Global Economic Growth and its Implications for China

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The term "globalization" did not come into general use until the 1990s. The Organization for Economic Cooperation and Development (OECD) defines globalization as the geographic dispersion of industrial and service activities, such as research and development, sourcing of inputs, production and distribution. Globalization also involves the cross-border networking of companies through joint ventures and the sharing of assets.

Defined in this way, globalization is as old as multinational corporations, which takes us back to the Singer Sewing Machine Company in the nineteenth century and the automobile industry before World War II. What is new is the enormous acceleration in international trade since World War II, especially since 1980. Between 1980 and 1996 world trade grew at 6.7 per cent per annum, or by nearly two and a half times the rate of growth of world gross domestic product (GDP). This acceleration of trade has been promoted partly by policy changes of governments that have served to promote competitiveness through deregulation, including the removal of trade and exchange controls. Trade has also been promoted by the acceleration of technological change, particularly the leap forward in information and communications technology since 1980.

The improvement in the speed, quality, and detail of information about investment opportunities has stimulated international capital flows and increased the level of direct foreign investment. Much of the direct investment has been undertaken by multinational enterprises

which have been spurred both by a search for cheaper sources of key inputs and by the growing opportunities to market their products, particularly in the newly industrializing countries of Southeast Asia (NICs).

Although trade and deregulation are essential factors in creating a favorable context for rapid economic growth in China and other NICs, the fundamental force behind rapid economic growth is technological change. New technologies are embodied in capital, both physical capital and human capital. When the rich countries (which I will designate by OECD) were making their transition to large-scale industrial production more than a century ago, their investments were overwhelmingly physical. In that age the technologies that drove the economy down the path of rapid economic growth were embodied in such enterprises as railroads, oil refineries, integrated steel furnaces and rolling mills, motor-vehicle-manufacturing plants, power plants to generate electricity and the grids to distribute it, and the whole array of factories that produced the new machines and consumer products made possible by electricity.

However, in OECD nations today the new technologies are embodied primarily in human capital or knowledge capital. In the United States, for example, knowledge capital represents at least two-thirds of the total stock of reproducible capital. This knowledge capital is embodied in professional skills, such as those required in medicine, mathematics, biology, chemistry, physics, engineering, finance, and programming. Indeed, more than a third of the U.S. labor force today consists of professionals. It is the size and quality of the knowledge capital embodied in the personnel of both small and large-scale firms, particularly in the multinational firms, that determine success in global competition.

It would be a mistake to assume, however, that economic growth in China and the other NICs will simply replicate the experience of the West. Although it is evitable that some of the

development patterns experienced by OECD countries during their phases of rapid transition will be repeated in the NICs, other patterns will be quite different. For example, rapid economic growth is necessarily uneven growth, uneven from one sector of the economy to another and from one geographic region of the country to another. Numerous bottlenecks arise as some sectors of the economy become much more developed than other sectors. This characteristic of rapid growth becomes apparent if we compare the current status of the economy of China to the pattern of the US economic growth over the last 120 years.

In the case of real per capita income, for example, China is now at the level that the United States attained around 1897. Similarly, the share of the labor force that is employed in agriculture suggests that China is today at the developmental level of the United States in 1880. If, on the other hand, we shift to education the comparisons are more favorable. The share of students in primary schools as a percentage of the relevant age group indicates that China is at the level the United States attained in the mid-1950s. However, if we look at high school education, China is at the level the United States attained in 1970, when United States per capita income was four times the current Chinese level. When life expectancy is used as the measuring rod, China is at level the United States achieved in 1966. However, according to the share of the population that is urbanized, China is at the level that the United States attained about 1890.

There is, in other words, not just one level of economic development in China but several different levels that coexist. Some sectors of the Chinese economy are quite advanced and some represent relatively early stages of economic development. The United States experience indicates that the more rapidly growing sectors of the economy are bound to generate heavy pressures on the less-developed sectors. In many respects, China is accommodating the intersectoral pressures of rapid economic growth more smoothly than the United States did.

Rapid urbanization is a case in point. Between 1980 and 1995 the share of the Chinese population that is urban increased from 19 to 30 percent. On the whole, this very large increase in the urban population in just 15 years unfolded in a beneficial way. Life expectancy in the cities improved despite a variety of pressures on housing and other important aspects of infrastructure. A similar shift of the rural population into the cities took place in the United States between 1860 and 1890. Although the American shift was more protracted, it was much more deleterious to living standards. Health conditions deteriorated badly and mortality increased. In the most crowded urban slums the infant death rate approached 50 percent. In the United States and much of Western Europe, the urban growth rate during the nineteenth and twentieth centuries exceeded the capacity of these economies to provide adequate housing, adequate sewage control, safe water and safe food supplies. By contrast, in China and in the other high-performing Asian economies, rapid urban growth has been based on a far more advanced public health technology and better housing, including the widespread practice of boiling water for human use.

