Explaining Economic Growth in China: Theories of Development and the Role of Knowledge

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This paper broadly examines possible causes of recent economic growth in China by looking at the role of knowledge in improving labor productivity. Older theories of development assert that investment in tangible forms of capital improves labor productivity and creates economic growth. While investment in land, labor, and machinery may improve the productivity of labor in the short term, it cannot by itself produce high rates of economic growth over the long term. The economic benefits of knowledge, when included in a theory of development, can explain the recent performance of China’s economy, while governance in China explains fluctuations in China’s economic growth rate through its effects on the creation and use of knowledge.

General Theories of Development

Many theorists of economic and social change have asserted that investment in labor and machines causes the long-term economic growth necessary for development. In *Capital*, for example, Karl Marx traced the industrialization of Western Europe to investments in men and machinery made possible by the creation of private property and changes in the organization of economic production.1 During the late Middle Ages, European peasants produced food and other crops on land that was owned outright by feudal lords or was held in common. Peasants had a customary right of access to the land, often, but not always, in exchange for supplying a portion of their harvests to the lords. In the late 15th and early 16th centuries, feudal lords forcibly drove the peasantry

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1 Volume 1 of *Capital* was written 1867; its first English translation appeared in 1887.
from the land and usurped the commons (Marx, *Capital*, Volume 1, Chapter 27). Once landowners – Marx’s nascent bourgeoisie or capitalists – could restrict access to land and hire whomever they wanted, agricultural labor was transformed into a commodity that could be bought and sold, and peasants were forced to compete against each other for employment. Because of the competition between agricultural laborers, wages declined, and landowners could hire more people at the same cost. Land became more productive, with capital accruing to the landowners.

The capital obtained from agriculture was then invested by landowners in various forms of manufacture. Peasants who migrated out of the countryside because of declining wages often found employment in towns and cities in a new form of production, the factory. Because of newly-discovered technologies, the specialization of labor, and economies of scale, the factories that employed these individuals were more efficient at producing goods than the traditional handicraft production of the rural estates (Marx, *Capital*, Volume 1, Chapter 15, Section 8). With the rise of factory production, capitalists were forced to compete against each other for profit, and the machines they used in their factories cost less than human labor, so production became increasingly mechanized, resulting in the Industrial Revolution.

Approximately forty years after the completion of *Capital*, Karl Marx’s argument was reversed by the sociologist Max Weber in *The Protestant Ethic and the Spirit of Capitalism*.² Weber said that the fundamental cause of industrialization in Western Europe was not a change in the structure of the economy, but a change in social values – a cultural shift – namely, the Protestant Reformation. Weber argued that under the Roman Catholic Church, religious piety meant a rejection of mundane affairs, including

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² Originally published in German as a series of essays in 1904-05, translated into English in 1930.
the acquisition of material goods, and economic activity was encouraged only as much as it was thought to assist a person in getting from this world into the next. On the other hand, Protestant movements had an affinity with what Weber called the commercial spirit because they asserted that a person could serve God while mastering the material world, a doctrine that encouraged the rational pursuit of economic gain. Protestant theology assigned a spiritual and moral value to work, because one’s profession – one’s calling in life – no matter how humble, generated wealth that could be used for the common good. As Weber states in Chapter 5 of *The Protestant Ethic*,

Wealth is thus bad ethically only in so far as it is a temptation to idleness and sinful enjoyment of life, and its acquisition is bad only when it is with the purpose of later living merrily and without care. But as a performance of duty in a calling it is not only morally permissible, but actually enjoined.

Protestant values thus created a feeling of obligation to one’s job, rational calculations of the possibility of high earnings, and frugality, all of which enormously increase economic performance.

Because of their work ethic, Protestants were more productive than Catholics, so they earned larger incomes, and they were also more frugal than Catholics, so they saved more. These behaviors permitted what was termed capitalist accumulation: the investment of savings in the most efficient forms of production, which generated wealth, leading to more savings and more investment. The most efficient forms of production were those that employed machinery; in other words, industry.
Investment as a Prerequisite for Growth

Though the theories of Marx and Weber appear to be in opposition to one another, they both rest upon the idea that the economic growth that fed Western Europe’s Industrial Revolution was caused by investment in labor and machines. Modern theories of economic growth have used the same assumption. One model of growth in particular, created by the economists Evsey Domar and Roy Harrod, formed the underlying premise of most economic development strategies employed in Latin America, Africa, and Asia after World War II.

