The Chinese Economic Fundamentals

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Introduction

- The 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 (or equivalently, the growth of total factor productivity (TFP))—that is, the ability to increase output without increasing inputs.
- The tangible capital stock is defined as the cumulative past real investment in structure, equipment and basic infrastructure, less the respective appropriate depreciations. The rate of growth of the tangible capital depends on investments in these three categories of fixed capital. The quantity of total investment in turn depends on the availability of national savings as well as foreign direct investment, foreign portfolio investment, foreign loans and foreign aid. • Technical progress (or the rate of growth of TFP) is not manna from heaven but depends on the cumulative past investments in (that is, the
 - stocks of) intangible capital such as human capital and Research and Development (R&D) capital. 3

The High Domestic Savings Rate

- Chinese economic growth since 1978 has been underpinned by a consistently high domestic investment rate, enabled by a high national savings rate. In fact, the Chinese national savings rate has consistently been quite high except for a brief start-up period in the early 1950s and during the periods of the Great Famine and the Great Proletariat Cultural Revolution. Since the early 1990s, the Chinese national saving rate has stayed around 40% and has at times approached or even exceeded 50% in more recent years.
- In the early 1950s, the Chinese economy benefitted from loans and aid from the Soviet Union, which made possible many of the investment projects in the First Five-Year (1953-1957) Plan. 4

Chinese National Saving and Gross Domestic Investment as Percents of GDP

Chinese National Savings and Gross Domestic Investment as a Percent of GDP since 1952



The High Domestic Savings Rate

- The high domestic savings rate means, among other things, that the Chinese economy can finance all of its domestic investment needs from its own domestic savings alone, thus assuring a high rate of growth of its tangible capital stock without having to depend on the more fickle foreign capital inflows (including foreign direct investment, foreign portfolio investment, foreign loans or foreign aid). 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. The Chinese economy is thus also more immune from external disturbances than other economies. For example, it was relatively unaffected by the 1997-1998 East Asian currency crisis, the 2008-2009 global financial crisis and the more recent European sovereign debt crisis.
- The national saving rate in China will remain high for a while even though it is expected to decline gradually. Consequently the Chinese economy is assured of a high rate of domestic investment and hence a high rate of growth of its tangible capital stock.

The High Domestic Savings Rate

- In addition, since new resources are forthcoming each year from new savings, enabling new investments to be made, the necessity of restructuring, redeploying or privatising existing fixed assets is greatly diminished. Thus, the potentially politically divisive issues such as factory closings and lay-offs of redundant workers and the creation of "losers" can be avoided. This helps to maintain social harmony and facilitate economic reform.
- A high national savings rate also allows the normally more efficient nonstate sector more room and greater scope for development and expansion as there is less "crowding out" of the non-state enterprises by the investments of the government as well as the state-owned enterprises.
- However, tangible capital input-driven economic growth has its limitations, because as the stock of tangible capital relative to labor increases, the marginal productivity of tangible capital will begin to decline and will eventually reach a point when additional tangible capital is no longer productive. This is a point made by Prof. Paul Krugman in his influential article, "The Myth of Asia's Miracle," Foreign Affairs, Vol. 73, No. 6, November/December, 1994, pp. 62-78.

Savings Rates of Selected Economies, 1952present



Savings Rates of Selected Asian Economies (1980-present)



The Savings Rate and Real GDP per Capita: East Asian Economies



Chinese Household Savings Rates



Savings Rates of Urban and Rural Chinese Households





The High Domestic Savings Rate

• One way to understand the high Chinese domestic savings rate is to look at the share of final consumption (the total of household consumption and government consumption (aggregate government current expenditures at all levels)) in GDP. It is only approximately 60% as of 2015. The rest is national savings. • The share of household consumption in Chinese GDP was approximately 38% in 2015. It will take a fairly long time before Chinese household consumption can become the major driver of Chinese economic growth. The share of disposable household income in Chinese GDP may be estimated to be no more than 50% in 2014. Even if the households consume its entire disposable income, household consumption cannot exceed 50% of GDP, compared to between 65% and 70% for developed 13 economies.

