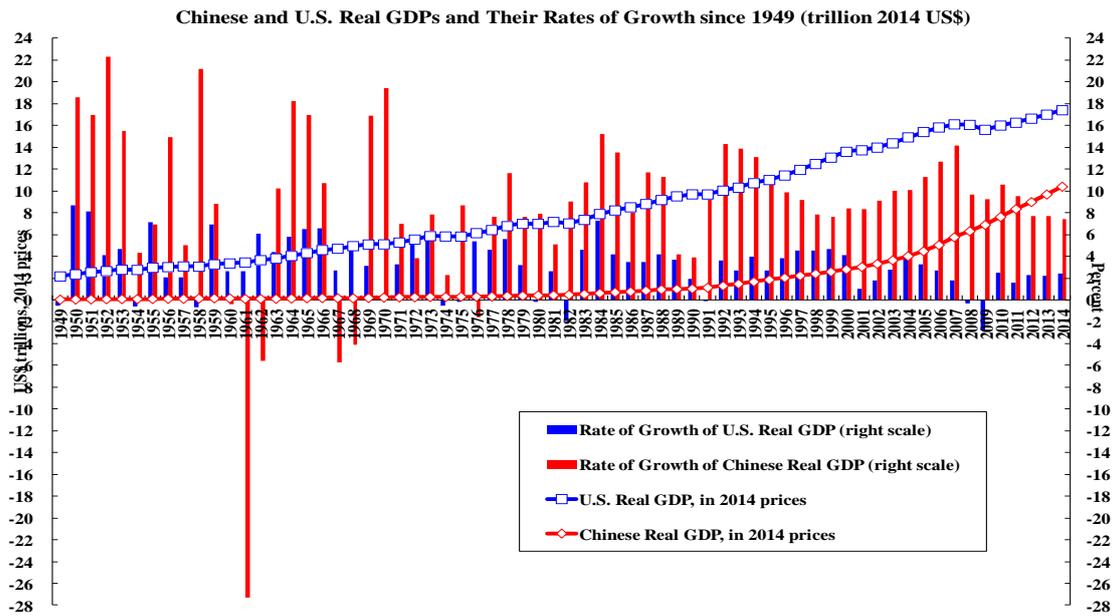
<sup>1</sup> This is a paper presented at the Conference, “A Just Society: Honoring Joseph Stiglitz”, held at the Columbia Business School, Columbia University, New York, 16-17 October 2015. Lawrence J. Lau is the Ralph and Claire Landau Professor of Economics, The Institute of Global Economics and Finance, The Chinese University of Hong Kong, and the Kwoh-Ting Li Professor in Economic Development, Emeritus, Stanford University. He wishes to thank Michael Boskin, Ayesha Macpherson Lau, Joseph Stiglitz, Yanyan Xiong and Wentong Zheng for their invaluable advice, comments and suggestions, but retains sole responsibility for any remaining errors. All opinions expressed herein are the author’s own and do not necessarily reflect the views of any of the organizations with which the author is affiliated

## **1. Introduction**

China has made tremendous progress in its economic development since it began its economic reform and opened to the World in 1978. It is currently the fastest growing economy in the World—averaging 9.72% per annum over the past 36 years. It is historically unprecedented for an economy to grow at such a high rate over such a long period of time. However, the Chinese economy has begun to slow down, to an annual rate of growth of around 7%, in a process of transition to a “New Normal”. Why has China been able to grow at such a high rate and for such a long period of time? What are the sources of Chinese economic growth since 1978? These are the questions explored in this paper.

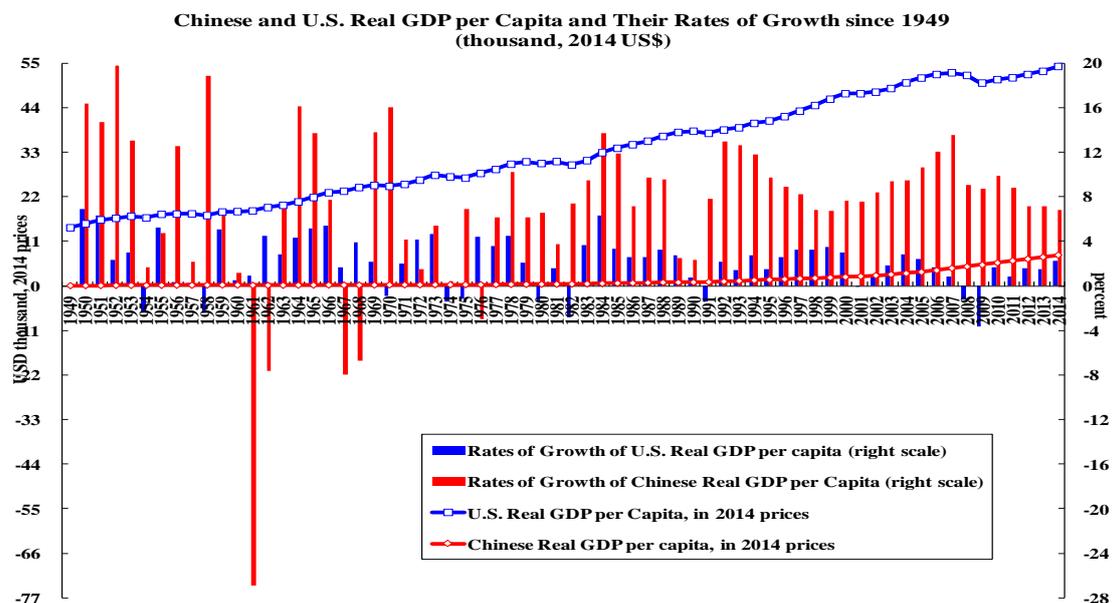
It is interesting to compare the growth of Chinese and U.S. real GDP in both aggregate and per capita terms (Charts 1 and 2). The red and blue lines represent the levels of real GDP and real GDP per capita of China and the U.S. respectively. The red and blue columns represent the annual rates of growth of China and the U.S. respectively. Chart 1 shows that between 1978 and 2014, Chinese real GDP grew from US\$369 billion to US\$10.4 trillion (in 2014 prices), to become the second largest economy in the World, after the U.S. Chinese economic growth began to take off after China began its economic reform in 1978, and accelerated in 2001, when China acceded to the World Trade Organisation (WTO). The rate of growth of Chinese real GDP has been higher than that of the U.S. in every single year since 1978, sometimes significantly so. By comparison, the U.S. GDP of approximately US\$17.4 trillion was approximately 1.7 times Chinese GDP in 2014.

