ATLANTIS PRESS
Advances in Economics, Business and Management Research, volume 20
2nd International Conference on Economy, Management, Law and Education (EMLE 2016)

Human Capital Investment and the Middle-income Trap

International Experience and Facts of China

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***Abstract*—As the "Lewis turning point" occurred and the demographic dividend disappeared, China is facing the risk of falling into the middle-income trap. Both theory and international experience show that human capital investment is the key to avoiding the middle income trap. However, human capital accumulation in China now faces problems such as impaired motivation for education, unbalanced allocation of educational resources, and insufficient higher education opportunities. In response to these, we may draw on the experience of Japan and Korea in going smoothly through the middle-income phase. China needs to increase investment in public education, improve the structure of such investment, further popularize higher education, and develop continuously vocational education and on-the-job training, so as to provide solid human capital foundation for overcoming the middle-income trap.**

Keywords—middle-income trap; human capital investment; education improvement

I. INTRODUCTION

Though China's economy has been growing rapidly since the implementation of the reform and opening-up policy, it is facing tremendous challenges with the emergence of the "Lewis turning point" and the disappearance of demographic dividend. Having entered the middle-income phase, China must shift its economic growth away from the traditional element input-driven model and towards the innovation- and technology-driven model. This relies mainly on human capital including the knowledge and skills of workers. Both theory and practice show that human capital is an important source of total factor productivity, and enhanced investment in human capital is a must if a country is to go through the middle income phase smoothly. This paper, first of all, demonstrates that human capital investment is fundamental to sustainable economic growth in China; then, it discusses the experience of Japan and Korea in going through the middle income phase smoothly by accumulating human capital. Lastly, the paper points out some outstanding issues in human capital investment in China and proposes some countermeasures.

II. HUMAN CAPITAL ACCUMULATION IS THE KEY TO SUSTAINABLE ECONOMIC GROWTH

In 2010, China ranked No. 2 in the world for the first time by economic aggregate, and its GDP per capita was USD 4,361, making it an upper-middle income country as defined by the World Bank. Then in 2013, its GDP per capita increased to around USD 6,800, which represented fast movement towards the high-income club. However, China's economic growth has long been driven by rich labor resources and high savings rates. With the Lewis turning point that occurred in 2004, China's demographic dividend wore out in 2013. Under this background, the impact of efficient resource relocation brought about by the three pillars of China's economic growth, i.e. labor force growth, capital formation and labor transfer, gradually dampened and China is now facing the hard question of how to sustain its economic growth.

International experience shows that if a country fails to move up to the high-income category after some time as a middle-income country, it may fall into the "middle income trap" which, as defined by the World Bank, refers to the phenomenon that few middle-income countries manage to become high-income ones. Instead, they are more likely to fall into long economic stagnation, failing to compete with low-income countries of a low salary level or high-income countries of high-tech R&D. Examples include Brazil, Argentina, Mexico, Chile and Malaysia which became middle-income countries in the 1970s and remain so now with a GDP per capita between USD 3,000 and USD 5,000.

One general theoretical explanation to the middle-income trap is that more developed countries or regions are at the leading edge of technological innovation, have comparative advantage in capital- and technology-intensive industries, and thus, gain high benefits in the process of globalization. Less-developed countries or regions have advantage in labor-intensive industries due to rich labor resources and low cost and thus, also gain profits from the process of globalization. Those in the middle, however, are less likely to gain in this process because they show little advantage on either side. Cai (2016) refers to this as the "comparative advantage vacuum", portraying vividly the awkward circumstance.

Human capital is critical to the improvement of total factor productivity, and to promote human capital investment is a crucial choice for a country to go through the middle-income phase successfully. A general trend in the development of a modern economy after reaching a certain point is to shift from the traditional factor input-driven model towards a reliance on human capital and a model of economic growth driven by innovations and technological progress resulted from human capital accumulation. A consensus in developmental economics and economic growth theory is that human capital investment is a driving force for economic growth, especially for under-developed countries that wish to catch up with developed ones. According to some research findings, the annual total factor growth in China was approximately 3-3.5% between 1978 and 2009, 0.5 percentage point of which can be attributed to the increase of human capital. In the meantime, research from a different perspective shows that human capital increase could offset the impact of the poor total factor productivity in China. According to Aoki (2014), China has passed the Kuznets stage of economic development and is moving towards a stage that is centered on human capital increase. A success in shifting to this stage was exactly the reason why Japan and Korea managed to move from the middle-income to the high-income group.