The problem of unemployment under conditions of rapid economic growth is another point of comparison. Unemployment in China is similar to the unemployment that developed in the United States and Western Europe during critical periods in the transition from a primarily agricultural to a primarily industrial society. High unemployment in Western Europe, and in the United States after 1880, was promoted by the rapid increase in agricultural productivity that made a large proportion of the agriculture labor force redundant.

While realization of China's growth targets will mitigate some of the unemployment problems caused by structural change, it will not eliminate all of the squeezes. Indeed, some reforms now planned, such as the reform of the state-owned enterprises, are likely to increase

transitional unemployment, while other reforms, such as rapid increases in consumer durables, are likely to put pressure on infrastructures. Modern industry is highly intensive in energy requirements, in transportation services, and in communication services. These are all areas in which extremely rapid economic growth is bound to put pressure on the infrastructure.

Consider the case of motor vehicles. In the United States the income elasticity of the demand for motor vehicles between 1910 and 1970, the sixty years of rapid penetration of the economy by this new form of transportation, was 2.6. In other words, a one percent increase in per capita income led to a 2.6 percent increase in the demand for motor vehicles. If China's per capita income grows at six percent per annum and China has the same income elasticity for motor vehicles as the United States, Chinese households and firms will be purchasing ten million vehicles per year by 2015. Currently, Chinese motor vehicle production is about 1.5 million units per annum. So in 15 years output will grow by about 6-fold. Such an increase would put China at the current United States level of vehicle purchases. If China continues to grow at six percent until 2024, an income elasticity of 2.6 implies that motor vehicle purchases will increase to 45 million per year, which is nearly equal to the current world total of motor vehicle purchases.

It might well be argued that the income elasticity of the United States is too high to be employed in forecasting the Chinese market. However, the forecasts will not be much different if one assumes an elasticity that is a third less in China than it was in the United States. In that case, the milestones in which annual purchases of ten million and forty-five million vehicles are achieved get pushed back a little, but not much. The relevant years become 2022 and 2036.

In the American case motor vehicles became a major factor in elevating the standard of living of ordinary people. Motor vehicles provided numerous pleasures, contributed to

occupational and geographic mobility, and were an essential instrument in permitting Americans to exploit growing opportunities for leisure-time activities. It is likely that an increase in the availability of motor vehicles will do the same for Chinese households. But putting a car in every household, or even in most households, will put great pressure on petroleum supplies and other sources of energy. It will also require a major program of construction of roads on which the vehicles can travel. Other raw materials that will be squeezed include steel, which will be needed not only to construct cars but also for supplying spare parts and for construction materials.

One may well wonder about the impact that a massive increase in the use of cars will have on the environment. The growing use of fossil-based fuels is already creating major environmental problems for China. However, new technologies are emerging that will greatly reduce carbon-based fuels. The development of practical hydrogen-based fuels is particularly promising and should alleviate pollution problems not only in the NICs, but also in OECD nations, perhaps within the next two or three decades

Rapid economic growth means not only that China will rapidly catch up with American technology but also that it will experience far-reaching changes in the structure of consumption, similar to those experienced in the United States. Table 1 shows the change in the structure of consumption that took place in the United States over the 120 years extending from 1875 to 1995. In 1875, food, clothing, and shelter, the necessities of life, accounted for 75 percent of consumption, while education and health care represented 2 percent, and leisure accounted for 18 percent.

By 1995 necessities accounted for only 12 percent of consumption. Education and health care together now represent larger share of consumption than food, clothing, and shelter. The

most dramatic rise in consumption, however, was in the category of leisure, which accounted for 67 percent of all household expenditures in 1995.

The third column of Table 1 presents the long-term income elasticities of the demand for each of the four categories of consumption. The income elasticity of necessities was 0.3. In other words, a one percent increase in income increased the consumption of necessities by just three-tenths of one percent. On the other hand, education, health care and leisure all had income elasticities in the neighborhood of 1.6, which means the demand for these categories increased much more rapidly than income.

The American experience indicates that at the current U.S. levels of income consumers reach saturation in their consumption of those products that once defined the standard of living, including many items that a few decades ago were considered luxuries, or existed only in the imagination of science-fiction writers. Such items as refrigerators, air-conditioners, washing machines, telephones, radios and television sets have reached saturation in the American market in the sense that most households have adequate stocks. Indeed in some items, such as radios, the U.S. appears to have reached supersaturation since there is now more than one radio per ear.