Total Chinese Final and Household Consumption as a Percent of Its GDP



- China, like Japan, Taiwan, and South Korea in their respective early stages of economic development, has an unlimited supply of surplus labor—there is therefore no shortage of and no upward pressure on the real wage rate of unskilled, entry-level labor. This means the Chinese economy can continue to grow without being constrained by the supply of labor or by rising real wage rates of unskilled, entry-level labor over an extended period of time.
- Surplus labor is best understood in the context of a two-sector model of an economy, say, an agricultural (traditional) sector, and a nonagricultural (advanced) sector. At the very early stage of the development of an economy, the agricultural sector is large and the non-agricultural sector is small. The bulk of the labor force is employed in the agricultural sector, where its marginal productivity is low or even zero. The basic idea is that if on the margin some labor is removed from the agricultural sector, it will not cause the agricultural output to decline. That is why the labor is referred to as "surplus"₁₅

- In contrast, the potential marginal productivity of labor in the nonagricultural sector is much higher than that of the agricultural sector so that on the margin, a transfer of labor from the agricultural sector to the non-agricultural sector will increase total output of the economy. However, the transfer is potentially constrained by the scarcity of complementary capital in the non-agricultural sector, the demand for non-agricultural goods, and the supply of wage goods for the labor in the non-agricultural sector.
- Investment in tangible or physical capital such as structure, equipment and basic infrastructure is very productive under conditions of surplus labor. As long as there is sufficient complementary domestic physical capital, the surplus labor can be gainfully employed and enable the real output of the economy to grow rapidly. This is exactly what the late Professor W. Arthur Lewis (1954), Nobel Laureate in Economic Sciences, said in his celebrated paper on surplus labor sixty years ago.

- The distribution of Chinese GDP by production-originating sectors in 2015 was approximately: Primary (agriculture), 9.0%; Secondary (manufacturing, mining and construction), 40.5%; and Tertiary (services), 50.5%. (Note that mining is normally included in the primary sector in most other economies.)
- The distribution of employment by sector in 2015 was: Primary, 28.3%; Secondary, 29.3%; and Tertiary, 42.4%.
- The agricultural sector employed 28.3% of the Chinese labor force but produced only 9.0% of the Chinese GDP in 2015. Thus labor can be productively transferred to the other two sectors where labor productivities and wage rates are higher as long as complementary capital and demand are available.

The Distribution of Chinese GDP by Sector Since 1952

The Distribution of GDP by Sector Since 1952



The Distribution of Chinese Employment by Sector Since 1952

The Distribution of Employment by Sector since 1952



- Hence, as long as the percentage of labor force employed in the primary sector significantly exceeds the percentage of GDP originating from the primary sector, there will be little or no upward pressure on the real wage rate of unskilled, entry-level labor in the secondary and tertiary sectors. Surplus labor will continue to exist in the Chinese economy for a couple of decades. • The termination of the "one-child" policy will help to maintain the supply of labor in the long run. It will take at least a couple of decades before the "two-child" policy can make a significant impact.
- In the interim, increasing the retirement age and changing the related rules on administrative leadership positions can reverse the decline of the active labor force.

The Shares of Rural and Urban Population in China, 1949-Present

The Shares of Rural and Urban Populations in China, 1949-Present



- China has a long tradition of emphasis on education and learning (human capital) and will continue to increase its investment in human capital. The enrollment rate of tertiary education has been rising rapidly and stands at over 30 percent today. It is expected to rise further over the next decades as private tertiary educational institutions become more numerous in response to demand and facilitated by government policy.
- China has also begun to increase its expenditure on Research and Development (R&D), but it missed its target of 2.2 percent of GDP by 2015 by 0.1 percent. The target is to increase its expenditure on R&D to 2.5 percent by 2020.
- However, relative to many other economies, China lags behind on investment in both human capital and R&D capital, especially on a per capita basis.

- The principal sources of Chinese economic growth will gradually evolve from the growth of tangible inputs such as tangible capital and labour, to the growth of intangible inputs such as human capital, R&D capital, and reputational capital (branding and goodwill).
- Sustained investment in human capital and research and development (R&D) is essential for the occurrence of technical progress or growth in total factor productivity in an economy. China has also begun to invest heavily in R&D in recent years its R&D expenditure has been rising rapidly, both in absolute value, and as a percentage of GDP. But it still lags behind the developed economies as well as the newly industrialised economies of East Asia. (The Chinese R&D Expenditure/GDP ratio is targeted to reach 2.5% in 2020, approximately the same as the historical average of 2.5% for the \overline{U} .S.) 23

