Human Capital in China
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Principal Investigator

Haizheng Li

China Center for Human Capital and Labor Market Research

Central University of Finance and Economics

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Research Team Members

Principal Investigator

Haizheng Li   Special-term Professor and Director

China Center for Human Capital and Labor Market Research (CHLR)Central University of Finance and Economics (CUFE)

&Professor, Georgia Institute of Technology

Core Team Members

Professors of China Center for Human Capital and Labor Market Research：

Ake Blomqvist   Special-term Professor, CHLR (2009-2011)

Belton Fleisher   Special-term Professor and Senior Fellow, CHLR

Professor of Economics Emeritus , Ohio State University (2008-)

Barbara Fraumeni   Special-term Professor and Senior Fellow, CHLR

Professor of Public Policy

University of Southern Maine (2008-)

Zhiqiang Liu   Special-term Professor, CHLR

Associate Professor of Economics

State University of New York at Buffalo (2008-)

Xiaojun Wang   Special-term Professor, CHLR

Associate Professor of Economics

University of Hawaii at Manoa (2008-)

Kang-Hung Chang   Associate Professor, CHLR (2009-)

Li Yu   Associate Professor, CHLR (2010-)

Sophie Xuefei Wang   Assistant Professor, CHLR (2012-)

Chun-Wing Tse   Assistant Professor, CHLR (2012-)

Doctoral and postdoctoral students participated in this project：

Zhiyong Liu	Post-doctoral fellow, CHLR
	Associate Professor, Hunan University of Commerce
Yunling Liang	Doctoral Student, 2008, CHLR (2009-2012)
Na Jia	Doctoral Student, 2009, CHLR (2010-2013)
Bo Li	Doctoral Student, 2010, CHLR (2011-)
Dazhi Guo	Doctoral Student, 2011, CHLR (2012-)
Tang Tang	Doctoral Student, 2011, CHLR (2012-)
Yuefang Qiu	Doctoral Student, 2011, CHLR (2012-)
Yue Sun	Doctoral Student, 2012, CHLR (2013-)
Xiaobei Zhang	Doctoral Student, 2009, Hunan University (2010-2013)
Qinyi Liu	Doctoral Student, 2011, Hunan University (2011-)

2013 Team
Graduate Students, CHLR

| 2012 students | Shuping Chen, Yinghua Chen, Yulong Chen, Xiaojiao He, Suyi Huang, Ping Ma, Yiwen Sun, Liyang Xie, Shan Ye, Hanqing You, Chao Zhang, Junwu Zhang, Haibo Zhao, Xiang Zheng |

2012 Team
Graduate Students, CHLR

| 2011 students | Tingting Ding, Junzi He, Junfeng Li, Tianjing Li, Shirui Wang, Wenbo Wu |

2011 Team

Graduate Students, CHLR

2010 students   Zhanwang Chang, Xiaotang Chen, Lu Feng, Yang He,

Bo Hu, Angran Li, Li Li, Wenwei Li, Yan Li, Yanchao Li,

Xiaoyang Liu, Liying Mu, Xianzhou Wu, Le Zhang, Linjun Zhu

Graduate Students, School of Economy and Trade, Hunan University

2010 students   Biao Luo, Lina Zhai, Li Zhang

2010 Team

Graduate Students, CHLR

2009 students   Jing Bai, Jing Fang, Chao Guo, Xin Gao, Xiaoyan Gan,

Jun Li, Jin Li, Tianyi Liu, Dandan Wu, Yuanyuan Xin,

Pengfei Xing, Yanqiu Yang, Chen Zhang, Linghua Zhang

Graduate Students, School of Economy and Trade, Hunan University

2009 students   Lin Ding, Hongling Wang, Qiujie Wu, Xiaomin Yan

Graduate Students, Georgia Institute of Technology：Chongyu Lu

Hao Deng   Former Executive Assistant to Director, CHLR

Jing Xiao   Graduate Coordinator, CHLR

Qinyi Liu   Executive Assistant to Director, International Research Center

for Human Resources, Hunan University

2009 Team

Graduate Students, CHLR

2008 students	Huajuan Chen, Yuhua Dong, Mengxin Du, Jinquan Gong, Jingjing Jiang, Rui Jiang, Qian Li, Sen Li, Chen Qiu, Xinping Tian, Mo Yang

Graduate Students, Georgia Institute of Technology: Yuxi Xiao

Song Gao	Assistant Professor, China Academy of Public Finance And Public Policy, CUFE
Ruiju Wang	Former Executive Assistant to Director, CHLR
Hao Deng	Former Graduate Coordinator, CHLR

A Brief Introduction to
China Center for Human Capital and Labor Market Research

Established in March 2008, the China Center for Human Capital and Labor Market Research (CHLR) at the Central University of Finance and Economics (CUFE) is an integral part of the Advantageous Program Platform in Economics and Public Policy at the CUFE. It is an international research center for the study of human resources, labor markets, and their impact on economic development, focusing on China and related economies.

The CHLR has master's, doctoral- and post-doctoral degree programs. Our advisory board includes two Nobel laureates, Kenneth J. Arrow and James Heckman, and the founder of the income-based method for measuring human capital, Dale W. Jorgenson at Harvard University.

Our major research areas include: human capital and skill measurement, human capital investment, human capital mobility, human capital and innovation, and health and human capital.

Faculty members and research fellows of the CHLR all hold Ph.D. degrees in economics from North America and some are tenured professors at U.S. universities. The CHLR Special-term Director, Dr. Haizheng Li, is also Professor at the School of Economics, Georgia Institute of Technology. Currently the Center has 6 full-time faculty, 4 special-term faculty, 7 senior research fellows, and 3 research fellows.

The Center has established its graduate programs following international standards. The curriculum and instruction are rigorously designed. All the courses are taught in English. Since 2008, the CHLR has admitted 85master's students, 9 doctoral students, and 1 post-doctoral fellow.

The Center is first and foremost an international research institution. We have a team of international scholars and train graduate students to international standards. We also adopt international management practices in the Center's daily operation. Faculty performance is evaluated using standards similar to those commonly adopted by research universities in the United States.

Then Impact of China's Human Capital Project

The research project, "China's Human Capital: Measurement and Index Construction," is conducted by the China Center for Human Capital and Labor Research Center (CHLR), and funded by the National Natural Science Foundation of China and the Central University of Finance and Economics. The project aims to establish China's first scientific and systematic human capital index, quantitatively describe China's human capital distribution, trend and dynamics. It constructs important measurements for further evaluating human capital and its contribution to economic development, and provides policy-makers with important information on the nation's human capital development.

The project is part of the international effort to establish comparable national human capital measurement across nations and to eventually incorporating human capital into the system of national income and product accounts.

The project is led by the Director of the CHLR, Professor Haizheng Li. The research team includes Professor Barbara Fraumeni (a pioneer scholar in developing the Jorgenson-Fraumeni method of human capital calculation), other full-time and special-term professors, graduate students, and administrative staff at the CHLR. Since the inaugural issue of the China Human Capital Report in 2009, the project has generated great social impact, and drawn the attention of academia and governments both at home and abroad.

I. Papers published based on China Human Capital Report:

- "Human Capital in China, 1985-2008", *Review of Income and Wealth*, Volume 59(2), pp. 212-234, 2013.

- "The Rural-Urban Disparity of Human Capital in China," Chinese Economists Society Presidential Forum, in: <u>Economic Reform and Future Development Directions</u>, Nankai University Press, pp.209-227, 2012.

- "Human Capital In Beijing-A Measurement Based on the Jorgenson-Fraumeni Income Approach" in: <u>Beijing Human Resources</u>

Development Report 2010-2011, Beijing Human Recourses Bluebook Series, edited by Zhiwei Zhang, Social Science Literature Press, Beijing, China, in Chinese, pp. 57-79, 2011.

- "Human Capital Index in China," in: The Changing Wealth of Nations, Washington, DC: World Bank, Chapter 6, pp. 105-114, 2010.

- "Human Capital Measurement and Index Construction in China," *Economic Research Journal*, (top Chinese journal), Issue #8, 2010. (Reprinted in *China Social Science Digest*, 2010, No. 12.)

- "Human Capital Index in China," National Bureau of Economic Research, working paper (http://papers.nber.org/papers/w15500).

II. Invited Speeches and Presentations:

- International Symposium on "Labor Aspect of Corporate Social Responsibility and Public Policy," organized by the United Nations ILO Training Centre in Turin and Nanjing University of Finance and Economics, "Human capital per labor of China," Nanjing, China, May10-13, 2013.

- University of Southern California, US-China Institute conference on "The State of the Chinese Economy: Implications for China and the World," Los Angles, "Human Capital in China," February 24-25, 2011.

- The Chinese Economists Society (CES) President Forum, Nankai University, Tianjin, China, December 10, 2010, "Human Capital and Its Contributions".

- High-Level Working Group on Skills and Human Capital hosted by the Lisbon Council, Invited Speaker, Brussels, November 16, 2010, "Measuring Human Capital in China."

- The 25th Anniversary of the Sino-US Exchange on Economics Education (Ford Class) Renown Scholar Forum, Renmin University of China, invited speaker, Beijing, China, July 23, 2010, "Human Capital in China".

- The 31st IARIW General Conference of the International Association for Research in Income and Wealth, invited plenary session presentation, St.

Gallen, Switzerland, August 23-28, 2010, "Human Capital in China."

- Plenary Session Chair and co-organizer, Beijing municipal government conference, "World Talent, World City," Beijing, May 28, 2010.

III. Related Funded Projects:

- The National Natural Science Foundation of China supported the human capital measurement project for the years 2010-2012, and will continue to support it for the four years 2013-2016. The new grant title is, "China Human Capital Index System Improvement and Applications," 2013.

- The CHLR has been invited to join the European Union project, "Lifelong Learning, Innovation, Growth and Human Capital Tracks in Europe," to study human capital, skills and outcomes with other eight research teams from various countries/regions.

- State Administration of Foreign Experts Affairs, "A Study of Evaluation Mechanism for International Talents," invited project, 2012.

- State Administration of Foreign Experts Affairs, "A Study of Compensation Mechanism for Recruiting International Talents," invited project, 2011.

- Ministry of Education, "A Study of the Contribution Rate of Human Capital," invited project, 2010.

- OECD Director of Statistics Directorate, Mr. Paul Schreyer, has officially recommended to the Director of China National Bureau of Statistics Mr. Jiantang Ma, that the CHLR human capital research team should participate in the OECD human capital consortium as China's officially designated representative, 2010.

- State Councilor Yandong Liu visited the CHLR and praised the Center's achievement in human capital research in October, 2009, and made the remarks that "China is in a transition from a country with huge population to a country with strong human capital, and therefore it is very important to conduct research in China's human capital."

- China Human Capital Report 2009 and its summary have been requested by

the Ministry of Education as references. It has been submitted to the Ministry of Organization for the Second National Meeting on Talents Policy as supplementary materials.

Acknowledgement

What's New in the 2013 Report

The updates of this report include:

- Calculated human capital for five new provinces: Hainan, Jiangxi, Jilin, Sichuan, and Chongqing

- Human capital calculation has been updated for the nation and all previous 17 provinces using newly released 2010 census data. Those provinces are Beijing, Liaoning, Shanghai, Jiangsu, Anhui, Shandong, Henan, Hubei, Hunan, Guangdong, Guizhou, Gansu, Tianjin, Heilongjiang, Zhejiang, Guangxi, and Shaanxi.

- Human capital calculation has been extended to 1985-2010.

- A new household survey data set, Chinese Household Financial Survey(CHFS) 2011, is added to the estimation of human capital this year; and provincial level data have been updated as well.

- Provincial physical capital stock for 1985-2010 is estimated and reported for public use.

- Cross-province living cost adjustment index (Purchasing Power Parity index) for 1985-2010 is estimated and reported for public use.

Notes

Abbreviations:

- Provinces:

GD=Guangdong	JS=Jiangsu	SD=Shandong
HeN=Henan	HB=Hubei	HuN=Hunan
AH=Anhui	SH=Shanghai	LN=Liaoning
BJ=Beijing	GZ=Guizhou	GS=Gansu
TJ=Tianjin	HLJ=Heilongjiang	ZJ=Zhejiang
GX=Guangxi	SAX=Shaanxi	HN=Hainan
JX=Jiangxi	JL=Jilin	CQ=Chongqing
SC=Sichuan		

- HC: Human capital
- LFHC: Labor force human capital

Definitions:

- Total human capital calculation: age 0-55 for female; age 0-60 for male
- Labor force human capital(LFHC) calculation: Non-retired population aged 16 and over, excluding full-time students
- Growth rates, calculated as the annual difference of logarithm of the variable measured in real values
- Average growth rate: Calculated arithmetic average of annual growth rates for all years included
- Ratio of HC to GDP: use current values
- Ratio of GDP to LFHC: use current values

Contents

Executive Summary

Although the importance of human capital in economic growth and innovation is well recognized, constructing an accurate measure of human capital is still difficult. We adopt the widely used Jorgenson-Fraumeni lifetime income approach (hereafter referred to as the J-F approach) to calculate the stock of Chinese human capital by modifying it to fit the Chinese data.

In this report we calculate the human capital stocks of China at the national level and for 22 provinces from 1985 to 2010, including total human capital and per capita human capital for rural and urban, male and female. The provinces calculated are: Beijing, Tianjin, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Anhui, Zhejiang, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Shaanxi and Gansu.

Additionally, we estimated national level and provincial level physical capital stock for the same period; and constructed living cost adjustment index (i.e., purchasing power parity index) for cross province comparison of money value. Our estimated human capital, physical capital, living cost adjustment index and all raw data and processed data will be released for public use.

The main findings are summarized below (real values are calculated using1985's currency and growth rates are calculated based on real values).

1. China's human capital reached RMB 715.1 trillion in 2010. Urban and rural human capital was 539.1 and 176.0 trillion, respectively, accounting for 75% and 25% of the total human capital.

2. China's human capital increased at an average annual rate of 7.10% during 1985-2010. This growth accelerated after 1995, with a growth

rate of 2.12% for 1985-1994 and 10.84% for 1995-2010.

3. Human capital per capita reached RMB 636.9 thousand Yuan in 2010. Urban and rural human capital per capita was 939.0 and 320.0 thousand Yuan, respectively. Per capita human capital for male and female is 771.4 and 483.4 thousand Yuan, respectively.

4. Per capita human capital almost increased five-fold during 1985-2010. Total human capital grew at a higher rate than human capital per capita before 1995 (2.12% and 0.97% average annual rate, respectively), but the two grew at closer rates after 1995 (10.84% and 10.54%, respectively). In the same period, population grew at an average annual rate of 1.38% before 1995 and 0.68% after 1995. Thus, the result suggests that, after 1995, human capital growth was mainly caused by education improvement and other factors, in addition to population growth.

5. During 1985-2010, rural human capital grew at an average annual rate of 3.79%, but urban human capital grew at 9.48%. Growth rate in both urban and rural areas accelerated since 1997 (14.47% and 6.43%, respectively, for 1997-2010). Urban human capital exceeded rural human capital starting in 1996, and the gap has been increasing ever after.

6. Rural human capital per capita grew at an average annual rate of 4.95% during 1985-2010, while it was 5.77% in urban for the same period. Before 1997, the rural human capital per capita grew slightly faster than the urban area (0.82% and 0.53%, respectively). After that, however, the urban human capital per capita grew much faster than the rural area (10.62% and 8.76%, respectively). Clearly, the urban-rural gap in human capital rises quickly.

7. At the national level, the ratio between human capital and physical capital decreased rapidly before 1995 and then became stable and began

to rise slowly, indicating a higher growth rate of human capital relative to physical capital in later years.

8. At the national level, the ratio of GDP to human capital shows an upward trend, suggesting increased efficiency of human capital in production.

9. Human capital at the provincial level generally shows a similar trend to national human capital. However, since provinces differ in their population, education structure and the degree of market mechanism, their dynamics in human capital also show some differences.

10. Among the 22 provinces estimated, the top three provinces ranked by human capital stock in 2010 are Guangdong, Jiangsu and Shandong; and by human capita per capital are Shanghai, Beijing and Zhejiang.

11. While China has a large total human capital stock, its human capital per capita is relatively small compared to developed countries.

Chapter 1   Introduction

Since the concept of human capital was introduced to modern economic analysis by Schultz (1961) and Becker (1964), it has been widely used in academic studies and policy analysis. An Organization for Economic Co-operation and Development (OECD) publication defines human capital as "The knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being" (OECD, 2001, page 18). Human capital has been called probably "the most important and most original development in the economics of education" in the second part of the 20th century (Coleman, 1990, page 304). In most countries, human capital accounts for more than 60% of the nation's wealth (World Bank, 1997).[1]

It is generally believed that human capital is an essential source of economic growth and innovation, and an important factor for sustainable development and reducing poverty and inequality (see, for example, Stroombergen et al., 2002, and Keeley, 2007). Detailed analyses of human capital accounts for Canada, New Zealand, Norway, Sweden, and the United States unanimously show that human capital is a key source of economic growth.[2] The Stiglitz Commission report noted the importance of human capital as a "beyond Gross Domestic Product" measure of economic and social progress.[3]

In China, since the start of economic reforms, the economy has grown at a

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[1] These World Bank wealth estimates include natural resources, physical capital and intangible capital, which is primarily human capital.

[2] These include Jorgenson-Fraumeni (J-F) accounts for Canada (Gu and Ambrose 2008), New Zealand (Li, Gibson, and Oxley 2005), Norway (Greaker and Liu 2008), Sweden (Alroth 1997), and the United States (Jorgenson and Fraumeni 1989, 1992a, 1992b, and Christian 2009).

[3] See Stiglitzet. al. (2009).

dramatic rate. It is believed that human capital has played a significant role in the Chinese economic miracle (see, for example, Fleisher and Chen, 1997, and Démurger, 2001). Additionally, studies show that human capital also has an important effect on productivity growth and on reducing regional inequality in China (Fleisher, Li and Zhao, 2009).

Despite the important role of human capital in the Chinese economy, however, until now, there has been almost no comprehensive measurement of the total stock of human capital in China. Human capital measures for China are central to any understanding of the global importance of human capital for a number of reasons. First, China is the most populous country in the world. It is important to understand the dynamics of human capital caused by demographic changes (for example, due to the one-child policy, migration, and urbanization) and by the rapid expansion of education during the course of economic development. Second, such measures would allow for better assessment of the contribution of human capital to growth, development, and social well-being in empirical and theoretical research. Construction of comprehensive human capital measures is an important step in assessing the contribution of human capital to economic growth. Currently, only partial measurement of human capital, such as education characteristics, has been used in such studies.

Additional benefits from human capital measures include the provision of useful information for policy makers for the purpose of assessing how education policies of central and local governments affect the accumulation of human capital. This is especially important, given the long-term nature of human capital investment. For example, since the early 1980s, there has been a remarkable increase in the educational attainment of the Chinese population. In 1985 the largest population masses were concentrated in the "no schooling" and "primary school" categories (Figure 4.2.5). By 2010 the largest population mass was concentrated in the "junior middle" school category (Figure 4.2.7).

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Developing comprehensive measures of human capital in China provides the necessary early work for constructing China's human capital account and so that China can join the international OECD initiative in this area. This initiative will facilitate international comparison of human capital accumulation and growth across nations.

There is an ongoing international effort in developed countries to measure a nation's total human capital stock and to develop Jorgenson-Fraumeni (J-F) national human capital accounts. The U.S. Bureau of Economic Analysis has recently supported research on human capital (Abraham 2010 and Christian 2010). Statistics Canada (Gu and Wong 2008), the Australian Bureau of Statistics (Wei 2008), and Statistics Norway (Greaker and Liu 2008) have established similar research programs on the measurement of human capital using agency researchers. In addition, seventeen countries (Australia, Canada, Denmark, France, Italy, Japan, Korea, Mexico, Netherlands, Norway, New Zealand, Poland, Spain, the United Kingdom, the United States, Romania, and Russia), and two international organizations, Eurostat and the International Labour Organization, have joined an OECD consortium to develop human capital accounts. A researcher from Statistics Norway, Gang Liu, has been at the OECD since October 2009 to coordinate this effort.[4] The work of this consortium will facilitate cross-country comparisons.

Another approach to estimating the impact of human capital has been undertaken by the Lisbon Council which is located in Brussels. The Lisbon Council European Human Capital Index has been constructed for the 13 European Union (EU) states and 12 Central and Eastern European states (see Ederer 2006 and Ederer et al. 2007). Developed countries have obviously

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[4] J-F human capital accounts have been constructed for several other countries independent of the consortium efforts. These countries include Argentina (Coremberg, 2010), New Zealand (Le, Gibson, and Oxley, 2005), and Sweden (Ahlroth and Bjorkland, 1997). O'Mahony and Stevens (2004) applied J-F methodology to evaluate government provided education in the United Kingdom.

realized the importance of monitoring human capital accumulation, while most developing and emerging countries, including China, have yet to start such projects.

Until now, there has been no systematic effort to construct comprehensive measures of the total human capital stock in China, but there are a few studies on human capital measurement published in Chinese journals. For example, Zhang (2000) and Qian and Liu (2004) calculated China's human capital stock based on total investment (cost-side); others, such as Zhu and Xu (2007), Wang and Xiang (2006), estimated human capital from the income side. Zhou (2005) and Yue (2008) used some weighted averages of human capital attributes to construct a measurement. In most cases, these studies partially measure human capital based on some education characteristics such as average years of education, for example, Cai (1999), Hu (2002), Zhou (2004), Hou (2000), Hu (2005), etc.

While the above studies have contributed to the understanding of human capital in China, there are major limitations. First, there has been no comprehensive and systematic measurement of the total human capital stock in China from the 1980s up to date, especially on the changes of human capital in rural and urban areas and for males and females respectively. Second, the methodology used has been limited by data availability, feasibility of parameter estimation, and some technical treatment difficulties. Limitations of this kind have made it difficult to implement internationally recognized methods for human capital estimation based on China's data.

We attempt to construct a comprehensive measurement of human capital in China by applying the methods used in other countries after modifying them to fit China's special cases. We estimate total human capital at the national level and provincial level, for males and females, for urban and rural areas from 1985 to 2010. Our estimates include nominal values, real values, indexes, and quantity measures. We mostly adopted the Jorgensen-Fraumeni (J-F)

lifetime income based approach, which has been widely used in other countries.

In addition to a full-implementation of the J-F approach to China's data to estimate the human capital series, another contribution of this study is that we combine micro-level survey data in human capital estimation to mitigate the lack of earnings data in China. In particular, we apply the Mincer equation to estimate earnings by using various available household survey data. Thus, it is possible to integrate the changes of returns to education and experience (on-the-job-training) into our estimates during the course of economic transition.

Moreover, by separating the calculation of human capital for urban and rural areas, we are able to capture the changes caused by rapid urbanization as well as by the large scale rural-urban migration since the start of economic reform in China. This framework is not only important for any transitional economy because of its changing economic structure and migration, it can also at least partially measure the effect of another type of human capital investment–migration, which helps realize a higher value of one's human capital.

The rest of this report is arranged as follows. Chapter 2 discusses methodology for human capital measurement. Chapter 3 describes J-F method and its application and modifications for China. Chapter 4 states China's population and education dynamics. The estimated national results of human capital are reported in Chapter 5, Chapter 6 shows the cross-province comparison results, followed by the disaggregated human capital results for Beijing, Tianjin, Liaoning, Jilin, Heilongjiang, Zhejiang, Shanghai, Jiangsu, Anhui, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Shaanxi and Gansu.

Chapter 2   Methodology

In general, human capital can be produced by education and training (child bearing and rearing are investments that increase future human capital), as well as by job turnover and migration that help to realize the full potential value of human capital. Like physical capital, the human capital stock can be valued using two methods: i) it can be valued as the sum of investment, minus depreciation, added over time to the initial stock; ii) it can be valued as the net present value of the income flow it will be able to produce over an assumed lifetime. The first method-the perpetual inventory method--is used in the cost approach; while the second method is the income-based approach (this method is also often used to estimate the value of most natural resources). When human capital is measured using the perpetual inventory approach, only costs or expenditures are included in investment. When physical capital is measured in this way, investments are valued at their purchase price which is not generally available for human capital.

These and other measures of human capital have been used by researchers in many studies:

(1) The lifetime income approach of Jorgenson and Fraumeni (1989, 1992a, 1992b);

(2) The cost approach of Kendrick (1976);

(3) The indicator method in The Lisbon Council's approach (2006);

(4) Laroche and Merette (2000) construct indexes with either relative wage weights or relative lifetime income weights;

(5) The World Bank residual approach (2006).

The approach of Jorgenson-Fraumeni is discussed further in the next section.

2.1 Jorgenson-Fraumeni income-based approach

The J-F method estimates human capital stock as the expected future lifetime income of all individuals. If human capital could be traded in the market like physical capital, the asset price would be the net present value of the individuals' lifetime labor income.[5] The lifetime income approach can reflect the importance of long-term investments, such as education and health, in human capital accumulation.

The Jorgenson and Fraumeni (J-F) income-based approach is the most widely used method in estimating human capital stock, and has been adopted by a number of countries in constructing human capital accounts (see the previous section for examples). The advantages of this approach are that it has a sound theoretical foundation and that the data and parameters are relatively easier to obtain than they are for other approaches.

When estimating lifetime income to calculate human capital, an important issue is that income (or implicit income) can be generated from both market and nonmarket activities. Market activities of individuals produce goods and

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[5] In China, the labor market may still be at a stage where wage income does not fully reflect the marginal productivity of labor. Therefore, in the studies involving wages, there may be a certain degree of distortion. When estimating human capital using the wages income, one must recognize that this problem may exist. Therefore, our study is clearly limited by the current development level of the labor market mechanism in China. But the income approach is the most commonly used method for measuring human capital. Even in the United States and other developed countries, wages do not fully reflect the marginal productivity, because its labor market is not perfectly competitive. Even so, wages are still representative of the human capital gains from an individual perspective, and still a measure of human capital in that sense. With the improvement of market mechanism in China, this limitation will gradually decrease. According to estimates of the current literature, wages are generally lower than the marginal productivity (see Fleisher, Li and Zhao, 2010). Therefore, from this perspective, our calculation can be interpreted as a conservative estimate of human capital.

services, foster innovation and growth through managerial and creative activities, and generate income that allows for the acquisition of market goods and services. Nonmarket activities of individuals include household production, e.g., cooking, cleaning, and care-giving. Investment is generated from both market and nonmarket activities. Because household production activities are difficult to quantify and value and require time-use estimates, we have opted to exclude them in this first approximation to estimating China's human capital.[6]

2.2 Cost approach

Kendrick is an early pioneer in the construction of human capital accounts. Kendrick (1976) estimates both tangible and intangible human capital. Tangible human capital includes child rearing costs. Intangible human capital includes education, training, medical, health and safety expenditures, and mobility costs. Human capital stocks are created using a perpetual inventory method where investment expenditures are cumulated and existing stocks are depreciated. Implementation of a Kendrick approach for China is difficult as Kendrick's human capital investment is the sum of a long list of human capital related costs, and reliable data on such information is only available for the most recent decades.

Tangible human capital investment is average lifetime rearing costs including expenditures on food, shelter, health, schooling, and so on. The cost of parental time is not included in this measure. Intangible human capital investment in formal and informal education includes both private and government costs. Private formal education costs include net rental for private education sector's plant and equipment and students' expenditures on supplies.

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[6] Among the most recent human capital estimates, i.e., Mira and Liu (2010), Gu and Ambrose (2008), Greaker and Liu (2008) and Christian (2010), only Christian, for the United States, includes a full set of nonmarket activities and estimates human capital for those too young to go to school or to perform market work.

Estimate for the total cost of rentals of books and equipment and opportunity cost depends on a student's imputed potential compensation. Government formal education costs include all types of expenditure, including those for construction. Personal informal education expenditures include a portion of those for radio, TV, records, books, periodicals, libraries, museums, and so forth. Business and institutional expenditures include a portion of those for media expenditures. Religious education expenditures are imputed from figures on religious class attendance and imputed interest on plant and equipment of religious organizations. Government expenditures include those for library, recreation costs and military education expenditures.

Intangible human capital investment in training values initial nonproductive time and nonwage costs and includes explicit training expenditures. Both specific and general training is captured, as well as military training. A substantial fraction of medical, health and safety expenditures, which are split between investment and preventive expenditures, are by governments. Annual rental costs for plant and equipment are imputed when not available.

Kendrick considers his human capital mobility investment estimates to be tentative. These include unemployment, job-search, hiring, and moving costs, for both residents and immigrants. Depreciation is estimated using the depreciation methodology most widely used at the time of his research: A double declining balance formula with a switch to a straight-line method. Lifetimes in these formulas are assumed to be the reciprocal of the percentage of persons in the group.