**Chart 1: Chinese and U.S. Real GDPs and Their Rates of Growth since 1949 (2014 US\$)**



However, despite the rapid growth of the Chinese economy in the aggregate, in terms of its real GDP per capita, China is still very much a developing economy. Chart 2 shows that in 1978, the Chinese real GDP per capita was only US\$383 (in 2014 prices), approximately 1.25% of the U.S. then real GDP per capita of US\$30,472. By 2014, the Chinese real GDP per capita had grown to US\$7,604, still less than one-seventh of the U.S. GDP per capita of US\$54,575.

**Chart 2: Chinese and U.S. Real GDPs per Capita and Their Rates of Growth since 1949 (2014 US\$)**



## **2. The Chinese Economic Fundamentals**

What are the sources of this Chinese economic growth? Long-term economic growth of a country depends on the rates of growth of its primary inputs—tangible (or physical) capital and labor—and on technical progress (also known as the growth of total factor productivity (TFP))—that is, the ability to increase output without increasing inputs. The rate of growth of tangible or physical capital depends on the rates of investment on structure, equipment and basic infrastructure, which in turn depends on the availability of national savings. The rate of technical progress depends on investment in intangible capital, which includes human capital and Research and Development (R&D) capital.

Chinese economic growth since 1978 has been underpinned by a consistently high domestic investment rate, enabled by a national saving rate of over 35% except for a brief start-up period in the early 1950s (see Chart 3). The Chinese national saving rate rose to around 40% in the early 1990s and at times approached or even exceeded 50% in more recent years. The high Chinese saving rate means that the Chinese economy can finance all of its domestic investment needs from its own domestic savings alone, without having to depend on the more fickle foreign capital inflows (including foreign direct investment, foreign portfolio investment, foreign aid, or foreign loans). In particular, it does not need to borrow abroad and bear the potential risks of a large, short-term and often interruptible foreign-currency-denominated debt. Thus, the Chinese economy is always assured of a high rate of growth of its tangible capital stock. It is therefore also more immune from external disturbances than most other economies.

