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ABSTRACT

Human Capital, Economic Growth, and Inequality in China

China's rapid growth was fueled by substantial physical capital investments applied to a large stock of medium skilled labor acquired before economic reforms began. As development proceeded, the demand for high skilled labor has grown, and, in the past decade, China has made substantial investments in producing it. The egalitarian access to medium skilled education characteristic of the pre-reform era has given rise to substantial inequality in access to higher levels of education. China's growth will be fostered by expanding access to all levels of education, reducing impediments to labor mobility, and expanding the private sector.

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China's rapid growth was fueled by substantial physical capital investments applied to a large stock of medium skilled labor acquired before economic reforms began.^{1,2} As development proceeded, the demand for high skilled labor has grown, and, in the past decade, China has made substantial investments in producing it. The egalitarian access to medium skilled education characteristic of the pre-reform era has given rise to substantial inequality in access to higher levels of education. China's growth will be fostered by expanding access to all levels of education, reducing impediments to labor mobility, and expanding the private sector.

The complementarity between the abundant medium skilled labor and the large inflow of physical capital induced by the Open Door policy has fostered China's economic growth since 1979. The high saving rate, fast accumulation of physical capital, and integration of China into the world economy during the 1980s and 1990s increased the demand for high skilled workers. The return to education increased dramatically. The government implemented a radical expansion of higher education in 1999 in response to the substantial increase in the demand for high skilled labor. As a result, the skills of the labor force have been substantially increased in the first decade of the 21st century. However, the restrictive household registration (*hukou*) system and segmented labor market distort the incentive to invest in human capital and have created a large pool of "left behind" children in rural areas. Moreover, reliance on family resources to finance the children's education beyond the primary level, the lack of capital markets, and substantial increases in tuition and accommodation fees have restricted opportunities for children from poor families to attain higher education. These factors reduce social mobility and perpetuate intergenerational poverty.

¹ Medium skilled labor refers to those with primary or secondary education. The illiterate or semi-illiterate are referred to as low skilled labor. The tertiary education graduates are defined as high skilled labor.

² For an insightful discussion of China's economic reforms and its policies, see Lin (2011).

1. Complementarity between abundant medium skilled labor and the large inflow of physical capital initiated China's economic growth since 1979

The extraordinarily high primary and middle school enrollment rates before the 1979 economic reform have not been fully appreciated in the literature in studying China's economic growth. For example, in 1975 the primary school enrollment rate was 96%, and the middle school enrollment rate was 60% (NBS, 2010). Adjusting for stages of economic development, the primary and secondary completion rates were much higher in China than that in other Asian countries, such as South Korea and Taiwan, in the early stage of their economic take-off (Becker et al., 2012). Further, the Chinese pupil-teacher ratio of primary school in 1976 was 29, ranking 51st in the world and second in South and East Asia, next to Japan (World Bank, 2011).

However, in 1976, per capita GDP in China was about 2% of that in the U.S., ranking at the bottom across the world. In contrast with the abundance of labor, physical capital was extremely scarce in the 1970s. For example, the net foreign exchange reserve was in the negligible amount of 0.58 billion U.S. dollars in China in 1976 (NBS, 2010). The Open Door policy induced a huge inflow of physical capital since 1979. The total amount of FDI was US\$1,096.6 billion from 1979 to 2008 (NBS, 2010). Adjusting for the stage of economic development, the per capita FDI was higher in China than that in South Korea and Taiwan at the comparable stage of economic development.

2. Fast accumulation of physical capital endogenously increased the demand for higher education

However, the stock of highly skilled labor was low. Tertiary education was suspended during the Cultural Revolution from 1966 to 1976. Tertiary school enrollment rates hovered around 1.5% to 2.5% from 1979 to 1995 (NBS, 2011a). With the economic growth and fast accumulation of physical capital, the return to education increased (Wang, 2012). China, as with other East Asian countries, maintained a national gross saving rate as high as 35-55% throughout the entire economic reform period, dramatically increasing the marginal productivity of labor, especially highly skilled labor. The newer technology was strongly complementary with higher skilled labor (Liang, 2012).

The increase in the demand for higher education led the government to implement a radical policy of expansion of higher education in 1999. The total number of fresh college graduates increased more than six-fold from 960,000 in 2001 to 6,350,000 in 2010, at an annual increment of 1 million per year (NBS, 2011a). The tertiary school enrollment rates jumped from less than 3% to almost 19% during the same period. Moreover, the increase in the stock of domestic college graduates is only one part of the entire picture. Constant et al. (2011) show that the number of Chinese students studying abroad had also increased dramatically. In 2000, less than 40,000 Chinese students went overseas. This number increased more than four-fold to almost 180,000 in 2008. China's impressive stride in human capital investment and its notable achievements in education have been less appreciated by the literature.

3. The widening inequality in education in China

Along with the rapid economic growth and expansion in higher education, inequality in education in China has increased drastically. Public schooling is funded mainly at the local level. Rich provinces tend to produce more human capital per capita than poor provinces. Resource constraints affect access to schooling of individuals in different parts of China differentially, bringing disadvantages to rural areas and those in the West. Moreover, the place of a person's birth is one of the most important determinants of that person's adult skill level (Fleisher et al., 2011). This creates serious regional disparities and is a powerful source of cross-sectional and intergenerational inequality in Chinese society (Heckman, 2003, 2005).