Kendrick estimate of nominal human capital is about five times Gross Domestic Product. However, the J-F human capital estimate is substantially larger than Kendrick's.[7] The Kendrick approach covers detailed aspects of human capital formation from the cost side and provides a very complete menu

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[7] See table 37 of Jorgenson-Fraumeni (1989).

for summing up all related costs to estimate the value of human capital. Yet, the data requirements are enormous, for example, we may need to get government statistics ninety years back to do the calculation. This is impossible, given the People's Republic of China is only 61 years old in 2010.

Additionally, the Kendrick approach gives no clear rationale for some important assumptions, such as for the split of health expenses between investment and preventative costs. For all these reasons, we do not adopt this approach for our calculation.

2.3 Indicator approach

An example of an indicator approach is the Human Capital Index of the Lisbon Council. It is a human capital input cost, or cost of creation approach. This index has been constructed for the 13 European Union (EU) states and 12 Central and Eastern European states as previously noted.[8] The Human Capital Endowment measure is an input to two of the other three components of the overall European Human Capital Index. The Human Capital Endowment measure sums up expenditures on formal education and the opportunity cost of parental education, adult education, and learning on the job. Parental education includes teaching their children to speak, be trustful, have empathy, take responsibility, etc. The Human Capital Utilization Index is the endowment measure divided by total population and the Human Capital Productivity Measure is Gross Domestic Product (GDP) divided by the endowment employed in the country.

Finally the Demography and Employment measure estimates the number of people who will be employed in the year 2030 in each country by looking at

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[8] See Ederer (2006) and Ederer *et. al.* (2007). The 2006 paper states that the index was developed by the German think tank Deutschland Denken. In addition the paper states that it is part of a research project undertaken by several individuals in the think tank and with the institutional support of Zeppelin University.

economic, demographic, and migratory trends.[9] As it has cost components and index components, it is best viewed as a blend of a cost approach and an indicator approach. Since the technical details for this approach have not been released, we do not apply it here in our calculation.[10]

2.4 Attribute-based approach

The attribute-based approach is usually considered to be a variant of the income-based approach (Le, Gibson and Oxley 2003, 2005). However, it constructs an index value of human capital instead of a monetary value as in other income-based methods. The primary advantage of an index value is that it nets out the effect of aggregate physical capital on labor income, therefore this measure captures the variation in quality and relevance of formal education across time and country.

Based on the pioneer work of Mulligan and Sala-i-Martin (1997), Koman and Marin (1997) applied the attribute-based method to Austria and Germany. However, our method is akin to Laroche and Merette (2000) in that we also incorporate work experience into the model along with formal education. That is, we also emphasize informal channels, such as work experience, in the accumulation of human capital.

Specifically in this method, the logarithm of human capital per capita in a country at any time is computed using the following formula：

$$\ln\left(\frac{H}{L}\right) = \sum_e \sum_a \omega_{e,a} \ln\left(\rho_{e,a}\right)$$

（1）

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[9] Ederer (2006), p. 4 and p. 20.

[10] We have discussed with Dr. Ederer on possible collaboration of applying the China data to their method in the future.

$$\omega_{e,a} = \frac{e^{\sum_s (\beta_s e + \gamma_s Exp + \delta_s Exp^2)\varphi_{s,a}} L_{e,a}}{\sum_e \sum_a e^{\sum_s (\beta_s e + \gamma_s Exp + \delta_s Exp^2)\varphi_{s,a}} L_{e,a}}$$

（2）

where *e* and *a* denote years of formal schooling and age, respectively. $\rho_{e,a} = L_{e,a} / L$ is the proportion of working age individuals of age *a* with *e* years of schooling. $\omega_{e,a}$ is the efficiency parameter defined as proportion of wage income of workers of age *a* with *e* years of schooling in the total wage bill of the economy. *Exp* represents work experience, which is defined as $a - e - 6$. *s* is a gender index and $\varphi_{e,a}$ is the share of men and women of age *a* in the population. Parameters *β*, *γ* and *δ* are estimates from a standard Mincer equation. The parameter *β* is often considered to be the rate of return to one more year of formal education.

In order to implement this method, we need to construct a population data set by age, gender and educational attainment for each year we study. Secondly, we need two sets of estimates from Mincer equations for each year, one for each gender. It is feasible to calculate a human capital measure based on this approach. The major issue is that in this setup, the measurement is actually a Cobb-Douglas formula. In other words, the proportions of different education groups by construction are not "perfect substitutes." When the share of one education group increases, it could cause the total measurement to decline. For example, if we increase the proportion of population with higher education, the measurement should increase as the overall education get higher, but it could decline due to the Cobb-Douglas formulation. This happened in our calculation. Since we believe that an education-based human capital measurement should be a monotonically increasing function of the overall education, we do not report the results of the attribute-based approach. In our future work we plan to

modify the structure, using, for example, average years of schooling. [11]

2.5 Residual approach

The World Bank (2006) uses a residual approach to estimate human capital for 120 countries. Due to data and methodological limitations, total wealth in the year 2000 is measured as the net present value of an assumed future consumption stream. The value of produced capital stocks is estimated with the perpetual inventory method. Produced capital includes both structures and equipment. Natural capital is valued by taking the present value of resource rents. Natural capital includes nonrenewable resources, cropland, pastureland, forested areas, and protected areas. Intangible capital is equal to total wealth minus produced and natural capital. Intangible capital is an aggregate which includes human capital, the infrastructure of the country, social capital, and the returns from net foreign financial assets. Net foreign financial assets are included because debt interest obligations will affect the level of consumption. Intangible capital represents more than 50% of wealth for almost 85% of the countries studied.

Using a net present value approach to estimate total wealth requires assumptions about the time horizon and the discount rate. The World Bank chooses 25 years as the time horizon as it roughly corresponds to one generation. It chooses a social discount rate rather than a private rate as governments would use a social discount rate to allocate resources across generations. The social discount rate is set at 4%, which is at the upper range of estimates it reviewed for industrialized countries. The same rate is used for all countries to facilitate comparisons across countries.

A Cobb-Douglas specification is employed to estimate the marginal returns and contribution of three types of intangible capital in the model. The

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[11] This point was confirmed by email communication with Dr. Reinhard Koman.

model's independent variables include years of schooling per capita of the working population, human capital abroad, and governance/social capital. Human capital abroad is measured by remittances by workers outside the country. Governance/social capital is measured with a rule of law index. Although the marginal return to human capital in the aggregate is the highest of the three included intangible capital components, the contribution decomposition demonstrates that the relative contributions can differ significantly across countries (World Bank, 2006, chapter 7).

To sum up, taking into account the data availability in China, we believe that the J-F income approach is most suitable for measuring China's human capital. Moreover, this method is widely used internationally, so using it facilitates comparisons of China's human capital level with other countries'. At the same time, it is easier to calculate and implement scientifically and accurately in China. For all these reasons we will use the method of J-F to measure human capital in China.

Chapter 3   J-F Method and its application for China

The J-F approach imputes expected future lifetime incomes based on survival, educational enrollment, and employment probabilities. Expected future wages and incomes are estimated from the currently observed wages and incomes of the cross section of individuals who are older than a given cohort at the time of observation. Future incomes are augmented with a projected labor income growth rate and discounted to the present with a constant interest rate. Estimation is conducted in a backward recursive fashion, from those aged 75, 74, 73, and so forth to those aged .

[12] When it's applied to China, we made some modifications and assumptions about the method and parameters used accordingly.

3.1 Estimate lifetime income by backward recursion

With the J-F income-based approach and data or estimates of individual's annual market labor income per capita, lifetime incomes are calculated by a backward recursion, starting from the oldest cohorts in the population. The life cycle is divided into five stages, and the equations used for calculating the lifetime expected incomes are as follows.

The fifth and final stage is retirement or no school or work (males older than 60 years old, females older than 55 years old):

$$mi_{y,s,a,e} = 0 \qquad\qquad （3）$$

where the subscripts y, s, a, and e denote respectively year, sex, age and

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[12] The J-F inclusion of nonmarket lifetime income and expected lifetime income for youngsters produces human capital estimates that are notably higher than those in the studies mentioned above who have adopted the J-F methodology.

educational attainment, and *mi* stands for lifetime market labor income per capita.

The fourth stage is work but no school (male 25-59 or female 25-54 years old):

$$mi_{y,s,a,e} = ymi_{y,s,a,e} + sr_{y+1,s,a+1} \times mi_{y,s,a+1,e} \times \frac{1+G}{1+R} \qquad (4)$$

Where *sr* is the survival rate, defined as the probability of becoming one year older, *ymi* denotes annual market income per capita, *G* is the real income growth rate, and *R* is the discount rate.

The third stage is school and work (16-24 years old):

$$mi_{y,s,a,e} = ymi_{y,s,a,e} + \left[senr_{y+1,s,a+1,e+1} \times mi_{y,s,a+1,e+1} + (1 - senr_{y+1,s,a+1,e+1}) \times mi_{y,s,a+1,e} \right] \times \frac{1+G}{1+R}$$

$$(5)$$

Where *senr* is school enrollment rate--the probability of an individual with educational attainment *e* to enroll in education level *e+1*.

The second stage is school but no work (6-15 years old):

$$mi_{y,s,a,e} = \left[senr_{y+1,s,a+1,e+1} \times mi_{y,s,a+1,e+1} + (1 - senr_{y+1,s,a+1,e+1}) \times mi_{y,s,a+1,e} \right] \times \frac{1+G}{1+R}$$

$$(6)$$

The first stage is no school and no work (0-5 years old):

$$mi_{y,s,a,e} = sr_{y+1,s,a+1} \times mi_{y,s,a+1,e} \times \frac{1+G}{1+R} \qquad (7)$$

If we let $L_{y,s,a,e}$ stand for the population in the respective categories, the expected lifetime income in a country, i.e., the total human capital stock, can be written as:

$$MI(y) = \sum_{s} \sum_{a} \sum_{e} mi_{y,s,a,e} L_{y,s,a,e} \qquad (8)$$

Similar equations can be applied to estimate lifetime nonmarket labor

income[13], which can be added to lifetime market labor income to obtain total lifetime labor income:

$$LIFE(y) = \sum_s \sum_a \sum_e (mi_{y,s,a,e} + nmi_{y,s,a,e}) \cdot L_{y,s,a,e} \qquad (9)$$

3.2 Estimate current income using Mincer models

One important component of the income approach is the estimation of future potential earnings for all individuals in the population. With the J-F income-based approach, we first need data or estimates of individual's annual market labor income per capita. We conduct estimation and make projection based on the basic Mincer (1974) equation. It has been shown that there are significant differences in the structure of the earnings equation across genders and between the rural and urban populations. To ensure our income estimates as accurate as possible, we estimate the parameters for the rural and urban populations by gender and year using survey data in selected years and derive their imputed values for missing years over the period of 1985 to 2010.

The data used for estimating the parameters of the earnings equation come from four well-known household surveys in China. The first is the annual Urban Household Survey (UHS) conducted by the National Statistical Bureau of China over the period of 1986 to 1997. The second data set we use is the China Health and Nutrition Survey (CHNS) for the years of 1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009. The third data set we use is the Chinese Household Income Project (CHIP) for the years of 1988, 1995, 2002, 2007. The fourth data set we use is the China Household Finance Survey (CHFS)

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[13] Nonmarket activities include household production, e.g., cooking, cleaning, and childrearing and other nonmarket activities such as education and health-related activities. In our calculation we exclude the nonmarket lifetime income because it is difficult to quantify.

for the year of 2010. The CHIP, CHNS and CHFS cover both urban and rural population, and UHS covers only urban population.

The UHS is a representative sample of the urban population. The sample size varies from year to year, ranging from a low of 4,934 respondents in 1986 to a high of 31,266 respondents in 1992. Individual earnings are annual wage incomes, which include basic wages, bonuses, subsidies and other work-related incomes. Years of schooling are calculated using the information on the level of schooling completed: primary school equals 6 years of schooling, junior middle school 9 years, senior middle school 12 years, professional school 11 years, community college 15 years, and college and above 16 years. Assuming schooling begins at age 6, we approximate work experience by age minus years of schooling minus 6. As the minimum legal working age is 16 and the retirement ages are 60 and 55 for males and females respectively, we restrict our sample to individuals who are currently employed and are between 16 and 60 years old for male workers and between 16 and 55 for female workers. Self-employed and temporary job holders are excluded, so are those who did not report wage income or educational attainment. Appendix B.3.1 provides a complete description of the income and education definitions and sampling standards. Appendix B, Table B.1.1 lists the descriptions of all the statistics.

Chinese Household Income Project (CHIP) survey, reports income, consumption, job, production and other related information of urban and rural populations. Appendix B.3.2 provides a complete description of the income and education definitions and sampling standards. Appendix B, Table B.1.2 includes the descriptions of all the statistics.

CHNS is an international project that aims to learn more about China's transitional economy and society's impact on social economy, population and health behaviors in urban and rural areas. Appendix B.3.3 provides a complete description of the income and education definitions and sampling

standards. Appendix B, Table B.1.3 lists the descriptions of all the statistics.

CHFS is a nationwide survey conducted by the Survey and Research Center for China Household Finance in Southwestern University of Finance and Economics. The main purpose of the survey is to collect information on household financial information at the micro-level, which includes housing assets and financial wealth; liabilities and credit constraints; income; consumption; social security and insurance coverage; intergenerational transfer payments; demographic characteristics and employment; payment habits and other relevant information. The rural samples of this database included 22 provinces; the urban samples in this database also included 22 provinces. The survey is conducted in 2011. The information of the statistics on household income starts from the year of 2010. Urban samples include only personal income data, comprising wage income and social security income. Rural income includes personal income and household income: personal income primarily consists of wage income and social security income, household income mainly is the net income of agriculture. As the family income is calculated as the unit of household, we need to allocate the income to individual household members, to obtain personal income. The method is Family net income of agricultural production divided by Labor force engaged in agricultural household production. Years of education is determined by the level of education according to the survey, work experience is calculated by age minus years of education and then minus 6. We restrict the sample to males of 16-60 years old and females of 16-55 years old, who have information of education and income status. Appendix B.3.4 gives the complete definitions of income, education, other variables and also the sample selection criteria of CHFS. Appendix B, Table B.1.4 lists the descriptive statistical indicators of CHFS.

With these four data sets, we estimate the parameters of the Mincer equation for each gender of the urban and rural populations by year. If we

have more than one data set for any year, we weighted the estimates by sampling size of the data set to obtain the parameter estimates for that year. Finally, we extract fitted estimates by applying linear or exponential time trends. We use the fitted time trends to generate the imputed parameters of the earnings equation for the urban and rural populations for the period of 1985-2010.

3.2.1 Estimate current income using Mincer models at the national level

We first estimate the basic Mincer equation:

$$\ln(inc) = \alpha + \beta \cdot e + \gamma \cdot Exp + \delta \cdot Exp^2 + u \qquad （10）$$

Where ln(inc) is the logarithm of earnings, e is years of schooling, Exp and Exp^2 are, respectively, years of work experience and experience squared, and u is a random error. The coefficient α is an estimate of the average log earnings of individuals with zero years of schooling and work experience, β is an estimate of the return to an extra year of schooling, and γ and δ measure the return to investment in on-the-job training.

Equation (10) has been widely adopted in empirical research on earnings determination. It has been estimated on a large number of data sets for numerous countries and time periods. Many studies have applied the model to Chinese data and found evidence consistent with the human capital theory. Notable studies include Liu (1998), Maurer-Fazio (1999), Li (2003), Fleisher and Wang (2004), Yang (2005), and Zhang *et al.* (2005). Following the convention of a large body of empirical literature, we estimate equation (10) by ordinary least squares.[14]

We use UHS, CHIP, CHNS and CHFS to estimate parameters of the

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[14] Griliches (1977) finds that accounting for the endogeneity of schooling and ability bias does not alter the estimates of earnings equation. Ashenfelter and Krueger (1994) also conclude that omitted ability variables do not cause an upward bias in the estimated parameters of equation (1).

basic Mincer equation, and obtain the fitted values for the intercept, return to education, and coefficients on experience.

The intercept, which measures the base wage for the, population without schooling or working experience, clearly shows a male advantage. Figure 3.2.1 shows the intercept gap between urban and rural populations during 1985-2010. Meanwhile, the intercept for males in urban is higher than for females in urban, while the opposite is true for rural population. Returns to schooling are positive and in general increasing over the sample years. When the Soviet-type wage grid was replaced by market wages (Fleisher, Sabirianova, Wang 2005), Wang, Fleisher, Li, and Li (2009) also find that female rates of return dominate male returns, and they argued that rising returns to education have been a ubiquitous phenomenon in transitional economies. Figure 3.2.2 shows the trend of the return to education for males and females in rural and urban areas. Figures 3.2.3-3.2.4 show that earnings also increase with work experience but at a decreasing rate——a pattern found in most existing studies. The male profile is much higher than the female profile, indicating uniformly higher return to experience for males than for females, *ceteris paribus*.
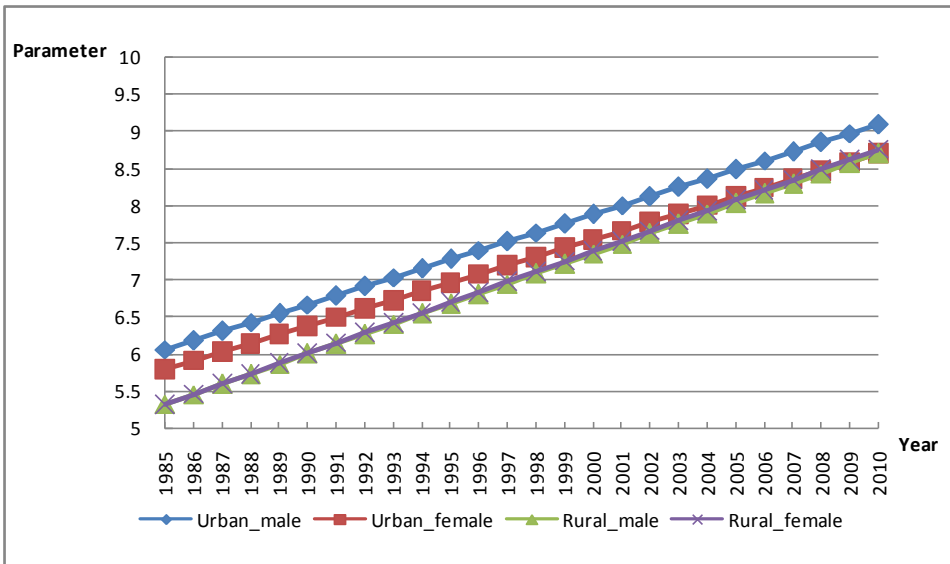
Figure 3.2.1   Regression Intercepts by Gender and Urban/Rural
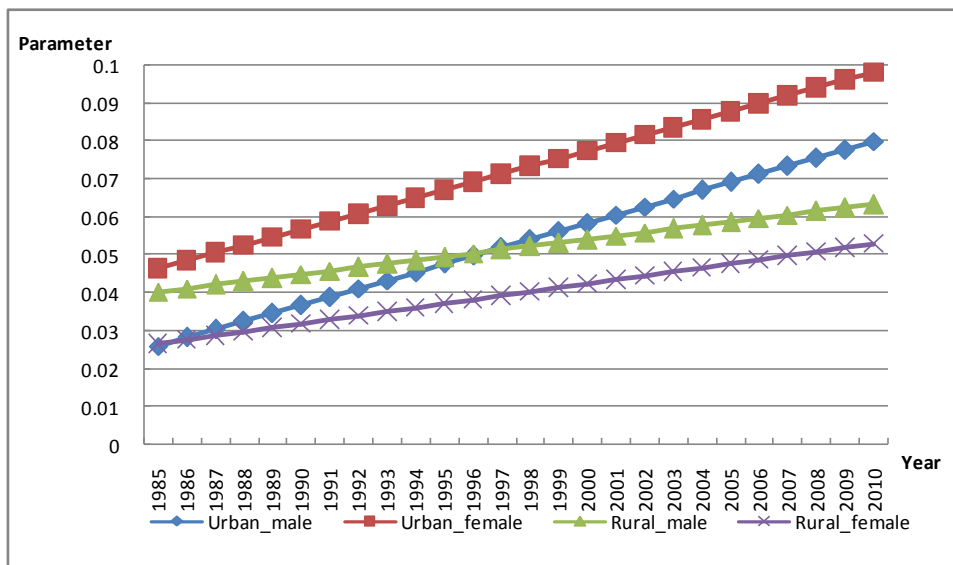
Figure 3.2.2 Rates of Return to Education by Gender and Urban/Rural
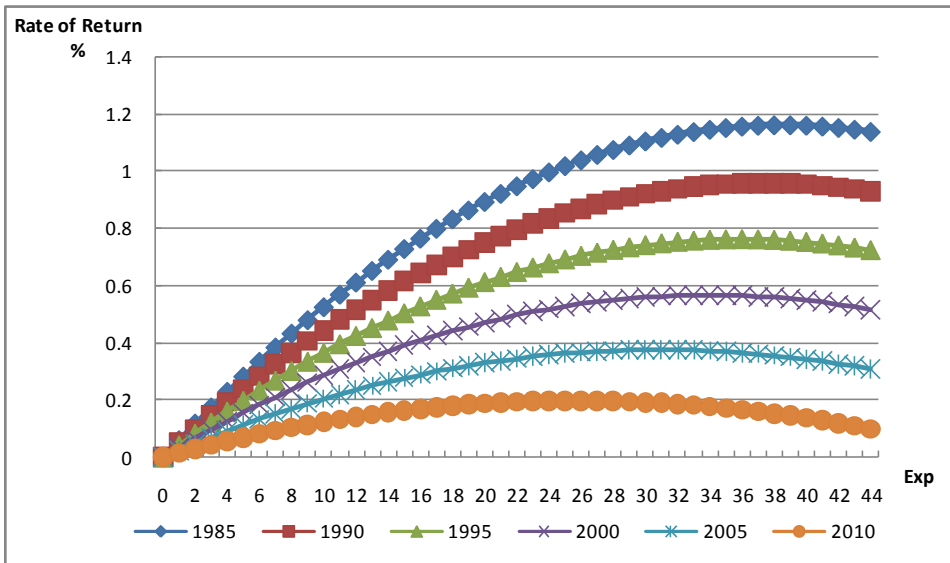
Figure 3.2.3   Return to Experience for Males
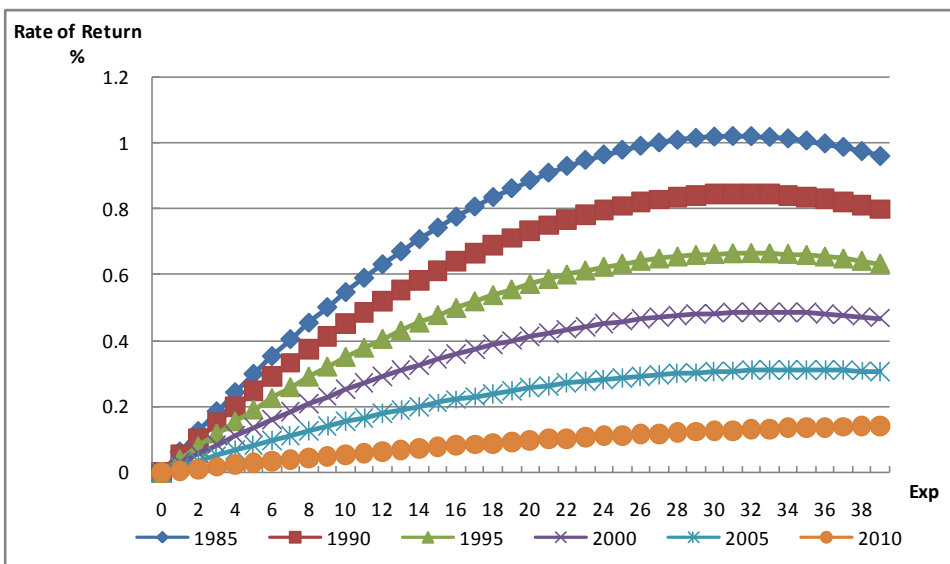
Figure 3.2.4   Return to Experience for Females

3.2.2 Estimate current income using Mincer models at the provincial level

As for the estimation at the province level, based on the Mincer equation, we use macro data for adjustment. We estimate the following Mincer equation:

$$\ln(inc) = \beta_0 + \beta_1 \cdot \ln(Avwage) + \beta_2 \cdot Sch + \beta_3 \cdot Sch \cdot Avgdp + \beta_4 \cdot Sch \cdot Ratio + \beta_5 \cdot Exp + \beta_6 \cdot Exp^2 + \mu$$

（11）

Where ln*inc* is the logarithm of earnings, *Sch* is years of schooling, *Exp* and *Exp²* are, respectively, years of work experience and experience squared, and *u* is a random error. *Avwage* represents the average employee nominal salary for the rural and urban populations. It could reflect earning gap between different provinces to. *Avgdp* stands for nominal GDP per capita. *Ratio* means the primary industry employment ratio of the total working population. The parameters of *Sch Avgdp* and *Sch Ratio* could reflect the job market situation of the educated population. We add *Avwage* into the intercept term, *Avgdp* and *Sch* as an interaction term, the first industry employment ratio of the total working population and *Sch* as an interaction term into the equation. Adding these additional variables into the conventional Mincer equation not only makes better use of the existing data and helps solve the missing data problem in parameter estimations, but also makes the estimation results more realistic.

In the model, $\beta_0 + \beta_1 \cdot \ln(Avwage)$ is the logarithm of the base wage for the population without schooling or working experience. $\beta_2 + \beta_3 \cdot Avgdp + \beta_4 \cdot Ratio$ represents the return to education, β_5 and β_6 measure the return to experience. For Shanghai, it only has urban parameter estimates. Moreover, we assume male has different returns to experience in urban and rural areas, but shares the same parameter for *Exp* and *Exp²* across all provinces; we use the same practice for estimations for females.

As national Mincer parameter estimation, provincial data used for estimation also come from UHS, CHIP, CHNS and CHFS. We use ordinary least squares (OLS) to estimate equation (11). When all data sets are available for a sample year, we drop CHNS and use UHS, CHIP and CHFS due to the relatively low quality of CHNS income measures. The estimates are weighted by respective sample size for larger sample size will make estimates closer to the real value. We adopt the same sampling standards as in the national estimation. We use the fitted trend lines to generate imputed values of the parameters for each gender by year over the period 1985 to 2010. Graphs show that when we plot each of the parameter estimates against time, they are generally trended. We adopt the linear trend model to obtain the fitted values of parameters, that is $Y = \alpha_0 + \alpha_1 \times time + \mu$. Under the assumption that the effect of *Avwage*, *Sch*, *Exp*, *Exp²* on income growth grows at a fixed rate, we use the linear trend fitting method for all the parameters.

3.3 Other data and Parameters used

Besides annual population data by age, sex and educational attainment, which are adjusted by the age distribution of education and survival rate, the J-F method requires additional information on lifetime income, enrollment rate, employment rate, growth rate of real wage, and discount rate. We will briefly discuss how we construct these supplemental data sets in this section. Some parameters have to be set at values appropriate for China. Detailed information can be found in the appendixes.

3.3.1 Age distribution

We use the data from the China Educational Statistical Yearbook: 2003-2010 to estimate the age distribution (1982-2010) of new enrollments. We have the data of new enrollment in primary school by age, region, and sex, and the data of new enrollment in junior middle school by age, grade, sex and

region from 2003 to 2010. Detailed information can be found in the appendixes.

3.3.2 Survival rate

We get survival rate (1-death rate) by age and sex. With population and death rate, both by age and gender, from the population sampling data for each year, the number of deaths of those aged 65 and over for each year can be calculated, and dividing it by the corresponding total population gives the death rate of those aged 65 and over. Since there is no population sampling data for 1983-1986, 1988 and 1991-1993, the death rate of the closest year with available data is used for these missing years.

3.3.3 Enrollment rate

Following J-F as previously described, an individual may assume one of the following six statuses at any time: no school or work (age 0-5), school only (age 6-15), work and school (age 16-24), work only (25 to retirement), and retirement (age 60+ for male and 55+ for female). Each status implies a different pattern of age-income profile, therefore the method of computing lifetime income will be different.

We first estimate a standard Mincer equation (i.e. a regression of annual income on years of schooling, working experience, and working experience squared) with microeconomic data sets (the China Household Income Project, the China Health and Nutrition Survey, and the Urban Household Survey). We use annual employment rates by age, sex, and educational attainment (from the China Population Statistical Yearbook and the China Population Census) to convert annual income into annual market income. Then the lifetime income for each age/sex/educational category can be calculated using the methodology described in the previous section.

For the in-school population, we carefully derive the number of individuals in each educational level with data on new enrollment, mortality

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rate and attrition rate. We consider the following five categories of schooling: no schooling, primary school, junior middle school, senior middle school and college and above, or for six categories of schooling where we break down college and above into college (less than 4 years) and university (at least 4 years) and above. We compute lifetime income for each grade at each educational level, taking into account how likely the individual will continue into the next grade and the next educational level. For the five categories of schooling estimation, college and above is the highest educational level. And for the six categories of schooling estimation, college or university and above are the highest educational levels. We do not allow for the possibility that one can go to college and then to university.