- One indicator of the level of human capital in an economy is the average number of years of schooling per person in the working-age population. In the following chart, the average number of years of schooling is compared across selected economies.
- By this measure, the United States and Japan are clearly the global leaders. South Korea has also been catching up fast. Most of the other East Asian economies also have quite rapidly increasing levels of human capital but it will take a while before they can catch up with the levels of human capital in the developed economies. China, Indonesia and Thailand have lagged behind in terms of investment in human capital.
- China has a different definition of working-age population—with a terminal age of 60--and so the number of school years per person in the customary working-age population, that is, up to 65, may well have been lower, given the lower enrolment rates at all levels of education 60 years ago.
- The number of school years per working-age person in China was probably around 9 years in 2014.

Average Number of Years of Schooling of Selected Economies (1948-present)



R&D Expenditures as a Percent of GDP: G-7 Countries, 4 East Asian NIES & China

R&D Expenditures as a Percentage of GDP: G-7 Countries, 4 East Asian NIEs and China



The Chinese Economic Fundamentals: R&D Capital Stock

- The R&D capital stock, defined as the cumulative past real expenditure on R&D less the depreciation of 10% per year, is an useful indicator of innovative capacity. It should quite properly be treated as capital since R&D efforts generally take years to yield any results.
- Lawrence J. Lau and Yanyan Xiong (2015), in their Working Paper, "Are There Laws of Innovation? Part I: Introduction", have constructed R&D capital stocks for the Group-of-Seven (G-7) countries, the East Asian Newly Industrialized Economies (NIEs) and China. The R&D capital stocks of China and the U.S. are presented in the following chart.
- At US\$3.656 trillion in 2013 (in 2012 prices), the U.S. is the World leader in R&D capital stock. The Chinese R&D capital stock, at US\$722 billion in 2013, has caught up with those of most countries and regions with the exceptions of the U.S., Japan and Germany.

R&D Capital Stocks and their Growth Rates: A Comparison of China and the U.S., 2012 US\$

Real R&D Capital Stocks and their Growth Rates: A Comparison of China and the U.S. (Billion US\$, 2012 Prices)



- One indicator of the potential for technical progress (national innovative capacity) is the number of patents created each year. In the following chart, the number of patents granted in the United States each year to the nationals of different countries, including the U.S. itself, over time is presented.
- The U.S. is the undisputed champion over the past forty years, with 140,969 patents granted in 2015, followed by Japan, with 52,409. (Since these are patents granted in the U.S., the U.S. may have a home advantage; however, for all the other countries and regions, the comparison across them should be fair.)

- The number of patents granted to Chinese applicants each year has increased from the single-digit levels prior to the mid-1980s to 8,166 in 2015.
- The economies of South Korea and Taiwan, granted 17,924 and 11,690 U.S. patents respectively in 2015, are still far ahead of Mainland China.

Patents Granted in the United States: G-7 Countries, 4 East Asian NIEs & China



- The stock of R&D capital, defined as the cumulative past real expenditure on R&D less depreciation of 10% per year, can be shown to have a direct causal relationship to the number of patents granted (see the following chart, in which the annual number of U.S. patents granted is plotted against the R&D capital stock of that year for each country).
- The chart shows clearly that the higher the stock of R&D capital of an economy, the higher is the number of patents granted to it by the U.S.
- Because China has had both a much lower R&D expenditure to GDP ratio and a much lower GDP than the United States and other developed economies in the past, it will take more than a couple of decades before the Chinese R&D capital stock can catch up to the level of U.S. R&D capital stock (and hence to the number of U.S. patents granted each year).

Patents Granted in the United States and R&D Capital Stocks, Selected Economies



- However, innovation also depends on the existence of competition. Monopolies are generally not very good in innovation and not very good in making full use of their innovation. China must create and maintain a competitive market environment with free entry and exit so as to encourage innovation.
- In addition, in order to encourage innovation, China also needs to protect intellectual property rights vigorously. The establishment of a national intellectual property court was an important step towards better protection of intellectual property rights, both Chinese and foreign.
- Finally, in order that "break-through" innovation can occur in China, the Chinese Government must commit a much greater share of its R&D expenditure to the support of basic research₃₄

Basic Research Expenditure and Its Share in Total R&D Expenditure: China & U.S.