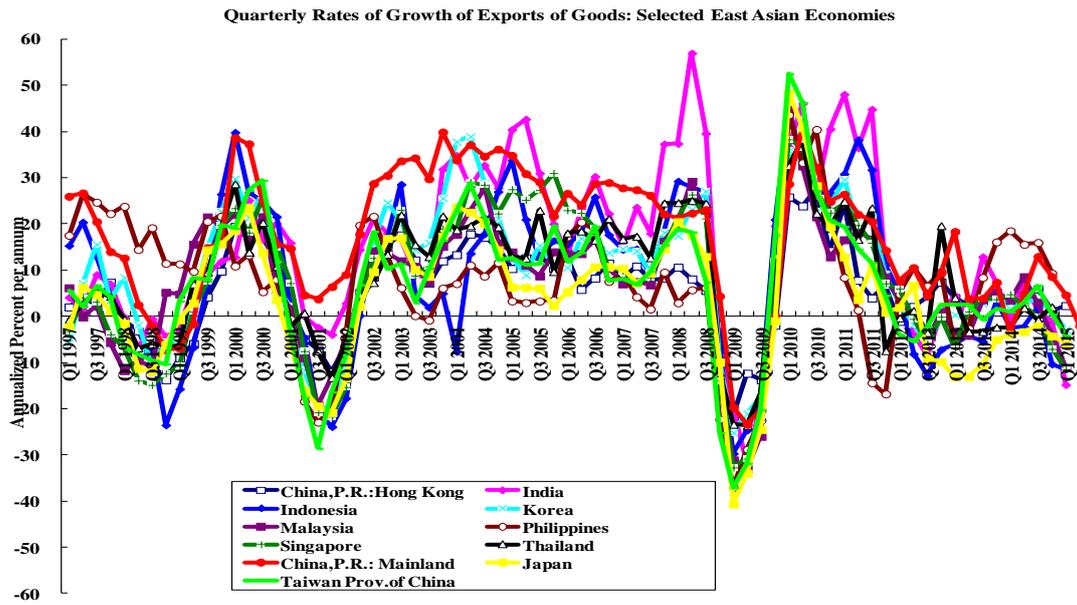




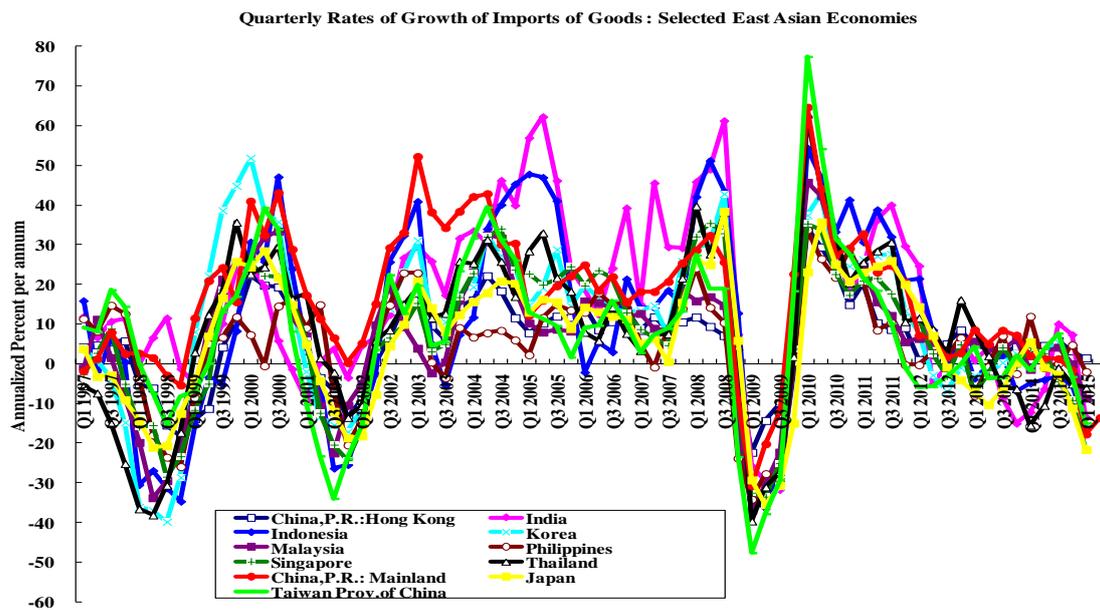
The huge size of the domestic market with 1.37 billion consumers and their pent-up demands for housing and transportation and other consumer goods and services (e.g., education, health care, and more recently, elderly care) enables the realization of significant economies of scale in production, based entirely on the domestic demand in China. The huge domestic market also greatly enhances the productivity of intangible capital (e.g., R&D capital and goodwill, including brand building) by allowing the fixed costs of the R&D for a new product or process or advertising and promotion in brand building to be more easily amortized and recovered. In addition, the huge domestic market also enables significant “learning-by-doing”, so that the unit costs of production decline with rising cumulative output. This is yet another form of manifestation of economies of scale.

Another important implication of the huge size of the domestic economy is the relatively low external dependence. Thus, while the rates of growth of Chinese exports and imports fluctuate like any other economy (see Charts 6 and 7 for the quarterly rates of growth of exports and imports respectively for selected Asian economies), the quarterly rates of growth of the Chinese real GDP, represented by the red line in Chart 8, can be clearly seen to be relatively much more stable than those of other economies. It never turned negative whereas many of the other Asian economies would experience absolute declines in their real GDPs. This is of course also due in part to the fact that China does not have to depend on the inflow of foreign savings for its investment.

**Chart 6: Quarterly Rates of Growth of Exports of Goods: Selected Asian Economies**



**Chart 7: Quarterly Rates of Growth of Imports of Goods: Selected Asian Economies**



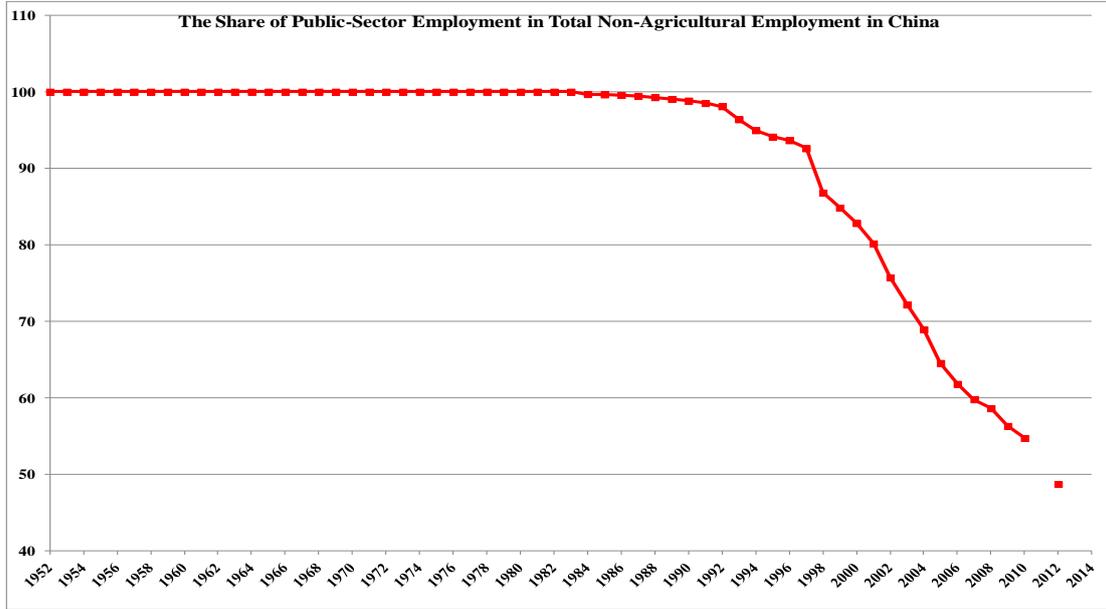


China and set their wage rates. As the sole employer, the Chinese Government could exercise its monopsonistic power and pursued a low (and egalitarian) wage policy, resulting in a low share of labor in GDP of less than 50% over the past several decades.

The low- wage policy reflected three considerations: First, it was designed to increase national savings through higher profits of the enterprises, most of which are state-owned, so that the needed domestic investments could be readily financed. This objective of the low-wage policy is similar to the “price scissors” policy of maintaining a large gap between industrial and agricultural prices, practiced in the former Soviet Union in the early Twentieth Century. Second, it helped to maximize employment, and in particular, the absorption of surplus labor from the agricultural sector into the industrial and service sectors. Third, it was compatible with the ideological preference of the Chinese Communist Party for thrift and egalitarianism in the distribution of income. Note that if the government is the sole employer, the wage and individual income tax policies can be de facto integrated—no separate individual income tax is necessary. In this context, a low-wage (and low or no tax) policy has a similar economic effect as a high-wage and high-tax policy but is politically easier to adopt, implement and sustain.

Even as recently as 2010, the share of Chinese public sector employment, which includes the employees of central and local governments and their affiliated units, state-owned enterprises (SOEs), and publicly financed educational and health care institutions, was still over 50% of all urban employment (see Chart 9). The government could therefore exercise a decisive influence on not only the wage rates of the public-sector employees, but also the level of wage rates in the economy as a whole. Today, a government job is still the preferred choice for many Chinese workers because of the job and income security and the significant fringe benefits that it offers.