Because data is not available for some age groups and some educational levels, additional imputations and assumptions are needed. Imputations of data sets for certain age groups and initial age of enrollment are described in Appendix A, while enrollment and grade advancement imputations and assumptions are described in this section.

The imputation of two components of the J-F human capital estimates is described in this section: 1) Number of years until an educational category is completed, and 2) The probability of advancing to the next higher educational category. We assume that all students complete an educational level (if they continue) in the same number of years: 6 for primary, 3 for junior middle, and 3 for senior middle school. It is also assumed that no drop-outs return to school, no grades are skipped, and that education continues without a break. These assumptions are also made by J-F. The probability of advancing to the next higher educational level is estimated as the average ratio of the sum of all students of any age in a year who are initially enrolled to the sum of all students of any age initially enrolled in the next higher educational level 'X' years later. "X" depends on the number of years it takes to complete an educational level. These imputations and assumptions allow for the appropriate discounting of a

future higher income level.

In each case, continuing students are tracked from their age of initial enrollment, through individual grade levels, until they advance to the next higher level. The number of years discounted until they realize higher level of lifetime income depends on the number of years it takes to advance given the current grade of enrollment.

Then, we treat the terminal educational level as a probabilistic event, and therefore lifetime income is a forecast based on the contemporary information set, except that the probability of advancing depends on initial enrollments at a higher educational level in subsequent years. For instance, the lifetime income of a student who is in the first year of junior middle school, assuming that the student will live to finish junior middle school and go onto senior middle school, depends upon an adjusted lifetime income of someone who is currently three years older and whose educational attainment is senior middle school. The adjustments include those for three years of labor income (wage) growth and three years of discounting.

3.3.4 Employment rate

To calculate employment rate, $empr(y, s, a, e)$ by age, sex and educational level for individuals older than 16, we use the average of the employment rates in 1995 and 2000. We assume that the employment rate of college graduates is the same as that of university graduates.

The formula used to calculate the employment rate is:

$$empr(y, s, a, e) = [employed(y, s, a, e)]/pop(y, s, a, e)$$

The data sources of employment rate are listed in the table below:

Data	Sources
The employed by age, sex and educational level in 1987	"China Population Census 1987"
Population by age, sex and educational level in 1987	"China Population Census 1987"
The employed by age, sex and educational level in 1995	"China Population Census 1995"
Population by age, sex and educational level in 1995	"China Population Census 1995"
The employed by age, sex and educational level in 2000	"China Population Census 2000"
Population by age, sex and educational level in 2000	"China Population Census 2000"

Note: The 1% sample population in 1995 is converted into the whole population by the actual sampling percentage of 1.04%.

The employed in "China Population Census 2000" for each province, autonomous region and municipality directly under the central government are aggregated to the whole population employed by the actual sampling percentage of 10%.

3.3.5 Growth rates of real income

To measure lifetime earnings for all individuals in the population, we need to project incomes for future years and discount these incomes back to the present. We use the following method to estimate the real income growth rates for urban and rural areas respectively.[15]

Assuming that the technology is labor-augmenting, we specify the aggregate production function as:

$$Y = (AL)^a K^b \qquad （12）$$

Where Y is output, A denotes a technology factor, L denotes labor input,

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[15] In China, there are also growth rates of real annual income in urban areas reported in the series of the *China Statistical Yearbook*, but this income only includes labor wage for those who work in or get paid from the state-owned, urban collective, joint venture, joint-stock, foreign and Hong Kong, Macao and Taiwan invested companies and their subsidiaries. Thus, this cannot reflect the overall income level in China, as Chinese enterprises have other ownership forms.

and K is physical capital input. The average product of labor or labor productivity is proportional to the marginal product of labor.[16] Because the marginal product of labor equals the real wage when the labor market is in equilibrium, labor productivity and the real wage are expected to grow at the same rate. This suggests that the growth rate of the real output per employed worker can serve as a reasonable estimate for the growth rate of real wage.

The labor productivity for the rural sector is calculated using the real GDP of the primary industry divided by the number of workers in that industry; and for the urban sector we use the real GDP of the secondary and tertiary industries divided by the number of workers in these industries. The result shows that, for the 32-year period, 1978-2010, labor productivity grew on average by 4.52% and 6.30% annually in the rural and urban sectors, respectively. Those growth rates will be used in the J-F calculation.[17]

We use the same method to calculate the provincial income growth rates for Beijing, Tianjing, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Shaanxi and Gansu; their growth rates for urban and rural areas are shown in Figure 3.3.1. We assume that labor productivity in each province (real income) grows at a fixed annual rate

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[16] The marginal product of labor is given by $\beta Q/L$, where Q/L is the average product of labor.

[17] Those rates are considerably higher than the growth rate of 1.32% (Jorgenson and Yun, 1990) used in the OECD human capital calculation because the Chinese economy has grown much faster. Although the rate is based on 32-year moving average, it is still unclear whether it can represent long-run growth rate in China.

	BJ	TJ	LN	JL	HLJ	SH	JS	ZJ	AH	JX	SD	HeN	HB	HuN	GD	GX	HaiN	CQ	SC	GZ	SAX	GS
■Urban	6.59	8.27	7.26	8.65	6.33	7.26	8.73	8.54	6.63	6.51	7.00	6.93	7.41	6.63	8.24	6.90	7.56	7.65	6.84	7.51	7.41	5.99
■Rural	5.47	6.09	4.96	3.90	3.56	7.02	6.48	6.37	4.32	5.51	5.71	5.12	4.20	4.63	5.77	4.95	7.57	5.96	5.57	3.60	4.73	3.66
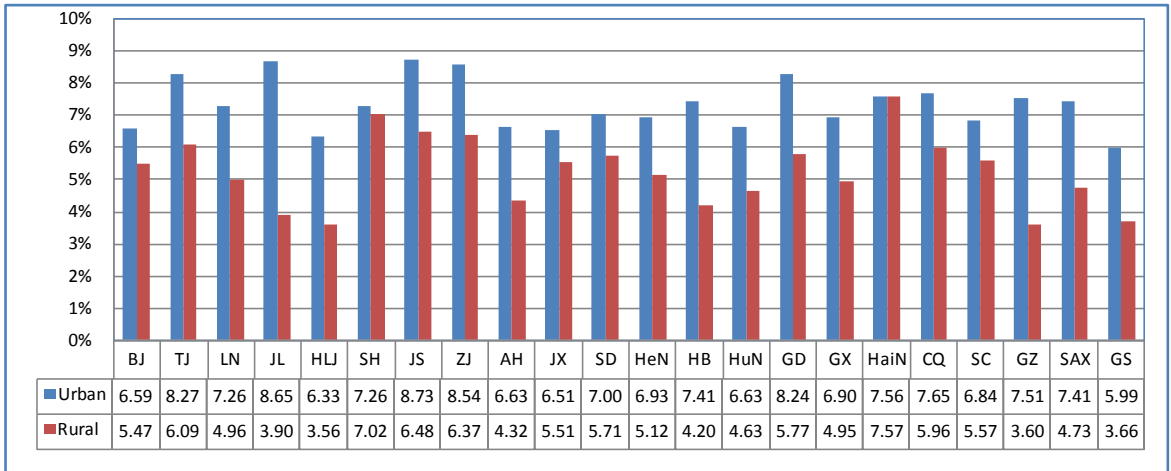
Figure 3.3.1 Provincial Income Growth Rate

3.3.6 The discount rate

The discount rate that is used to value future incomes into present terms should reflect the rate of return that one expects from investments over a long time horizon. We adopt the discount rate of 4.58% which is also used by Jorgenson and Fraumeni (1992a). This discount rate was derived by Jorgenson and Yun (1990) based on the long-run rate of return for the private sector of the U.S. economy. As in the case of other calculations using discount rate, the result will be sensitive to the choice of the discount rate. We also use alternative discount rates for the purpose of comparison, including the average interest rate on the 10-year government bonds issued to individual investors in China over the period 1996 to 2007, net of the average rate of inflation over the same period, 3.14%[18], the average benchmark lending rate over 5 years in

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[18] The details could be found in the *China Human Capital Index Analysis Report* 2009 Version. However, although the ideal discount rate should include market risk, someone may question that coupon rate does not reflect it. We used the yield to maturity of the 10-year book-entry bonds issued to individual investors that are circulated in the stock exchange market and commercial banks as a comparison and found that the difference of the results is minor.

China from 1996 to 2009, 5.51%[19], and the social discount rate based on the method from the World Bank, 8.14%.[20]

Discount rate reflects the time value of currency and is derived based on the return on long-term investments. The discount rate of 4.58%, used in Jorgenson and Yun (1990) and Jorgenson and Fraumeni (1992a), is based on the rate of return on long-term investments in the private sector of the U.S. economy. This is also the rate adopted by the OECD consortium (OECD 2010). We adopt it as well.

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[19] The People's Bank of China sets and adjusts the benchmark lending rate, which plays a key role in the money market. We excluded the serious inflation period of 1993-1995, starting from 1996 to avoid negative discount rates.

[20] We calculated the average growth rate of individual consumption over the period 1985 to 2008 based on World Bank's method. More details are available in "*Where is the wealth of nations? Human capital and economic growth in China*", and from the World Bank, "A Social Discount Rate for the United Kingdom" in *Environmental Economics: Essays in Ecological Economics and Sustainable Development*, ed. D. W. Pearce, 268–285. Cheltenham: Edward Elgar Publishing.

Chapter 4   China population and education dynamics

4.1 Population imputation

In order to implement the various methods used in estimating human capital, we first and foremost need annual population data by age, sex, and educational attainment. We construct such data sets according to the following procedure.

First, data sets are available for the years 1987, 1995, and 2005 from the 1% Population Sampling Survey and for the years 1982, 1990, 2000 and 2010 from the Population Census. The data sets also contain disaggregated numbers for urban and rural populations categorized by age and gender.

For all other years, based on the existing years' population data, we combine birth rate, mortality rate by age and sex, and enrollment at different levels of education to impute yearly population by age, sex and educational attainment for urban and rural areas. We define the following levels of educational attainment: illiterate (no schooling), primary school (Grade 1-6), junior middle school (Grade 7-9), senior middle school (Grade 10-12), and college and above. From 2000 on, additional statistical information makes it possible to separate the population at the level of college and above into two: one is college, and the other is university and above.

Specifically, we use the following perpetual inventory formula to deduce population by age, sex and educational attainment in missing years:

$$L(y,e,a,s) = L(y-1,e,a,s) \cdot (1-\delta(y,a,s)) + IF(y,e,a,s) - OF(y,e,a,s) + EX(e,a,s)$$

(13)

L(y,e,a,s) is the population in year *y* at education level *e*, with age *a* and

sex *s*. $\delta(y,a,s)$ is the mortality rate in year *y*, with age *a* and sex *s*. *IF(y,e,a,s)* and *OF(y,e,a,s)* are inflow and outflow of this particular group. For example, inflow would include individuals who just achieved this level of education, while outflow would include those who just achieved the next level of education. *EX(e,a,s)* is a discrepancy term.[21] Moreover,

$$IF\left(y,e,a,s\right)=\lambda\left(y,e,a,s\right)\cdot ERS\left(y,e,s\right) \tag{14}$$

$$OF\left(y,e,a,s\right)=\lambda\left(y,e+1,a,s\right)\cdot ERS\left(y,e+1,s\right) \tag{15}$$

$$\sum_{a}\lambda\left(y,e,a,s\right)=1 \tag{16}$$

ERS is the matriculation at education level *e*, λ is the age distribution at education level *e*. In order to obtain accurate estimate for λ, we use both microeconomic data sets CHNS (China Health and Nutrition Survey, 1989, 1991, 1993, 1997, 2000) and CHIP (Chinese Household Income Project, 1995), macroeconomic data sets (China Education Statistical Yearbook, 2003-2007). Details can be found in Appendix A.

4.2 Trend of population and education distribution

Here we present several features of China's population growth, based on the population by educational attainment, age, sex, and location (i.e. urban and rural). First of all, during our sample period, China's total population increased from 1.02 billion in 1982 to 1.341 billion in 2010. The urban population increased by 455 million, while the rural population. decreased by 131 million (Figure 4.2.1).

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[21] For example, the discrepancy can be caused by migration, but we do not have the data.
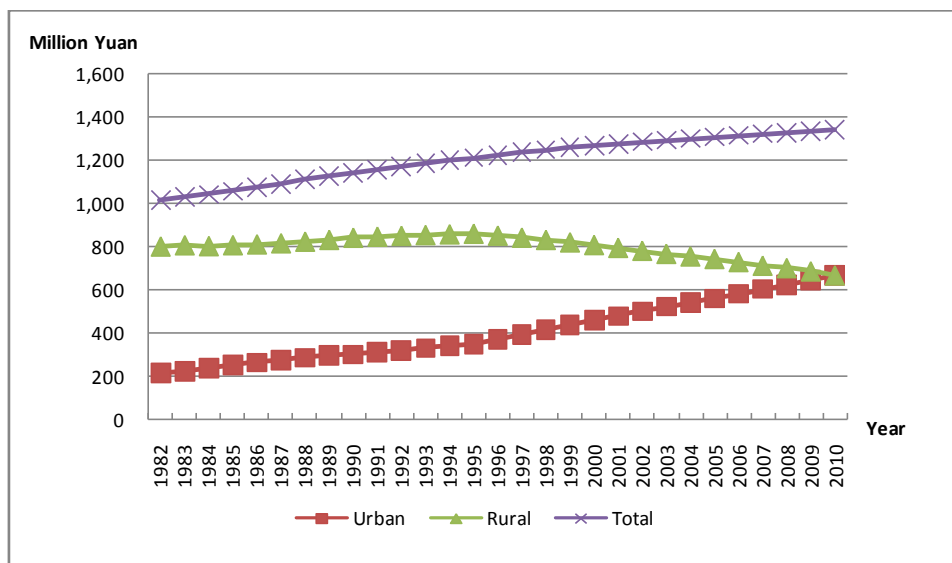
Figure 4.2.1 Population in China

Figure 4.2.2-4.2.4 shows the trend of national, urban and rural population classified by education attainment. The illiterate population was cut in half from 402 million in 1982 to 201 million in 2000, but was relatively stable from 2000 to 2010. The number of primary school graduates increased from 359 million in 1982 to the peak of 466 million in 1997, then declined gradually to 357 million in 2010. This decline is expected as more primary school graduates continue to receive higher education instead of terminating formal education. This is also shown in the rapid growth of junior middle school graduates.

Junior middle school students experienced the largest growth among all education levels: the number of junior middle school graduates increase from 181 million in 1982 to 518 million in 2010. This may be related to the implementation of 9-Year Compulsory Schooling Law since 1994 (9-year schooling amounts to completing junior middle school). However, growth slowed down after 2001. Senior middle school and college and over, both started from very low numbers, have grown significantly. Senior middle

school graduates increased from 68 million in 1982 to 187 million in 2010, while college and above increased from only 6 million in 1982 to 118 million in 2010. For the senior middle school and college and above level, the growth in rural areas is much slower than that in the urban areas.
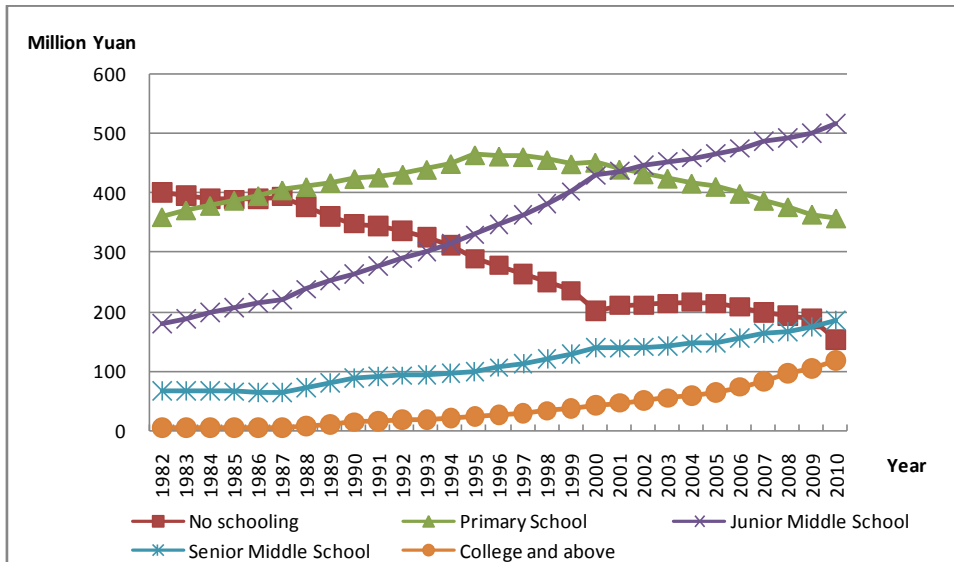
Figure 4.2.2 Population by Education Attainment in China
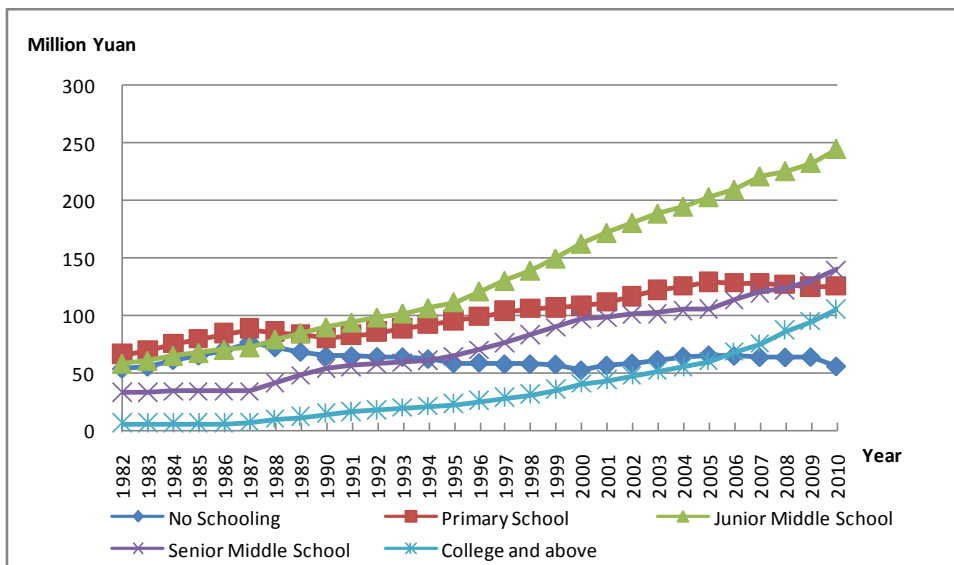
Figure 4.2.3 Urban Population by Educational Attainment
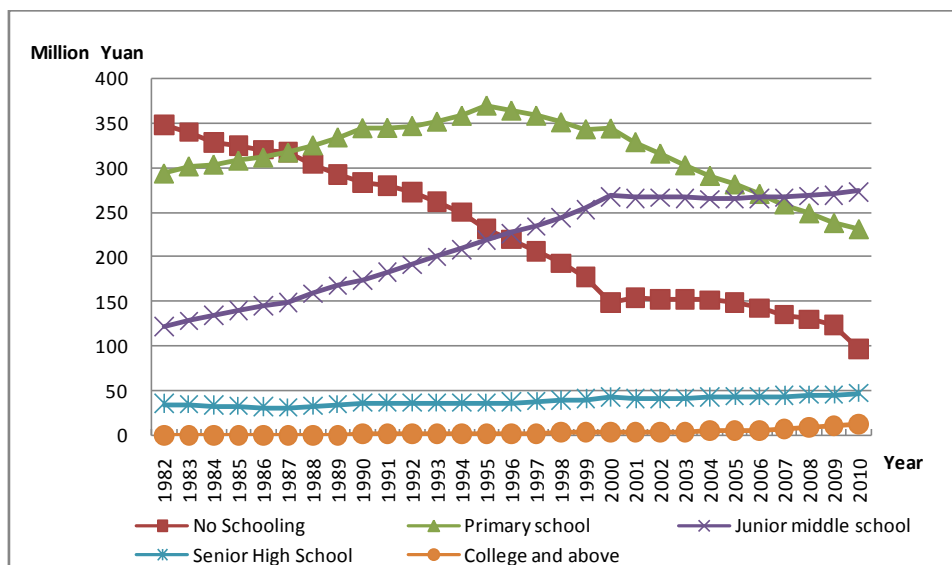
Figure 4.2.4 Rural Population by Educational Attainment

We next take a closer look at the changes in the distribution of education attainment in the population at different time points. Figures 4.2.5 to 4.2.7 show the rightward shift of the educational attainment distribution in the population. In 1985, among the five education levels, the illiterates and primary educated dominated the distribution. The 1995 distribution is dominated by people with primary and junior middle education, i.e. the distribution remains heavily skewed to the right. By 2010, junior middle has become the dominant education level. The distribution is still skewed to the right, but it is much less so than in 1985. Moreover, female educational attainment has improved more relative to that of males; the number of illiterate females decreased faster than that of illiterate males, while the gender gap at higher education levels shrunk considerably. As a result, the female educational attainment distribution is becoming similar to that of the male, despite the very large difference in 1985.
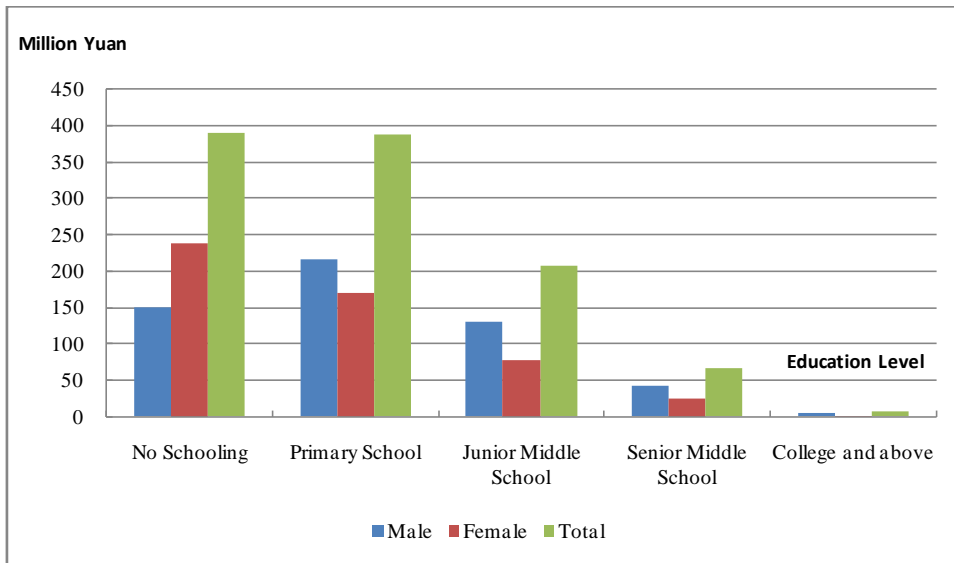
Figure 4.2.5 Population of Different Educational Levels by Gender, 1985
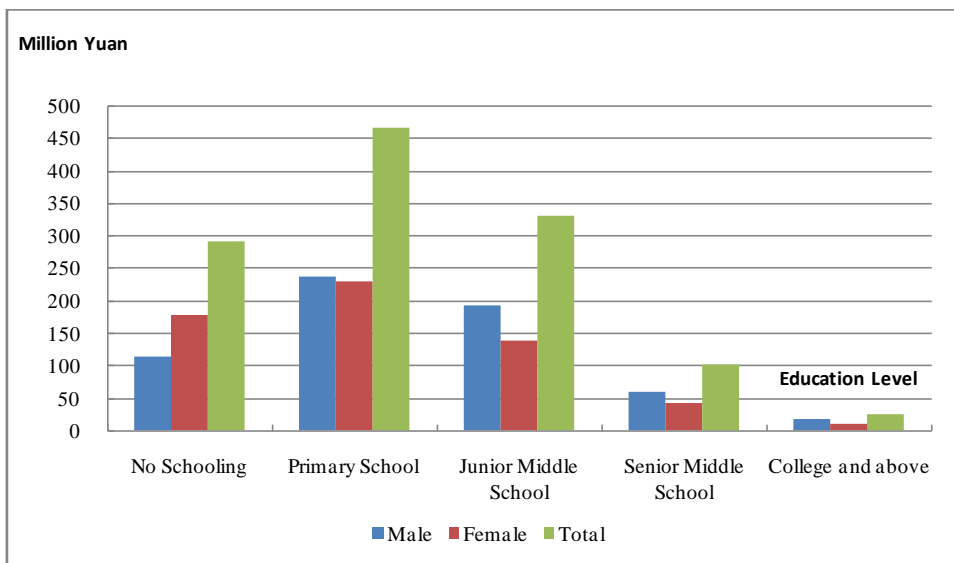
Figure 4.2.6 Population of Different Educational Levels by Gender, 1995
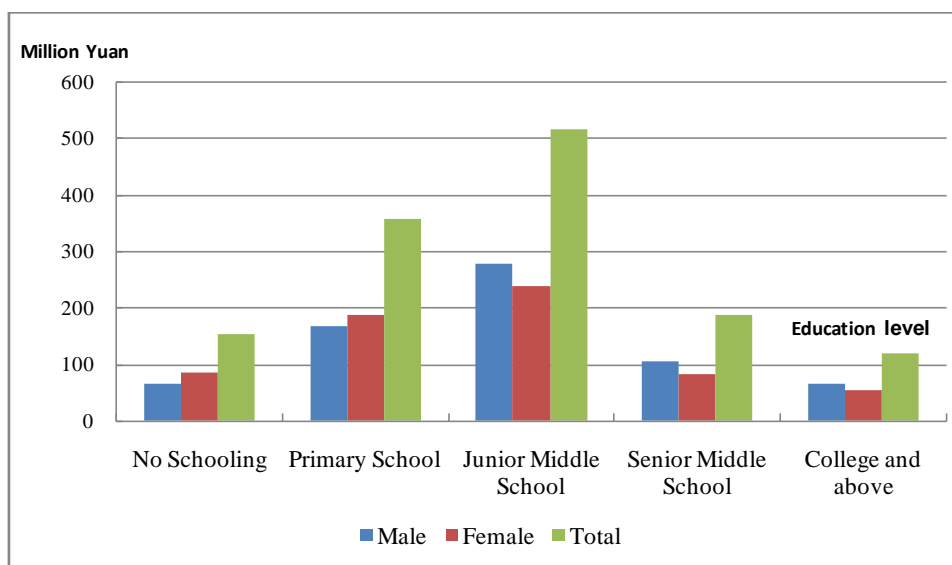
Figure 4.2.7 Population of Different Educational Levels by Gender, 2010

Figures 4.2.8 to 4.2.10 disaggregate the data into rural and urban subsamples. Not surprisingly, most of the illiterate population resided in the rural area. However, the rural illiterate population fell from 325 million in 1985 to 97 million in 2010. Although the urban illiterate population changed slightly in absolute terms, its share in the urban population fell from 25.70% in 1985 to 9.20% in 2010. In the meantime, in the highest three levels of education (junior middle, senior middle, and college and over), urban growth outpaced rural growth. For example, the urban junior middle school population increased from 67 million to 244 million, while the rural junior middle school population roughly doubled, from 140 million to 274 million. The comparison is more startling in the highest two education levels. The urban senior middle school population increased from 33 million to 140 million, while the rural senior middle school population only increased from 33 million to 47 million. The urban college and over population increased from 6 million to 106 million, while in rural areas, it grew from 0.63 million to 125.5 million.

