

China: Growth and Consequences
Growth and Externalities in China

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China has achieved incredible economic success, lifting millions of people out of abject poverty in a timeframe and on a scale never before accomplished. This transformation, begun in 1978, can essentially be attributed to a change in *incentives*. N. Gregory Mankiw, in his *Principles of Economics* textbooks lists “Ten Principles of Economics.” One of the key principles is that “People Respond to Incentives.” The power of incentives is difficult to overstate. Economist Steven Landsburg even states: “Most of economics can be summarized in four words: ‘People respond to incentives.’ The rest is commentary.” Ever since reading those words in Landsburg book, *The Armchair Economist*, I have looked more carefully for the incentives that drive behavior. China offers a great example of a change in incentives and the results.

The phenomenal growth rate and the economic “miracle” produced by China is well known. Less known is the side effects of this rapid growth, the externalities that are created by this fevered pace of development. Nearly all Principles of Economics textbooks will discuss externalities and possible solutions to this problem known as a market failure. Economists think of market failure as a situation in which the optimal level of production, from society’s point of view, is not met. Externalities is a situation in which, among other solutions, the government can get involved and add efficiency.

Externality: the costs or benefits associated with the production or consumption of a product to third parties who do not produce or pay to consume the product. An example of external costs, or negative externality, is any type of pollution, while an example of an external benefit, or positive externality, is immunizations. In the case of negative externalities, people who are not even buying electricity from a coal-fired utility company may incur costs such as health costs, lower crop yields, etc., imposed on them by this power plant. A person who gets a flu shot is often making the decision on personal costs and benefits, but will often lower the chance that those around her will catch the flu.

China’s rapid growth has led to incredible negative externalities in the form of pollution. This became obvious from our visit to China.

Why has the Chinese Communist Party (CCP) allowed pollution to become a major problem? I think the simple answer has to do with the tradeoffs that they face, or at least perceive that they face. One theme that I repeatedly heard and read is that to maintain legitimacy, the CCP must continue rapid growth (read jobs) or face a challenge to its authority. To decrease pollution dramatically would involve raising pollution standards, and thus lower the growth rate. The CCP is seeing an increase in protests due to the extensive pollution, so it is possibly walking a tightrope between jobs and a cleaner environment. Complicating the issue is the incentives at the local level. The local officials seem to be more interested in jobs than the environment and therefore enforcement of pollution laws is lacking.

This lesson can be used at the high school or at the principles level in college for discussing externalities. For many years, I have taught this lesson using examples and data from the United States. Now, I can broaden this approach and include data and experiences from China and contrast that with the U.S. case. The fundamental economics is the same, the examples differ. It has already been useful to my students to see the tradeoffs that China faces and the magnitude of the pollution issue. Also illustrative is the way a one-party central government handles these problems – the pros and cons.

Lesson Plan:

1. The Mao years. Start with a brief background, the stagnant economy and the disasters created by Mao's leadership.
2. Deng and the change in incentives. Briefly look at some of the new incentives and the effect on growth.
3. Externalities. Describe some of the Chinese pollution issues.
4. The economics of externalities and correcting for externalities.

The Mao Years

From the establishment of the People's Republic of China (PRC) in 1949 to his death in 1976, Mao Zedong was the dominant force. Though credited with uniting a country that had been in turmoil, he also is responsible for anemic growth and severe negative externalities.

Tim Harford in his book, *The Undercover Economist* describes some of the problems.

"Under Mao, that waste was legendary. China's initial development efforts were two-pronged: massive investment in heavy industry such as steel, plus application of special agricultural techniques to make sure that China's vast population was fed...This two-pronged push was called the 'Great Leap Forward.' It seemed to make sense, but it was the greatest economic failure the world has ever seen...Villagers were ordered to build steel furnaces in their backyard but had no iron ore to put in them...If industrial policy was a farce, agricultural policy was a tragedy (Harford p. 233)

To meet quotas, people literally melted steel to make steel. It was a great waste of valuable resources. Hanson continues,

"Mao personally redesigned China's agricultural techniques, specifying closer planting and deeper sowing (of rice) to increase yields...Crop yields fell, of course, but even this would not have been as disastrous without the state's insistence that the policy was working...While crops were failing, China doubled its exports of grain from 1958 to 1961 as a symbol of its success...Estimates of the death toll from the famine range from 10 million to 60 million...Even the Chinese government figures later acknowledged that 30 million people had died." (Harford p. 234)

One of the most important distinctions between a market economy and a command economy is pointed out by Harford.

