

*[See end for comments]*

## Growth of Economy, Consumption in China

In 2003, China's GDP, a composite number formed by the dollar amount of consumer spending, investment, government spending and the balance of trade, grew by 9.1%, with the growth rate in the last three months of the year measured at 9.9% (3). To understand the full ramifications of this number, it is important to understand the economic history of China, the innate connection to energy consumption, and the implications of fulfilling this need.

In order to have any modern economic growth, let alone the average growth rate of 9.3% since 1978, a government needs to be established to provide the needed infrastructure for development, including stable and supportive policy and a stable legal environment for private (or public) investors (11). China lost this in 1911 with the collapse of its dynasty and was not able to restore a secure and able government until 1978 with the death of Mao Zedong. This instability and lack of economic growth caused China to be the latest country to have entered the world economy as an industrial power, falling behind countries like Japan and virtually all of its coastal neighbors (11).

In the early 1900s, China would have been more than able to have undergone industrialization with a male literacy rate far above surrounding countries, thousands of people who were experienced running government offices, and trade that was largely independent of European powers (11). One large reason for this unnaturally stunted

economic growth was the lack of sufficient capital formation. The government at the time invested roughly 5% of its GNP (gross national product) into capital, which can do little more than maintain the present capital stock, assuming there is no growth in population even. This incredibly low investment rate was due to the instability following the crash of the last dynasty. In 1916, Yuan Shikai's efforts to establish a new dynasty failed, causing the country to split into warring groups of local leaders until 1928. The Japanese seized the north-east in 1931 and fought an all-out war with the Chinese from 1937-1945. When the Chinese weren't fighting the Japanese, they were fighting each other in a civil war which lasted until 1949 (11).

In 1949, the Communist Party took control, which actually caused economic growth to rise faster than the population (11). China had adopted the Soviet economic system with central planning, collectivized agriculture, and the elimination of market forces. China also became the only developing country capable of making this system work, with failures listed in Cuba, Vietnam, Albania, and Tanzania. China's success was due largely to its experience running a large bureaucratic system over the centuries, its educated populous, and the cohesion of the early Chinese Communist Party, which didn't degenerate into corruption nearly as rapidly as other Communist nations. The most important change, though, was the rate of capital formation, which increased to 20%. This rate of investment lasted for decades, until it jumped to 30%, which is the current number. The actual growth rate of the GDP during this period has been disputed in recent years, as many numbers were considerably inflated in order to make the introduction of communism to appear extremely successful. A growth rate of 6% would not be contested, though (11).

This period of growth and development was put on hold as Mao Zedong brought the technique of mass mobilization strategies based on his guerilla warfare experience to lead government (11). The state was in turmoil for 20 years as the unpredictable currents of the Great Leap Forward and the Cultural Revolution took hold. Schools were often closed, and, when opened, had a curriculum solely centered on the study of communist ideology. Strikes disrupted production and sometimes fighting would break out between students and workers. The most destructive phenomenon, economically, was the xenophobia that held the country. Importation of foreign technology was unheard of. Total factor productivity growth was negative throughout the period. Despite this, the economy still grew, due to capital formation that averaged around 30% of GNP throughout Mao's rule (11).

The year 1978 marked a turning point for China's economy (11). Mao Zedong died and his close supporters were expelled from the government. Two very fundamental changes occurred as a direct result of Mao's absence that fueled the economic growth that continues today. Markets were freed up, so that much of what was produced could be sold directly to consumers at market prices typically much higher than those that prevailed when almost everything had to be sold to the state. The effects of the freed market, especially rural markets can easily be demonstrated in agriculture, which developed at a rate of 7.3% per year, despite a minuscule share of state investment. The other early change was in the foreign trade sector. After Mao's death, there was a push to purchase capital equipment from outside China, but they soon found out that they lacked the foreign exchange to pay for such large purchases. This caused China to push exports, which became a driving force of the economy (11).

With China's 1.3 billion people and the very large amount of capital formation that has been developed over the last 50 years, China's industry skyrocketed immediately. Now, China's economy is 8.5 times larger than it was in 1978 (13). Its foreign trade has grown by 30 times, causing its trade dependence to hit 50% compared with Japan's 17% and the United States' 22% (13). In the past year alone, exports have jumped 35% (10). In the last two years, \$100 billion in fresh capital was poured into China from foreign investment alone (8). Industrial output rose a total of 17% in 2003 (3). These numbers are not expected to slow, either. Goldman Sachs, one of the most prestigious U.S. investment firms forecasted that China's 2004 GDP will rise as much as 9.5%, a possible increase from last year's rate (10). According to Li Deshui, director of China's National Statistics Bureau, "There is no need to slam on the brakes."