Economic growth is essentially an increase in a society’s average standard of living. To increase the average standard of living of a society, members of that society must produce more goods in a given unit of time; essentially, economic growth is driven by an increase in the productivity of labor. The Harrod-Domar model assumes that greater investment in machinery will allow workers to produce more goods. Because machines are more efficient than human labor, the more machines an economy has, the more that economy can produce. A change in production – usually measured in terms of gross domestic product (GDP) – is proportional to a change in the amount of machinery used in production, which means that a certain rate of investment in machines will create a particular rate of economic growth (Perkins, Radelet, and Lindauer 2006, 110-112). The difference between the amount of investment needed for economic growth and a society’s savings, which forms the pool of money available for investment, is known as the financing gap.

In conventional development strategies, there are three ways to bridge the financing gap. First, policymakers can raise the rate of investment, by suppressing
individual consumption and increasing the amount of money that citizens save – but in underdeveloped countries, most people spend the majority of their meager incomes and save very little. Second, the investment can come from private sources outside the country – but private firms located in the developed world often view investing in poor economies as too risky and too unprofitable. Finally, the money needed to fill the financing gap can come from foreign aid – via other governments and international lending institutions. The answer to the problem of low economic growth in the underdeveloped world is thus an increase in foreign aid. More foreign aid means more money available for investment in machinery, and more machinery will increase labor productivity to the extent needed for economic growth.

Although the aid-investment-growth approach guided development efforts for several decades, it produced little to no sustained economic growth in underdeveloped states because the forms of investment capital that were used have diminishing returns. Capital is anything that can be used to produce something else of greater value; for example, land, labor, machinery, or money. Under conditions of diminishing returns, every additional unit of capital applied to the production of a good contributes less to the production of that good.

For example, if land is being used as capital to produce a crop, the first land to be farmed is the land that is the most fertile – this land produces the largest harvest when farmers expend a given amount of labor. Any additional land that is brought under cultivation is less fertile; the labor expended is the same, but a smaller harvest is produced. The productivity of the labor working the land has decreased. Eventually, only the worst and most unfertile land is left, and cultivating it doesn’t result in any
additional crops – farmers can’t grow anything on this land no matter how much labor they expend, and the rate of return on additional capital has diminished to zero.

Similarly, increasing the amount of labor involved in the production of a good does not make that labor more productive; in fact, because of the law of diminishing returns, eventually labor becomes less productive as more labor is added. Doubling the number of people who cultivate a given area of land does not by itself generate a harvest that is twice as large, and increasing the number of people working a piece of land from ten to one thousand can easily result in smaller harvest because of everyone getting in everyone else’s way. Physical space, time, and other factors diminish the returns of additional labor.

Machines obviously can increase the productivity of labor – a farmer with a tractor can plough more land in a day than a farmer with a hoe. But supplying that farmer with a second tractor will not then make the farmer twice as productive, because it is impossible for one farmer to drive two tractors at the same time. In other words, providing more machines per unit of labor may create a short term boost in productivity, but the benefits of additional machines diminish over time. Investment in capital in the form machinery therefore cannot by itself cause long-term economic growth.

**Increasing Returns of Knowledge**

In his study of the United States’ economy, Solow (1957, 320) found that investment in tangible capital accounted for only 12.5 percent of the increase in labor productivity that occurred over a forty year period. Technological change, i.e., knowledge, accounted for the remaining 87.5 percent of labor productivity growth. Why does knowledge have such a large effect on labor productivity? Unlike other forms of
capital, knowledge has increasing rather than decreasing returns, primarily for two reasons. First, the use of land, labor, or machinery by one individual or firm “precludes its use by another” (Romer 1990, S73-4); in contrast, knowledge can be utilized simultaneously by any number of people. Knowledge can also be used “over and over again at no additional cost” (Romer 1990, S71). The repeated use of other forms of capital leads to lower returns because of consumption and wear.