When people in a market economy try a new process, "mistakes stay small...when they fail some people will go bankrupt, but nobody will die. Only command economies can promote experimentation on such a fatally extravagant scale and suppress informed criticism." (Harford p. 235)

The picture of China during the Mao years is one of poor incentives, such as communes, which led to little growth and disastrous results.

Deng and Economic Reforms

John and Doris Naisbitt in their book, *China's Megatrends, the 8 Pillars of a New Society*, list “balancing top-down and bottom-up. They discussed the beginning on a bottom-up approach in the story of a bold group of farmers.

“A group of eighteen destitute farmers decided to take action and fight for a better life; at any risk. On an evening in October 1978, the impoverished group met secretly, dipped their fingers in red ink, and sealed a pioneering paper. ‘If we are successful we will not ask the country for any money or grain. If we are not (successful) we cadres are willing to risk imprisonment or the death penalty...’ this agreement is now at the National Museum of China in Beijing. The farmers agreed to split up the commune’s cropland into eighteen individual plots and allocate them among its member households. Working independently, each household and each family would cultivate its plot on its own and keep the crop. This was a revolutionary and dangerous step...This bold act gained early support from Wan Li, the first secretary of the Anhui Provincial Party Committee, and its success came to the attention of Deng Xiaoping and changed the course of Chinese history.” (Naisbitt)

The series of reforms included the privatization of land, as started above, the beginning of private entrepreneurship, opening the country to foreign direct investment and later to the privatization of state-owned enterprises (SOEs).

The results have been impressive. The growth rate of GDP since the mid 1980s has averaged somewhere around 9.5% to 10%.

But, what are the costs? These include:

1. Dislocation. This can be due to major projects such as the Three Gorges Dam or due to the great migration from rural to urban areas. Sometimes this rural to urban migration meant a breakup of the family. Dislocation was not a new issue for China. During the Great Leap Forward and the Cultural Revolution, families were moved, separated, and given new jobs. While much of that dislocation was to serve socialism, in this paper, I am discussing dislocation that resulted from the Reforms and primarily economic in nature.
2. A rapidly growing inequity in society, between rural and urban, east and west etc.
3. Incredible pollution as the country chooses growth versus the environment. Although there was a great deal of economic degradation during the Mao years, this paper looks at the period since the beginning of the Reforms in which rapid economic growth has accelerated this degradation.

An article posted on Telegraph.CO.UK on March 2nd, 2010, entitled “China’s wealth gap the widest since economic reforms began” discussed this increase in inequity. It stated that last year the average annual income in cities was 17,175 yuan and for the country was 5,153 yuan. “The increasing split between China’s prosperous cities and its vast interior is a ‘serious threat to social stability’, according to the government, which has linked a spate of public protests to perceptions of social inequality.” (Moore)

The reforms started under Deng include the positive externality, education. As the Cultural Revolution ended, education was once again praised and encouraged. China has continued to improve its education system and has dramatically increased the opportunities for post-secondary education. This is a strong positive externality.

Issue: Pollution in China

On February 9th, 2010, several sources reported results of the Pollution Census that was taken by China. This national survey involved a staff of 570,000 and took two years to complete. The government has not released the report to the Chinese public. Huffingtonpost.com reported that:

“China has revealed its most ambitious measure of what explosive development has done to its environment, saying its first national pollution census has mapped nearly 6 million sources of industrial, residential and agricultural waste. The world’s largest polluter also said its pollution levels might peak sooner than expected as China tries to balance economic and green concerns. The central government now has a year to use the results to shape its next five-year environmental protection plan. Ministries are also studying the possibility of an environmental tax.” (Huffington)

It seems that the Chinese government may be ready to move to taxation of polluters.

The usual solutions to pollution abatement are government regulation, taxes, or pollution permits. Government regulation is usually the first thing that nations try and is usually very inefficient. Often a government agency will mandate equal percentage cuts across all major polluters in a region. In addition, the government agency might decide which technologies will be used. Taxes can be an efficient solution, but would require a great deal of information to carry out efficiently. The alternative, selling pollution permits, has been very successful in the United States. Authors Miller, Benjamin and North published a book, *The Economics of Public Issues*. One chapter, “Smog Merchants” discusses the sale of pollution permits to control smog in southern California.

“The key element in the program is that the companies are allowed to buy and sell pollution rights. A firm that is successful in reducing pollutants below the levels which it is entitled receives emission reduction credits (ERCs) for doing so. The firm can sell those credits to other firms, enabling the latter to exceed their baseline emissions by the amount of the credits they purchase...because most of the emissions reductions will be made by firms that are the most efficient at doing so, the standards will be met at the lowest cost to society.” (Miller, p.173)

One of the real problems of pollution abatement has always been determining the costs and benefits of abatement. Cost estimates vary significantly. The sale of pollution permits resulted in a market for the “right” to pollute. This essentially resulted in a market price. When the permit system started in southern California, prices were as high as \$300. The price soon went to approximately \$100.