In fact, there is only one reason that China's continued exponential growth is deeply concerning; energy. Demand for oil has been rising at a fairly constant rate of 7.5% (15). Currently, oil consumption is at 5.8 million barrels per day making China the second largest oil consumer in the world, replacing Japan (16). The installed capacity of electricity has risen from 57.12 million KWh in 1978 to 338.61 million KWh in 2001, a capacity second in the world only to the United States (2). This rate of growth has not slowed in recent years. The China State Grid, which accounts for 50% of China's generating assets predicts that electricity transmission across regional grids is expected to increase by 66.7% as more country is developed and total sales are expected to increase 9.2% (1). Once again, there is no sign of slowing down consumption in the near future, especially as the auto industry takes off. According to The Wall Street Journal, demand for automobiles has been increasing at a rate of 19% a year (8). It is predicted that, in

2010, China will have 90 times as many cars as in 1990 (15). Projections show that China could surpass the total number of cars in the U.S. by 2030. This growth is not helped by the fact that China has some of the most affordable gasoline, due to the lack of taxes to discourage consumption (15).

China stands on the brink of creating an extremely difficult situation, though their oil consumption is far from that of the United States, they can't support any sort of increase through domestic production. China actually exported oil during the seventies and eighties, but became a net importer in 1993 (15). Currently, it is estimated that China's maximum exploitable oil reserves are at 13-16 billion tons, comparable to a medium sized oilfield in Iran. This number is also only rated to last the whole country only one week (16). According to China's National Statistics Bureau, crude oil imports rose 31.3% in 2003 and refined oil increased by 38.8% (4). China's total oil imports are expected to double by 2010 and are supposed to equal U.S. oil imports by 2030 (15). These numbers could have been substantially worse, but China fuels most of its energy and electricity needs with coal, which is domestically abundant. In 1978, national coal production stood at 617 million tons; in 1997, this number hit 1.325 billion (9). China is also encouraging large increases in the consumption of natural gas over oil.

China's level of oil imports are extremely alarming from the perspective of the U.S. because it is necessary for China to secure foreign sources, most of which are already dominated by the United States. Many of the deals that have been made abroad by China have involved the sale of arms, supporting state terrorism in many countries. China is known to have been a provider of ballistic missiles to North Korea, Iran, Iraq, Syria, Libya, and Sudan (15). Currently, China is Iran's number one provider of

unconventional arms. Not surprisingly, the U.S. government recognizes this as a threat and is not pleased. A report by the U.S.-China Security Review Commission, a group created by Congress, said, "A key driver in China's relations with terrorist-sponsoring governments is its dependence on foreign oil to fuel its economic development. This dependency is expected to increase over the coming decade" (15). Of especial concern to the U.S. is the growing relation between China and Saudi Arabia, traditionally one of the largest U.S. suppliers. This relationship has been developing since the mid-1980s, when China sold Saudi Arabia intermediate range ballistic missiles. In 1997, Saudi Aramco announced that it would triple its exports to China (5). High profile visits marked the nineties the latest occurring in 1999, President Jiang Zemin made a state visit in which he pronounced a "strategic oil partnership" between the two countries (15). China was also the largest consumer of Iraqi oil previous to the recent war started by the U.S. (5). The current president, Hu Jintao, has conferred with Mexican President Vincente Fox on energy cooperation and has signed a memorandum forming the Australia-China Natural Gas Technology Partnership Fund. On Dec. 18, Hu also met Israeli President Moshe Katsav in Beijing in order to discuss cooperation in petroleum technology (15).

China recognizes that it is treading a dangerous area and is trying very hard to be self-sufficient, a goal that is central to Marxist Communism. In late November of last year, it was proposed to the State Council to develop an oil-focused strategy in order to bridge the gap with the international energy market and better resist price fluctuations (15). One of the most important provisions of this proposal was heavy funding for intensive research of alternative fuels in order to reduce reliance on fossil fuels (15). China's energy utilization efficiency is also sub par, at 33.4%, a number 10% below the

advanced international level (14). Also, at present, the average Chinese automobile consumes about a tenth to a fifth more fuel than one in developed countries (7). While the correction of these problems in them will not be enough to stop energy consumption growth, it can help dramatically, especially as cars become more popular.

With a population of 1.3 billion people, any increase in any product consumed in China has a large effect on the rest of the world. Currently, China only consumes 25 million British thermal units per capita; in the U.S, this number is 355 (6). In fact, despite the considerable GDP growth in the last 20 years, energy consumed per dollar of GDP is below all the developed nations of Europe (6). The fact that China's entrance into industrialization is having this dramatic of an effect on the world indicates a problem far deeper. It becomes apparent rather quickly that fossil fuels have become so finite that any extra consumption at all is enough to throw off global stability. This problem needs to be stopped at the root and alternatives to the current means of energy must be found.

*Comments:*

- *Nice historical perspective at the beginning. Recent growth rates are amazing, and it's hard to imagine how institutional and cultural change can keep up with them – or how the environment will survive the onslaught.*
- *What is China doing about renewable energy sources and nuclear energy?*
- *An alarming paper! Well written and nice class presentation.*

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