Shift to Human Capital-intensive Mode for Urban Innovation and Development

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We found that in 2000-2005 Shanghai and Beijing have shown a paradigm shift moving from the physical capital-intensive mode to human capital-intensive mode, and in between 2005-2010 this feature of human capital accumulation in the two cities became increasingly prominent, at the same time, Tianjin also began joining theechelon (This study on human capital index is based on a five-year study period). This shift is very important, and is also closely linked to the sub-forum theme of 'innovation'.

Reporter: As we know the Sub-forum of the Shanghai Forum you participated is called " Strategy of Innovation-driven Development and the Construction of Innovation Nations in Asia," and I know that you have engaged in study of China's human capital over the years. Could you elaborate that what is the human capital accumulation meant to construction of an innovation-oriented country?

Wang Xiaojun: In recent years, the calls for China's economic transformation has

become compellingly louder and louder. A transformation of economic development mode means a transition to the Human Capital-Intensive mode from the Physical Capital-Intensive mode. Currently, China attaches increasingly importance to its human capital accumulation as we can see it from the country's various types of domestic policy planning and economic researches. Here, how to achieve accurate measurement of human capital has become an increasingly important issue in the country. The traditional methods to estimate human capital in China are too rough and inaccurate. According to the traditional methods, they will generally select factors such as average schooling years of the country/regions' laborforce, proportion of senior middle school graduates in the total population, or the proportion of college graduates in the total population. However, these factors are not further classified against the huge population in accordance with such important attributes as region, age, gender, urban and rural areas, nor it established a convincing link with income levels.

In order to obtain more precise human capital index, starting in 2008, I participated in the creation of the China Center for Human capital and labor Market Research (CHLR) of the Central University of Finance and Economics that was sponsored by Professor Li Haizheng. The Center has an iconic project funded by the National Natural Science Foundation of China, that is, construction of China human capital index and measurement System. This project uses the income approach to quantize China's human capital. The approach as a new calculation method was suggested by world renowned economists, mainly Jorgenson and Fraumeni, and thus called JF Approach. What is very different from the traditional methods are it is based on the basic economic theory as the starting point, and the data requirements are loosed to some degreeforeasy employment in practice.

Reporter: Then,what are differences of the income approach in terms of its principle and specific operation comparing to the traditional methods?

Wang Xiaojun: The Principle of the income method is actually very simple. Here, we may make a comparison between the human and physical capitals. Specifically to say, how do we estimate the value of a machine? One method that is easy to come out of our minds is we take the estimated future income generated by this machine, and discount the income according to a certain ratio to the present, then we get a present value of the machine. The same method is also true for human capital. For an ordinary person, for example, me as an individual laborer, how much is my human capital worth? That is the present value generated from a discount based on the future income that I would make before I retire.

Reporter: specifically, how to estimate future earnings of a person?

Wang Xiaojun: We use the method called the Age Earnings Profile. It is a theory of the Population Economics that is applied widely in practice. Based on the theory, we can conduct estimations of wages for each bracket of ages. The input data used in the model is the data of every part of the population as categorized by province and by educational level, plus a macro-economic growth rate and a discount rate. To ensure correct setup and operation of the model, the Centre hired Ms. Fraumeni, the founder of the income approach and a renowned scholar, as a technical adviser.

As I just said, the key in the measurement is that all of the data is required to be categorized by province, age, education, gender, urban and rural areas. This means enormous workload we should bear. So far, we have successfully obtained the national time series data as of 1985-2009 covering 28 provinces, and now at the level of province, we have basically formed a panel data. During this process, my students of the previous two school years have made great contributions. Despite many difficulties, what we do is something that has not been done by others, so we can be counted the first person to try tomato.

Reporter: Would the human capital index estimated under this system be compared to the one that is calculated based on a real investigation?

Wang Xiaojun: Our entire project does not involve investigation. We adopt all existing data. Population wise, we need only macro data, which are provided free by the National Bureau of Statistics (NBS). In addition, we also need micro income data, which comes mainly from existing databases, such as CHIPS. After properly treated, these microscopic data will be used to operate the age-income model. So, the combination of macro and micro data used in the model is one of the characteristics of our project. In addition, because in calculation of our human capital index we use the actual value that excludes inflation rather than use the nominal value, so it is comparable in the time series. We also conducted a price adjustment for data of different regions, so our data is also comparable among difference regions- this feature is scarce; in these two years, more and more researchers begin to adopt our results.

Reporter: So for the annual estimates of the human capital indexes obtained, did you do any further analysis and make any conclusion?

Wang Xiaojun： Yes of course we did. Every year we analyze the data and publish a research report, which covers data comparison of different provinces, trend analysis of the time series, contrastive analysis to the physical capital, and comparison of the regional GDP indicators, etc. We get conclusions that in some provinces, it is Human Capital Intensive mode, and others are Physical Capital Intensive mode. In a same province,for exampleHebei, we will get both the accumulation rates of human capital and physical capital, and conduct contrastive analysis.

Reporter: For the accumulation rate of human capital and physical capital, does there any apparent trends appeared over the years?

Wang Xiaojun： Yes. We found that most provinces of our country pay close attention to the accumulation of physical capital, and overlook the accumulation of human capital. As of 2000, our country's main economic motivation is still aimedat accumulation of physical capital, but after the year of 2000, it started an interesting change. We found that in 2000-2005 in the cities of Shanghai and Beijing, there has shown a paradigm shift moving from the physical capital-intensive mode to human capital intensive mode, and in between 2005-2010, this feature in the two cities became increasingly prominent, at the same time Tianjin also began joining this trend (The study on human capital index is based on a five-year study period). From the chart I drew, you will see the obvious trend of Shanghai and Beijing moving to the left since 2000, and since 2005, Tianjin joined the echelon. Unfortunately, other provinces still remain the rightward trend, that is to say they are still on the track continuing the physical capital intensive mode. So it can be said, the most developed regions in the country have been already in the human capital intensive paradigm. This shift is very important. It is also closely linked to our sub-forum theme of "innovation". Speaking of innovation, the most important is accumulation of advanced human capital. When I started to study and analyze the data, I did not envision such a result, but later I found the results are very interesting, very suitable for this forum, especially suitable for the sub-form for further discussion.

Reporter: You mentioned the leftward movement in Shanghai, Beijing and Tianjin, does it mean that it takes place at the cost of other regions which are moving rightward?

Wang Xiaojun： This is a good question. It is linked to my other research ideas. I have been considering such an issue long. For example, Anhui and Jiangxi are geographically near to the economic powerhouses of Jiangsu, Shanghai and Zhejiang, but they are not able to take a ride on the latter's wind. Why ?It involves the issues of brain drain and brain gain. Especially, this is much prominent in the relationship

between Anhui and Shanghai, as many people leave Anhui Province to Shanghai, this is undoubtedly a serious brain drain for Anhui, while for Shanghai it is purely a brain gain. This phenomenon is quite common to see. If we look at education level, we might intuitionally feel the average education level of a large city's immigrants should be lower than urban residents. But through the 2010 census data analysis, I found that in Metropolitans such as Beijing, Tianjin, and Shanghai, the result is true so, but in other areas it is just not necessarily the case. For example, for immigrants from Hunan to Hubei (here we lack of data support), the educational level of the majority of immigrants in fact is higher than the local residents, this is just opposite to the phenomenon happened in large cities we see above. So, it is hard to say that the brain drain and brain gain play a role in contributing inter-regional imbalance. By far I got no further studies to the question, but only got a roughly preliminary result. I intend to address this question and write a working paper in the future. Personally I am quite interested to study it.