Basic Research Expenditure and its Share in Total R&D Expenditure: A Comparison of China and the U.S.



- Past Chinese economic growth has been mostly driven by the growth of tangible capital. Technical progress or growth of total factor productivity accounts for less than 10 percent of Chinese economic growth since 1978.
- In order for technical progress to become an important driver of economic growth, investment in intangible inputs such as human capital and R&D capital must be increased. Moreover, capital allocation must be made more efficient. That is why the "supply side" reform is so important for the Chinese economy.

- The huge domestic market of 1.37 billion consumers with pent-up demand 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 in many manufacturing industries, based entirely on the domestic market 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.
- Another important implication of the size of the domestic economy is the relatively low external dependence. Thus, while the rates of growth of Chinese exports and imports fluctuate like other economies, the rate of growth of Chinese real GDP has been relatively much more stable. (China is represented by a red line in the following charts.)₃₇

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• An economy with significant economies of scale will grow faster than an economy with constant returns to scale given the same rates of growth of the measured inputs. The degree of returns to scale at the economy-wide level is not precisely known. The assumption used by Edward F. Denison (1961) for the degree of returns to scale for the U.S. is 1.1, that is, if all inputs are doubled, output will be increased by 1.1 times. On the assumption that this also holds for the Chinese economy, it implies that Chinese economic growth will be 10 percent higher each year than an economy with the same rates of growth of capital and labor inputs but without the economies of scale. Of course, the effects of economies of scale are sometimes confounded with those of technical progress or growth of total factor productivity (there is an identification problem). However, if there were economies of scale at all, they should be manifested in the Chin²⁰se economy.

• Suppose the annual rates of growth of the inputs in the economy are 7%. Under constant returns to scale, the economy will grow at 7% per annum. However, under increasing returns to scale of degree 1.1, the economy will grow at 7.7% per annum. In 10 years, the economy with economies of scale will be 7% larger than the one without; in 20 years, 14%; and in 40 years, 31%, a significant difference. Thus, the existence of economies of scale can make a huge difference in the level of GDP in a few decades. Moreover, economies of scale can increase the rates of return to investment and may lead to higher investment rates than otherwise. 40

- Another important and favorable implication of a large domestic economy is the relatively low degree of external dependence and hence vulnerability. Large continental economies, such as China, Russia and the United States, are likely to be self-sufficient in many of the resources because of their large size and geographically diversified location. These economies are also mostly driven by their internal demands, and not by international trade. For example, exports have never been very important to the U.S. economy, and the U.S. economy has never been dependent on international trade, except perhaps in the 19th Century. The Chinese economy is similar—China has adequate supplies of most natural resources domestically (with the possible exception of oil). Chinese economic growth in the future decades will be mostly driven by internal demand rather than exports.
- Thus, while the rates of growth of Chinese exports and imports fluctuate like other economies, the rate of growth of Chinese real GDP has been relatively much more stable. China is relatively immune to external disturbances, just like other large economies such as the U.S. and Japan (China is represented by a red line in the following charts.)

Quarterly Rates of Growth of Exports of **Goods: Selected East Asian Economies**

Quarterly Rates of Growth of Exports of Goods: Selected East Asian Economies



-60

Quarterly Rates of Growth of Imports of Goods: Selected East Asian Economies





Quarterly Rates of Growth of Real GDP, Y-o-Y: Selected East Asian Economies

Quarterly Rates of Growth of Real GDP, Year-over-Year: Selected East Asian Economies



The "Wild Geese Flying Pattern"--The Further Advantage of China's Size

- Professor Kaname Akamatsu (1962) was the first to introduce the metaphor of the "wild-geese-flying pattern" of East Asian economic development, which suggests that industrialization will spread from economy to economy within East Asia as the initially fast-growing economies, beginning with Japan, run out of surplus labor and face labor shortages, rising real wage rates, and quota restrictions on their exports, and need to relocate some of its industries to lower-cost economies. The fastest-growing economy will thus slow down and a lower-cost economy will take over as the fastest-growing economy.
- Thus, East Asian industrialization spread from Japan to first Hong Kong in the mid-1950s, and then Taiwan in the late 1950s, and then South Korea and Singapore in the mid-1960s, and then Southeast Asia (Thailand, Malaysia, Indonesia) in the 1970s, and then to Guangdong, Shanghai, Jiangsu and Zhejiang in China as China undertook economic reform and opened to the world beginning in 1978. During this industrial migration, the large trading firms such as Mitsubishi, Mitsui, Marubeni and Sumitomo of Japan and Li and Fung of Hong Kong played an important role as financiers, intermediaries, quality assurers, and managers of logistics and supply chains.