**Chart 9: The Share of Public Sector Employment in Total Non-Agricultural Employment in China**



This low-wage policy has had two major effects: first, it has kept the labor share (and the household share) of GDP low; and secondly, it has created large profits for state-owned (and other) enterprises. The disposable household income share of GDP in China may be estimated at around 50% in 2014, much lower than the corresponding share in a developed economy, where it would typically be around 60%, and also lower than those of other developing economies with a comparable real GDP per capita. The Chinese share of labor is likely to be lower than the share of household disposable income, as the latter includes, in addition to wages and salaries, also net proprietor’s income, net asset income and net transfers (which amounted to 43% of the total household disposable income), but excludes direct taxes and other mandatory charges such as social security contributions. As Chinese households have less disposable income to spend relative to Chinese GDP, China also has a lower household consumption to GDP ratio than others. This ratio, as well as the total final consumption (which is the sum of government consumption and household consumption) to GDP ratio, have been declining over time (see Chart 10). As of 2014, the total final consumption ratio was just over 50% and the household consumption ratio was approximately 38%, both significantly lower than most other economies with a comparable real GDP per capita. The Chinese household saving rate may be estimated at around 30% from survey data, comparable to those of



the tangible capital stock has grown much more rapidly than labor over the past 36 years.

**Table 1: The Rates of Growth of Real Output, Capital Stock and Labor**

<b>Rate of Growth of Real Output (1978-2014)</b>	<b>9.72%</b>
<b>Rates of Growth of Inputs (1978-2013)</b>	
<b>Tangible or Physical Capital</b>	<b>10.83%</b>
<b>Labor</b>	<b>1.88%</b>

Chinese economic growth since 1978 could have come from several sources: (1) The realization of the surplus potential output from the initial economic slack that resulted from mandatory central planning; (2) The growth of tangible capital and labor inputs (and the growth of the intangible inputs such as human capital and R&D capital<sup>3</sup>); (3) Technical progress (growth of total factor productivity (TFP)); and (4) The effect of economies of scale.

Lau and Zheng (2015), by comparing the economic performance of the Province of Anhui and the Municipality of Shanghai before and after the introduction of economic reform, found that the pre-existing slack in the Chinese economy before it undertook its economic reform and opened to the World in 1978 could be estimated to be 50% of the actual output in 1978. Based on the assumption that the Chinese real GDP in 1978 was 50% higher than it actually was, the implied average annual rate of growth of the Chinese economy between 1978 and 2014 would have been 8.49% instead of 9.72%. Thus, the reduction of the economic slack that existed before 1978 would account for approximately 1.23 percentage points of the economic growth over the past 36 years, or approximately 12.5 percent of the post-1978 economic growth. The remaining economic growth of 8.49% per annum can be attributed to the growth of the primary inputs, technical progress or growth of TFP, and economies of scale.

The degree of economies of scale cannot be estimated in a straightforward way. In fact it is under-identified with time-series aggregate data from only a single country--the effects of economies of scale are confounded with the effects of technical

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<sup>3</sup> In this paper, the contributions of the growth of human capital and R&D capital to Chinese economic growth are not estimated separately but subsumed in the contribution of technical progress or growth of TFP.

progress. However, a meta-production function approach, first introduced by Lau and Yotopoulos (1989) and extended by Boskin and Lau (1992), based on the transcendental logarithmic production function introduced by Christensen, Jorgenson and Lau (1973), can be used to identify and separate the effects of economies of scale and technical progress under fairly general and testable assumptions. Boskin, Guo and Lau (2015) have recently estimated the degrees of returns to scale for the Group-of-Seven (G-7) Countries using the meta-production function approach. They found the degree of local returns to scale of the U.S. to be 1.20 in 1960 and 1.11 in 2007. The average degree of returns to scale for the U.S. over this period would be 1.155, almost the same as the 1.15 estimated by Denison (1974)<sup>4</sup> but somewhat larger than the assumption of 1.10 used by Denison (1961)<sup>5</sup>. Assuming that this estimate of the returns to scale also applies to the Chinese economy on average, it would mean that over a 36-year period, from 1978 to 2014, the average rate of growth would have been 8.36% if there were only constant returns to scale, instead of the actual 9.72%. This difference would have accounted for 36.1% of the Chinese real GDP in 2014. It also means that out of the rate of growth of 9.72%, economies of scale account for 1.36 percentage points, or 13.99 percent of the measured economic growth over this period.

As pointed out in Section 3, the actual share of labor in GDP in China is low relative to other economies. It may be estimated to be around 50%<sup>6</sup>. However, it is believed that the production elasticity of labor is probably higher than the labor share, somewhere between 0.55 and 0.6, as labor has been systematically underpaid due to the low-wage policy maintained by the Chinese Government. Since there exist increasing returns to scale, capital, as the residual claimant, cannot in general be paid its marginal product; but because labor is actually underpaid, capital can be either underpaid or overpaid relative to its marginal product. With returns to scale assumed to be 1.155, and the production elasticity of labor estimated as between 0.55 and 0.6,

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<sup>4</sup> See Denison (1974), p. 75.

<sup>5</sup> See Denison (1961), p. 175.

<sup>6</sup> One possible estimate of the share of household disposable income in Chinese GDP is 43% in 2014, based on officially published data. However, the labor share can differ from the above because of net proprietor's income, net household asset income and direct taxes and transfers. The data on the household consumption share of GDP, which are probably less prone to errors, indicate a share of around 38% in 2014 (see Chart 10). However, a household consumption share of 38% does not seem to be consistent with a household income share of 43%, which would imply an exceptionally low household saving rate out of disposable income. A more reasonable estimate of the household disposable income share or labor share in GDP in 2014 is probably around 50% or even a little higher.

the production elasticity of capital may be estimated as (1.155-0.55) or (1.155-0.6), or between 0.555 and 0.605, as the capital and labor elasticities should sum to the degree of returns to scale. Thus, the relative weights of capital and labor may be estimated as 0.48 versus 0.52, or vice versa. Since they are almost equal, we shall use 0.5 as the relative weights of capital and labor for the purpose of the growth-accounting exercise.