Note that during most of the sample period, the rural population far

exceeded the urban population. Although both the urban and the rural distributions have improved, i.e. less skewed to the left, the improvement has certainly been more rapid and significant in the urban area. One caveat, however, is that the result might be caused by better educated people migrating from rural to urban areas. We take special measures to control for that effect (See Appendix A).[22]
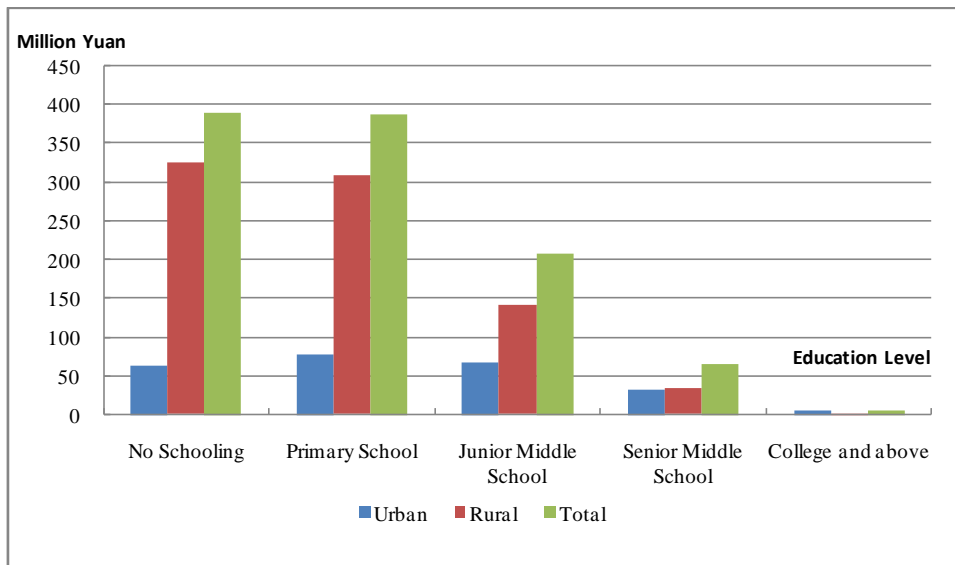
Figure 4.2.8 Population of Different Educational Levels by Region, 1985

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[22] To take the migrants into account, we make the following adjustments in the population imputation part: under the assumption that the number of immigrants in each year is the same, we retrieve the average difference between imputed population data and the census data back to the estimated population data according to the structure of the population by age, gender and education level.
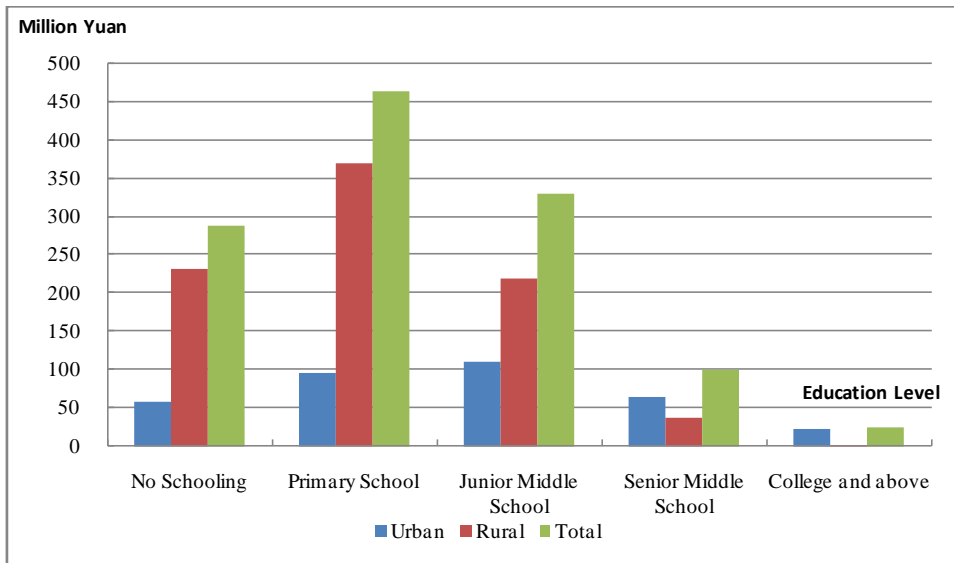
Figure 4.2.9 Population of Different Educational Levels by Region, 1995
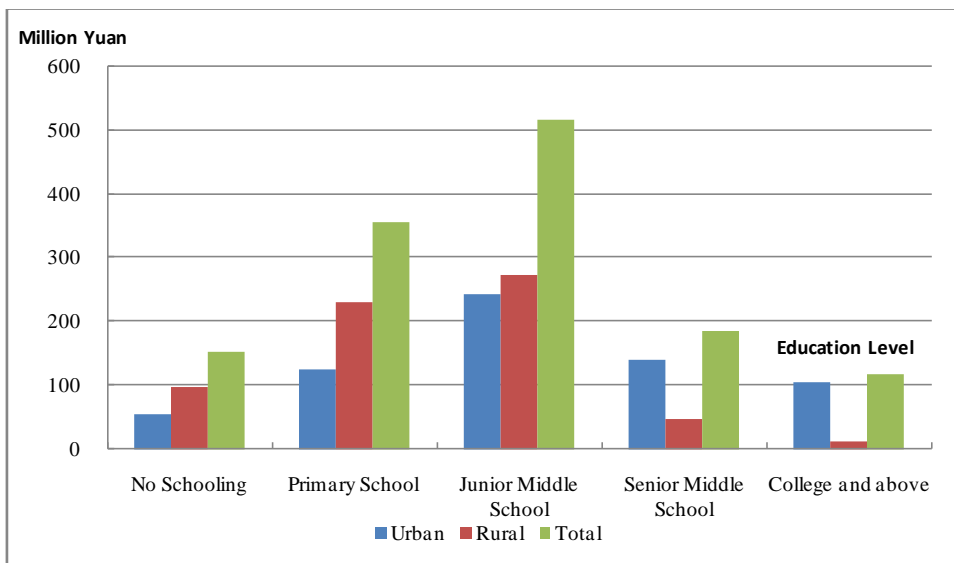
Figure 4.2.10 Population of Different Educational Levels by Region, 2010

Chapter 5　National human capital[23]

5.1 Trends in human capital

In order to discuss the trend of human capital in China, we use CPI as deflator to calculate the real values. One reason is that other published deflators are not available for later years; and the other reason is that, as can be seen above, the results based on CPI are smaller than that based on capital deflators reported in those two studies. Thus, we give more conservative estimates of human capital in China.

Table 5.1.1 shows real human capital for the country as a whole, by gender, and by region. From 1985 to 2010, the human capital increased from 28.60 trillion to 168.98 trillion Yuan, an increase of nearly five-fold. Moreover, based on Fleisher, Li and Zhao (2010), the Chinese economy exhibits a structural change after 1994. Such a change is also reflected in the trend of human capital growth. Specifically, the growth of human capital accelerated after 1994. The average annual growth for 1985-1994 is 2.26%, and for 1995-2010 is 11.15%.

Male real human capital is higher than female real human capital. Male real human capital increased from 17.51 trillion to 109.14 trillion Yuan; female real human capital increased from 11.09 trillion to 59.84 trillion Yuan. Male real human capital increased by about five-fold over this period while female real human capital increased by about four-fold.

Both urban and rural real human capital increased from 1985 to 2010. Rural real human capital increased from 16.87 trillion to 43.57 trillion Yuan; urban real human capital grew from 11.73 trillion to 125.41 trillion Yuan.

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[23] The national and provincial human capital estimates are developed mainly based on Jorgenson-Fraumeni methodology as previously described in the previous chapter.

The corresponding annual growth rates are 3.79% and 9.48% for rural and urban areas, respectively. From 1985 to 1996, urban real human capital is smaller than rural real human capital, but by 2010 it is more than twice as large. The region gap increased from 0.25 trillion in 1997 to over 81 trillion in 2010, growing at an annual rate of 45.05%. The gap is getting bigger from 1997 to 2010 as urban real human capital growth is much faster than rural real human capital growth, with an average annual growth rate of 6.43% for rural and 14.47% for urban.

Table 5.1.1 National Real Human Capital by Gender and Region[24]

Billions of 1985 Yuan

Year	National	Male	Female	Urban	Rural
1985	28,604	17,511	11,093	11,727	16,877
1986	30,594	18,786	11,808	12,780	17,814
1987	32,508	20,037	12,471	13,681	18,827
1988	31,373	19,357	12,016	13,234	18,139
1989	30,225	18,667	11,558	13,070	17,155
1990	33,683	20,845	12,838	15,108	18,575
1991	36,652	22,690	13,962	16,409	20,243
1992	38,803	24,040	14,763	17,336	21,467
1993	38,255	23,750	14,505	17,136	21,119
1994	34,640	21,583	13,057	15,619	19,021
1995	33,216	20,696	12,520	15,241	17,975
1996	34,593	21,640	12,953	16,623	17,970
1997	37,994	23,870	14,124	19,114	18,880
1998	43,085	27,210	15,875	22,640	20,445
1999	49,315	31,240	18,075	27,129	22,186
2000	56,052	35,680	20,372	31,800	24,252
2001	62,451	39,650	22,801	36,580	25,871
2002	71,180	45,330	25,850	43,170	28,010

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[24] Some discrepancy may exist when summing up male and female, urban and rural to get the national amount. This is mainly caused by rounding errors.

Year	National	Male	Female	Urban	Rural
2003	79,780	50,670	29,110	50,170	29,610
2004	86,540	54,820	31,720	56,060	30,480
2005	98,030	61,770	36,260	65,570	32,460
2006	107,840	69,060	38,780	72,910	34,930
2007	120,120	76,970	43,150	84,020	36,100
2008	130,570	83,680	46,890	93,470	37,100
2009	150,720	97,030	53,690	109,850	40,870
2010	168,980	109,140	59,840	125,410	43,570

Figure 5.1.1 shows that real human capital stock by five education categories keeps growing, and it grew even faster during 1996-2010. One reason male real human capital is higher than female real human capital is the earlier retirement age for women (age 55 vs. age 60 for men based on China Labor Law). Accordingly, men have a longer time to generate income in the market. Another reason is higher educational attainment for men. Moreover, the male-female income gap has been on expanding. The results based on six education categories show similar trends.
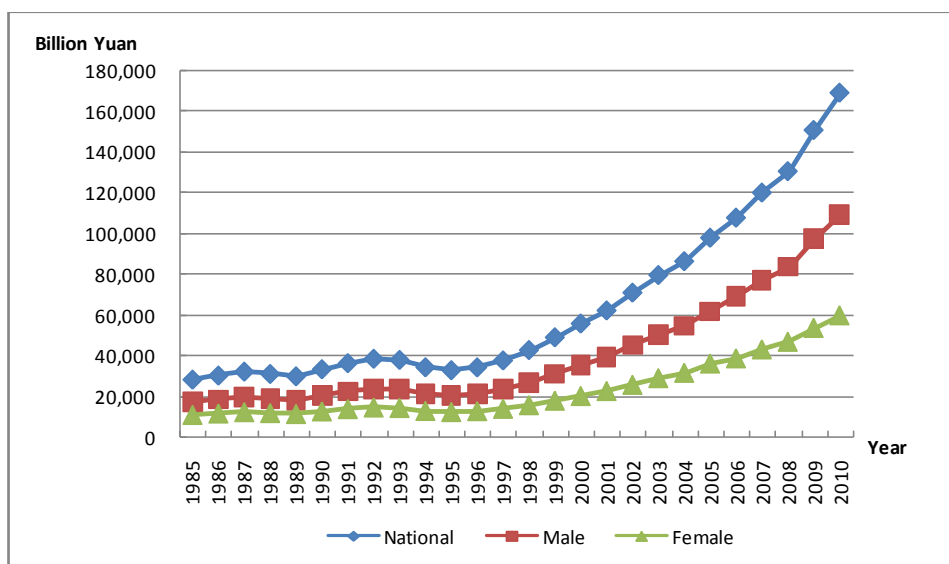
Figure 5.1.1 National Real Human Capital by Gender

Figure 5.1.2 shows real human capital for urban and rural China separately. As previously noted, before 1998, the amount of real human capital in both areas was very close. In fact, rural real human capital was even larger than that in the urban area until 1997. Since 1996, however, the real human capital in the urban area has been rising much more rapidly, while the real human capital in the rural area grew quite slowly, which results in an increasing larger region gap.

There are several reasons for such a trend. First, in the early years, the rural population was significantly larger than the urban population, and thus had larger amount of human capital. For example, in 1985, there were 808 million people in rural areas, which were more than three times the urban population of 251 million. By 2010, however, the population in rural China reduced to 671 million, much closer to the urban population of 670 million. This change was, to a large extent, a result of the rapid urbanization during the course of economic transition as well as a large scale rural-urban migration. Another reason is the education gap between the urban and rural population. Urban areas usually have a larger proportion of educated population than rural areas.
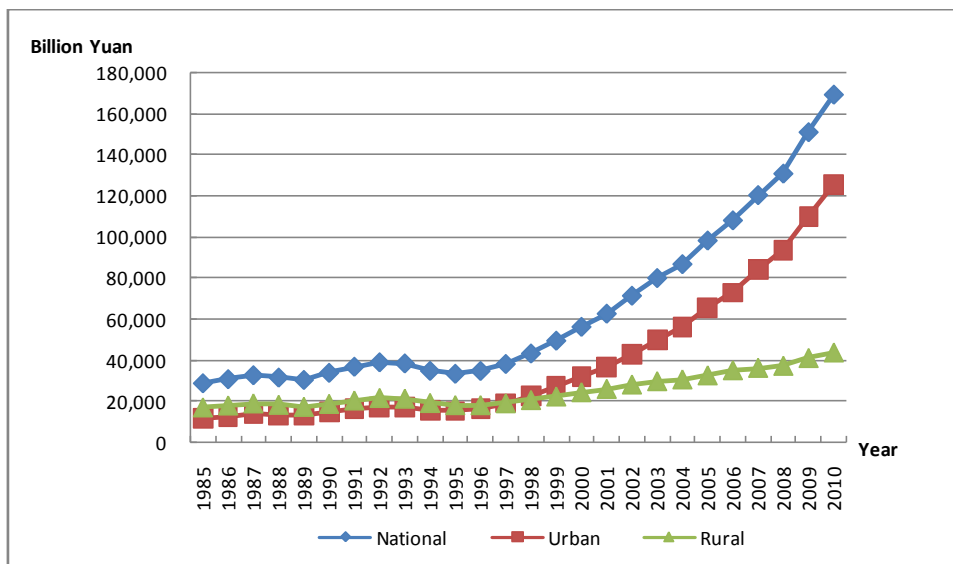
Figure 5.1.2 National Real Human Capital by Region

Figures 5.1.3 and 5.1.4 show the trends of male and female real human capital in urban and rural areas. Male and female real human capital estimates in the urban area exhibit similar trends, but the gender gap seems to be widening. The gender-based real human capital estimates for the rural population paint a somewhat different picture. In the later part of the period, the growth of male real human capital seems to have slowed down while that of females seems to have sped up; therefore the gender gap became narrower. This result is probably caused by two factors: i) A disproportionate rural-to-urban migration in favor of men; ii) An increase in education for women in rural areas. The reduction of gender gap in the rural area is consistent with the rising gender disparity in the urban area.
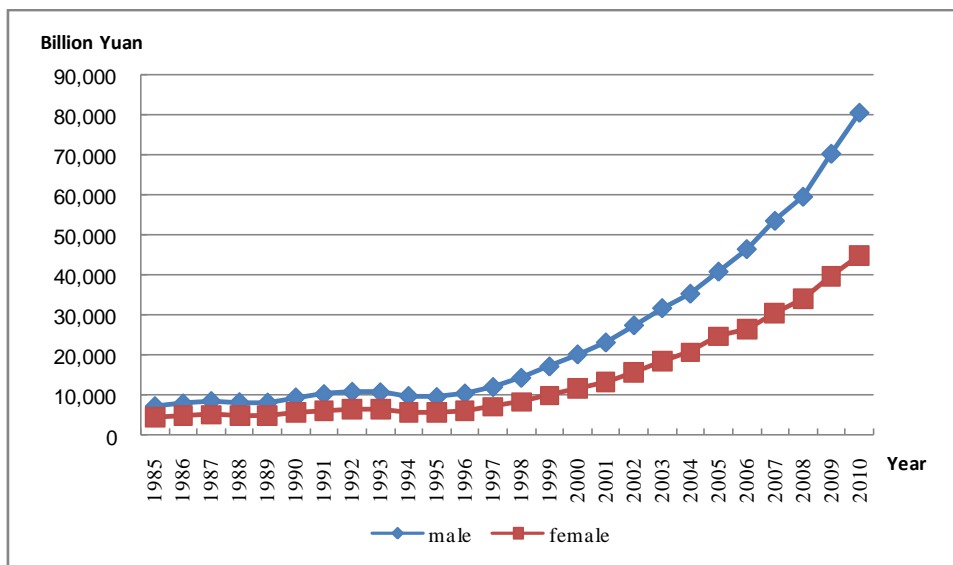
Figure 5.1.3 National Urban Real Human Capital by Gender
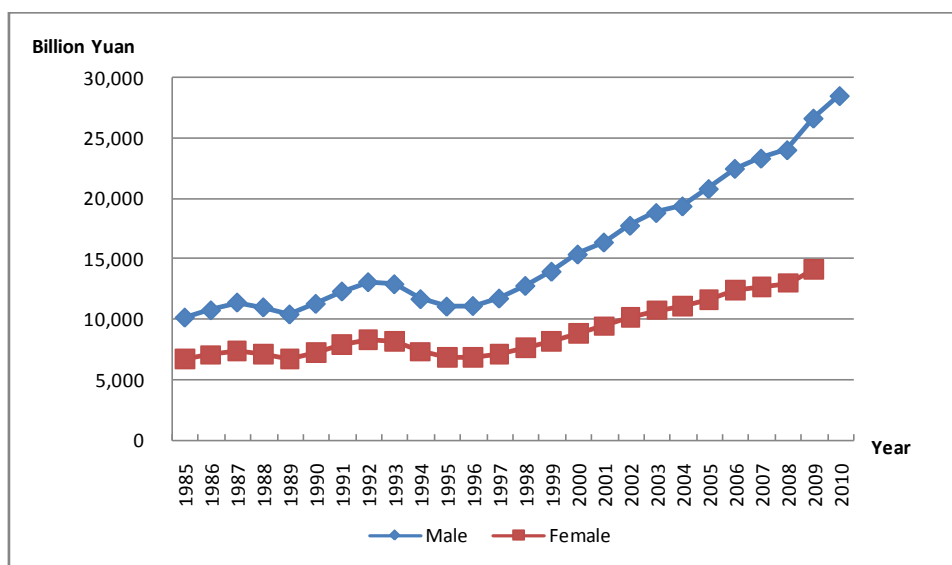
Figure 5.1.4 National Rural Real Human Capital by Gender

Finally we calculate real human capital indices by setting 1985 equal to 100. The results for each group are reported in Table 5.1.2.

Table 5.1.2 National Real Human Capital Index (1985=100)

Year	National	Male	Female	Urban	Rural
1985	100	100	100	100	100
1986	106.96	107.28	106.45	108.98	105.55
1987	113.65	114.43	112.42	116.66	111.55
1988	109.68	110.54	108.32	112.85	107.48
1989	105.67	106.60	104.19	111.45	101.65
1990	117.76	119.04	115.73	128.83	110.06
1991	128.14	129.58	125.86	139.92	119.94
1992	135.66	137.29	133.08	147.83	127.20
1993	133.74	135.63	130.76	146.12	125.13
1994	121.10	123.25	117.70	133.19	112.70
1995	116.12	118.19	112.86	129.97	106.51
1996	120.94	123.58	116.77	141.75	106.48

Year	National	Male	Female	Urban	Rural
1997	132.83	136.31	127.32	162.99	111.87
1998	150.63	155.39	143.11	193.06	121.14
1999	172.41	178.40	162.94	231.34	131.46
2000	195.96	203.76	183.65	271.17	143.70
2001	218.33	226.43	205.54	311.93	153.29
2002	248.85	258.87	233.03	368.12	165.97
2003	278.91	289.36	262.42	427.82	175.45
2004	302.55	313.06	285.95	478.04	180.60
2005	342.71	352.75	326.87	559.14	192.33
2006	377.01	394.38	349.59	621.73	206.97
2007	419.94	439.55	388.98	716.47	213.90
2008	456.47	477.87	422.70	797.05	219.83
2009	526.92	554.11	484.00	936.73	242.16
2010	590.76	623.27	539.44	1069.41	258.16

Figure 5.1.5 shows the index of national human capital. Before 1997 the index grows quite steadily; it accelerates after that year. Figures 5.1.6 and 5.1.7 show the indices by gender and for urban and rural areas, respectively. A comparison of these three figures demonstrates that the growth in the urban index is the main catalyst for the acceleration of the national index beginning in 1997 as the urban index reaches a maximum value of about 1000 in 2010 compared to a maximum value of less than 600 for any of the other indices.
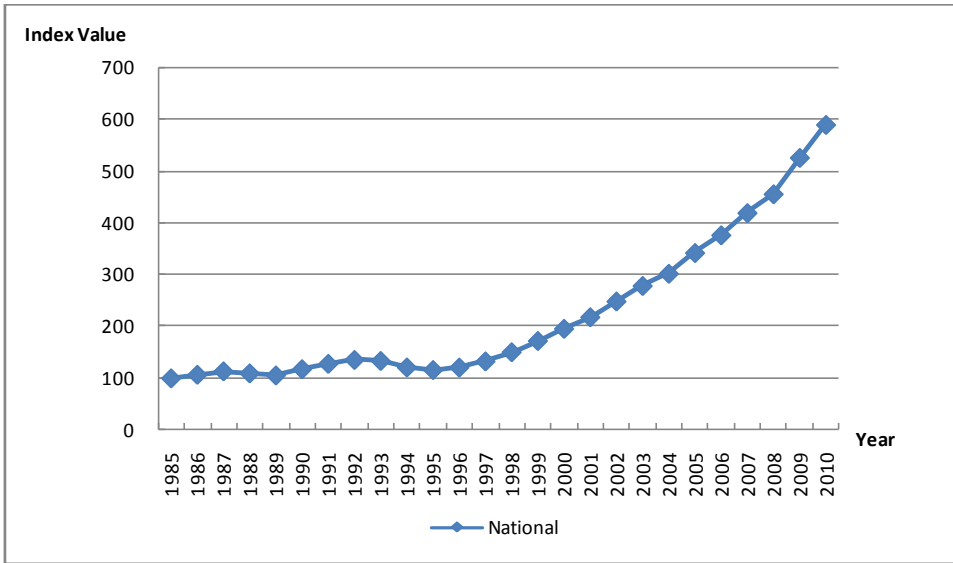
Figure 5.1.5 National Real Human Capital Index
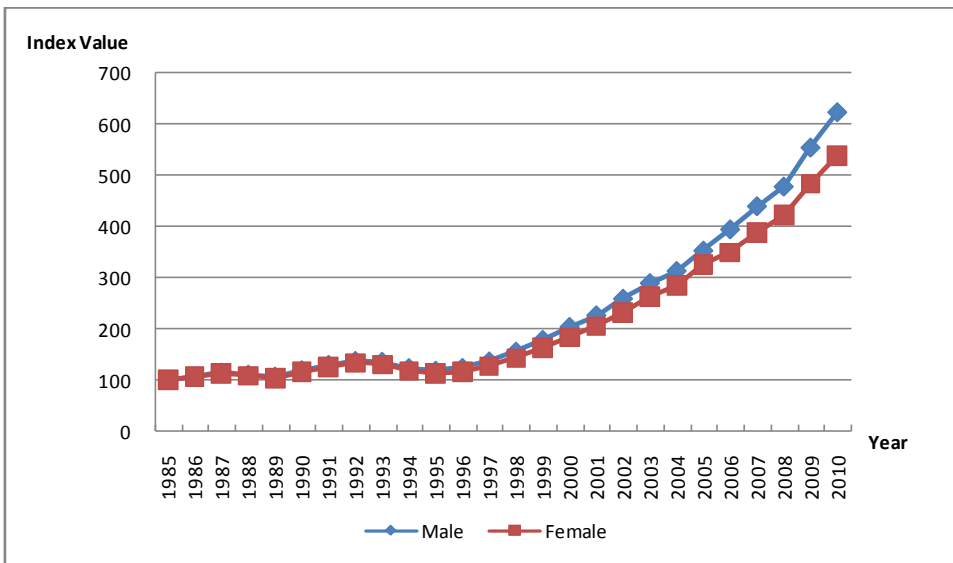
Figure 5.1.6 National Real Human Capital Index by Gender
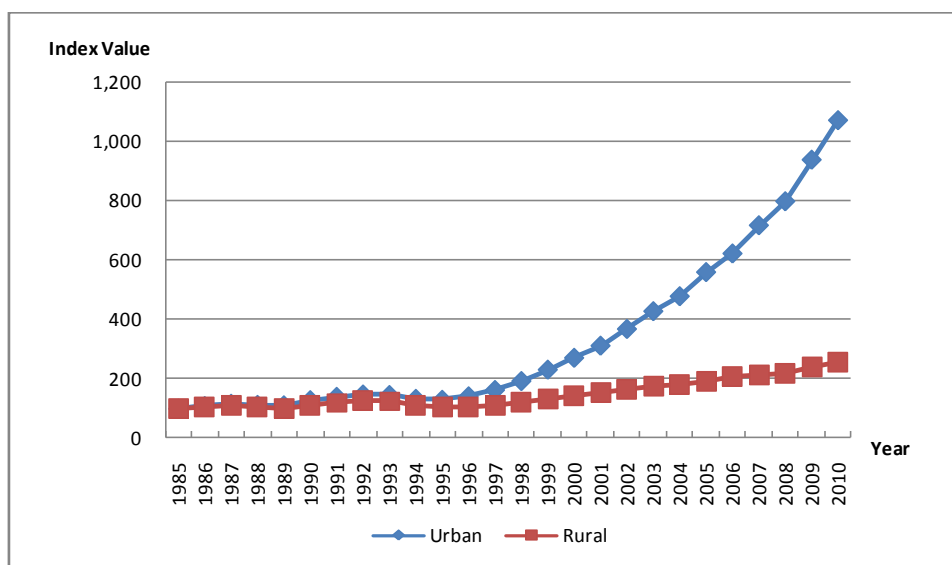
Figure 5.1.7 National Real Human Capital Index by Region

5.2 Human capital per capita

An increase in real human capital can be caused by a number of factors, such as population growth, demographic changes (e.g., the size of retirement group), region migration or urbanization (e.g., an individual can achieve higher value of human capital by moving from rural to urban area), higher educational attainment, higher rates of return to education, and higher rates of return to on-the-job training. In order to get further information on the dynamics of human capital in China, we calculate real human capital per capita, i.e., the ratio of real human capital to non-retired population (Table 5.2.1).

Based on the 5-education category, the real human capital per capita was 29,770 Yuan in 1985, 30,960 Yuan in 1995, and 150,520 Yuan in 2010 From 1985 to 2010, real human capital per capita increased by around 4 times. Real human capital per capita growth accelerated from 1997. The average annual growth rate was 1.19% from 1985 to 1997, and 10.35% from 1997 to 2010. The growth rate in the later period is eleven times higher than that in the earlier period. These growth rates are very high. These high growth rates are probably

a result of the dramatic economic growth since 1978, rapid expansion of education, transition toward market-oriented system (so that human capital can realize much higher values), and region migration. Real human capital per capita for male is higher than that for female; however real human capital per capita for male and female both exhibit an evident rising trend. Real human capital per capita for urban remains higher and grows faster than that for rural.