The "Wild Geese Flying Pattern"--The Further Advantage of China's Size

• However, this metaphor actually applies not only to East Asia but also to China itself because of its large size. Within China, industrialization first started in the coastal regions and then would migrate and spread to other regions in the interior—to Chongqing, Henan, Hunan, Jiangxi, Shaanxi and Sichuan—as real wage rates rose on the coast. As the coastal regions began to slow down in their economic growth, the regions in the central and western regions of China would take their turns as the fastest growing regions in China. China as a whole will therefore be able to maintain a relatively high rate of growth for many more years to come. 46

The Relative Backwardness

- \bullet In addition to a high domestic savings rate, abundant surplus labor, rising investment in intangible capital (human capital and R&D) capital), and the huge domestic market, China also has the advantage of relative backwardness.
- ◆ Thus, the Chinese economy has:
 - The ability to learn from the experiences of successes and failures of other economies, e.g., by adopting an export-oriented rather than an import-substitution development strategy;
 - The ability to leap-frog and by-pass stages of development (e.g., the telex machine, the VHS video-tape player, and the fixed landline telephone are all mostly unknown in China; and the personal computer is not a household consumer good as it was in the developed economies); and
 - The possibility of creation without destruction (e.g., online virtual bookstores like Amazon.com do not have to destroy brick and mortar bookstores which do not exist in the first place; internet shopping versus brick and mortar malls).

The Unimportance of the Stock Market

- What is the impact of the bursting of the Chinese stock market bubble in June 2015 on the Chinese economy itself? It should be realized that this is not the first time that a Chinese stock market price bubble burst. It happened once before, in 2007, when the peak of the bubble was higher and the trough was lower than the current one (see the following chart). However, neither the run-up of the stock price bubble, or its subsequent burst, appeared to have had much effect on the Chinese real economy.
- Why is this the case? One reason is that approximately 90 percent of the Chinese stock investors are individual retail investors, who tend to hold their shares for only brief periods, and trade very often. It is probably more accurate to describe their behavior as "gambling" rather than "investing". Moreover, for the longest time, "Initial Public Offerings (IPOs)" were suspended on Chinese stock markets. Thus, the developments in the real economy and the stock market are uncorrelated. The next two charts also show that the real rates of growth of the Chinese economy are basically uncorrelated with the rates of growth of the Shanghai Composite Stock Price Index.

The Chinese Quarterly Real GDP and the Shanghai Stock Exchange Composite Index



The Rates of Growth of Chinese Quarterly Real GDP and the Shanghai Stock Index (1993-)

Rates of Growth of Chinese Quarterly Real GDP and the Shanghai Composite Index



Concluding Remarks

- Chinese economic growth since economic reform and opening to the World began in 1978 can be mostly 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.
- 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 Chinese experience also reaffirms the importance of basic infrastructure and the maintenance of economic openness to the successful development of an economy.

Concluding Remarks

- In the short to medium term, continuing Chinese economic growth going forward will depend mostly on the growth of internal demand (public infrastructural investment, public goods consumption (education, health care and environmental control, preservation and restoration) and household consumption) and not on exports and not on manufacturing capacity expansion in the existing industries.
- The growth in household consumption will do its part, especially in the demand for services. The expanding and rising middle class will play a crucial role.
- In the longer run, Chinese economic growth will make a transition from tangible-inputs-driven to intangible-inputs- or innovationdriven.
- The "New Normal" is thus neither a "boom" of close to double-digit rates of growth, nor a "bust" of negative or low single-digit real rates of growth. There will be both sufficient supply and demand in the Chinese economy to support an average annual real rate of growth₅ $_{9}$ f around 6.5%.

Concluding Remarks

- The growth of tangible capital, supported by a high domestic saving rate, has been the principal source of past Chinese economic growth.
- The growth of intangible capital (human capital and R&D capital) will have to become a much more important source of Chinese economic growth as it has already become in the more developed East Asian economies such as Japan, South Korea, Singapore and Taiwan.

A Comparison of the Weighted Average Provincial and National Rates of Growth