When material aspects of consumption are largely satisfied, economic progress no longer pivots on the necessities of life, which a century ago made a difference between health and sickness, between a long useful life and premature death. Today, even the poor in the OECD countries have longer life spans than the rich had at the beginning of the twentieth century. Life expectancy is still increasing and it can no longer be assumed that short of a genetic breakthrough the upper limit on the life span has been, or soon will be, reached.

In OECD countries, the immaterial aspects of life have pushed to the forefront. Rather than endlessly accumulating consumer durables, most individuals prefer to take their gains in the

form of leisure. Leisure is not indolence. As the great Irish playwright George Bernard Shaw put it, "Labor is doing what we must, leisure is doing what we like, and rest is doing nothing whilst our bodies and our minds are recovering from their fatigue."

Today ordinary people in the United States and other OECD nations wish to use their liberated time to buy those amenities of life that only the rich could afford in abundance a century ago. These amenities broaden the mind, enrich the soul, and relieve the monotony of working for a living. They include travel, athletics, enjoyment of the performing arts, education and shared time with family. The principal cost of these activities is often measured not by cash outlays but by outlays of time. In rich countries people are increasingly concerned with what life is all about. That was not an issue for the ordinary individual in 1880, when nearly the whole day was devoted to earning the food, clothing and shelter needed to sustain life. Economic growth has democratized leisure. Once available only to a small upper class, it is now abundant for ordinary people in rich countries.

The radical changes in the use of time in the United States over the past century or so is indicated by Table 2, which shows the secular trend in the use of discretionary time. Ten hours a day are biologically determined: eight hours for sleep and two hours for eating and vital hygiene. The remainder is discretionary time. "Chores" and "work" both involve tasks needed for earning and maintaining a standard of living.

The most notable feature of Table 2 is the large increase in leisure available to the typical male worker in the United States. His leisure time has tripled over the past century, as his work week declined from about 60 hours to about 34 hours today. China is making more rapid progress in work reduction than occurred in the United States. Urban working hours have declined to about 44, a level not generally attained in the United States and other OECD nations

until well after World War II. Moreover, it is possible that the demand for leisure will grow at a more rapid rate in China (i.e., have a higher income elasticity of demand) than in OECD nations, partly because of a knowledge of leisure opportunities available in OECD nations, and partly because of a very rapid rate of diffusion of the most advanced information and communications technologies.

In 1995, the time available for leisure activities by the typical household head in the United States exceeded the time spent at work. About a quarter of leisure time is now devoted to public events and some is devoted to sports. But most leisure time is spent at home in front of the television set, listening to music, reading, and socializing.

Table 2 also forecasts the division of the average American day in 2040. It shows that by that date more than half of the discretionary day will be devoted to leisure activities. The forecast is for a reduction of the work year from the current average of about 1730 hours to just 1400 hours per year, with the average work week down to 30 hours, paid holidays up to 30, and sick-days at 12. This forecast may underestimate the rate of the continuing decline in work hours, since the work year is already at 1650 hours in France and at 1600 in Germany. The pattern of change in the use of time among women was similar to that among men.

All in all the *lifetime* discretionary hours spent earning a living in the U.S. have declined by about one-third over the past century (see Table 3) despite the large increase in the total of lifetime discretionary time due to the increase in life expectancy. In 1880 four-fifths of discretionary time was spent earning a living. Today, the lion's share (59 percent) is spent doing what we like. Moreover, it appears probable that by 2040 over three-quarters of discretionary time in the United States will be spent doing what we like, despite a further substantial increase in discretionary time due to the continuing extension of the life span.

The extremely high income elasticity of the demand for leisure poses the problem of how to finance such an abundance of leisure. Both the OECD countries and China are now grappling with this issue. While it may take several decades to resolve the issue, it appears likely that the solution will take the form of providential funds under which workers will be required to save about a third of their income in designated mutual funds, and the proceeds will be used to finance health insurance, home mortgages, education, and pensions.

It is important to put the experience of China in a regional context when considering the rapid and radical shifts in the locus of global markets for durables and high-tech services. The observation is hardly new. Thousands of articles have been written during the past decade on the emerging markets of Southeast Asia. Nevertheless, the full meaning of this development for the unfolding of global economic growth during the next generation is still poorly understood.

In making my point, I want to focus on eight economies of the region. Included are the four "Asian Tigers" that have already broken into the golden circle of rich economies: Singapore, Hong Kong, Taiwan and South Korea. Also included are four nations that have yet to achieve that goal: they are China and Indonesia, which the World Bank still classifies as "poor nations," and Thailand and Malaysia, which are classified as middle-income nations. Taken as a group, these 8 nations had an average growth rate in GDP of 10.7% per annum during the 15 years between 1980 and 1995, before the outbreak of the financial panic. During the past two years these nations have largely recovered, and, although they have not collectively regained double digits, growth rates are now averaging around 8 or 9 percent per annum. As a result, they now have a collective GDP of about $6.5 trillion, which is about as large as the total GDP of the 5 largest West European economies and about four-fifths the size of the U.S. economy.