Returning to the Chinese Pollution Census, an article at guardian.co.uk on February 9th, 2010, claims “Chinese farms cause more pollution than factories, says official survey,” contained a couple of other interesting points.

“Overuse of fertilizers and pesticides has sent agricultural pollution through the roof. Farmers’ fields are a bigger source of water contamination in China than factory effluent...While the high figure for rural pollution is partly explained by the immense size of China’s agricultural sector, it also reflects the country’s massive dependency on artificial farm inputs such as fertilizers. The government says this is necessary because China uses only 7% of the world’s land to feed 22% of the global population.” (Watts)

Even more interesting, the article quotes China’s vice minister of environmental protection, Zhang Lijun:

“Because China follows a different pattern of development, it is very likely pollution will peak when per capita income reaches US\$3,000.” (Watts)

Zhang compares this with the \$8,000 that is the normal in other nations. And the article continues:

“If true, it would suggest the worst of China’s pollution problems may already be over. According to the World Bank and International Monetary Fund, per capita incomes in China have already passed this point. If exchange rates and a low cost of living are factored in, Chinese incomes may be equivalent to more than \$6,000.” (Watts)

Note: World Health Organization in 2009 showed China’s Gross National Income (GNI) per capita at \$5,370 (US\$).

What is the cost of China’s pollution?

“China also has a significant impact on the regional and global environment. The burning of coal is responsible for about half of the world’s sulfur dioxide emissions and causes acid rains throughout East Asia. ‘We even see huge brown clouds of sulfur making their way across the ocean.’ Lisa Mastny, the Worldwatch Institute project director, said. ‘The haze in L.A. is not just from L.A. anymore.’” (Platt)

There are some estimates of the costs to China’s GDP. A 2007 Council on Foreign Relations article, “Scorched Earth: Will Environmental Risks in China Overwhelm Its Opportunities?” investigates these costs.

“In fact, China’s environmental problems are reaching the point where they could constrain its GDP growth. China’s State Environmental Protection Administration (SEPA) concluded in June 2006 that environmental degradation and pollution cost the Chinese economy the equivalent of 10% of GDP annually. This figure is echoed in more specific costs reported in the Chinese press: up to \$36 billion lost

industrial output from a lack of water to run factories, \$13 billion from the degradation and health impact of acid rain, \$6 billion from the spread of desert region, and the list goes on.” (Economy)

A more gripping number is the estimated number of premature deaths from pollution.

“China, the world’s fastest growing economy, has earned another startling superlative: the highest annual incidence of premature deaths triggered by air pollution in the world, according to a new study. A World Health Organization (WHO) report estimates that diseases triggered by indoor and outdoor pollution kill 656,000 Chinese citizens each year, and polluted water kills another 95,600. Air pollution is estimated to cause approximately two million premature deaths worldwide per year...” (Platt)

This data was also stressed in a *New York Times* article, “As China Roars, Pollution Reaches Deadly Extremes.”

“This spring (2007), a World Bank study done with SEPA, the national environmental agency, concluded that outdoor air pollution was already causing 350,000 to 400,000 premature deaths a year. Indoor pollution contributed to the deaths of an additional 300,000 people while 60,000 died from diarrhea, bladder and stomach cancer and other diseases that can be caused by water-borne pollution. China’s environmental agency insisted that the health statistics be removed from the published version of the report, citing the possible impact on ‘social stability,’ a World Bank official said. But other international organizations with access to Chinese data have published similar results. For example, the World Health Organization found that China suffered more deaths from water-related pollution and fewer from bad air, but agreed with the World Bank that the total death toll had reached 750,000 a year. In comparison, 4,700 people died last year in China’s notoriously unsafe mines, and 89,000 people were killed in road accidents, the highest number of automobile-related deaths in the world. The Ministry of Health estimates that cigarette smoking takes a million Chinese lives each year.” (Kahn)

As the article points out, it is interesting that the models used to generate the data are western models from the U.S. and Europe.

“But Chinese experts say that, if anything, the Western models underestimate the problems. ‘Chinese pollution is worse, the density of the population is greater and people do not protect themselves as well,’ said Jin Yinlong, the director general of the Institute for Environmental Health and Related Product Safety in Beijing. ‘So the studies are not definitive. My assumption is that they will turn out to be conservative.’” (Kahn)

As previously discussed, the priority of the CCP is to maintain control so it is no surprise that they tried to suppress this data.