This inequality is reinforced by the *hukou* system. Based on the 1% sample of the 2005 Census, there are about 140 million rural-to-urban migrants working in urban areas. Most of these migrants are not able to acquire urban residency due to the *hukou* system. Thus, most children of these migrants are deprived of the right to attend free public schools in urban areas. Those able to attend public schools in the city have to pay a substantial tuition fee above what is required of locals. As a consequence, many migrant workers leave their school-age children behind to attend schools in their home villages. These "left-behind" children are usually taken care by grandparents or other relatives. According to the research commissioned by the All-China Federation of Women, the estimated number of "left-behind" children is 58 million (Ye et al., 2005). The rapid increase and large number of "left-behind children" have caused serious concerns for Chinese society and the government. The schooling quality of these "left-behind" children is not the only source of concern. The substantially negative effect on the children's psychological development and human capital caused by the parental absence is

another serious issue. The *hukou* system has led a segmented labor market (Fleisher and Wang, 2004; Meng and Zhang, 2001). In this system, the *hukou* status is a major determinant of an individual's salary, which distorts the incentive to investment in human capital (Heckman, 2005).

The ratio of government investment in schooling over GDP has historically been very low, and was 3% in 2007, despite the fact that tertiary school enrollment rates increased from less than 2% in 1990 to almost 19% in 2010. A child's tertiary education in China is mainly financed by the family. In addition, tuition fees have also increased substantially with the rapid expansion of higher education. In the early 1990s, higher education was almost entirely subsidized by the government. However, the tuition fee plus accommodation fee for an ordinary college student exceeded RMB10,000 per year in 2010. Since the annual income for rural residents is only RMB5,919, and the annual disposable income for urban residents is RMB19,109 in the same year (NBS, 2011b), the cost of attending colleges has become a heavy burden for ordinary families, particularly for rural families. The lack of any capital market to finance the college education of children has further widened inequality in education. Li and Xing (2010) find that relative to other groups, the minority females and children from the central-western region and rural areas are much less likely to enter college. Wang et al. (2007) report evidence of the growing influence of private financial constraints on decisions to attend college as tuition costs have risen. Moreover, educational reform without the concomitant capital market reform and government support for the financially disadvantaged exacerbates the increase in inequality.

In addition, educational choice is a sequential process. The increase in the cost of attending tertiary schools discouraged children from poor and rural families from attending

secondary school, because the option value of attending secondary school decreased. In recent years, secondary school enrollment in rural areas has deteriorated (NBS, 2011a).

4. Policies to foster human capital, promote economic growth, and decrease inequality

Although notable achievements in education have been made in the past decades, China still faces serious challenges in decreasing the inequality in education, fostering a highly-skilled workforce, and promoting economic growth.

Faced by these challenges, government expenditure on education needs to increase. The current ratio of government expenditure on education over GDP is too low. A child's tertiary education is financed mainly by their families. This is neither efficient nor fair. On the one hand, investment in human capital has strong positive external effects on society. Private investment in human capital will never reach the efficient level. On the other hand, relying on family resources to finance a child's education leads to persistent intergenerational poverty.

The Chinese government should balance human capital investment across regions and across rural and urban areas. Schooling should be expanded in middle and western regions, as well as in rural areas. More primary and secondary schools should be built in urban areas to accommodate children of rural-to-urban migrants. Education for the large number of "left behind" children should also be a priority of the government budget. More investments should be used to support the publicly supported college loan system to allow students to borrow against their future earnings, thereby allowing children from poor families to have the opportunity to attend college (Heckman, 2005). The tertiary school completion rate in China is still very low compared

that in many developed countries, such as the U.S., South Korea, and Japan. Moreover, the rapid expansion of tertiary education has also led to a deterioration of its quality (NBS, 2011a).

Increasing government expenditure is not the only way to enhance the quality of education. A lesson learned from studies in the United States, Europe, and other countries around the world is the value of competition among schools and incentives in improving the performance of educational institutions (Heckman, 2000). Thus, it is better to allow more private and foreign educational organizations to operate as it will undoubtedly promote competition between public and private schools and enhance the resources available to support the expansion of education. Even if the government is cautious in permitting private and foreign educational institutes to enter into the market, more competition among the existing public schools should be encouraged because competition will increase the quality of education.

Another important way to foster human capital that would entail less direct cost to the government would be to free up the labor market. The segmented labor market induced by the *hukou* system reduces incentives to invest in human capital in China. Current practices restrict labor mobility across regions. The government should remove these artificial barriers to achieve an integrated and efficient labor market. A free labor market allows individuals to reap the fruits of their skills, and thus allows the forces of market incentives to operate.

5. Summary

China's rapid economic growth was initiated by the complementarity between a solid base of medium skilled labor force and a huge inflow of FDI. It has been sustained by rapid physical capital accumulation and rapid human capital formation. However, China is now facing serious challenges. The Chinese government should take firm actions to enhance public expenditure on

education and to equalize educational opportunities between coastal and inland areas and between urban and rural areas. It should enhance the quality of education and foster a highly-skilled labor force, remove inefficient institutional barriers, and develop an integrated and efficient labor market.

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