Table 5.2.1 National Real Human Capital Per Capita by Gender and Region

Thousands of 1985 Yuan

Year	National	Male	Female	Urban	Rural
1985	29.77	34.58	24.40	51.57	23.01
1986	31.45	36.68	25.63	53.72	24.23
1987	32.93	38.57	26.66	55.03	25.50
1988	31.32	36.65	25.37	51.36	24.35
1989	29.76	34.76	24.16	49.33	22.84
1990	32.63	38.07	26.50	55.46	24.45
1991	35.16	41.12	28.46	58.57	26.55
1992	36.89	43.28	29.75	60.32	28.08
1993	36.14	42.59	28.96	58.25	27.59
1994	32.50	38.47	25.86	51.93	24.85
1995	30.96	36.77	24.54	49.64	23.50
1996	31.94	38.00	25.22	50.75	23.77
1997	34.79	41.54	27.29	54.94	25.39
1998	39.18	46.99	30.49	61.56	27.98
1999	44.67	53.58	34.70	70.18	30.95
2000	50.13	60.32	38.69	78.12	34.09
2001	55.71	66.98	43.10	86.10	37.16
2002	63.49	76.87	48.64	97.70	41.20
2003	71.30	86.31	54.73	109.65	44.75
2004	77.64	94.04	59.65	119.38	47.24
2005	88.24	106.16	68.53	136.41	51.52
2006	96.87	118.05	73.41	146.00	56.96

Year	National	Male	Female	Urban	Rural
2007	107.97	131.01	82.18	161.60	60.88
2008	117.54	142.20	89.76	175.12	64.20
2009	135.93	164.62	103.37	200.10	72.96
2010	150.52	182.34	114.17	218.44	79.28

Figure 5.2.1 shows the trend of real human capital per capita by gender at the national level. Real human capital per capita shows a similar trend for males and females. Real human capital per capita for male and female both exhibit an accelerated growth after 1997. Specifically, the average annual growth rate during 1985-1997 was 1.40% for males and 0.86% for females; the average annual growth rate during 1997-2010 was 10.34% for males and 10.15% for females. As a result, the male-female gap has been widening.
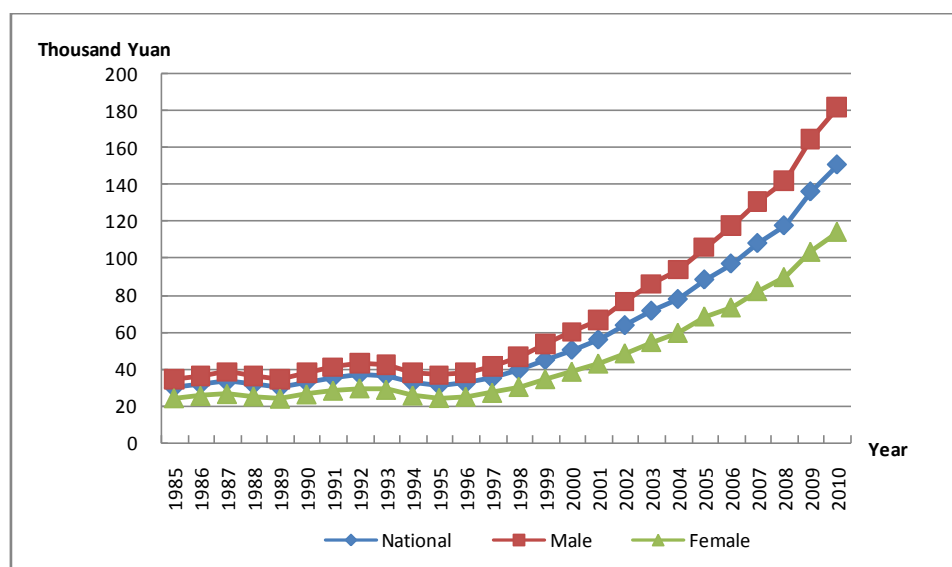
Figure 5.2.1 National Real Human Capital Per Capita by Gender

Figure 5.2.2 shows the trends in real human capital per capita in urban and rural areas. There is a similar trend for males and females (see Figure 5.2.3 and 5.2.4). During the period of 1985-2010, real human capital per capita for urban and rural both exhibit an accelerated growth after 1996. Based on 5-education

category, in 1985, real human capital per capita was 51,573 Yuan in the urban area and 23,006 Yuan in the rural area; the corresponding numbers become 218,438 Yuan and 79,278 Yuan, respectively, in 2010. The absolute size of the region gap has been on the rise. The annual growth rate was 5.77% for the urban area (0.48% during 1985-1997 and 9.74% during 1998-2010), and 4.95% for the rural area (0.75% during 1985-1997 and 8.01% during 1997-2010). Therefore, the region gap kept widening over the 1985-2010 period. The wide region gap raises concern for the increasing disparity between these two areas. Based on Fleisher, Li and Zhao (2009), human capital is a significant contributing factor to economic growth (total factor productivity). Therefore, such a trend in human capital can worsen the region inequality in China.
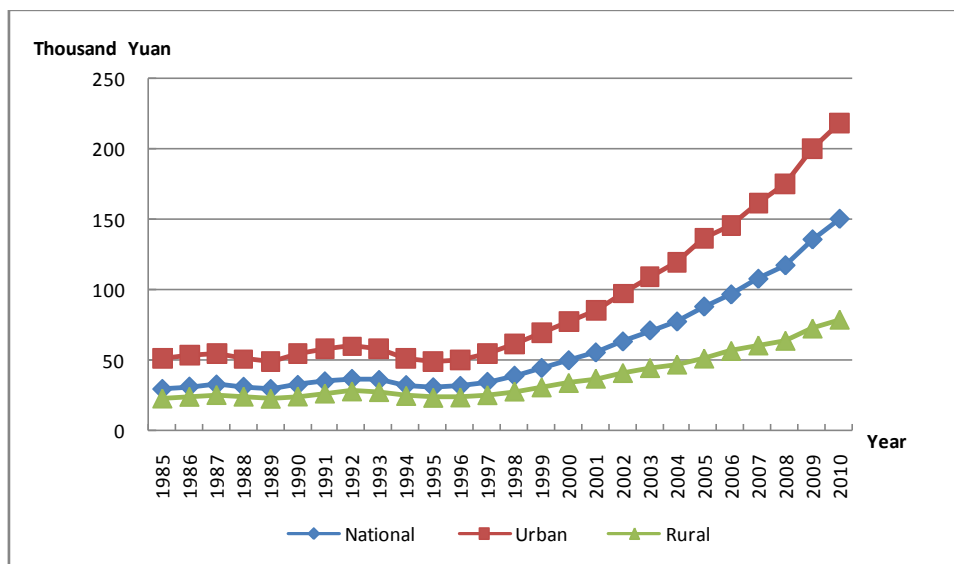
Figure 5.2.2 National Real Human Capital Per Capita by Region

Figures 5.2.3 and 5.2.4 show the gender differences for urban and rural areas, respectively. The patterns are similar to that of national human capital. In particular, real human capital per capita for male and female both show similar trends in the urban area, but real human capital per capita grew faster for males than for females in the rural area in recent years.
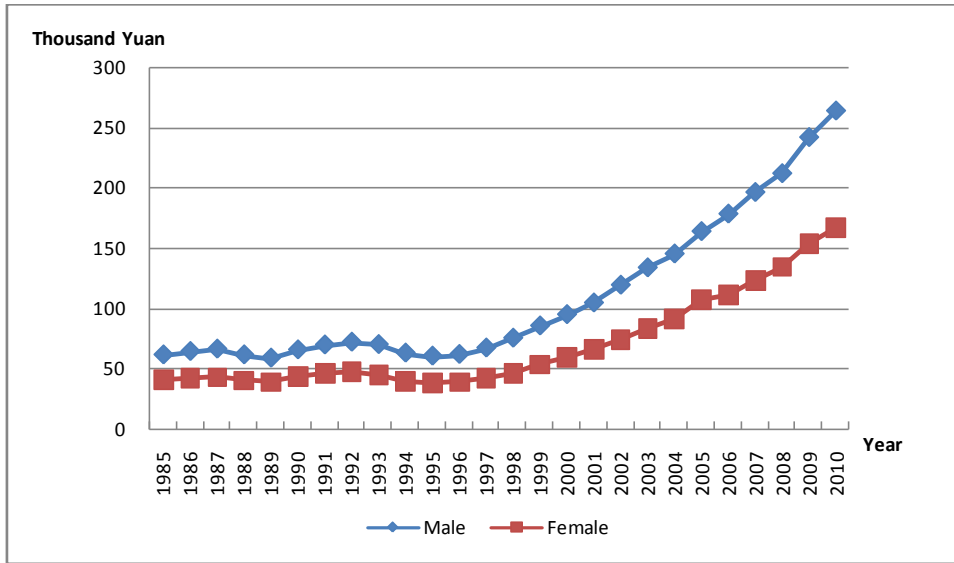
Figure 5.2.3 National Urban Real Human Capital Per Capita
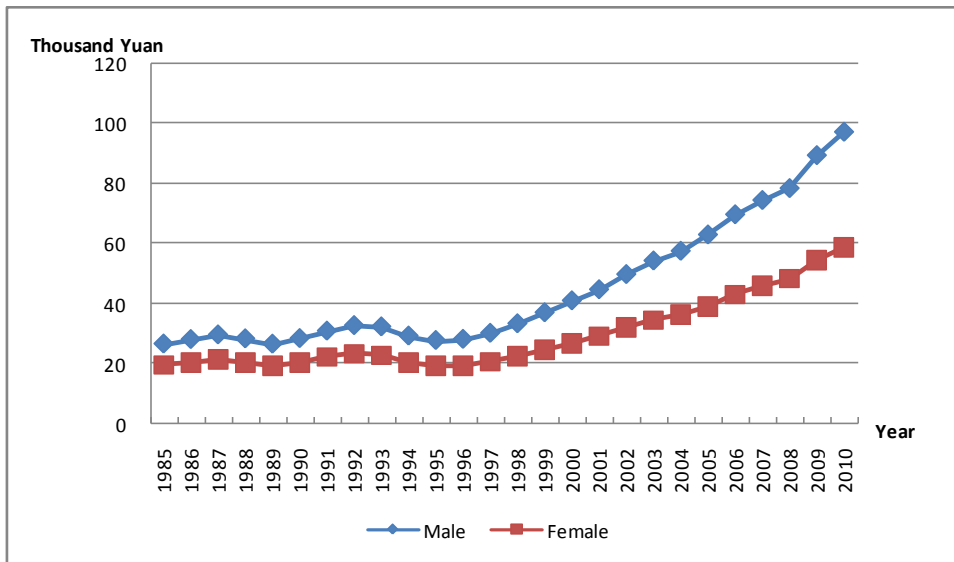
Figure 5.2.4 National Rural Real Human Capital Per Capita

We also construct real human capital per capita indices setting 1985 equal to 100 (Table 5.2.2).

Table 5.2.2 National Real Human Capital Per Capita Index (1985=100)

Year	National	Male	Female	Urban	Rural
1985	100	100	100	100	100
1986	105.64	106.06	105.02	104.16	105.33
1987	110.61	111.53	109.24	106.70	110.83
1988	105.20	105.98	103.94	99.58	105.85
1989	99.99	100.50	98.99	95.65	99.27
1990	109.63	110.07	108.57	107.54	106.28
1991	118.13	118.91	116.62	113.56	115.40
1992	123.94	125.14	121.90	116.96	122.07
1993	121.40	123.15	118.66	112.95	119.93
1994	109.17	111.25	105.96	100.70	108.00
1995	103.99	106.33	100.56	96.25	102.15
1996	107.30	109.89	103.34	98.41	103.32
1997	116.87	120.11	111.85	106.53	110.37
1998	131.60	135.86	124.94	119.36	121.60
1999	150.07	154.92	142.21	136.08	134.54
2000	168.41	174.41	158.54	151.48	148.17
2001	187.16	193.69	176.63	166.95	161.52
2002	213.27	222.27	199.30	189.44	179.09
2003	239.53	249.58	224.29	212.61	194.50
2004	260.82	271.93	244.45	231.47	205.32
2005	296.44	306.98	280.84	264.49	223.95
2006	325.41	341.35	300.81	283.10	247.61
2007	362.71	378.83	336.78	313.35	264.63
2008	394.86	411.18	367.82	339.57	279.06
2009	456.64	476.00	423.61	388.00	317.12
2010	505.64	527.25	467.86	423.55	344.60

Figure 5.2.5-5.2.7 show trends of various real human capital per capita indices. As is seen from the graph below, real human capital per capita was essentially stable before 1996, but significant growth occurred after 1996. The patterns of the real human capital per capita indices by gender and by region are similar to that of national real human capital per capita index.
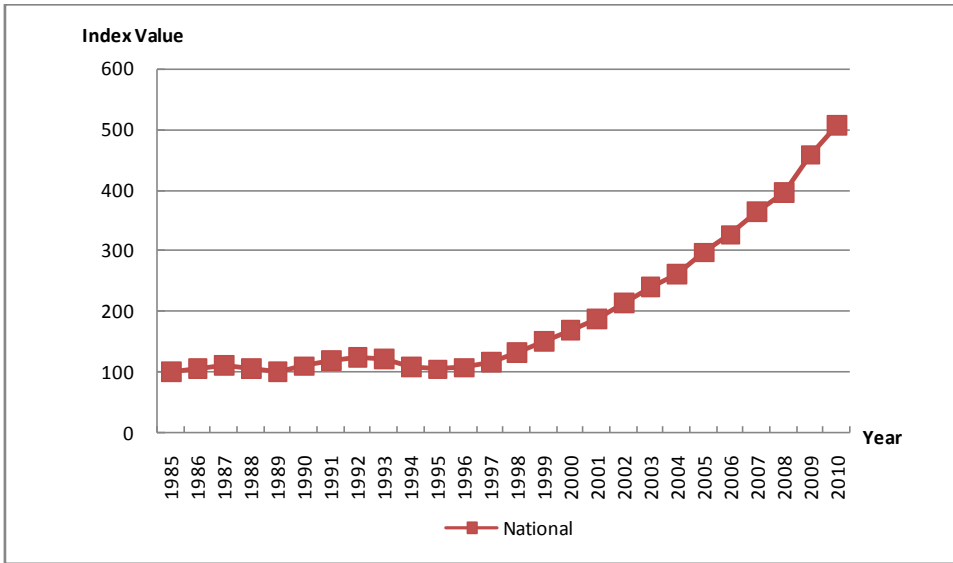
Figure 5.2.5 National Real Human Capital Per Capita Index
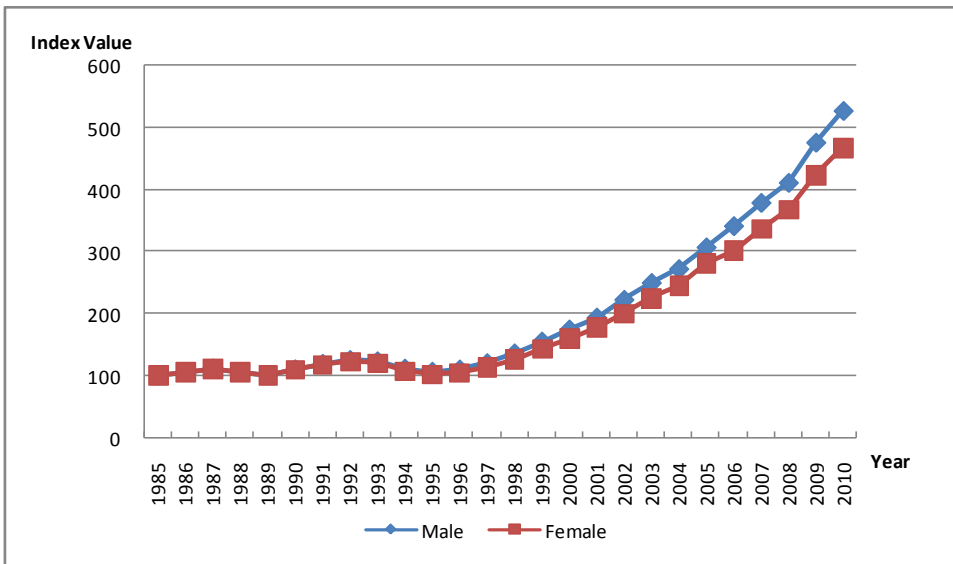
Figure 5.2.6 National Real Human Capital Per Capita Index by Gender

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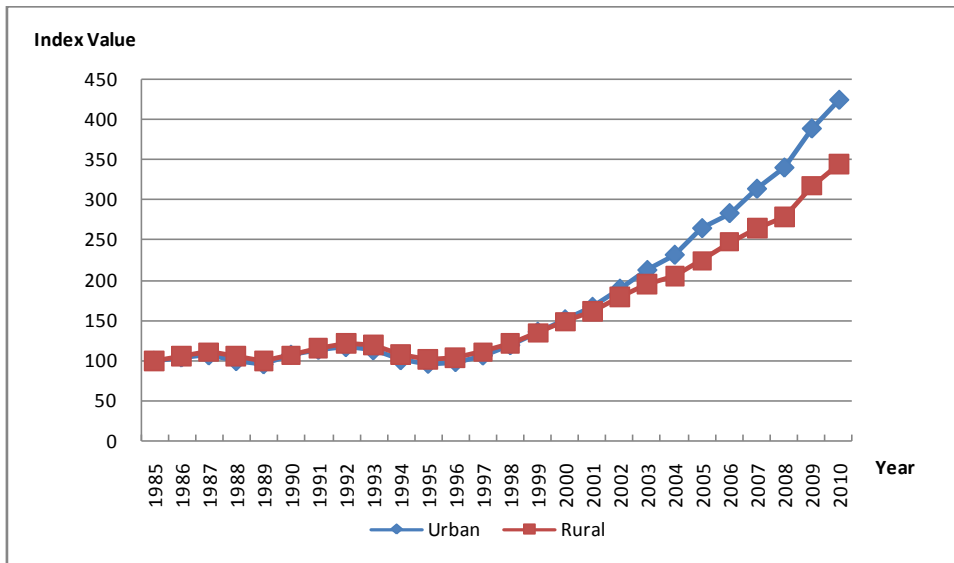
Figure 5.2.7 National Real Human Capital Per Capita Index by Region

5.3 Labor force human capital

5.3.1 National labor force human capital

Labor force human capital represents the human capital of the population that is over 15 years old, non-retired and out-of-school. Labor force human capital is estimated in the same way as national human capital. The national labor force human capital is reported in Table 5.3.1. The real values in this table are calculated by deflating the nominal values with the CPI.

Table 5.3.1 National Nominal and Real Labor Force Human Capital and Nominal GDP

Year	Nominal labor force human capital (Billions of Yuan)		Real labor force human capital (Billions of 1985 Yuan)		Nominal GDP (Billions of Yuan)	Ratio of labor force human capital to GDP
	By five education categories	By six education categories	By five education categories	By six education categories		
1985	13,661		13,661		904	15.11
1986	15,761		14,804		1,027	15.34
1987	18,286		16,009		1,205	15.17
1988	21,604		15,912		1,504	14.37
1989	25,147		15,690		1,700	14.79
1990	29,066		17,586		1,872	15.53
1991	32,984		19,279		2,183	15.11
1992	36,998		20,336		2,694	13.73
1993	41,380		19,828		3,526	11.74
1994	46,050		17,776		4,811	9.57
1995	51,520		16,962		5,981	8.61
1996	57,709		17,510		7,014	8.23
1997	64,990		19,145		7,806	8.33
1998	73,880		21,890		8,302	8.90
1999	83,700		25,080		8,848	9.46
2000	96,630	95,110	28,760	28,322	9,800	9.86
2001	106,010	104,720	31,279	30,909	10,807	9.81
2002	116,730	115,760	34,657	34,365	11,910	9.80
2003	129,380	128,880	37,905	37,753	13,498	9.59
2004	143,500	143,790	40,400	40,464	15,945	9.00
2005	161,330	161,710	44,526	44,621	18,362	8.79
2006	185,110	185,790	50,314	50,481	21,590	8.57
2007	213,170	214,170	55,205	55,435	26,642	8.00
2008	243,480	245,000	59,484	59,823	31,603	7.70
2009	288,430	290,630	70,806	71,317	34,032	8.48
2010	346,250	349,700	82,108	82,897	39,976	8.66

Note: The ratio of labor force human capital to GDP is based on the current values for that year.

The trends in national nominal and real labor force human capital are presented in Figure 5.3.1. Similar to the trend of national human capital, from 1985 to 2010, national labor force human capital both in nominal and real terms keeps on increasing.
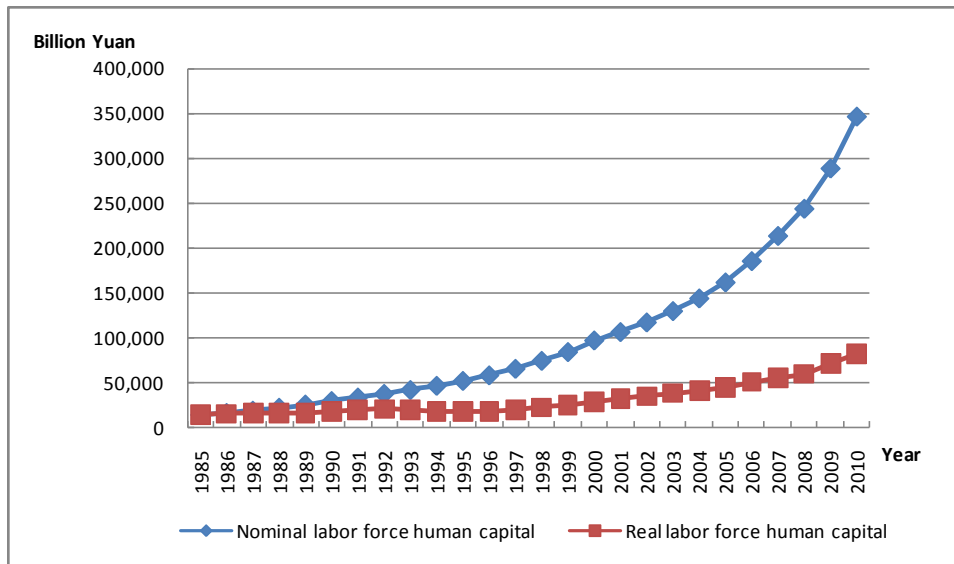
Figure 5.3.1 National Nominal and Real Labor Force Human Capital

We also calculate the ratio of labor force human capital to GDP for China. The results are reported in the last column of Table 5.3.1. As before, the ratio could reflect human capital's influence on sustainable growth of GDP, and may also reflect changes in human capital productivity and efficiency. Figure 5.3.2 shows the trend for the ratio. The pattern of the ratio for national labor force human capital is almost the same as that for national human capital. The level of nominal labor force human capital is much higher than that of nominal GDP. The ratio remains between 7 and 10 and generally shows a decreasing trend from 1995. It indicates that although national human capital stock level still remains much higher than physical capital, the efficiency of human capital has improving, however, the decreasing trend may also indicate possible constraints on the future GDP

growth in China.
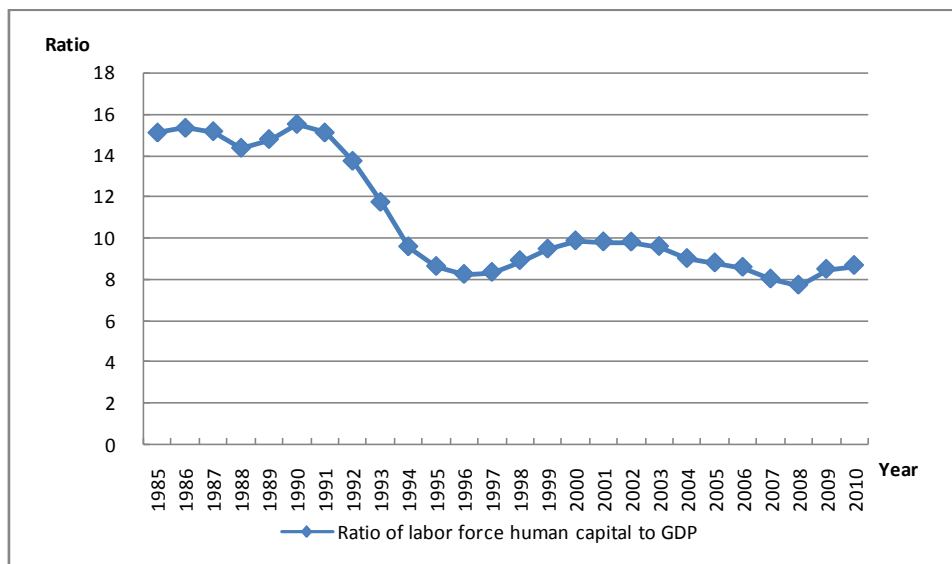
Figure 5.3.2 National Ratio of Labor Force Human Capital to GDP

Labor force human capital by gender is reported in Table 5.3.2. Both male and female real labor force human capital exhibit an increasing trend. Male real labor force human capital is larger than that of female throughout the whole period.

Table 5.3.2 National Nominal and Real Labor Force Human Capital by Gender[25]

Year	Nominal labor force human capital (Billions of Yuan)			Real labor force human capital (Billions of 1985 Yuan)		
	National	**Male**	**Female**	**National**	**Male**	**Female**
1985	13,661	8,476	5,185	13,661	8,476	5,185
1986	15,761	9,801	5,960	14,804	9,205	5,599

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[25] Some discrepancy may exist when summing up male and female, urban and rural to get the national amount. This is mainly caused by rounding errors.

1987	18,286	11,400	6,886	16,009	9,978	6,031
1988	21,604	13,491	8,113	15,912	9,932	5,980
1989	25,147	15,718	9,429	15,690	9,804	5,886
1990	29,066	18,231	10,835	17,586	11,030	6,556
1991	32,984	20,656	12,328	19,279	12,070	7,209
1992	36,998	23,150	13,848	20,336	12,718	7,618
1993	41,380	25,930	15,450	19,828	12,418	7,410
1994	46,050	28,900	17,150	17,776	11,148	6,628
1995	51,520	32,350	19,170	16,962	10,644	6,318
1996	57,709	36,520	21,189	17,510	11,071	6,439
1997	64,990	41,400	23,590	19,145	12,185	6,960
1998	73,880	47,410	26,470	21,890	14,037	7,853
1999	83,700	54,100	29,600	25,080	16,199	8,881
2000	96,630	63,020	33,610	28,760	18,741	10,019
2001	106,010	69,030	36,980	31,279	20,353	10,926
2002	116,730	76,030	40,700	34,657	22,560	12,097
2003	129,380	84,080	45,300	37,905	24,620	13,285
2004	143,500	93,360	50,140	40,400	26,270	14,130
2005	161,330	104,900	56,430	44,526	28,940	15,586
2006	185,110	121,450	63,660	50,314	33,000	17,314
2007	213,170	140,420	72,750	55,205	36,350	18,855
2008	243,480	160,860	82,620	59,484	39,290	20,194
2009	288,430	191,580	96,850	70,806	47,020	23,786
2010	346,250	230,750	115,500	82,108	54,710	27,398

Figure 5.3.3 shows that both male and female real labor force human capital exhibit a rising trend from 1985 to 2010. Before 1997, male and female real labor force human capital grew quite slowly. Both increased significantly from 1997.The gender gap was fairly stable before 1997, but increased afterwards.
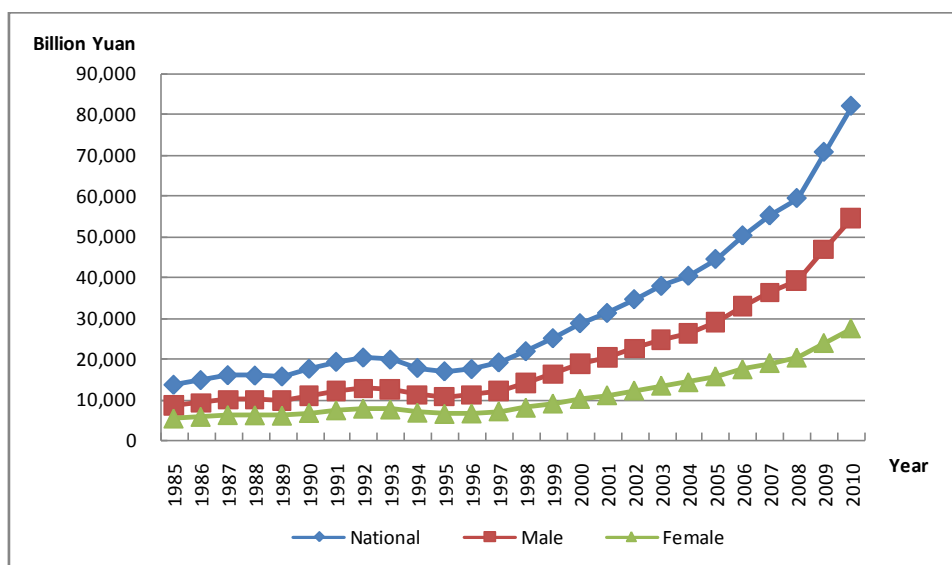
Figure 5.3.3 National Real Labor Force Human Capital by Gender

Table 5.3.3 shows the nominal and real labor force human capital for urban and rural respectively. The pattern of national real labor force human capital is almost the same as that of the national real human capital. Urban real labor force human capital surpassed its rural counterpart for the first time in 1999. The region gap has increased from less than 0.5 trillion Yuan in 1999 to 30.75 trillion Yuan in 2010.

Table 5.3.3 National Nominal and Real Labor Force Human Capital by Region

Year	Nominal labor force human capital (Billions of Yuan)			Real labor force human capital (Billions of 1985 Yuan)		
	National	**Urban**	**Rural**	**National**	**Urban**	**Rural**
1985	13,661	5,467	8,194	13,661	5,467	8,194
1986	15,761	6,464	9,297	14,804	6,042	8,762
1987	18,286	7,663	10,623	16,009	6,582	9,427
1988	21,604	9,254	12,350	15,912	6,585	9,327
1989	25,147	10,933	14,214	15,690	6,690	9,000
1990	29,066	12,800	16,266	17,586	7,732	9,854

1991	32,984	14,560	18,424	19,279	8,369	10,910
1992	36,998	16,312	20,686	20,336	8,633	11,703
1993	41,380	18,285	23,095	19,828	8,336	11,492
1994	46,050	20,577	25,473	17,776	7,505	10,271
1995	51,520	23,260	28,260	16,962	7,263	9,699
1996	57,709	27,129	30,580	17,510	7,786	9,724
1997	64,990	31,850	33,140	19,145	8,866	10,279
1998	73,880	37,870	36,010	21,890	10,605	11,285
1999	83,700	45,070	38,630	25,080	12,789	12,291
2000	96,630	54,360	42,270	28,760	15,297	13,463
2001	106,010	60,810	45,200	31,279	16,999	14,280
2002	116,730	67,990	48,740	34,657	19,198	15,459
2003	129,380	76,560	52,820	37,905	21,418	16,487
2004	143,500	86,820	56,680	40,400	23,518	16,882
2005	161,330	100,180	61,150	44,526	26,703	17,823
2006	185,110	116,040	69,070	50,314	30,480	19,834
2007	213,170	136,190	76,980	55,205	34,230	20,975
2008	243,480	158,030	85,450	59,484	37,620	21,864
2009	288,430	194,400	94,030	70,806	46,670	24,136
2010	346,250	242,610	103,640	82,108	56,430	25,678

Figure 5.3.4 shows real labor force human capital for urban and rural respectively. The pattern of national labor force human capital is almost the same as that of national real human capital. The urban labor force human capital surpassed the rural one in 1999 and has grown much faster ever since.
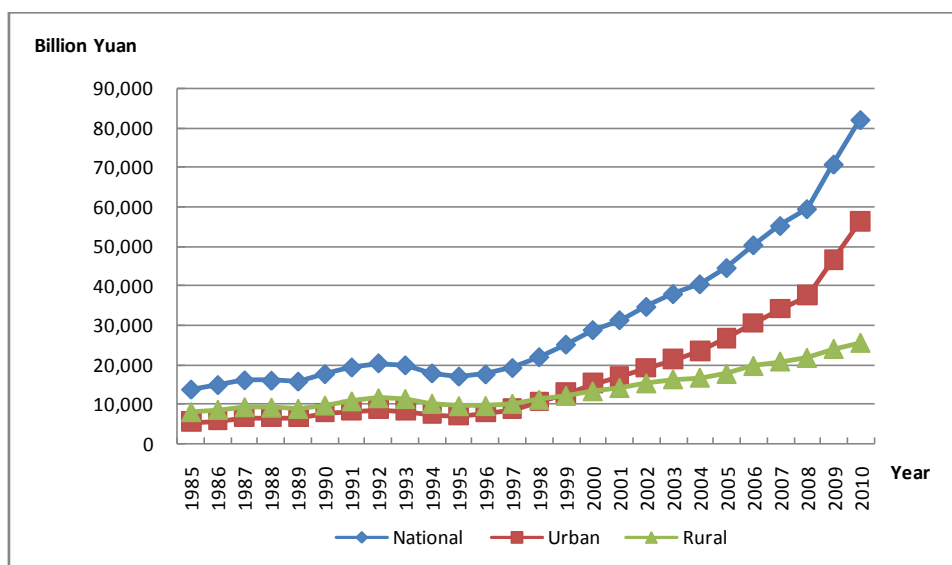
Figure 5.3.4 National Real Labor Force Human Capital by Region

Similarly, we construct a set of real labor force human capital indices with their corresponding values in 1985 set to 100. Table 5.3.4 shows various human capital indices.