The results of the growth-accounting exercise are presented in Table 2. We note that the elimination of the pre-existing economic slack and economies of scale account for respectively 1.23 and 1.36 percentage points, or a total of 2.59 percentage points, of the Chinese economic growth of 9.72% between 1978 and 2014. If we subtract 2.59% from 9.72%, we obtain 7.13%. This average annual rate of growth has been achieved by quite a few other economies over a couple of decades in the past. We also note that the growth of tangible capital accounts for more than half of the growth in real output, whereas the growth of labor and technical progress each account for less than 10 percent of the economic growth. If we take out the contributions of the elimination of the prior economic slack and economies of scale, the growth of tangible capital accounts for the bulk of the remaining economic growth, 5.42% out of 7.13%, or 76%. This is similar to the findings of Kim and Lau (1994) on the sources of economic growth of the East Asian Newly Industrialized Economies (NIEs). If a more conventional growth accounting exercise is done under the assumption of constant returns to scale, the effects of the elimination of the pre-existing economic slack and economies of scale would have been captured as part of technical progress or the growth of TFP. If that is done, technical progress or growth of TFP would have accounted for 34.61% of Chinese economic growth since 1978.

**Table 2: The Sources of Chinese Economic Growth**

<b>Monopsonistic Labor Market Case</b>		
<b>Sources of Chinese Economic Growth, 1978-2014</b>	<b>Percentage Points</b>	<b>Percent</b>
<b>Elimination of Pre-Existing Economic Slack</b>	<b>1.23</b>	<b>12.65</b>
<b>Growth of Tangible Capital</b>	<b>5.42</b>	<b>55.71</b>
<b>Growth of Labor</b>	<b>0.94</b>	<b>9.67</b>
<b>Technical Progress</b>	<b>0.78</b>	<b>7.97</b>
<b>Economies of Scale</b>	<b>1.36</b>	<b>13.99</b>
<b>Total</b>	<b>9.72</b>	<b>100.00</b>

## **5. The Role of Expectations**

Expectations of the future are important determinants of the behavior of enterprises and households, which in turn determines whether and how much they invest and consume respectively. For a large economy such as China, the domestic investment and consumption together determine the level of aggregate demand and ultimately whether the economy grows or stagnates. There are many ways in which expectations about the future may be formed. Expectations may be based on past experience, such as “tomorrow will be the same as today,” but they may also not be based solely on past experience, for example, they may be based on the views of so-called opinion leaders. Expectations may also be affected by the occurrence of some important event, such as the breakout of a war, the election of a new government, the rise of an epidemic, or some specific government pronouncement or action, which can credibly cause changes in the public expectations of the future. Moreover, expectations can often, but not always, and certainly not consistently, be self-fulfilling, if they are sufficiently strongly held by a sufficiently large number of people.

One well-known manifestation of self-fulfilling expectations is in the asset markets. If investors expect the price of an asset, for example, real estate or stock, to go up, and act accordingly by buying real estate or stock, the price of real estate or stock will indeed be driven up by the concerted buying, because the increase in demand in real estate or stock is not and cannot be immediately met by an increase in supply. Thus, the expectations of the investors can be self-fulfilling. There are many such examples in which asset price bubbles are created around the World.

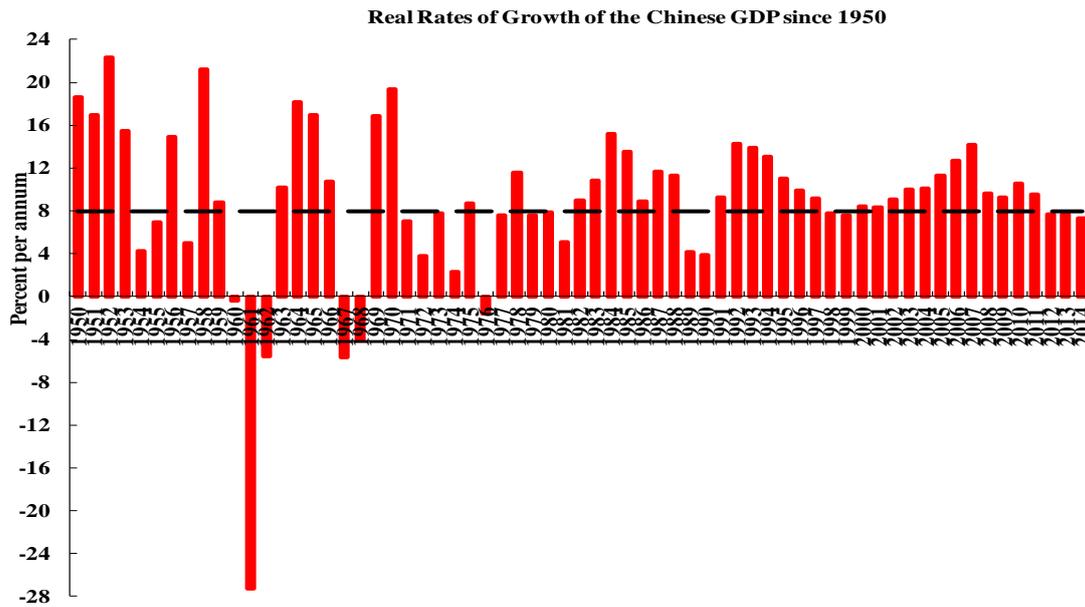
The run-up in the price of Chinese residential real estate between October 2012 and October 2013 was an example of self-fulfilling expectations. The more recent Chinese stock price run-up between November 2014 and July 2015 may also be considered as another such example. But self-fulfilling expectations do not always have to be bullish. If all investors believe that the price of residential real estate is likely to be stable, and act accordingly, that is, they do not try to out-bid one another since they know they can always buy a similar property later, then the price of residential real estate will indeed be quite stable. This was what occurred in Singapore, where the government was believed by the public to adjust the rate of release of new lots for residential construction upwards and downwards in the same direction as the price of residential real estate, thus dampening the price changes.