As a middle-income country, China will not be able to sustain its economic growth simply by putting in more labor and capital. Human capital, together with the technological progress and productivity improvement it brings, is the key to future development. For an economy that has passed the Lewis turning point, demographic dividend wears out and all other driving forces for economic growth tend to decline in effectiveness. The only thing that remains for it to rely on is technological advance and productivity improvement. In the past, China relied mainly on capital accumulation, labor increase and the decline of dependency ratio for its economic growth. As it passes the Lewis turning point and the demographic dividend wears out, the contribution of capital accumulation will decline naturally; labor increase will make no contribution at all and the impact of dependency ratio will first decrease to zero and then drop further to the negative range. In order to maintain economic growth in the future, the focus must be shifted to total factor productivity, that is, to drive growth by improving the efficiency of production factors, re-allocating resources and upgrading the industrial structure.

Human capital accumulation will play an important part in the future economic growth of China. As labor supply changes and wage grows, China's comparative advantage will shift gradually from labor-intensive industries to capital-, technology- and knowledge-intensive ones. During this transition, a major challenge is how to offset the decline of the quantity of labor with the improvement of labor quality, and the key lies in the significant increase of human capital and success in meeting the needs of an upgrade of the industrial structure.

III. International Experience in Avoiding the Middle-income Trap with Human Capital

Japan and the "four Asian tigers" are widely recognized as having succeeded in overcoming the "middle income trap" or going through the "middle income phase". But only Japan and Korea are relatively large economies. Japan's GDP per capita was USD 3,800 in 1973 and exceeded USD 11,000 in 1985. Korea's GDP per capita approached USD 3,500 in 1987 and surpassed USD 11,000 in 1995. It took Japan 12 years and Korea 8 years to go through the middle-income phase. China may draw on their experience.

According to Japan's experience, investment in public education should be highest priority. Investment in public education was increased actually before Japan became a middle-income country. The proportion of public education expenditure in its GDP was 3.72% in 1971, 4.08% in 1972, and 4.11% in 1973 when it became a middle-income country. The ratio rose further afterwards, reaching 4.75% in 1975, 5.15% in 1980, and around 5% in 1983 when it graduated from the middle-income stage.

Second, secondary education should be universal in the early days of the middle-income stage. Compulsory education was extended from six years to nine years and secondary education was basically universal in Japan before it entered the middle-income group. Up to 93.6% of all primary school graduates in Japan continued to secondary school in 1971, and the share reached 99.5% in 1973 when it became a middle-income country and remained at nearly 100% ever since. In 1973, 89.9% of all people of the appropriate age enrolled in secondary school in 1973, and the share increased to 92.3% in 1975, 92.5% in 1980, and 95.2% in 1983. Education improved labor quality and laid a solid foundation of human resources for rapid economic growth.

Third, vocational education should be strengthened in addition to general education. When the economy started to grow rapidly, Japan put its emphasis on secondary vocational education, carried out reforms on secondary and higher education to strengthen vocational education. Many vocational training schools were established in the 1970s and many joined hands with enterprises. Schools train skilled workers for enterprises and enterprise, acting as education bases, offer practical training opportunities for students. What's more, national laws were introduced safeguard the partnership between schools and enterprises.

Fourth, higher education should be popularized with strengthened efforts. Higher education is considered popular when the gross enrollment rate is between 15% and 50%. Japan's enrollment rate fell into this range in the early 1970s. Its gross enrollment rate was 17.6% and 20.8% in 1971 and 1973 respectively. It then rose to 24.6% in 1975 and 31.2% in 1980 representing an average annual increase of about 1.5%. In the following years, it remained at around 30%.

Lastly, lifelong education and on-the-job training should be promoted. Japan started to advocate lifelong education in the early 1970s. The Central Council for Education, as an advisory body for the Ministry of Education, Science and Culture published a report on lifelong education, in which it

claimed that general modifications of the whole education system were needed for the adoption of lifelong education. The Japanese government also attaches great importance to on-the-job training and has put in place a thorough continuing education system. It is stipulated that employers bear the responsibility of offering on-the-job training for employees. Strategic partnerships are built between the government and enterprises for training purposes. Vocational training generally falls into two categories: a quarter of all training programs are provided by the government through public institutions, and the remaining three quarters are provided by private enterprises as authorized by the national government.