Second, the economic benefit of knowledge increases and the cost of using it decreases with the number of people who use it. Workers who possess a lot of knowledge can be more productive working together than working separately. Putting a star player on an athletic team with no other talent isn’t going to help the team win many games, but if a second talented player, or a third, is added, the skills of these players enhance the performance of each other, and as a set they are able to contribute more toward the team’s overall level of play. The complementary nature of knowledge means that the more a society already knows, the more a new idea is worth, and the larger the market for new knowledge, the greater the economic incentive there is to create it (Easterly 2002, 150-3). Increasing returns make knowledge the one form of capital that can create long-term economic growth. If one defines development as economic growth, and knowledge causes economic growth, development is a question of creating the social conditions that facilitate knowledge’s creation, distribution, and use – conditions that foster technological change.

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3 Repeated use of knowledge without additional cost assumes that institutional mechanisms intended to exclude individuals and firms from reaping the benefits from knowledge that they did not create – patent protection, copyright, licensing, and other forms of law – are temporary or ineffective. Romer (1990) thus treats knowledge as a partially-excludable good.
The Case of China

The theories of Marx and Weber imply that China lacked the economic and cultural prerequisites for the creation and investment of capital. Marx stated that in China, an imperial, despotic state used its control over land and the irrigation systems that peasants depended upon for survival to acquire the peasantry’s surplus product and to prevent market relations from developing between dispersed villages (cf. *Capital*, Volume 3, Part 6, Chapter 47, Section 3). Peasants in Asia were economically stagnant and politically inert – a vast, isolated mass – and with surplus capital being consumed by the state, investment was negligible to nonexistent.

On the other hand, Weber said that the Confucian values of Chinese culture, in contrast to the Protestant ethic of mastering the material world through self-effort, emphasized accommodating oneself to the world through a dependence on extended family networks and a concern for social status, both of which discouraged the individual pursuit of economic gain.

Although China’s communist state has retained considerable influence on the Chinese economy (Child and Yuan 1996, 73; Han and Pannell 1999, 292-3; Kojima 2006, 44) and Chinese culture has changed little over the last thirty years, China’s economy has grown between 8 and 10 percent annually in terms of per capita GDP. Clearly, the Chinese have been able to generate capital and invest it at a high rate to create such a large amount of economic growth.

If the Harrod-Domar model held true, investment in machinery, a fixed capital asset, would parallel the rate of economic growth. While investment in fixed capital assets in China has indeed been high since 1979, much of that investment has been in real
estate – at a rate four times greater than that of machinery and equipment (Kojima 2006, 41). The acquisition of machinery has not occurred rapidly enough to account for China’s economic growth under the parameters of the Harrod-Domar model.

The rapid and sustained growth of China’s economy comes from greater use of knowledge. But what explains the ability of the Chinese to deploy knowledge in a manner that creates such substantial growth in only three decades? Could there be, in contrast to the argument of Weber, something about the values of traditional Chinese culture that encourages knowledge creation and use of knowledge? If so, what other feature of Chinese society has overridden this cultural trait to cause volatility in China’s economic growth rate? Do political policies and institutions cause such changes?

**Chinese Culture**

Chinese culture is, despite descriptions to the contrary, very open to new knowledge, as is demonstrated by the flexibility with which Chinese society defines what it is to be Chinese (Onishi 2004). Being Chinese can mean being ethnic Chinese, regardless of what part of the world one is born or raised in; it can mean being culturally Chinese, again, regardless of what part of the world one is from, or it can mean being a citizen of the Chinese state. When a foreigner travels to China, that person’s name, regardless of its linguistic origin, is written, sometimes in tortuous fashion, in Chinese characters, a practice that person as Chinese, or an insider. As with the names of foreign people, Chinese characters are also used for foreign products and ideas, a process that, in effect, makes them Chinese. The use of Chinese characters for things foreign bestows upon them, in the Chinese view, some of the advantages of being Chinese, while at the
same time it functions as a mechanism through which foreign concepts can rapidly become familiar to ordinary Chinese and assimilate into Chinese society.