Table 5.3.4 National Real Labor Force Human Capital Index（1985=100）

Year	National	Male	Female	Urban	Rural
1985	100	100	100	100	100
1986	108.37	108.60	107.98	110.52	106.93
1987	117.19	117.72	116.32	120.40	115.05
1988	116.48	117.18	115.33	120.45	113.83
1989	114.85	115.67	113.52	122.37	109.84
1990	128.73	130.13	126.44	141.43	120.26
1991	141.12	142.40	139.04	153.08	133.15
1992	148.86	150.05	146.92	157.91	142.82
1993	145.14	146.51	142.91	152.48	140.25
1994	130.12	131.52	127.83	137.28	125.35
1995	124.16	125.58	121.85	132.85	118.37
1996	128.18	130.62	124.19	142.42	118.67
1997	140.14	143.76	134.23	162.17	125.45

1998	160.24	165.61	151.46	193.98	137.72
1999	183.59	191.12	171.28	233.93	150.00
2000	210.53	221.11	193.23	279.81	164.30
2001	228.97	240.13	210.72	310.94	174.27
2002	253.69	266.16	233.31	351.16	188.66
2003	277.47	290.47	256.22	391.77	201.21
2004	295.73	309.93	272.52	430.18	206.03
2005	325.94	341.43	300.60	488.44	217.51
2006	368.30	389.33	333.92	557.53	242.06
2007	404.11	428.86	363.65	626.12	255.98
2008	435.43	463.54	389.47	688.13	266.83
2009	518.31	554.74	458.75	853.67	294.56
2010	601.04	645.47	528.41	1032.19	313.38

Figure 5.3.5 shows the index of national real labor force human capital. It follows the same trend of national real human capital. Growth in real labor force human capital has accelerated since 1997.
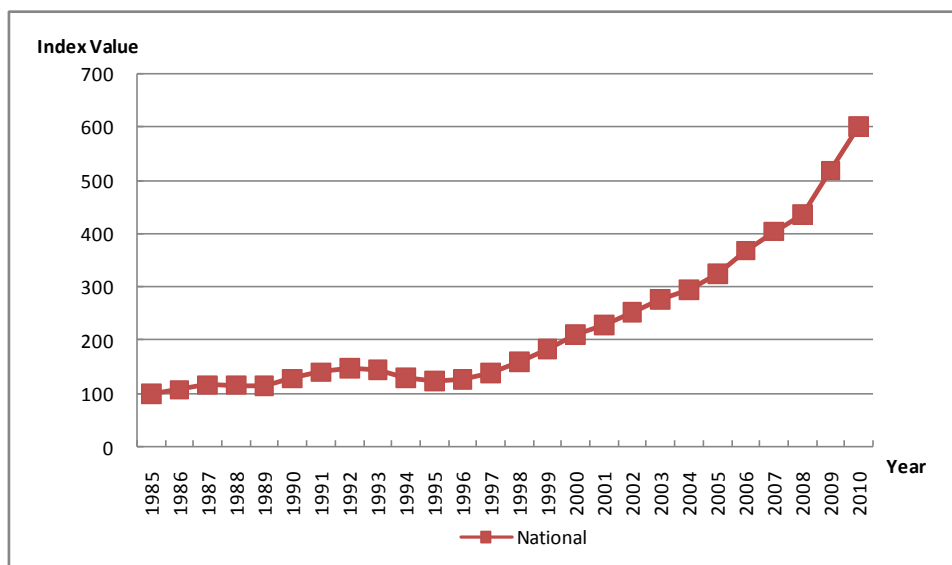
Figure 5.3.5 National Real Labor Force Human Capital Index

Figure 5.3.6 shows the national ratio of labor force human capital to total human capital by five education categories. The ratios reflect age structures as

human capital for the young and often highly-educated population will be higher than that for the older and less-educated population. As is seen from the graph, before 1991, the ratio grew steadily, but it dropped dramatically after that. The decreasing trend may indicate that the proportion of young generation in total population is getting smaller, and the aging population phenomenon is becoming clear. Moreover, it may indicate constraints on the productivity efficiency improvement in future China.
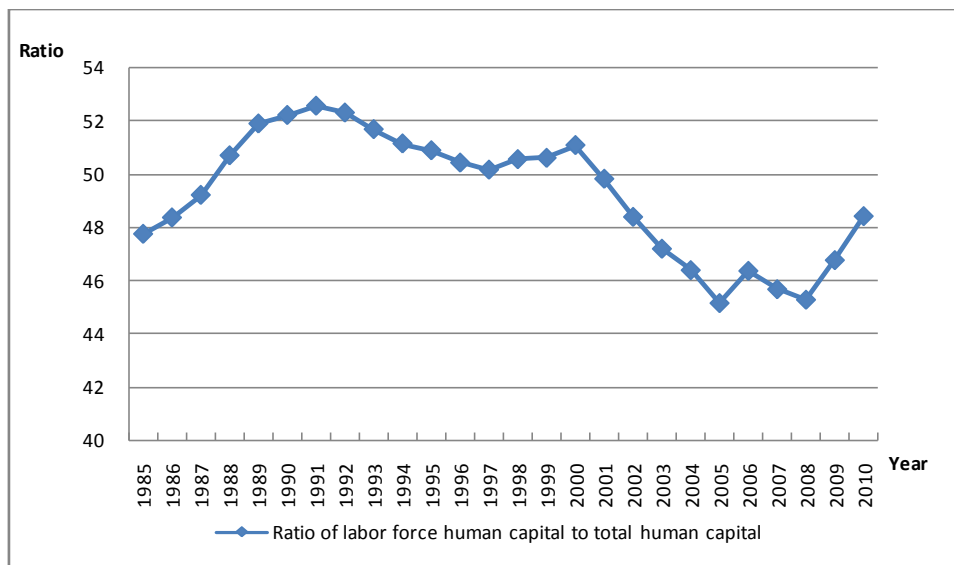
Figure 5.3.6 National Ratio of Labor Force Human Capital to Total Human Capital

5.3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the real average labor force human capital. Here the average labor force human capital means national labor force human capital divided by the number of the population that are over 15 years old, non-retired and out of school. Table 5.3.5 shows that the average labor force human capital both in real and nominal terms have kept increasing.

Table 5.3.5 National Nominal and Real Average Labor Force Human Capital

Year	Nominal average labor force human capital (Thousands of Yuan)		Real average labor force human capital (Thousands of 1985 Yuan)	
	By five education categories	By six education categories	By five education categories	By six education categories
1985	24.19		24.19	
1986	27.28		25.63	
1987	30.79		26.96	
1988	35.01		25.79	
1989	39.49		24.64	
1990	44.55		26.95	
1991	49.36		28.85	
1992	54.31		29.85	
1993	60.15		28.82	
1994	66.35		25.61	
1995	73.08		24.06	
1996	81.28		24.66	
1997	90.39		26.63	
1998	100.93		29.90	
1999	112.50		33.71	
2000	125.98	124.98	37.50	37.22
2001	138.76	138.15	40.94	40.78
2002	152.59	152.52	45.30	45.28
2003	168.68	168.91	49.42	49.48
2004	187.09	188.45	52.67	53.03
2005	208.98	210.56	57.68	58.10
2006	239.47	241.91	65.09	65.73
2007	275.77	278.87	71.42	72.18
2008	315.39	319.43	77.05	78.00
2009	370.26	375.98	90.89	92.26
2010	433.90	440.43	102.89	104.40

Table 5.3.6 reports the real average labor force human capital by

gender. Additionally, the table shows that the real average labor force human capital for female was smaller than that for male.

Table 5.3.6 National Nominal and Real Average Labor Force Human Capital by Gender

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	National	**Male**	**Female**	**National**	**Male**	**Female**
1985	24.19	28.37	19.49	24.19	28.37	19.49
1986	27.28	32.19	21.82	25.63	30.23	20.49
1987	30.79	36.50	24.45	26.96	31.95	21.42
1988	35.01	41.46	27.81	25.79	30.52	20.50
1989	39.49	46.60	31.48	24.64	29.07	19.65
1990	44.55	52.49	35.50	26.95	31.76	21.48
1991	49.36	58.35	39.24	28.85	34.10	22.94
1992	54.31	64.48	42.97	29.85	35.43	23.64
1993	60.15	71.83	47.26	28.82	34.40	22.67
1994	66.35	79.61	51.81	25.61	30.71	20.02
1995	73.08	88.15	56.72	24.06	29.00	18.69
1996	81.28	98.44	62.50	24.66	29.84	18.99
1997	90.39	109.81	68.98	26.63	32.32	20.35
1998	100.93	123.46	76.06	29.90	36.55	22.57
1999	112.50	138.01	84.09	33.71	41.32	25.23
2000	125.98	155.60	92.85	37.50	46.27	27.68
2001	138.76	171.72	102.15	40.94	50.63	30.18
2002	152.59	190.08	111.51	45.30	56.40	33.14
2003	168.68	210.20	123.43	49.42	61.55	36.20
2004	187.09	233.98	136.25	52.67	65.84	38.40
2005	208.98	262.25	151.69	57.68	72.35	41.90
2006	239.47	301.36	172.05	65.09	81.89	46.79
2007	275.77	345.86	198.23	71.42	89.53	51.38
2008	315.39	394.26	226.98	77.05	96.30	55.48
2009	370.26	462.75	265.34	90.89	113.57	65.17
2010	433.90	541.67	310.48	102.89	128.43	73.65

Table 5.3.7 reports the real average labor force human capital by location. The real average labor force human capital was much smaller in rural area than in urban area.

Table 5.3.7 National Nominal and Real Average Labor Force Human Capital by Region

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	National	Urban	Rural	National	Urban	Rural
1985	24.19	38.29	19.42	24.19	38.29	19.42
1986	27.28	42.90	21.75	25.63	40.09	20.50
1987	30.79	48.22	24.43	26.96	41.42	21.68
1988	35.01	54.71	27.53	25.79	38.93	20.80
1989	39.49	61.85	30.87	24.64	37.85	19.55
1990	44.55	70.14	34.60	26.95	42.37	20.96
1991	49.36	77.04	38.40	28.85	44.28	22.74
1992	54.31	84.21	42.43	29.85	44.57	24.00
1993	60.15	92.67	46.98	28.82	42.24	23.37
1994	66.35	101.79	51.74	25.61	37.12	20.86
1995	73.08	111.65	57.03	24.06	34.86	19.57
1996	81.28	123.52	62.31	24.66	35.45	19.81
1997	90.39	137.21	68.15	26.63	38.19	21.14
1998	100.93	153.10	74.45	29.90	42.87	23.33
1999	112.50	170.03	80.78	33.71	48.24	25.70
2000	125.98	189.69	87.91	37.50	53.39	28.00
2001	138.76	206.49	96.27	40.94	57.71	30.42
2002	152.59	224.66	105.35	45.30	63.43	33.42
2003	168.68	246.66	115.59	49.42	69.02	36.09
2004	187.09	272.20	126.50	52.67	73.73	37.68
2005	208.98	302.28	138.94	57.68	80.59	40.50
2006	239.47	342.80	159.24	65.09	90.04	45.73
2007	275.77	390.88	181.17	71.42	98.25	49.36
2008	315.39	444.68	204.73	77.05	105.85	52.38
2009	370.26	520.22	231.75	90.89	124.89	59.48
2010	433.90	604.21	260.67	102.89	140.56	64.57

Finally we calculate a set of real average labor force human capital indices using 1985 as the base year and setting its values at 100. Table 5.3.8 reports the results.

Table 5.3.8 National Real Average Labor Force Human Capital Index
（1985=100）

Year	National	Male	Female	Urban	Rural
1985	100	100	100	100	100
1986	105.95	106.57	105.14	104.69	105.59
1987	111.45	112.63	109.87	108.16	111.68
1988	106.61	107.60	105.17	101.67	107.11
1989	101.87	102.47	100.82	98.83	100.67
1990	111.43	111.96	110.20	110.64	107.97
1991	119.29	120.20	117.71	115.64	117.13
1992	123.41	124.89	121.26	116.38	123.60
1993	119.17	121.26	116.29	110.31	120.37
1994	105.90	108.26	102.73	96.93	107.42
1995	99.47	102.24	95.89	91.03	100.78
1996	101.96	105.20	97.44	92.57	102.04
1997	110.09	113.94	104.40	99.74	108.89
1998	123.64	128.86	115.77	111.96	120.16
1999	139.37	145.68	129.44	125.98	132.36
2000	155.03	163.13	141.99	139.42	144.19
2001	169.27	178.48	154.84	150.71	156.65
2002	187.30	198.82	170.03	165.64	172.11
2003	204.32	216.98	185.71	180.23	185.86
2004	217.77	232.10	196.98	192.54	194.08
2005	238.46	255.05	214.94	210.45	208.58
2006	269.10	288.67	240.06	235.13	235.53
2007	295.26	315.62	263.57	256.57	254.24

2008	318.56	339.48	284.61	276.40	269.76
2009	375.79	400.38	334.32	326.14	306.32
2010	425.40	452.74	377.84	367.05	332.58

5.4 International comparison

Jorgenson-Fraumeni lifetime earnings approach has been adopted by many countries for human capital estimation, for example for Canada (Gu and Ambrose, 2008), New Zealand (Le, Gibson and Oxley, 2005), Norway (Greaker and Liu, 2008), Sweden (Alroth, 1997), and the United States of America (Jorgenson and Fraumeni, 1989, 1992a, 1992b and Christian, 2009). A summary of international comparison of human capital estimates is reported in Table 5.4.1. China's human capital is quite large, second only to the United States. However, China's human capital per capita is still very small. In 2001, the human capital in China is around 15 times of that in Australia and about 144 times of that in New Zealand. In 2006, China's human capital is about 78 times of Norway's, and in 2007, China's human capital is 10.6 times of Canada's. However, human capital per capita in China is one-fifth of that in Australia, less than one-fourth of that in Canada and one-sixth of that in US. The large gap in human capital per capita between China and these selected developed economies may suggest that it is necessary for China to invest more in human capital as it further develops.[26]

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[26] More recent estimates include those for Argentina (Coremberg, 2010) and the United States (Abraham 2010 and Christian 2010).

Table 5.4.1 International Comparison of Human Capital Estimates

Currency unit: US Dollars

	Canada	Norway	New Zealand	U.S.A	Australia	China[27]		
	2007	2006	2001	2006	2001	2001	2006	2007
Age Range	15-74	15-67	21-65	0-80	18-65	male 0-60, female 0-55		
Human capital per capita (Thousands)	54.85		32.32	about 70	35.56	6.57	11.74	13.06
National human capital (Trillions)	13.61	1.66	0.51	212	4.86	73.4	130.4	144.7
Ratio of human capital to GDP	11	8	6	>15	10	20.19	18.52	17.14

Note: The PPP exchange rates are from Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 7.0 (China version 1), Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, May 2011. The website link is http://pwt.econ.upenn.edu/php_site/pwt_index.php.

5.5 Physical capital

We also compare our human capital estimates with physical capital estimates for China. There are a few estimates of China's physical capital. For example, Zhang, Wu, and Zhang (2004) and Holz (2006) calculated China's physical capital, but using different methodologies. Nationally, Holz also calculated China's real national physical capital in 2006. We calculated fixed assets using both of their methodologies, which are described in the appendix. Table 5.5.1 reports 1985 to 2010 real national and provincial level physical capital using Holz's methodology with a 5%

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[27] We use the national nominal human capital in Table 5.1.1 to calculate the internationally comparable results for China.

depreciation rate.

From table 5.5.1 we can see that physical capital in China increase rapidly cross time. For example, the physical capital in Beijing in 1985 is only around 51 billion, in 2010, it is almost 2,700 billion, which is over 50 times higher than in 1985.

Table 5.5.1 Real Physical Capital (Holz methodology), 1985-2010

Unit: 100 millions of 1985 Yuan

Year	Beijing	Tianjin	Hebei	Shanxi
1985	514	362	720	497
1986	601	425	821	574
1987	709	490	934	655
1988	835	557	1,089	733
1989	946	629	1,236	816
1990	1,097	706	1,373	914
1991	1,245	815	1,550	1,025
1992	1,439	949	1,783	1,144
1993	1,716	1,113	2,133	1,305
1994	2,156	1,339	2,586	1,487
1995	2,751	1,635	3,216	1,677
1996	3,412	1,947	3,922	1,896
1997	4,175	2,392	5,077	2,218
1998	5,022	2,852	6,297	2,620
1999	5,932	3,312	7,666	3,063
2000	6,923	3,805	9,097	3,531
2001	8,000	4,328	10,471	3,998
2002	9,233	4,914	11,872	4,539
2003	10,510	5,596	13,386	5,184
2004	12,137	6,507	15,559	6,111
2005	14,154	7,615	18,240	7,333
2006	16,362	8,956	21,462	8,844
2007	18,885	10,662	25,395	10,719
2008	21,089	13,088	30,789	13,027
2009	23,715	16,409	36,743	16,188
2010	26,907	20,631	43,516	20,058

Year	Inner Mongolia	Liaoning	Jilin	Heilongjiang
1985	269	1,008	398	847
1986	306	1,141	447	946
1987	345	1,301	505	1,053
1988	398	1,493	573	1,173
1989	452	1,680	634	1,296
1990	507	1,880	708	1,427
1991	582	2,107	792	1,569
1992	688	2,399	897	1,740
1993	829	2,852	1,064	1,953
1994	988	3,402	1,258	2,213
1995	1,167	3,962	1,486	2,542
1996	1,364	4,596	1,745	2,942
1997	1,600	5,314	2,030	3,484
1998	1,846	6,054	2,340	4,100
1999	2,122	6,845	2,723	4,721
2000	2,426	7,747	3,175	5,371
2001	2,748	8,663	3,632	6,044
2002	3,214	9,668	4,158	6,762
2003	3,957	10,860	4,735	7,458
2004	5,173	12,786	5,475	8,373
2005	6,991	15,150	6,602	9,457
2006	9,244	18,206	8,465	10,830
2007	12,159	22,096	11,145	12,628
2008	15,887	28,732	14,909	14,932
2009	20,835	34,392	19,052	18,140
2010	26,724	41,402	24,033	21,543

Year	Shanghai	Jiangsu	Zhejiang	Anhui
1985	559	884	521	442
1986	677	1,078	616	519
1987	823	1,324	730	602
1988	1,011	1,605	864	698
1989	1,181	1,856	997	780
1990	1,367	2,144	1,139	871
1991	1,562	2,478	1,310	965
1992	1,817	2,990	1,554	1,106
1993	2,255	3,754	1,989	1,301
1994	3,008	4,619	2,621	1,541
1995	4,131	5,759	3,511	1,877
1996	5,161	7,060	4,535	2,339
1997	6,548	8,824	5,850	2,938
1998	7,850	10,745	7,201	3,533
1999	9,168	12,860	8,673	4,149
2000	10,541	15,123	10,329	4,814
2001	11,890	17,385	12,097	5,470
2002	13,358	19,942	14,229	6,183
2003	14,832	23,180	16,910	6,958
2004	16,820	27,666	20,529	8,148
2005	19,108	33,307	24,558	9,555
2006	21,710	39,712	29,045	11,253
2007	24,786	47,062	34,219	13,380
2008	28,035	56,230	40,075	16,124
2009	31,928	67,095	46,369	19,172
2010	35,635	80,192	53,814	23,018

Year	Fujian	Jiangxi	Shandong	Henan
1985	293	284	1,079	698
1986	349	325	1,264	818
1987	418	367	1,504	946
1988	501	423	1,794	1,104
1989	588	477	2,042	1,256
1990	692	531	2,324	1,429
1991	814	596	2,671	1,631
1992	994	681	3,117	1,863
1993	1,263	797	3,729	2,167
1994	1,654	943	4,474	2,588
1995	2,166	1,127	5,400	3,155
1996	2,700	1,367	6,486	3,797
1997	3,461	1,735	8,053	4,763
1998	4,301	2,114	9,755	5,791
1999	5,187	2,525	11,743	6,881
2000	6,098	2,962	14,092	8,082
2001	6,958	3,422	16,474	9,265
2002	7,866	4,034	19,252	10,555
2003	8,865	4,821	22,367	11,973
2004	10,249	5,916	26,917	14,052
2005	11,915	7,161	32,620	16,966
2006	14,007	8,630	39,324	20,885
2007	16,785	10,350	46,823	26,164
2008	20,388	12,390	55,796	33,017
2009	24,491	15,007	67,107	41,530
2010	29,113	18,015	80,269	51,733

Year	Hubei	Hunan	Guangdong	Guangxi
1985	600	516	988	286
1986	685	591	1,157	328
1987	788	677	1,345	375
1988	902	777	1,606	429
1989	992	861	1,876	483
1990	1,102	955	2,182	535
1991	1,221	1,068	2,541	600
1992	1,382	1,227	3,205	697
1993	1,624	1,428	4,295	879
1994	1,999	1,690	5,697	1,126
1995	2,549	2,031	7,264	1,407
1996	3,125	2,421	8,779	1,721
1997	3,977	2,975	10,502	2,090
1998	4,881	3,587	12,396	2,503
1999	5,865	4,299	14,584	2,969
2000	6,919	5,086	16,850	3,450
2001	7,981	5,903	19,109	3,928
2002	9,055	6,790	21,550	4,461
2003	10,109	7,720	24,378	5,025
2004	11,539	8,951	28,083	5,842
2005	13,280	10,588	32,745	6,926
2006	15,504	12,580	38,033	8,343
2007	18,261	15,106	44,213	10,175
2008	21,654	18,668	51,271	12,478
2009	25,848	22,985	60,014	16,147
2010	31,054	28,543	70,485	21,334

Year	Hainan	Chongqing+Sichuan	Guizhou	Yunnan
1985	29	1,048	192	184
1986	42	1,159	221	223
1987	54	1,290	254	263
1988	69	1,435	288	312
1989	93	1,581	322	363
1990	122	1,752	364	423
1991	158	1,952	408	495
1992	221	2,222	464	592
1993	349	2,598	534	755
1994	494	3,065	625	959
1995	626	3,663	743	1,209
1996	769	4,430	878	1,503
1997	888	5,478	1,091	1,929
1998	1,008	6,719	1,339	2,438
1999	1,141	8,050	1,639	2,981
2000	1,276	9,488	1,977	3,486
2001	1,404	11,041	2,371	3,973
2002	1,537	12,824	2,811	4,496
2003	1,678	14,834	3,269	5,087
2004	1,860	17,471	3,826	5,943
2005	2,076	20,686	4,452	7,066
2006	2,330	24,594	5,172	8,447
2007	2,627	29,446	6,022	10,120
2008	3,092	36,033	7,081	11,740
2009	3,656	43,079	8,369	13,953
2010	4,407	51,483	9,949	17,336

Year	Tibet	Shaanxi	Gansu	Qinghai
1985	10	316	192	81
1986	14	367	218	95
1987	17	430	248	111
1988	21	501	284	130
1989	25	577	316	146
1990	30	662	355	163
1991	37	758	397	180
1992	44	858	445	200
1993	54	1,008	509	227
1994	65	1,192	592	254
1995	86	1,411	698	289
1996	108	1,672	798	330
1997	128	2,024	962	407
1998	150	2,439	1,132	492
1999	177	2,924	1,342	589
2000	204	3,508	1,586	704
2001	231	4,100	1,826	841
2002	277	4,758	2,129	1,003
2003	339	5,587	2,438	1,176
2004	453	6,645	2,842	1,378
2005	584	7,954	3,404	1,607
2006	737	9,677	4,061	1,864
2007	915	11,705	4,839	2,163
2008	1,116	14,699	5,964	2,526
2009	1,361	18,114	7,095	3,030
2010	1,729	22,566	8,471	3,711

Year	Ningxia	Xinjiang	National
1985	73	192	14,010
1986	87	233	16,478
1987	102	274	19,361
1988	115	328	22,849
1989	128	390	26,273
1990	145	467	30,134
1991	167	569	34,687
1992	193	698	40,683
1993	227	871	49,395
1994	265	1,064	60,551
1995	310	1,299	74,554
1996	361	1,578	92,446
1997	427	1,929	112,138
1998	504	2,322	132,562
1999	601	2,727	154,900
2000	719	3,195	179,057
2001	851	3,668	203,557
2002	1,002	4,218	231,164
2003	1,194	4,848	261,876
2004	1,440	5,628	302,634
2005	1,726	6,562	350,599
2006	2,055	7,716	408,671
2007	2,451	8,964	479,444
2008	3,007	10,334	569,143
2009	3,783	11,839	675,745
2010	4,756	13,844	804,641

5.6 Human capital, GDP, and physical capital

As previously described, we calculated human capital at the national level for 1985-2010. The results are presented again in Table 5.6.1 along with nominal GDP and the ratio of nominal human capital to nominal GDP. Human capital estimates are based on the Mincer income parameter estimates and the population imputation data, with 4.58% as the discount rate and 4.11 and 6% as the real income growth rates for rural and urban respectively. Before 2000, five education categories were reported by the National Bureau of Statistics of China. They are: no school, elementary school, junior middle school, senior middle school, and college and above. Starting from 2000, college and above was further divided into two categories: three-year college, and four-year university and above.[28]With this more detailed information on educational attainment, we create a separate human capital series starting from 2000. Columns 1 and 2 contain the national human capital measured in nominal terms by 5-6 education categories, and columns 3 and 4 present the national human capital measured in real terms (in 1985 Yuan) accordingly. National human capital becomes larger with six education categories. This is because the lifetime income of four-year university and above graduates is higher than the lifetime income of three-year college graduates. In this table, the real values are calculated using the CPI as a deflator.[29]

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[28] When we estimate the Mincer equation to generate annual earnings, we assign 15 years of schooling for the category three-year college; and assign 16 years of schooling for the category four-year university and above. Because we use the lower bound of schooling for this education category, the amount of human capital is underestimated.