Korea's experience in overcoming the middle-income trap within only eight years (1987-1995) shows that human capital investment, including education and training, offered crucial support for industrial restructuring and the transformation of the economic growth pattern, playing an essential role in Korea's striding over the middle-income stage within a short time.

First, human capital investment should be taken as a national strategy. In the 1960s and the 1970s, guided by the principle of "strengthening compulsory primary education, popularizing secondary education, improving higher education and enhancing vocational education", the Korean government promoted comprehensively the development of all kinds of education and upgraded education to a level directly connected to national development. In the early 1970s, only 40% of the population of the appropriate age attended secondary school, yet the rate rose to 70% by 1979 and reached further up to 94% in 1987 when Korea became a middle-income country. The proportion of public education expenditure in GDP was above 4% in the 1980s. In 1982, 1983 and 1984, the percentage was 6.5%, 4.5%, and 4.2% respectively. It declined during 1987-1995 to a level between 3.3% and 4% when it was a middle-income country. During the same period, 40-44% of all laborers in Korea had finished junior high school, and 15-20% had higher education attainment. Sound human resource quality laid a solid foundation for going through the middle income phase.

Second, higher education should be promoted rapidly as a priority. Higher education expanded rapidly and enjoyed a high strategic position when Korea was striving to pass the middle-income phase. Higher education considered an important part of the knowledge industry, technological innovation and cultural development strategies and the solution to the possible insufficiency of qualified labor force in the middle-income stage. Before 1980, the gross enrollment rate of higher education was below 10%, but it exceeded 15% for the first time and rose to 15.3% in 1981, showing that higher education became popular in Korea. The figure rose further to 35.2% in 1987 when the middle-income phase started and to 48.9% in 1995 when it graduated from the middle-income phase. Higher education was basically universal. Throughout the middle-income phase, the gross enrollment rate of higher education in Korea increased by nearly 2% annually, which was second to none across the world.

Third, besides expanding higher education, vocational education should be promoted together with industry-school partnerships. Manufacturing was a pillar industry of Korea around the 1980s. In order to increase the supply of skilled workers, senior high school education was strongly promoted in Korea and the enrolment rate was pushed up from less than 50% to 80%. Most students were able to receive high-school education. In the meantime, it expanded vocational education vigorously, building a large number of vocational and technical colleges. In order to solve problems like the severe shortage of labs and practical training facilities, insufficiency of practical training and poor adaptability of graduates to job requirements, the Korean government launched an industry-school partnership program by issuing the *Act of Industrial Education Revitalization*. Enterprises were thus partnered up with vocational school in relevant fields. They provided sites and facilities, as well as necessary instructions for the practical training of students while vocational schools were involved directly or indirectly in the manufacturing activities of enterprises. Besides, enterprises observed students on site, and hired some selectively. Mutual benefit was achieved in this way.

IV. China's Progress in Human Capital Investment and Its Problems

A major way to invest in human capital is to promote school education and vocational training. China has made huge achievement in education development since the launch of the reform and opening up policy. *Compulsory Education Law* was promulgated in 1986 and revised in 2006, extending the coverage of compulsory education quickly. After 2007, in particular, when tuition and miscellaneous fees for compulsory education were exempted, the enrolment rate of nine-year compulsory education increased greatly. Data from the Ministry of Education shows that the net enrolment rate of primary school reached 99.9% and that of secondary school was 98.3% in 2012. In the meantime, China boosted higher education vigorously. Since 1999, it has expanded the enrolment of colleges and universities by a large margin, improving not only the overall enrolment rate of higher education but also that of high-school education. In 2012, high school enrolment rate reached 88%, and the gross enrolment rate of higher education was 30% with 33.25 million people receiving higher education. Undoubtedly, education development contributed significantly to the human capital investment as China's economy grew rapidly.

Moreover, China has also made great progress in vocational education and training. According to data from the Ministry of Education, there were a total of 12,663 secondary vocational schools and 7.54 million enrolled students, representing 47.17% of the total number of enrolled high-school students in 2012. In order to facilitate vocational training for rural laborers, six ministries including the Ministry of Agriculture and the Ministry of Labor and Social Security launched the *National Training Program for Rural Migrant Workers 2003-2010* in September 2003 and the Sunshine Project for Rural Labor Training and Transfer in April 2004, with an aim to cover 35 million rural laborers by

2010. In the meantime, labor security authorities also started vocational training for transferred migrant workers, covering over 10 million transferred rural laborers annually. Vocational education and training play an important role in accumulating human capital in Chinese laborers, especially the young.