What is likely to be the situation in 2030? Suppose we assume that Europe and the United States continue to grow at 4 percent per annum, which has been their recent record. Suppose we also assume that the growth rate of the NICs will only average about two-fifths of the rate achieved over the past 2 decades (including the period of the financial panic). Under those assumptions the NICs will have a collective GDP of about 60 trillion dollars or about 15 percent more than European and American economies combined.

If this scenario holds up, and I believe it is a plausible one, Southeast Asia will emerge as the dominant market globally, dictating to a large extent what multinational companies are producing, and setting standards for new products. Keep in mind that the kind of growth I am projecting was already achieved by the Asian Tigers for a generation and by Japan for almost as long. Such growth will be fueled during the next several decades, not only by continued adoption of existing technologies, but also by a large supply of promising new technologies that are already well along in the process of research and development, covering such fields as genetic engineering, pharmaceuticals, information and communications, transportation, energy production, and health care, among others.

The preceding analysis helps to explain why some of the giant multinationals are willing to risk huge capital investments in China and elsewhere in Southeast Asia despite the many difficulties still facing such investments. The head of the China Group at General Motors recently said that he expected Buick sales in China to quadruple during the next decade, which implies a rate of growth of 15 percent per annum. This is the rate that one obtains by multiplying the income elasticity of the demand of automobiles in the United States between 1910 and 1970 by a projected annual growth rate in Chinese GDP of 6 percent per annum.

I close with a final question. Suppose NICs are able to grow at 6 or 7 percent per annum for another generation. Does that mean that technological leadership will pass from the West to Southeast Asia? My answer is, not necessarily. Since new technologies in the information, biomedical, genetic engineering, and energy production industries are driven by the level of basic scientific knowledge, the key issue is not only the speed with which the NICs will be able to develop a large cadre of advanced scientists. It also turns on how rapidly these scientists can discover the most promising *uncharted* frontiers of scientific research.

The American experience shows that scaling such heights is not an easy task. The United States began the process of rivaling Western Europe in natural science when it began establishing post-graduate research programs in the U.S., beginning about 1875. During the next quarter century it sent some of its most promising young scientists to Europe to study with the great masters in Germany, France, and Great Britain. That policy yielded some successes, as indicated by the occasional Nobel prizes awarded to Americans. Yet in such fields as physics and chemistry, the Europeans remained dominant down to the outbreak of World War II. It was not until some of the European master-scientists emigrated to the United States, chased out of Europe by the Nazis, that the U.S. was able to gain the scientific dominance that it achieved during the second half of the twentieth century.

The conclusion I draw from that experience is that scientific training is still an artisanal craft that requires not just a few years of contact between the masters and students, but decades of patient interaction. To be a master of the frontier of science requires not only a command of the formal knowledge conveyed in class and in published material, but the informal knowledge that rattles around in the minds of the masters of the art and is verbalized only as the work of apprentices evokes comments. It is not, of course, precluded that the NICs will do better than the U.S. did.

Perhaps the old masters in the West will become too narrow in the range of issues they are willing to entertain and create new openings for younger minds. In any case, it will be interesting to see how the race for scientific excellence unfolds in the new millennium

Table 1. Changes in the U.S. Distribution of Expanded Consumption (%), ca. 1875-1995

	1875	1995	Income elasticity
Food, Clothing, and Shelter	75	12	0.3
Education and Health Care	2	14	1.6
Leisure	18	67	1.5
Other	6	7	1.1

Table 2. Secular Trends in the Use of Time: The Average Hourly Division of the Discretionary Day of the Average Male Household Head, ca. 1880-2040 (based on a 365-day year)

	ca. 1880	ca. 1995	ca. 2040
Chores	2.0	2.0	2.0
Work	8.5	4.7	3.8
Travel to/from work & illness	1.7	1.5	1.0
Other	1.8	5.8	7.2

Table 3. Estimated Trend in the Lifetime Distribution of Discretionary Time in the United States, ca. 1880-2040

	1880 (%)	1995 (%)	2040 (%)
Lifetime discre-tionary hours	**225,900 (---)**	**298,500 (---)**	**321,900 (---)**
Lifetime work hours	**182,100 (81)**	**122,400 (41)**	**75,900 (24)**
Lifetime leisure hours	**43,800 (19)**	**176,100 (59)**	**246,000 (76)**