[29] Because the national human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Table 5.6.1 National Nominal and Real Human Capital, Nominal GDP

Year	Nominal human capital (Billions of Yuan)		Real human capital (Billions of 1985 Yuan)		Nominal GDP (Billions of Yuan)	Ratio of nominal human capital to nominal GDP
	By five education categories	By six education categories	By five education categories	By six education categories		
1985	28,604		28,604		904	31.6
1986	32,581		30,594		1,027	31.7
1987	37,150		32,508		1,205	30.8
1988	42,604		31,373		1,504	28.3
1989	48,448		30,225		1,700	28.5
1990	55,656		33,683		1,872	29.7
1991	62,740		36,652		2,183	28.8
1992	70,720		38,803		2,694	26.3
1993	80,050		38,255		3,526	22.7
1994	90,020		34,640		4,811	18.7
1995	101,220		33,216		5,981	16.9
1996	114,420		34,593		7,014	16.3
1997	129,540		37,994		7,806	16.6
1998	146,110		43,085		8,302	17.6
1999	165,370		49,315		8,848	18.7
2000	189,120	190,330	56,052	56,358	9,800	19.3
2001	212,750	214,330	62,451	62,873	10,807	19.7
2002	241,200	243,280	71,180	71,740	11,910	20.3
2003	274,120	276,990	79,780	80,540	13,498	20.3
2004	309,310	312,910	86,540	87,510	15,945	19.4
2005	357,270	362,890	98,030	99,480	18,362	19.5
2006	399,230	403,840	107,840	109,030	21,590	18.5
2007	466,690	473,110	120,120	121,680	26,642	17.5
2008	537,690	545,980	130,570	132,510	31,603	17.0
2009	616,700	627,010	150,720	153,130	34,032	18.1
2010	715,040	727,800	168,980	171,940	39,976	17.9

Figure 5.6.1 graphs national real and nominal human capital reported by 5 categories in Table 5.6.1. As is seen from the figure, human capital in both nominal and real terms rises steadily and as expected nominal human capital grows faster than real human capital.
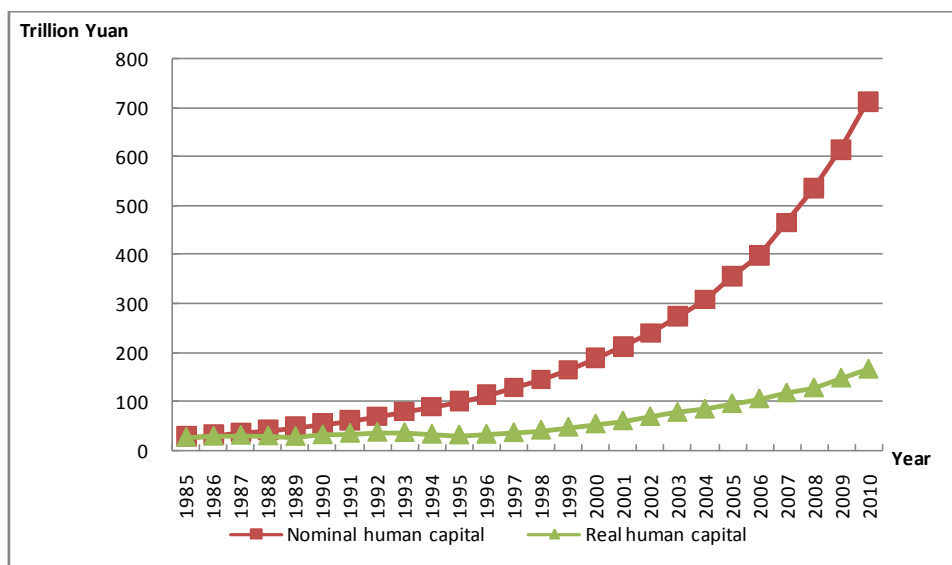
Figure 5.6.1 National Nominal and Real Human Capital

We report the ratio of human capital to GDP in Table 5.6.1.[30] to get a sense of the magnitude of the estimated national human capital. Similar to physical capital, human capital stock plays an important role in GDP growth, so the ratio could also reflect human capital's influence on the sustainability of the growth rate of GDP. Both Table 5.6.1 and Figure 5.6.2 below demonstrate that nominal national human capital is substantially higher than nominal GDP. The ratio of human capital to GDP drops over time from 31.64 in 1985 to 17.89 in 2010. Jorgenson and Fraumeni's (1992a) 1947 to 1986 estimates of the ratio of market human capital to GDP in the U.S. are between 18 and 22. The average annual growth for human capital in China

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[30] We use nominal values for calculating ratios throughout in order to prevent influences caused by using different deflators.

from 1985 through 2010 is 7.20% per year, considerably lower than economic growth.[31] Over the same period, the Chinese economy grew at an annual rate of 8.33%.[32] This helps explain the declining ratio of human capital to GDP. There are three stages in this series: Downwards from 1985 through 1995, upwards from 1995 through 2003, and finally downwards from 2003 through 2009. The period 1995 through 2009 overall is a period of rapid real human capital growth compared to earlier periods; however, this growth did slow down between 2003 and 2009. The downward trend in the most recent period is partly due to the confluence of continuing rapid economic growth with slower population growth. The decreasing ratio of human capital to GDP may indicate possible constraints on China's future GDP growth.
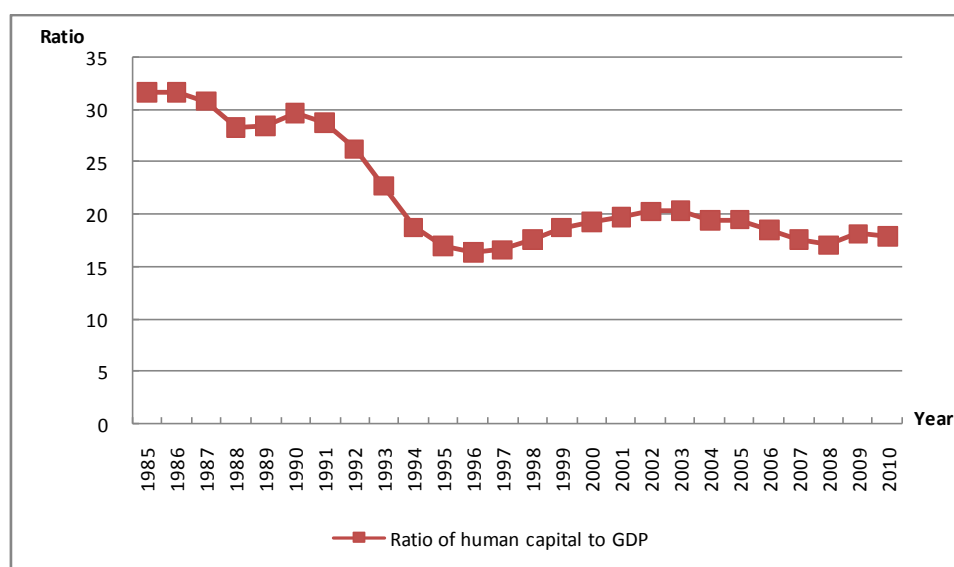
Figure 5.6.2 National Ratio of Human Capital to GDP

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[31] In calculating annual average growth rate in this report, we calculate annual growth rate using the difference of logarithm for every year, and then take average across years.

[32] The data come from "China Statistical Yearbook 2009", Table 2-1, 2-5.

As can be seen in Figure 5.6.3 and Figure 5.6.4, human capital is much larger than physical capital. More specifically, human capital is about 2 to 20 times the amount of physical capital. This is not surprising, given that in most countries intangible capital, which is predominantly human capital, accounts for over 60% of national wealth.[33] On the other hand, the ratio of human capital to physical capital is declining almost continuously, based on both estimates of physical capital and human capital. It is unclear whether such a trend indicates that the Chinese government has overly weighted towards physical capital investment relative to human capital investment.
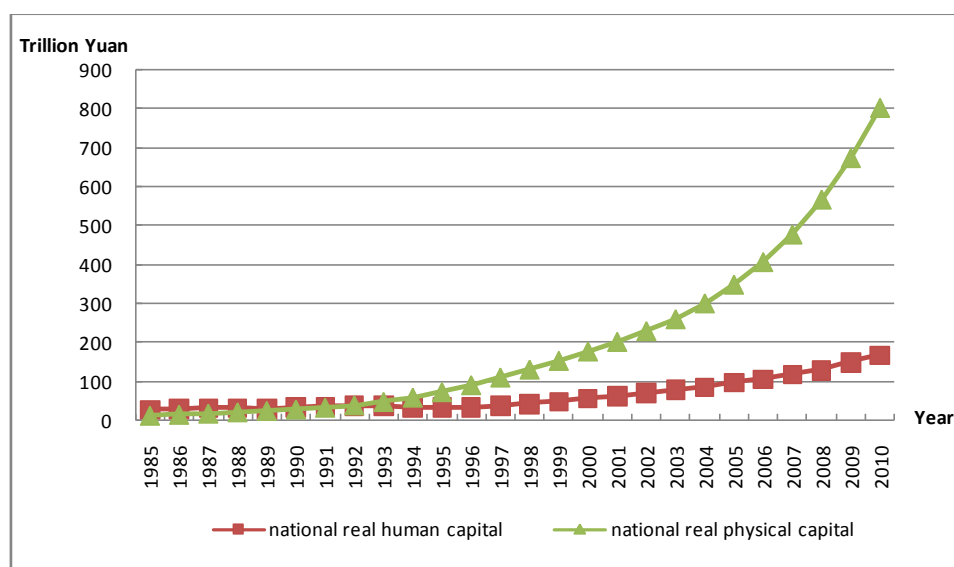
Figure 5.6.3 Human Capital and Physical Capital (Holz), 1985-2010

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[33] World Bank (1997). The World Bank wealth estimates include physical capital, natural resources, and other forms of intangible capital besides human capital.
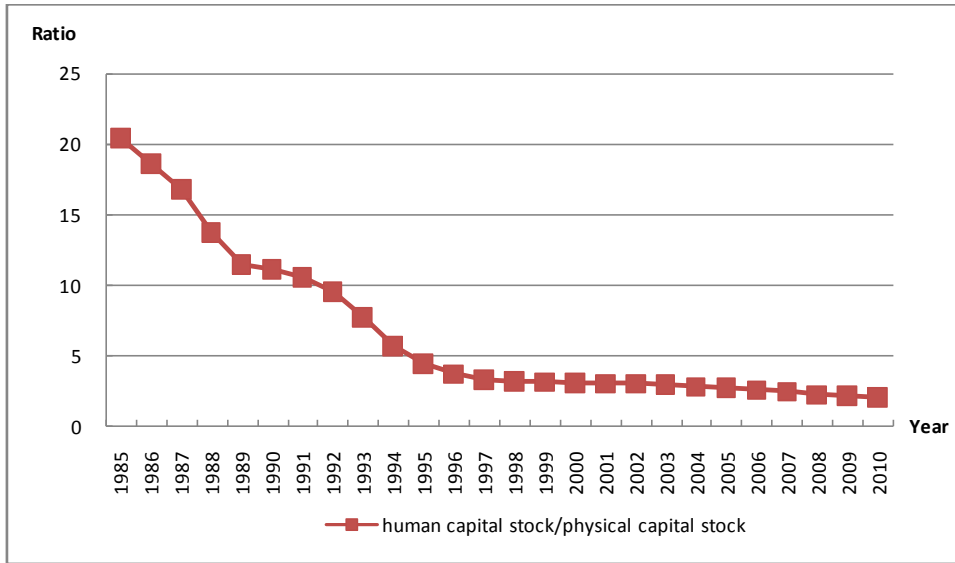
Figure 5.6.4 Human Capital and Physical Capital Ratio, 1985-2010

Chapter 6   Cross-province comparison

In order to see the differences in human capital accumulation between provinces, in this chapter we compare nominal and real human capital, labor force human capital, real human capital per capita, real average labor force human capital, and the ratios of labor force human capital to human capital and several sensitivity indicators across provinces. Detailed data can be found in Chinese appendix C and D, here we only choose 1985, 1995, 2005 and 2010 to conduct the comparison.

6.1 Living cost adjustment index calculation

A living cost adjustment index is a theoretical price index that measures relative cost of living over time or regions. It is an index that measures differences in the price of goods and services, and allows for substitutions to other items as prices vary. It's something like purchase power parity (PPP) index. In other words, we basically want to make a salary of RMB 1000 in Beijing comparable with that in Changsha, for example, Beijing RMB 1000 may be worth RMB 800 in Changsha. CPI (consumer price index) only serves as a measure of changes in the price index of the certain province, but cannot be a compared between provinces. The cost of living index selected the cost of living in Beijing in the year of 1985 as the base value (because we calculate human capital from 1985). The cost of living index of other provinces' in each year is derived from the cost divided by the base value of the cost of living index. Cost of living in a certain province over the years is calculated from the cost of living in 1990 multiplied by the ratio between the two years of the CPI. (For a few years around 1990, the NBS published price data on specific products in all provinces.) Thus, we will be able to carry out the living cost comparison of inter-provincial cross-section. Below are the

formulas:

$$COST_t = (CPI_t / CPI_{1990}) * COST_{1990} \quad (t=1985, 1986......2010)$$

$$\text{Living Cost Index}_{year, province} = \text{Cost}_{year, province} / \text{Cost}_{1985, Beijing} *100$$

The index is based on the cost of living in Beijing in 1985 as the base value of the index set at 100. CPIs over the years in various provinces are collected from the statistical yearbook of provinces. The living cost of 1990 in various provinces and the thinking are all derived from "Spatial Price Differences in China: Estimates and Implications" Loren Brandt and Carsten A. Holz (2006)". Sheet 6.1.1 is the living cost adjustment index in various urban areas. Sheet 6.1.2 is the living cost adjustment index in various rural areas.

Sheet 6.1.1   Urban living cost adjustment index in provinces 1985-2010
Cost of living in Beijing in 1985 serves as the base value

Year	Nation	Beijing	Tianjin	Hebei
1985	94.20	100.00	102.71	92.34
1986	100.79	106.80	109.69	97.88
1987	109.66	115.99	117.15	105.90
1988	132.36	139.65	136.95	125.28
1989	153.94	163.67	157.08	145.20
1990	155.94	172.50	161.79	146.94
1991	163.89	193.03	178.30	156.64
1992	177.98	212.14	198.62	169.96
1993	206.64	252.45	233.58	196.30

1994	258.30	315.31	289.64	245.18
1995	301.69	369.86	333.96	284.65
1996	328.24	412.76	364.01	306.28
1997	338.42	434.63	375.30	317.62
1998	336.39	445.07	373.42	313.49
1999	332.01	447.74	369.31	309.41
2000	334.67	463.41	367.84	310.96
2001	337.01	477.77	372.25	312.20
2002	333.64	469.17	370.76	307.83
2003	336.64	470.11	374.47	314.91
2004	347.75	474.81	383.08	326.56
2005	353.32	481.93	388.83	331.14
2006	358.62	486.27	394.66	336.77
2007	374.76	497.94	411.24	351.37
2008	395.74	523.34	433.44	369.65
2009	392.36	515.49	429.11	365.30
2010	404.92	527.86	444.13	375.61

Year	Shaanxi	Inner Mongolia	Liaoning	Jilin
1985	93.90	94.96	93.85	93.40
1986	99.91	100.19	100.42	99.01
1987	108.41	108.70	110.26	106.93
1988	132.36	127.18	131.87	130.03
1989	153.94	145.88	154.56	152.00
1990	156.25	148.50	159.35	157.93
1991	165.94	157.41	168.91	169.14
1992	181.04	171.11	182.59	184.87
1993	210.18	196.26	213.08	209.27
1994	264.62	243.95	268.70	257.82
1995	308.81	285.66	311.96	296.76
1996	334.44	307.09	337.54	319.61
1997	344.81	321.22	350.36	331.43
1998	340.33	318.97	349.66	329.11
1999	341.69	319.92	345.12	322.20
2000	357.75	324.08	345.12	316.72
2001	355.96	326.03	344.77	321.48
2002	348.13	328.64	340.98	318.90
2003	353.70	333.56	345.07	322.41
2004	366.43	341.90	354.73	334.02
2005	372.66	348.74	357.57	338.69
2006	379.37	353.28	361.51	342.76
2007	395.30	368.47	378.13	357.84
2008	422.97	388.36	394.77	376.09
2009	418.95	387.20	394.77	375.71
2010	431.93	398.82	405.83	388.49

Year	Heilongjiang	Shanghai	Jiangsu	Zhejiang
1985	92.17	106.52	93.25	90.32
1986	97.70	113.23	99.22	96.01
1987	107.18	122.40	109.64	106.48
1988	127.11	147.01	134.41	131.39
1989	145.67	170.38	155.92	153.47
1990	153.83	181.11	161.22	156.69
1991	166.44	200.13	173.63	165.46
1992	182.59	220.14	188.91	180.68
1993	210.34	264.61	224.24	219.35
1994	256.62	327.86	280.97	273.53
1995	297.42	389.17	326.49	320.03
1996	320.02	424.97	361.75	351.39
1997	334.43	436.87	366.46	365.80
1998	337.44	436.87	366.46	367.63
1999	327.31	443.42	361.33	365.79
2000	323.06	454.51	361.33	369.08
2001	325.64	454.51	361.69	367.61
2002	323.36	456.78	355.90	363.20
2003	325.95	457.24	359.10	365.01
2004	337.36	467.30	372.39	375.23
2005	340.06	471.97	379.84	380.86
2006	346.18	477.63	385.92	385.05
2007	364.87	492.92	401.74	400.07
2008	383.12	521.51	422.63	419.27
2009	382.35	519.42	420.94	413.82
2010	396.11	535.55	436.09	430.37

Year	Anhui	Fujian	Jiangxi	Shandong
1985	86.38	98.51	88.45	94.28
1986	91.40	105.31	93.76	98.99
1987	100.44	116.47	101.16	108.00
1988	121.94	147.92	125.14	130.24
1989	141.08	175.73	146.66	150.69
1990	144.75	175.90	148.86	154.61
1991	155.46	184.00	155.41	164.20
1992	169.14	198.72	167.07	178.32
1993	193.50	232.10	193.47	204.35
1994	246.52	290.36	245.51	256.26
1995	285.71	337.98	287.00	299.31
1996	314.57	361.30	310.25	330.74
1997	320.55	370.33	319.55	341.32
1998	321.51	370.33	322.75	340.30
1999	313.79	365.51	319.85	340.30
2000	316.62	377.21	326.56	344.38
2001	316.62	370.80	325.91	348.17
2002	313.77	367.83	326.56	343.64
2003	319.42	370.41	329.50	346.05
2004	333.15	384.48	340.37	355.74
2005	336.48	391.79	345.48	359.65
2006	341.19	396.10	348.59	363.25
2007	359.28	416.30	363.93	377.05
2008	380.83	435.03	385.40	394.77
2009	376.58	427.64	383.09	394.54
2010	387.87	440.89	394.28	405.99

Year	Henan	Hubei	Hunan	Guangdong
1985	95.68	92.33	84.54	126.28
1986	102.18	97.31	89.10	132.22
1987	110.15	105.78	99.17	149.14
1988	133.84	127.47	124.66	193.14
1989	153.78	145.44	146.22	235.44
1990	154.55	148.78	147.10	229.31
1991	162.43	158.01	154.60	234.59
1992	174.94	174.60	175.47	254.29
1993	193.48	207.42	206.00	310.24
1994	246.49	263.43	257.09	375.39
1995	288.15	316.38	303.63	424.56
1996	315.53	348.65	325.49	455.13
1997	323.10	357.71	335.25	464.69
1998	316.31	350.20	336.93	456.79
1999	305.56	340.40	335.58	449.48
2000	302.81	340.40	339.94	459.37
2001	304.93	341.76	336.20	455.70
2002	304.32	339.02	334.86	449.32
2003	309.49	347.84	339.55	452.46
2004	326.20	363.49	353.47	464.23
2005	333.05	373.31	360.89	473.51
2006	337.05	378.53	366.67	482.03
2007	355.31	396.32	385.73	499.87
2008	378.40	418.12	408.10	527.36
2009	373.95	415.19	406.88	514.71
2010	386.66	426.82	419.49	530.66

Year	Guangxi	Hainan	Chongqing	Sichuan
1985	91.53	118.27	83.60	82.19
1986	97.21	122.65	87.11	86.13
1987	107.13	134.67	95.65	94.83
1988	132.09	174.12	117.36	116.54
1989	158.11	219.92	137.43	137.29
1990	155.42	219.04	139.35	139.35
1991	159.61	227.80	149.10	145.34
1992	170.79	248.30	165.80	159.58
1993	210.58	307.15	196.81	186.55
1994	264.07	385.78	255.26	238.60
1995	311.60	426.67	304.78	283.94
1996	328.74	447.15	334.34	311.76
1997	331.04	453.85	345.38	327.66
1998	321.44	442.96	332.94	327.01
1999	312.44	438.98	330.61	320.80
2000	312.44	445.56	319.70	319.83
2001	316.50	440.21	325.14	325.59
2002	313.02	435.81	323.84	323.96
2003	315.84	433.20	325.78	330.12
2004	328.79	447.06	337.83	345.30
2005	338.65	452.87	340.54	351.17
2006	344.11	458.31	348.71	359.60
2007	363.38	479.39	365.10	380.82
2008	391.00	508.63	385.54	398.72
2009	382.79	506.09	379.38	401.38
2010	393.89	528.86	391.52	414.79

Year	Guizhou	Yunnan	Tibet	Shaanxi
1985	87.53	94.65	83.44	90.14
1986	93.13	99.19	89.28	96.09
1987	102.16	106.53	96.74	104.93
1988	124.13	129.01	113.96	126.03
1989	146.35	152.10	132.08	148.21
1990	147.96	154.54	138.95	152.06
1991	153.73	160.41	152.01	163.16
1992	167.10	177.09	165.69	181.43
1993	193.51	210.38	190.87	206.83
1994	236.08	246.78	239.54	265.16
1995	282.11	296.88	290.57	312.89
1996	312.02	322.11	318.17	345.12
1997	322.62	336.93	333.44	363.07
1998	324.24	345.01	332.78	354.71
1999	320.67	340.87	330.78	344.78
2000	318.11	332.69	332.10	345.82
2001	325.74	326.37	329.45	346.16
2002	322.16	324.09	332.74	339.93
2003	325.06	328.30	335.40	342.65
2004	336.43	348.33	342.11	352.93
2005	338.45	354.25	347.24	356.11
2006	343.87	360.98	353.84	363.59
2007	364.16	382.28	364.10	382.49
2008	389.65	402.92	384.86	406.21
2009	384.17	405.00	390.55	406.21
2010	395.31	420.39	399.14	421.24

Year	Gansu	Qinghai	Ningxia	Xinjiang
1985	89.53	83.33	88.36	84.78
1986	95.80	88.66	93.66	91.23
1987	103.85	95.58	102.93	99.34
1988	125.24	113.36	121.15	116.23
1989	148.04	132.97	140.78	133.09
1990	150.85	139.22	148.52	139.08
1991	159.45	151.33	158.77	152.01
1992	171.09	164.34	173.54	166.15
1993	197.09	187.35	199.92	188.74
1994	245.58	230.82	249.49	241.02
1995	291.99	276.29	292.66	285.37
1996	322.07	307.79	311.97	315.05
1997	331.08	323.48	324.14	326.08
1998	327.77	325.43	324.14	325.75
1999	318.59	323.80	321.22	318.26
2000	316.05	322.50	320.26	318.58
2001	325.53	332.18	324.42	331.32
2002	323.25	339.15	322.80	327.68
2003	326.16	345.26	327.64	329.32
2004	330.40	352.51	338.45	336.23
2005	334.36	351.45	343.87	338.25
2006	338.38	357.78	349.70	341.63
2007	355.97	380.32	367.53	357.35
2008	384.45	414.17	396.55	383.43
2009	387.91	427.42	397.92	384.04
2010	404.98	449.22	412.83	397.87

Sheet 6.1.2 Rural living cost adjustment index in provinces 1985-2010
Cost of living in Beijing in 1985 serves as the base value

Year	Nation	Beijing	Tianjin	Hebei
1985	76.27	85.23	86.97	76.27
1986	80.92	91.02	92.88	80.39
1987	85.94	98.85	99.20	86.34
1988	100.98	119.02	115.96	101.71
1989	120.47	139.49	133.01	124.29
1990	125.89	147.02	137.00	124.16
1991	128.78	164.52	150.97	126.15
1992	134.84	180.80	168.18	131.07
1993	153.31	215.16	197.78	146.67
1994	189.18	268.73	245.25	176.00
1995	222.29	315.22	282.78	202.05
1996	239.85	351.78	308.23	215.79
1997	245.84	370.43	317.78	223.13
1998	243.39	379.32	316.19	218.89
1999	239.74	381.59	312.71	213.63
2000	239.50	394.95	311.46	211.71
2001	241.41	407.19	315.20	212.98
2002	240.45	399.87	313.94	211.92
2003	244.29	400.66	317.08	216.15
2004	256.02	404.67	324.37	226.53
2005	261.65	410.74	329.24	231.51
2006	265.58	414.44	334.18	235.45
2007	279.92	424.38	348.21	247.41
2008	298.11	446.03	367.02	267.45
2009	297.18	439.34	363.35	268.34
2010	307.88	449.88	376.06	278.03

Year	Shaanxi	Inner Mongolia	Liaoning	Jilin
1985	76.31	77.80	80.61	78.10
1986	79.97	81.30	84.64	82.09
1987	85.25	86.18	89.38	86.44
1988	102.04	99.10	103.59	101.22
1989	125.41	117.24	124.41	120.76
1990	129.17	121.23	129.51	130.66
1991	132.92	124.26	134.95	137.45
1992	139.03	129.10	138.06	142.81
1993	156.69	145.24	153.10	155.38
1994	194.92	176.18	185.10	181.95
1995	228.45	207.89	214.72	210.33
1996	245.13	223.89	229.32	222.53
1997	252.48	233.52	234.14	230.77
1998	248.69	231.65	231.09	228.46
1999	244.96	229.57	227.16	225.26
2000	252.31	232.32	226.48	224.36
2001	253.32	233.49	226.93	225.48
2002	251.55	246.09	223.98	226.16
2003	257.84	254.71	232.27	229.55
2004	271.76	264.64	246.91	241.26
2005	281.82	273.37	256.78	245.84
2006	288.86	278.84	260.89	250.76
2007	305.33	293.34	279.15	266.05
2008	328.84	311.82	294.51	280.16
2009	331.80	311.20	295.39	282.12
2010	341.09	322.09	307.20	293.68

Year	Heilongjiang	Shanghai	Jiangsu	Zhejiang
1985	78.16	90.47	78.49	79.14
1986	84.02	96.17	84.54	83.96
1987	89.56	103.96	91.05	89.34
1988	103.98	124.85	110.53	107.03
1989	119.16	144.70	130.98	128.00
1990	126.67	153.82	134.91	130.56
1991	133.39	169.97	137.47	132.52
1992	141.26	186.97	143.52	138.88
1993	160.61	224.74	168.35	163.05
1994	194.82	278.45	204.88	203.65
1995	226.38	330.52	236.23	237.04
1996	239.51	360.92	253.00	253.64
1997	248.61	371.03	258.06	258.96
1998	247.86	371.03	255.48	257.15
1999	238.69	376.60	252.41	253.29
2000	232.01	386.01	252.67	256.08
2001	232.94	386.01	256.46	256.08
2002	231.77	387.94	256.97	254.29
2003	234.55	388.33	260.05	261.66
2004	246.75	396.87	272.02	273.70
2005	252.43	400.84	278.54	276.98
2006	258.48	405.65	283.28	279.75
2007	272.44	418.63	296.88	292.06
2008	292.06	442.91	313.50	307.54
2009	295.56	441.14	311.93	302.00
2010	310.05	454.84	325.35	313.18

Year	Anhui	Fujian	Jiangxi	Shandong
1985	69.97	82.61	76.25	77.06
1986	74.52	87.07	81.89	80.22
1987	80.71	93.95	86.07	86.16
1988	96.12	118.38	103.02	100.81
1989	114.19	140.75	123.32	119.86
1990	117.39	138.78	126.77	124.65
1991	122.20	142.11	128.42	129.64
1992	131.98	147.94	132.92	135.60
1993	152.30	168.94	149.53	150.11
1994	192.36	212.02	189.46	182.69
1995	218.71	242.56	221.66	215.39
1996	239.92	255.65	240.73	234.77
1997	241.60	258.98	245.78	240.41
1998	241.36	257.68	248.24	238.00
1999	236.53	255.62	243.52	234.67
2000	237.72	258.94	241.33	233.03
2001	240.81	257.13	239.40	238.62
2002	237.68	256.62	239.16	238.38
2003	241.72	259.18	240.60	241.96
2004	253.32	270.33	249.02	253.09
2005	258.13	277.90	254.50	259.16
2006	260.45	278.73	258.57	261.76
2007	274.00	293.78	273.57	275.63
2008	291.53	307.30	290.80	292.72
2009	289.86	300.84	288.47	292.94
2010	299.71	311.07	298.03	301.43

Year	Henan	Hubei	Hunan	Guangdong
1985	76.85	73.61	73.10	96.44
1986	80.16	76.71	76.97	101.55
1987	84.40	81.61	83.75	111.40
1988	99.68	95.65	105.02	144.04
1989	121.61	113.06	125.08	176.30
1990	122.71	117.02	125.33	172.07
1991	122.71	121.23	130.09	171.90
1992	126.26	131.05	140.37	182.04
1993	139.27	154.12	163.39	219.54
1994	172.00	191.26	205.22	268.94
1995	200.03	229.32	245.24	310.08
1996	221.84	247.43	265.34	330.24
1997	230.49	256.34	271.98	335.19
1998	223.80	253.78	272.25	328.82
1999	217.31	249.46	276.06	321.26
2000	215.58	244.97	279.93	321.26
2001	217.09	244.48	277.97	319.97
2002	218.39	246.44	276.30	315.50
2003	221.45	249.64	287.63	316.76
2004	233.40	264.12	304.02	328.48
2005	238.31	272.84	312.53	337.35
2006	241.88	278.02	316.29	342.74
2007	254.94	292.20	338.11	354.74
2008	275.08	313.82	363.13	375.31
2009	276.18	313.82	361.68	367.06
2010	286.67	323.55	373.25	378.80