However, the prices of assets cannot continue to go up forever. All asset price bubbles are sustained by new investors with new buying power coming into the market. At some point, the available potential new buying power will be exhausted with the price levels significantly exceeding what can reasonably be supported by the underlying economic fundamentals in steady state. When that happens, the asset prices will begin to fall and fall precipitously. So ultimately, the rosy expectations may fail to be fulfilled. And this will lead to a collective downward revision of the expectations.

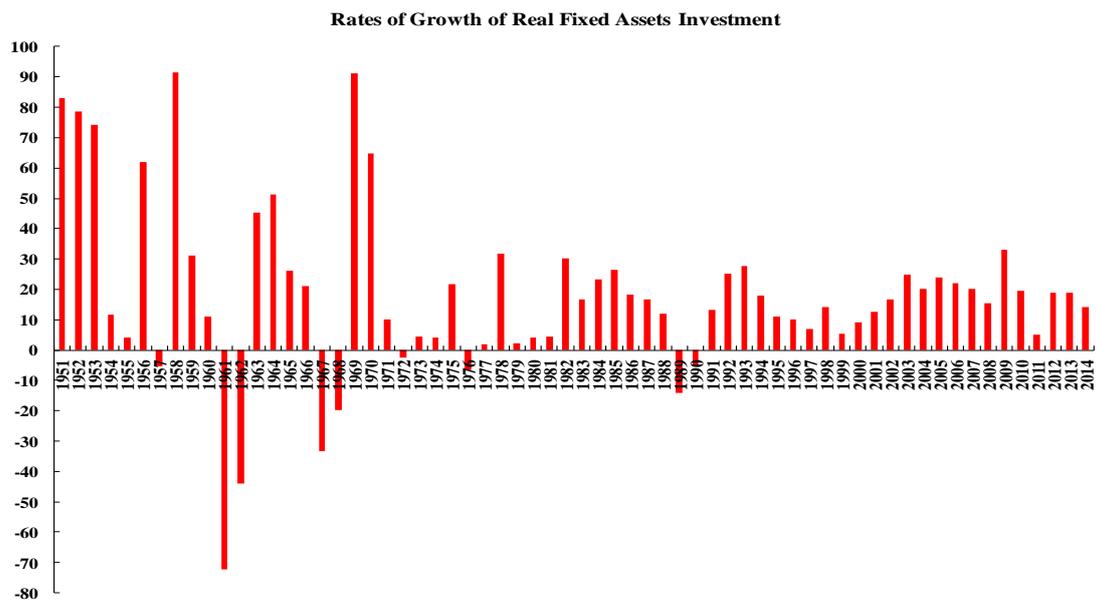
In the context of China, an important way in which self-fulfilling expectations can be created and changed is through the signaling by the Chinese Government. A government with credibility can use its pronouncement of policy changes and actual actions as instruments for changing the macroeconomic expectations of the public about the future of the economy. In fact, Keynesian counter-cyclical fiscal policies often work because they have the ability to change expectations. In a country such as China, expectations are often formed not only from directly experienced market outcomes but also from the pronouncements and actions of its senior government leaders. The government, because of the many potential instruments at its disposal, is widely believed to have the power to turn around the economy, and is thus a credible authority that can play the coordinating role. The following examples drawn from the Chinese experience show how the Chinese Government was able to change negative expectations credibly through its pronouncements and actions.

In 1989, in the aftermath of the June 4 incident, the Chinese economy became quite depressed, in part because of foreign sanctions, but mostly because of generally negative expectations about the future on the parts of enterprises and households. As a result, enterprises did not invest and households did not consume. 1990 and 1991 were similarly slow years, despite an abundance of liquidity. The rates of growth of real GDP in 1989 and 1990 were the lowest since economic reform began in 1978 (see Chart 11) and the rates of growth of fixed asset investment in 1989 and 1990 were negative--the only years with a negative rate of growth of fixed asset investment since 1978 (see Chart 12), which showed how negative expectations were.

**Chart 11: Annual Rates of Growth of Chinese Real GDP**



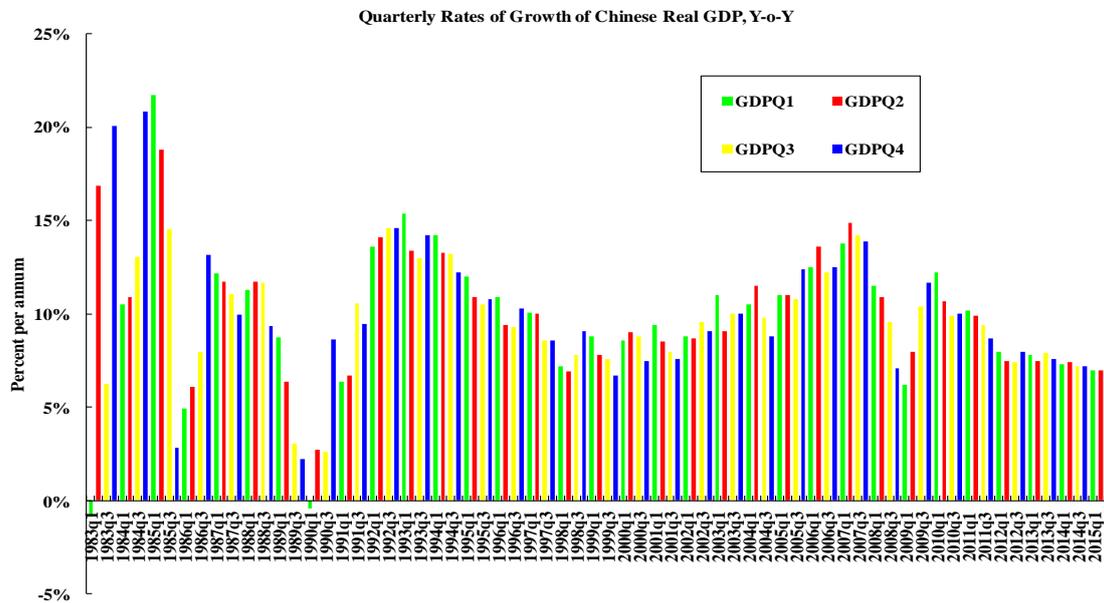
**Chart 12: Annual Rates of Growth of Chinese Fixed Assets Investment**