“China’s State Environmental Protection Agency engineered the removal of the statistics, the *Financial Times* reported, because the government feared the figures could trigger social unrest.” (Platt)

A July 17th, 2010 article in *The Economist* discussed some of the environmentalists in China in an article “Budding Greens.”

“China’s environment, most obviously the air in its cities, has been deteriorating roughly at the same dizzy pace that its industry has been expanding. Now some young activists, notably in university environmental clubs, are campaigning to raise awareness of pollution...even the greenest activists do not contradict the government’s stance on tackling climate change. But, Mr. Fan (environmental club member) and most of his peers also agree that economic growth and the environment are both pressing concerns, especially with the countless Chinese still living in poverty.” The article concludes: “This new breed of environmentalist is Chinese first, global citizen second.” (*The Economist* 1)

Other sources indicate the number of demonstrations involving environmental concerns is on the rise.

A great article in *The New York Times*, “As China Roars, Pollution Reaches Deadly Extremes,” again emphasizes the tradeoffs faced by the Chinese leadership between growth and pollution abatement.

“For the Communist Party, the political calculus is daunting. Reining in economic growth to alleviate pollution may seem logical, but the country’s authoritarian system is addicted to fast growth. Delivering prosperity placates the public, provides spoils for well-connected officials and forestalls demands for political change. A major slowdown could incite social unrest, alienate business interests and threaten the party’s rule.” (Kahn)

The article also shows the threat posed by letting pollution get out of control and the “thousands” of protests.

“But pollution poses its own threat. Officials blame fetid air and water for thousands of episodes of social unrest. Health care costs have climbed sharply. Severe water shortages could turn more farmland into desert. And the unconstrained expansion of energy-intensive industries creates greater dependence on imported oil and dirty coal, meaning that environmental problems get harder and more expensive to address the longer they are unresolved.” (Kahn)

The *Atlantic* magazine article, “China Makes, The World Takes,” asks about the factory boom in China.

“Has the factory boom been good for China? Of course it has. Yes it creates environmental pressures that, if not controlled could pollute China and the world out of existence. The national government’s current Five Year Plan—the 11th, running through 2010—has as its central theme China’s development as a ‘harmonious society.’ In China, the phrase is code for attempting to deal with income inequalities, especially the hardships of farmers and millions of migrant laborers. But it is also code for at least talking about protecting the environment. And yes, throughout China’s boom many people have been mistreated, oppressed, sometimes worked to death in factories. Even those not abused may be lonely

and lost, with damaging effects on the county's social fabric. But this was also the story of Britain and America when they built their great industries, their great turbulent industrial cities, and ultimately their great industrial middle classes. For China, it is far from the worst social disruption the country has endured in the last 50 years. At least this upheaval, unlike the disastrous Great Leap Forward of the 1950s and Cultural Revolution of the '60s and early '70s, has some benefits for individuals and the nation." (Fallows)

There have definitely been some bright spots. In March of 2008 the State Environmental Protection Administration (SEPA) was upgraded to the Ministry of Environmental Protection (MEP). A 2008 article from EarthTrends, summarized a comparison of the MEP with the U.S. EPA.

"In contrast to the U.S. system, the province is the basic political and economic unit in China. Environmental agencies at the provincial level are not staffed by the central government and are funded exclusively by local governments. This disconnect has effectively turned provincial environmental protection officers into professional workers with no real power. The five regional-level inspection offices will have little influence over the situation on the ground, as they still do not have the power to coordinate the provincial offices. In a country of 350 million people, the U.S. Environmental Protection Agency has more than 17,000 employees, not including outside contractors. China, a country with four times the population and significantly more pollution per capita, has only 300 workers at the MEP in Beijing and perhaps 30 people in each of the five regional inspection offices. Including affiliate agencies and institutes, the total number of personnel can perhaps reach 2,600." (He)

China knows it has a major problem and is taking steps to correct the externalities created by growth, but is it too little, too late? Only time will tell. Raising environmental protection to the Ministry level is a good sign. However, the size of the staff, the conflicting incentives, especially at the local level, in which economic growth (more jobs) is considered success, and a population of 1.3 billion and growing, makes significant improvement in pollution abatement difficult to say the least.

During my trip to China, after a presentation on pollution in China, I was asked by some of the others what I thought China might do. My prediction was that the Chinese government would respond to the pollution that has a greater effect on their own citizens and not worry as much about pollution such as carbon dioxide that has less immediate effect. However, as I am wrapping up this project, I noticed in today's, October 27th, 2010, *Wall Street Journal* an article, "China Oil Company's Carbon Play." Essentially, PetroChina is entering the carbon trading market. This may be a signal that China is more interested in carbon emissions than I thought.

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