Japanese culture, in comparison, draws a large distinction between what is “foreign” and what is “native”; for example, in the Japanese language, one set of characters, the kanji, is used to write Japanese names, while an entirely different set of characters, the katakana, is used for foreign names. In addition to indicating foreigners with non-Japanese names, katakana are used to denote foreigners of Japanese ancestry – people who have Japanese names but were born outside of Japan – and for anything else that, in the minds of Japanese, is not native to the country. Katakana characters are an automatic signal to the Japanese that they are dealing with a person, thing, or idea that is not Japanese and will forever remain non-Japanese.

This is not to say that Japan has not, or does not, have the ability to acquire new knowledge. Some of the strongest influences on Japanese culture have in fact been foreign in origin; for example, rice agriculture, iron metallurgy, and Buddhism. Historically, however, the Japanese have insisted on first adapting or changing knowledge to make it more “Japanese,” and therefore safe, before allowing it to percolate throughout Japanese society. This reluctance to adopt new knowledge slows down the process of putting it to use, which in turn slows down economic growth in Japan. China is less burdened by cultural inhibitions in this regard.

Chinese Political Institutions

If Chinese cultural attitudes toward knowledge are beneficial for economic growth, intermittent periods of little to no economic growth must have a non-cultural cause. Ideologically-based political institutions and policies can have a dramatic effect
Figure 1 depicts economic growth in China under communist rule in terms of annual changes in GDP. China’s communist leaders, after coming to power in 1949, ordered that agriculture be collectivized. Chinese leaders believed that collectivization would allow them to capture agricultural goods at below market prices while selling industrial and consumer goods to the peasantry at artificially high prices. The resulting capital bled from the countryside could be used by the state for investment in industrialization. However, agriculture, as organized under the communists, was highly inefficient. Economic growth was achieved only through the misallocation of resources (Wong 1986, 115). Labor was treated as a free good and farmers lacked incentives to expend effort in the fields or develop new methods of production in the state-controlled agricultural communes (Raymond, Selden, and Zhou 2000, 9). The state’s rigid system of bureaucratic management led to the mass starvation of the Great Leap Forward in the late 1950s and early 1960s, an event represented by the distinctly negative GDP growth during this period at the far left of the graph in Figure 1.

China’s next significant drop in GDP growth began around 1965 and bottomed out a few years later, during the Cultural Revolution, a Mao-inspired political movement in which technologically-sound ideas that had originated in the West were perceived as dangerous to Mao’s control over the party-state hierarchy. Individuals who were associated with such knowledge faced persecution. Ordinary Chinese, to survive a period of extreme political uncertainty, toed the Party line, schools and universities were emptied, and practical innovation was squelched.
The next large decrease in China’s GDP growth shown in Figure 1 occurred in 1976, following the death of Mao, which provoked a succession crisis and political instability. Again, ordinary Chinese were faced with a situation in which political risks outweighed the economic incentives of developing and applying new knowledge.

China’s GDP growth then accelerated in the early 1980s – when the communist party under Deng Xiaoping legalized household-based agricultural production, permitted private ownership of industrial enterprises, and implemented other market-based economic policies. Growth declined sharply for a brief period in 1989, because of the communist party’s crackdown pro-democracy demonstrations in Tiananmen Square and other forms of political dissent. China’s economy has since rebounded from this downturn and has achieved a GDP growth rate of approximately 10 percent per year.

Conclusion

Theories of development have not adequately considered the role of knowledge in long-term economic growth. Although Marx alluded to knowledge in his discussion of technological changes in the means of production, he primarily focused on the social effects of the generation and use of capital in general. For Marx, the means of production and the political relations that flow from it were the basic driving forces of socioeconomic development. In contrast, Weber attributed development to cultural values that promote investment. However, neither Marx nor Weber specifically identified knowledge as the one form of investment capital that contributes the most toward growth. Similarly, the Harrod-Domar model, by claiming growth is mostly a function of investment in machinery, overlooked growth’s underlying cause. Growth is
primarily caused by the increased labor productivity that results from the application of knowledge to the production of goods.

The creation of new knowledge, and the economic application of that knowledge once it has been created, is greatly affected by political policies and institutions. As illustrated in the case of China, such patterns of economic growth fluctuate because they are inextricably coupled with policies implemented by the state.

References


Gross Domestic Product - Annual Percentage Growth Rate
Units: Percent

Source: UNEP/DEWA/GRID-Europe, GEO Data Portal; compiled from World Bank, World Development Indicators 2007

01/02/2008