Then in early 1992, Mr. DENG Xiaoping, the paramount Chinese leader at the time, undertook his famous southern inspection tour. Everywhere he went, he urged the people to seize the moment and grasp the opportunities. His words changed expectations in the entire country almost overnight. Enterprises began investing and households began consuming once again. As a result, the rest of 1992, as well as 1993 and 1994, were boom years with double-digit rates of economic growth (and

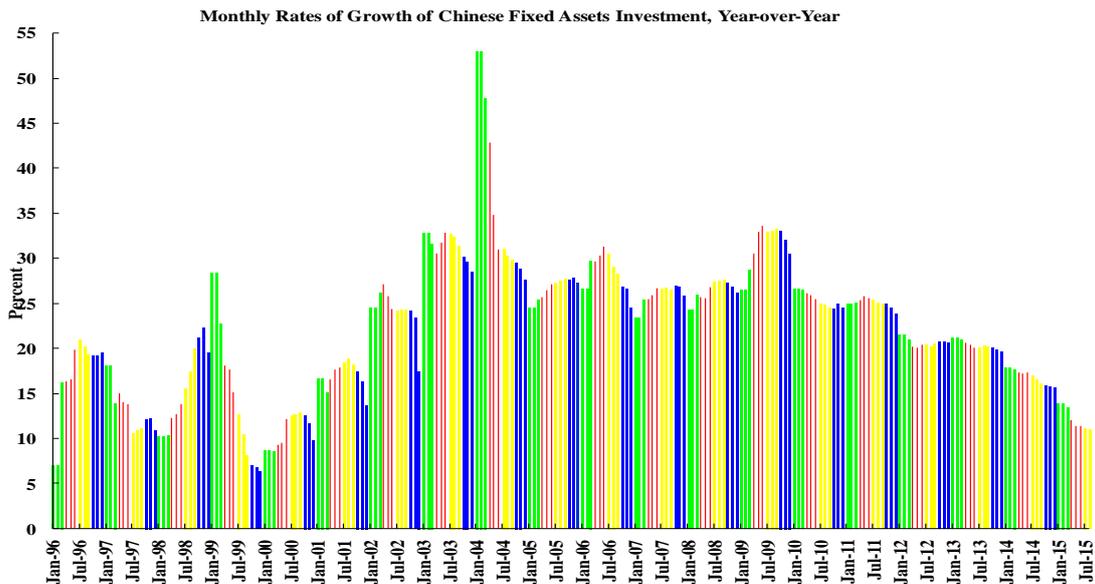
relatively high rates of inflation) and high rates of growth of fixed asset investment (see Charts 11, 12 and 13).

**Chart 13: Quarterly Rates of Growth of Chinese Real GDP, Y-o-Y**



In mid-1997, the East Asian Currency Crisis broke out, first in Thailand, and then in South Korea until it engulfed almost all of the East Asian economies, with the exception of Japan. Almost all of the East Asian currencies, with the exception of the Hong Kong Dollar, which was (and still is) pegged to the U.S. Dollar, devalued significantly. The quarterly rates of growth of exports and imports of all East Asian economies fell precipitously (see Charts 6 and 7). Premier ZHU Rongji of the People’s Republic of China decided to hold the Renminbi/US\$ exchange rate steady amidst the chaos of the East Asian currency crisis, and thus managed to maintain the confidence of the domestic investors and consumers about China’s economic future, keeping the Chinese economy growing (see Chart 14). In so doing, he also helped to stabilize the exchange rates of the other East Asian currencies and facilitated the recovery of the other East Asian economies. Had China also devalued at that time, it would have led to another cycle of competitive devaluation among the East Asian economies, with unimaginably negative economic and social consequences.