However, China still faces huge challenges in human capital accumulation. For example, our society today does not value education as highly as before. People are remarkably less enthusiastic about investment in education. Access to higher education is unequal. Older laborers are less skilled. Left-behind children and migrant children alike get insufficient education.

First, as the wage does not differ much between skilled and unskilled workers, the investment in education gains less in return, and, therefore, people are negatively motivated to receive formal education. Passing the "Lewis turning point", the supply of skilled workers tends to remain inadequate while the scarcity of unskilled workers aggravates. The wage of unskilled workers thus increases faster. In other words, ordinary and highly skilled workers tend to be paid similar wages, and the returns on education declines. In 2001, the hourly wage of migrant workers with senior high school education or above was respectively 80.4% and 25.9% higher than that of workers with only junior high school education. But in 2010, the margin shrank to about 57.1% and 16.9%. The incentive effect of education reduced notably. For this reason, young laborers from low-income families are more likely to drop out of school and enter the labor market early, and this may even occur before compulsory education was finished, which would definitely hold back the quality of future laborers and make it difficult to fulfill the need of industrial structure upgrading.

Second, access to higher education is insufficient and unequal, and students are less motivated to attend senior high school. Since China expanded the enrollment of higher education institutions in 1999, the numbers of enrolled students, undergraduates and graduates have been growing rapidly in formal education colleges, but the gross enrolment rate of higher education remained low. In 2012, the enrollment rate was only 30%, lagging far behind the 50% benchmark for universal higher education. Thus, access to higher education remains quite limited in China. Moreover, in recent years, especially since the expansion of higher education enrollment, it has been difficult for college graduates to find jobs, especially those from non-key universities. A negative employment prospect made unwilling to continue their support for children's education after compulsory education. In addition, the proportion of rural students declined in colleges, especially key universities. This reduces the motivation to go to senior high school.

Third, human capital decreases as the working population ages. It is a rule that the older the working-age population gets, the lower the quality of human capital. From 24 to 64 years of age, laborers' average years of schooling reduce by 10.2% per year of age on average; the older the age group, the sharper the decline. For example, from age 44 to 64, the years of schooling decrease 16.1% on average. Human capital accumulation suffers a huge loss in people who was educated during the Culture Revolution in particular. Therefore, it is a tremendous challenge for China to increase its human capital in the older working population through training so as to meet the needs of the labor market.

Finally, migrant and left-behind children in China have insufficient education. Many rural children who live in urban areas with their parents are entitled to free education in urban public schools according to existing policies and regulations. But in reality they have to pay extra fees after getting enrolled. Therefore, a large number of migrant children now attend low-quality schools established especially for them. For left-behind children, compulsory education is generally easily accessible, but the low quality is a serious problem. In urban areas, 41.2% of teachers are junior college graduates, 35% have a bachelor's degree or above. In contrast, only 38.5% of rural teachers finish junior college, and 5.8% have a bachelor's degree or above.

V. CONCLUSION

As compulsory education spreads higher education expands and vocational training improves, China has accumulated significantly more human capital. According to the *13th Five-year Plan for National Education Development of the People's Republic of China* and the *Planning of National Mid- and Long-term Education Reform and Development 2010-2020*, the average years of schooling among the working-age population increased from 6 in 1982 to 8.5 in 2005, 9.5 in 2009, and 10.5 in 2015. The average education years of new laborers rose from 10.9 in 2005 to 12.4 in 2009 and 13.5 in 2015. Besides, the sixth population census and the 1% population sample survey revealed that laborers with high school education accounted for 12.7% of the entire labor force in 2000, and the figure increased to 16.1% in 2010. The proportion of laborers with a college degree and above increased from 4.7% in 2000 to 11.1% in 2010. Meanwhile, vocational training helped promote human capital accumulation prominently. Between 2005 and 2012, 157,000 new vocational training institutions were open to the public annually, and a total of 55.05 million students graduated every year.

Though education and training are proved highly helpful to human capital investment in China by a large quantity of empirical data, analysis above reveals some serious problems, e.g. the declining motivation for school education and insufficient access to higher education. Based on the experience of Japan and Korea in passing the middle-income phase smoothly and in order to solve these problems, it is recommended that more effort be made to promote human capital investment in China by carrying out educational reforms and improving vocational education.

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