**Chart 14: Monthly Rates of Growth of Chinese Fixed Assets Investment, Y-o-Y**

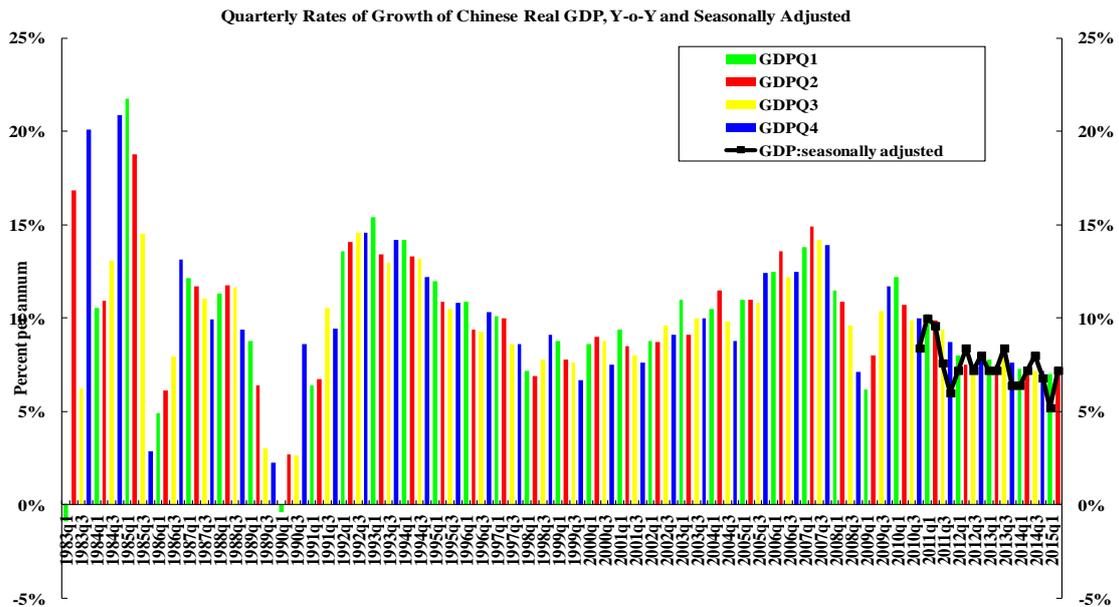


In 2000, the whole World was suffering from the burst of the internet bubble in the U.S. and China was no exception (the negative expectations then were reflected in the exceptionally low rates of growth of fixed asset investment). Then in December 2001, China became a member of the WTO. The Chinese accession to the WTO also changed expectations in a dramatic way, which also reflected the expected expiration of the Multi-Fibre Agreement which governed global trade in textiles in 2005. It had a significant effect on the rates of growth of both fixed asset investment (see Chart 14) and real GDP (see Chart 15). In 2005, the Renminbi began to be allowed to appreciate relative to the U.S. Dollar, which adversely affected the growth of exports, and the rate of growth of fixed asset investment fell back to more normal levels.

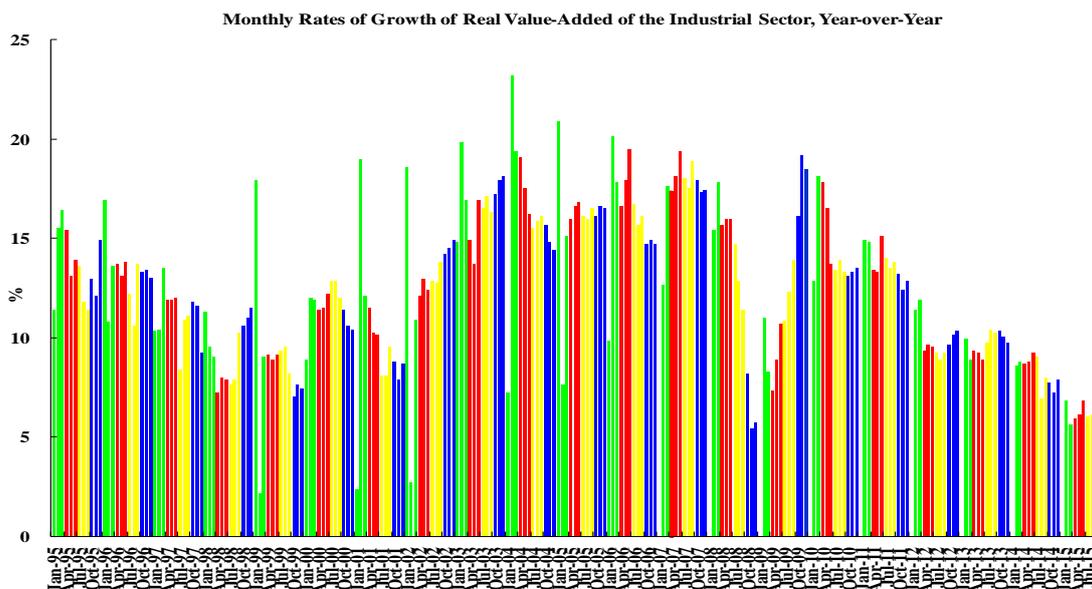
In 2008, in the immediate aftermath of the collapse of Lehman Brothers in the U.S., all credit dried up in the U.S. as well as the other developed economies. Overnight, importers in the U.S. and other developed economies could no longer place their import orders to China and other trading partner countries because their banks were not in a position to issue acceptable letters of credit. As a result, export orders received by Chinese enterprises declined by approximately fifty percent (see Charts 6 and 7). There was real panic in the air. Fortunately, barely six weeks later, Chinese Premier WEN Jiabao unveiled the 4 trillion Yuan (approximately 6% of the then Chinese GDP) economic stimulus program, which once again managed to

maintain the confidence of Chinese enterprises and households in their economy. Actually, the economic stimulus program did not really take effect until at least a year later, but the announcement of the program itself alone managed to restore positive expectations among the Chinese public (see Charts 14, 15 and 16).

**Chart 15: Quarterly Rates of Growth of Chinese Real GDP, Y-o-Y and Seasonally Adjusted**



**Chart 16: Monthly Rates of Growth of Real Value-Added of Chinese Industry, Y-o-Y**



In all of these cases, the Chinese Government was able to turn around the very negative domestic expectations about the future of the Chinese economy into positive ones, and in so doing greatly reduced the uncertainty pertaining to the future and increased general business as well as consumer confidence. These changes in turn fueled investment booms that resulted in the subsequent economic growth.

However, with the bursting of the Chinese stock market bubble in July 2015 and the slight but unexpected devaluation of the Renminbi of approximately 4% in August 2015, the confidence of the Chinese enterprises and households has been somewhat shaken. At the same time, reacting to these developments in China, the World markets have also panicked and doomsayers have been coming out in droves, predicting the imminent collapse of the Chinese economy. Perhaps this is the time for the Chinese Government to take more decisive and visible actions to increase domestic aggregate demand so as to reduce uncertainty, shore up confidence and change expectations of the Chinese public about the future.

## **6. Concluding Remarks**

Chinese economic growth during the past 36 years can be attributed to the growth of tangible inputs—tangible capital and labor, and in particular, tangible capital—rather than the growth in intangible capital or technical progress, just as the past economic growth of other East Asian economies at a similar stage of economic development. The successful Chinese experience strongly reaffirms the fundamental importance of having and maintaining a high investment rate, enabled by a high national savings rate, and surplus labor. A low-wage policy was instrumental in a high national saving rate and a rapid rate of absorption of surplus labor. In addition, the size of the Chinese domestic economy is a favorable factor allowing the ready realization of economies of scale and reducing vulnerability to external disturbances. The prior economic slack, inherent in any previously centrally planned economy, has also been a significant source of economic growth upon Chinese transition to a market economy.

Expectations will continue to play an important role in the Chinese economy. A strong Chinese central government with the unique power to mobilize domestic aggregate demand can credibly change expectations from negative to positive at critical junctures to keep the economy growing.

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