Year	Guangxi	Hainan	Chongqing	Sichuan
1985	75.97	76.97	66.13	66.06
1986	80.68	80.90	68.91	69.17
1987	85.36	88.83	75.66	73.04
1988	101.06	112.28	92.84	86.55
1989	124.61	143.15	108.71	104.99
1990	130.10	154.75	110.24	110.24
1991	134.00	160.32	117.95	112.55
1992	141.23	165.77	131.16	117.73
1993	168.21	193.12	155.69	137.39
1994	212.79	247.59	201.93	168.30
1995	252.36	293.14	241.10	199.10
1996	271.04	303.99	264.49	217.22
1997	273.21	304.90	273.22	228.08
1998	264.46	294.53	263.38	226.94
1999	259.70	286.58	261.54	224.67
2000	258.41	287.15	252.91	226.02
2001	257.37	282.27	257.21	232.12
2002	255.57	282.84	256.18	232.12
2003	258.89	285.38	257.72	234.21
2004	271.58	303.65	267.25	246.39
2005	275.92	308.81	269.39	250.33
2006	278.45	315.91	275.86	256.09
2007	297.38	335.50	288.82	271.45
2008	322.66	365.02	305.00	286.65
2009	314.59	361.37	300.12	289.41
2010	325.29	382.33	309.72	298.28

Year	Guizhou	Yunnan	Tibet	Shaanxi
1985	79.96	78.66	88.73	79.17
1986	83.64	83.69	94.28	83.37
1987	88.49	89.22	98.85	88.62
1988	103.71	105.99	112.59	103.51
1989	123.21	126.13	133.03	125.25
1990	126.66	130.42	139.28	127.88
1991	133.12	133.94	151.68	134.66
1992	142.30	145.73	164.57	144.49
1993	165.36	179.68	183.66	163.27
1994	204.38	215.44	239.86	204.42
1995	254.86	262.40	281.83	245.09
1996	274.74	285.49	299.03	268.62
1997	284.09	296.63	315.77	279.37
1998	282.95	299.89	320.51	277.41
1999	282.10	301.99	322.11	272.97
2000	282.66	297.16	321.47	270.24
2001	285.77	298.94	324.36	278.08
2002	283.77	300.43	324.04	279.19
2003	289.45	303.44	326.95	288.96
2004	304.79	321.34	338.07	298.21
2005	311.19	324.55	341.11	303.58
2006	317.41	330.40	349.30	304.79
2007	340.90	349.89	363.97	320.34
2008	370.90	370.88	384.71	341.80
2009	367.28	371.71	389.54	347.95
2010	377.93	385.09	398.11	364.31

Year	Gansu	Qinghai	Ningxia	Xinjiang
1985	75.55	73.43	74.81	75.52
1986	80.08	77.61	78.62	80.66
1987	85.29	81.65	82.79	84.29
1988	98.94	94.87	95.79	94.06
1989	116.35	111.95	113.51	111.28
1990	121.82	120.46	123.72	117.84
1991	127.30	126.73	130.28	127.15
1992	135.45	135.09	138.75	136.82
1993	156.85	149.27	157.89	151.59
1994	193.70	180.17	192.00	190.40
1995	233.03	208.46	223.49	233.24
1996	255.63	226.80	238.91	257.97
1997	263.04	236.33	247.27	268.03
1998	260.15	238.69	246.77	270.17
1999	255.47	237.74	242.09	261.53
2000	255.72	236.31	240.88	255.25
2001	269.79	239.15	246.17	264.95
2002	272.22	246.08	244.70	267.33
2003	276.03	252.24	249.59	267.87
2004	287.90	266.11	260.82	279.92
2005	296.53	274.36	263.95	283.28
2006	300.68	277.38	270.11	288.95
2007	319.63	297.62	286.04	309.75
2008	347.43	334.23	314.29	339.18
2009	355.08	339.91	319.07	345.94
2010	367.86	359.63	333.86	366.01

6.2 Cross-province human capital comparison

Figure 6.2.1 shows the provincial comparison of nominal human capital. [34] Guangdong ranks the highest, followed by Jiangsu, and Hainan ranks the lowest. The notable features of the differences across provinces are: (1) Population plays a dominant role in influencing total human capital, in spite of other provincial differences in educational attainment, age structure, and income level. Provinces with larger populations such as Jiangsu, Henan, Shandong, Guangdong, and Hunan rank relatively higher. (2) The relative ranking of provinces basically remains the same, although the gap keeps growing. As shown in the figure, the ranking of human capital in 2010 is quite similar to that in 1985, 1995 and 2005. This implies that it might be difficult for one province to surpass another over time. In addition, the gap enlarges over time.
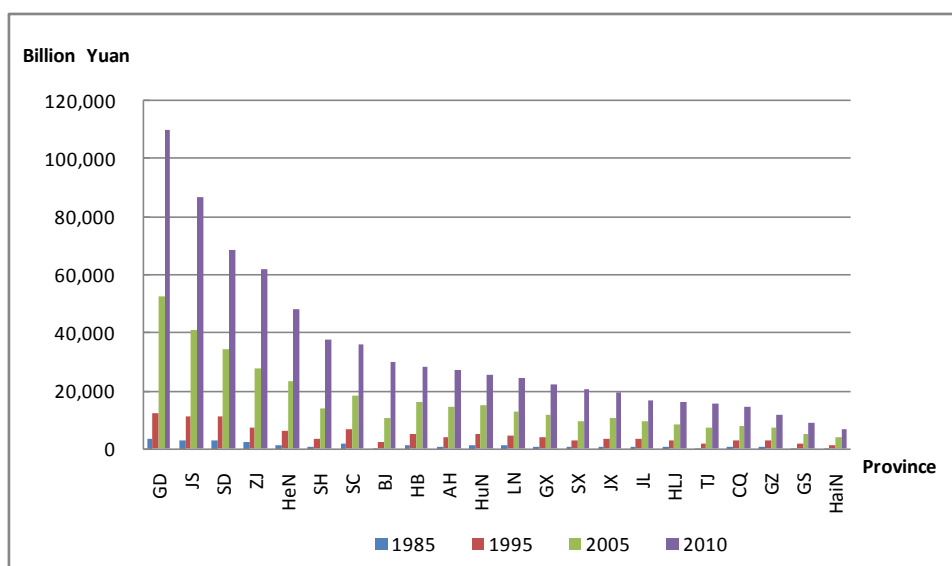
Figure 6.2.1 Provincial Nominal Human Capital

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[34] We order provinces by the size of 2010 human capital indicators in all the cross-province comparison figures below.

Figure 6.2.2 presents the provincial comparison of real human capital. Real human capital is created by deflating nominal human capital by a living cost index based on Brandt and Holz (2006).[35,36]We use their living cost index and update it over time using provincial CPI to construct a deflator that is comparable across provinces and over time. Accordingly, the real values of provincial human capital using the above deflator are comparable. The ranking of real human capital is similar to the nominal ranking: Guangdong has the largest real human capital, followed by Jiangsu, and Hainan ranks the lowest. As the living cost index is positively correlated with the stage of development, adjustments by a living cost index to some extent narrow the gap between developed and developing provinces. For example, Shanghai and Beijing's rankings clearly drop compared with their nominal human capital rankings.
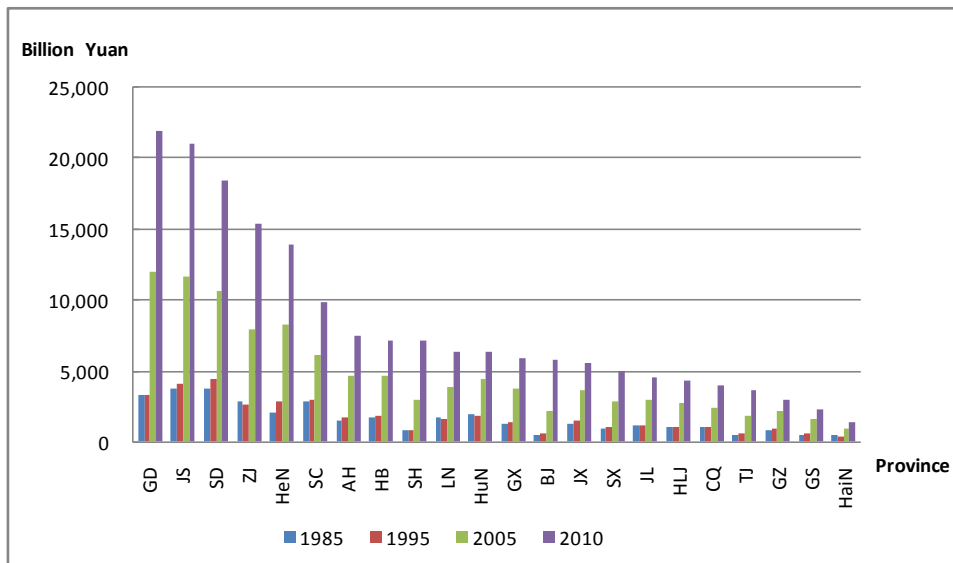
Figure 6.2.2 Provincial Real Human Capital

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[35] Brandt, Loren, Holz, Carsten, 2006. Spatial price differences in China: estimates and implications. Economic Development and Cultural Change 55, 43–86.

[36] Specifically, the living cost index we use here is based on a package of commodities of 1985 in Beijing, other provinces and years are adjusted correspondingly.
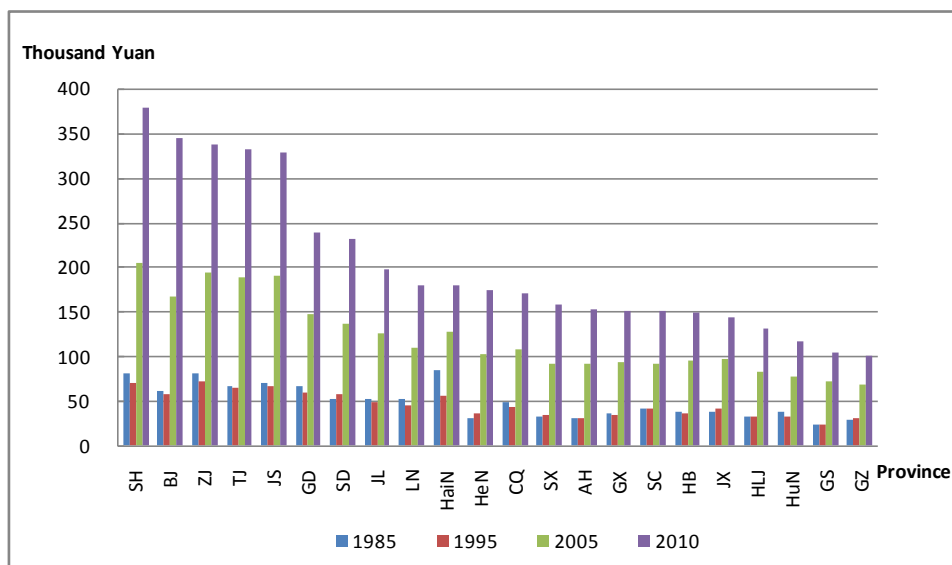
Figure 6.2.3 Provincial Real Human Capital Per Capita

Figure 6.2.3 shows the provincial comparison of real human capital per capita. The provincial ranking of real human capital per capita is obviously different from that of provincial real human capital. Shanghai, Beijing and Zhejiang rank the top three, Guizhou ranks the last. We conclude that the ranking is closely related to the development stage of the provinces. Real human capital per capita is directly influenced by income level and income growth rates. The ranking is also influenced by education level and population structure.

6.3 Cross-province labor force human capital comparison

Figure 6.3.1 displays provincial real labor force human capital. Overall, Guangdong has the largest real labor force human capital, followed by Jiangsu and Shandong; Gansu has the least. Real labor force human capital ranking could change because of the different sizes of the provincial labor force population and the human capital population. This might explain why Zhejiang ranks higher than Shandong in this category.
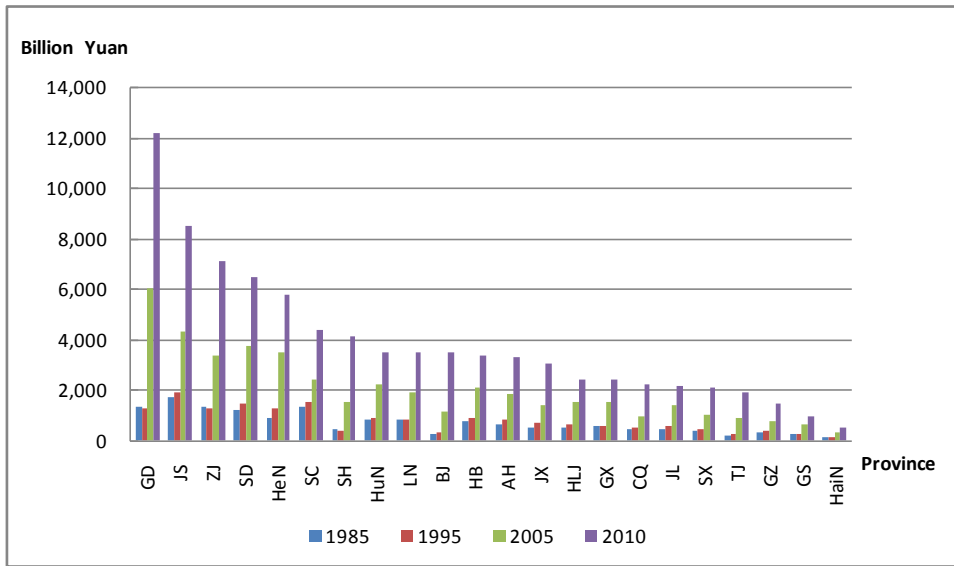
Figure 6.3.1 Provincial Real Labor Force Human Capital

Figure 6.3.2 shows the provincial comparison for real average labor force human capital. Average labor force human capital rankings are almost the same as those for real human capital per capita: Shanghai remains first, Beijing and Tianjin follows, Gansu stays in the last place.
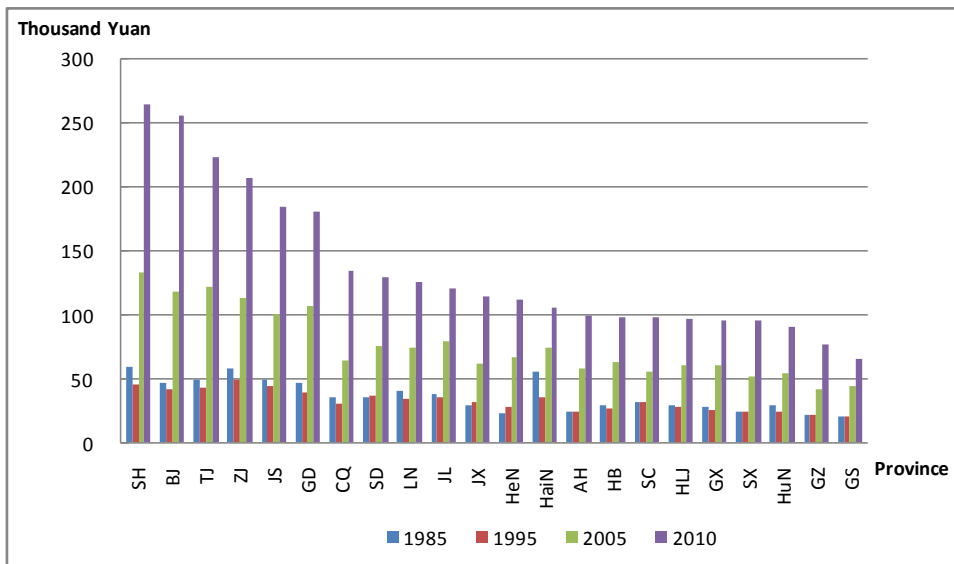
Figure 6.3.2 Provincial Real Average Labor Force Human Capital

6.4 Relative trend of human capital

Figure 6.4.1 shows the ratios of nominal labor force human capital to total nominal human capital by province. The ratios reflect age structures, as human capital of the young and more-educated population will be higher than that of the old and less-educated population. In general, for provinces with low ratios and relatively small young populations, the development of the province might rely to a greater extent on inflows from other provinces. On the other hand, labor forces in more developed provinces tend to be more educated, and therefore the ratio is usually larger. In 2010 Beijing ranks the first; Shanghai follows, Shandong ranks the last.
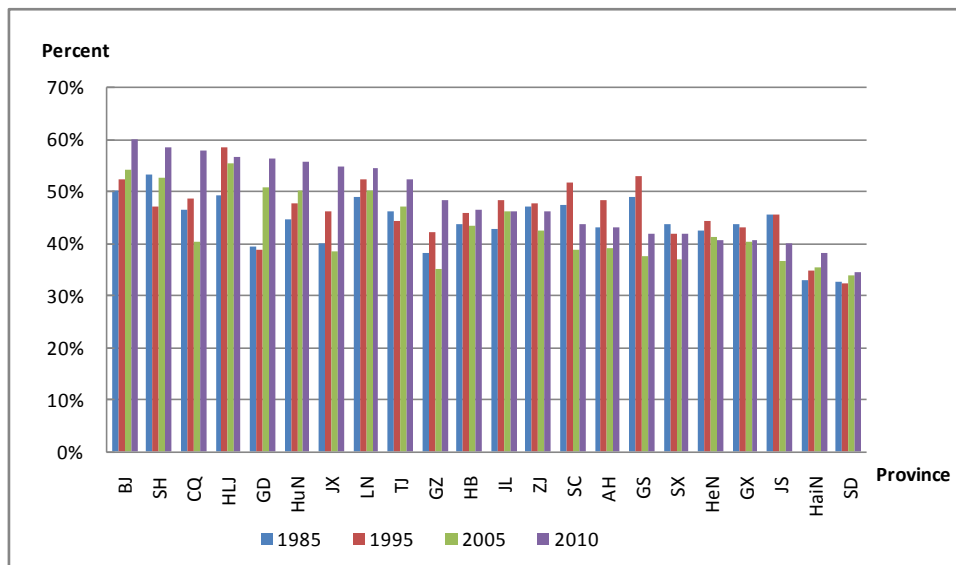
Figure 6.4.1 Ratio of Nominal Labor Force Human Capital to Total Nominal Human Capital

Figure 6.4.2 shows ratios of provincial nominal GDP to nominal labor force human capital. Shandong ranks the first in 2010, Liaoning and Hubei follows, Guangdong ranks the last. This indicates that more developed provinces have increased human capital productivity earlier than other provinces. The ratios for most provinces are rising, reflecting catching up in other provinces.
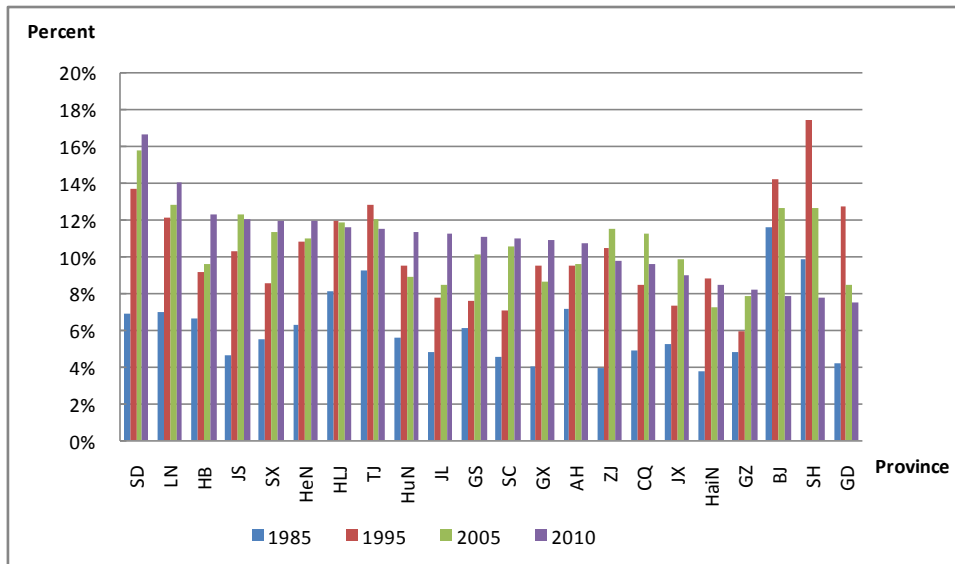
Figure 6.4.2 Ratio of Nominal GDP to Nominal Labor Force Human Capital

Chapter 7   Human Capital for Beijing

1. Total human capital

Human capital stocks of Beijing are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table BJ-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).37 Column 5 is the real physical capital for Beijing.

Table BJ-1.1 Real physical capital, Nominal and Real Human Capital for Beijing

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	442		442		51
1986	518		485		60
1987	605		521		71
1988	730		523		83
1989	872		533		95
1990	1,044		606		110
1991	1,189		616		125
1992	1,357		640		144
1993	1,557		617		172
1994	1,764		560		216
1995	2,033		550		275

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37 Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	2,383		577		341
1997	2,782		640		418
1998	3,285		738		502
1999	3,810		851		593
2000	4,539	4,872	980	1,051	692
2001	5,307	5,672	1,111	1,187	800
2002	6,305	6,730	1,344	1,434	923
2003	7,515	7,985	1,599	1,699	1,051
2004	8,909	9,471	1,876	1,995	1,214
2005	10,231	10,979	2,123	2,279	1,415
2006	13,281	14,140	2,730	2,909	1,636
2007	16,697	17,865	3,352	3,588	1,889
2008	20,699	22,206	3,954	4,243	2,109
2009	25,472	27,394	4,942	5,314	2,372
2010	30,117	33,619	5,705	6,369	2,691

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table BJ-2.1 presents the trend of human capital per capita for Beijing

by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 5.16 times from 66,820 Yuan to 411,360 Yuan. For female, it increases almost 4.59 times from 46,520 Yuan to 259,598 Yuan. From 1985 to 2010, the average annual growth rate is 5.89% for male, and 5.53% for female.

Table BJ-2.1 Nominal and Real Human Capital Per Capita by Gender for Beijing

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	57.58	66.82	46.52	57.58	66.82	46.52
1986	65.35	76.10	52.53	61.18	71.25	49.17
1987	74.11	86.69	59.22	63.89	74.75	51.08
1988	83.61	98.20	66.67	59.88	70.33	47.75
1989	94.14	110.77	75.17	57.52	67.69	45.92
1990	106.53	125.73	84.81	61.76	72.88	49.18
1991	120.88	142.97	96.08	62.62	74.06	49.78
1992	137.92	163.11	109.85	65.00	76.89	51.77
1993	158.46	188.27	125.48	62.77	74.58	49.70
1994	179.82	214.86	141.44	57.05	68.14	44.85
1995	203.03	244.30	158.15	54.89	66.05	42.75
1996	230.49	277.42	178.77	55.84	67.19	43.31
1997	261.46	316.10	200.36	60.16	72.71	46.10
1998	300.94	363.02	230.02	67.61	81.58	51.70
1999	339.85	409.82	259.11	75.90	91.53	57.87
2000	390.31	468.16	298.52	84.23	101.02	64.41
2001	445.33	535.42	342.24	93.22	112.07	71.64
2002	517.25	624.14	396.50	110.28	133.01	84.53
2003	604.20	731.68	461.14	128.55	155.65	98.08
2004	703.10	851.42	538.01	148.07	179.30	113.31
2005	793.18	962.06	607.38	164.61	199.57	126.03
2006	974.80	1184.50	742.36	200.39	243.58	152.68
2007	1160.92	1404.98	887.38	233.08	282.13	178.19

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2008	1370.42	1654.78	1047.96	261.80	316.22	200.21
2009	1609.05	1939.97	1230.94	312.18	376.32	238.86
2010	1801.36	2171.66	1372.69	341.20	411.36	259.98

Figure BJ-2.1 shows that the real human capital per capita of male is larger than that of female for Beijing from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.

Figure BJ-2.1 Real Human Capital Per Capita by Gender for Beijing

Table BJ-2.2 reports the results of human capital per capita by region for Beijing in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 59,280 Yuan to 372,860 Yuan, the per capita rural human capital increases from 53,650

Yuan to 14,960 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table BJ-2.2 Nominal and Real Human Capital Per Capita by Region for Beijing

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	57.58	59.28	53.65	57.58	59.28	53.65
1986	65.35	67.68	59.69	61.18	63.37	55.89
1987	74.11	76.98	66.93	63.89	66.37	57.70
1988	83.61	87.18	74.26	59.88	62.43	53.18
1989	94.14	98.73	81.50	57.52	60.33	49.80
1990	106.53	112.61	89.24	61.76	65.28	51.73
1991	120.88	128.78	98.66	62.62	66.71	51.11
1992	137.92	148.58	108.10	65.00	70.04	50.96
1993	158.46	172.72	119.11	62.77	68.42	47.18
1994	179.82	197.84	130.42	57.05	62.75	41.36
1995	203.03	224.87	142.90	54.89	60.80	38.64
1996	230.49	256.75	154.81	55.84	62.20	37.51
1997	261.46	292.30	169.05	60.16	67.25	38.90
1998	300.94	338.22	184.06	67.61	75.99	41.36
1999	339.85	382.56	200.26	75.90	85.44	44.73
2000	390.31	440.40	219.52	84.23	95.04	47.37
2001	445.33	500.26	241.02	93.22	104.71	50.45
2002	517.25	578.91	267.16	110.28	123.39	56.94
2003	604.20	673.86	296.52	128.55	143.34	63.07
2004	703.10	779.88	334.79	148.07	164.25	70.51
2005	793.18	874.62	374.60	164.61	181.48	77.73
2006	974.80	1071.85	427.59	200.39	220.42	87.93
2007	1160.92	1274.79	490.98	233.08	256.01	98.60

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2008	1370.42	1500.47	565.15	261.80	286.71	107.99
2009	1609.05	1760.21	651.01	312.18	341.47	126.29
2010	1801.36	1968.19	744.08	341.20	372.86	140.96

Figure BJ-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 1.10 in 1985 to 2.65 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 8.08% for the urban area, and 2.29% for the rural area.
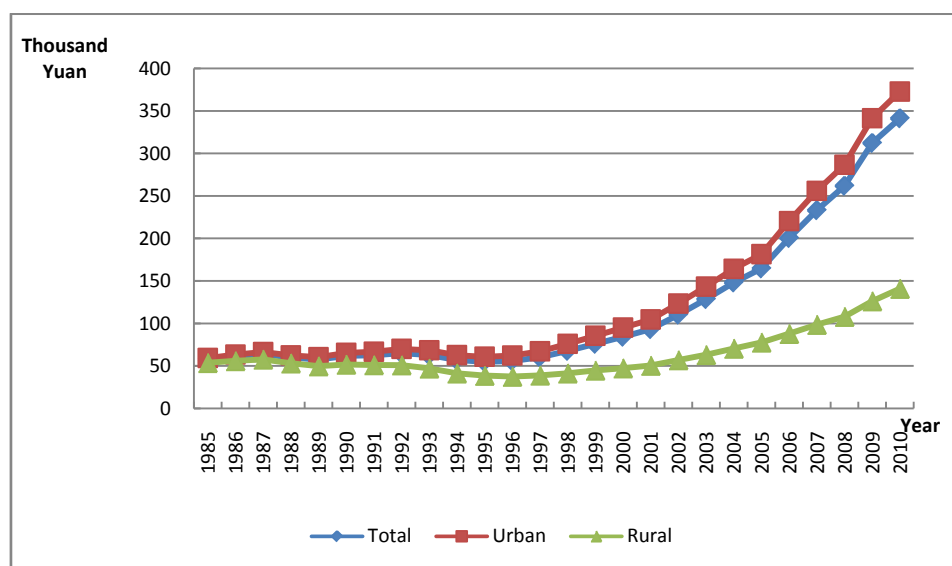
Figure BJ-2.2 Real Human Capital Per Capita by Region for Beijing

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Beijing is reported in Table BJ-3.1. The real values in this table are calculated by using CPI as the deflator.

Table BJ-3.1 Nominal and Real Labor Force Human Capital for Beijing

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	222		222	
1986	258		242	
1987	305		263	
1988	379		271	
1989	467		285	
1990	582		337	
1991	656		340	
1992	732		345	
1993	822		326	
1994	921		292	
1995	1,062		287	
1996	1,237		300	
1997	1,487		342	
1998	1,817		408	
1999	2,164		483	
2000	2,625	2,547	566	550

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
2001	2,995	2,956	627	619
2002	3,562	3,529	759	752
2003	4,264	4,239	907	902
2004	4,972	4,967	1,047	1,046
2005	5,536	5,727	1,149	1,188
2006	7,590	7,582	1,561	1,559
2007	9,743	9,734	1,957	1,955
2008	12,362	12,352	2,363	2,361
2009	15,501	15,488	3,007	3,004
2010	18,076	19,143	3,425	3,627

The trend of Real Human Capital and Real Labor Force Human Capital for Beijing is presented in Figure BJ-3.1. Before 2000, Real Human Capital Real Labor Force Human Capital Sometimes increased slowly. After 2000, Real Human Capital Real Labor Force Human Capital increase rapidly.

Figure BJ-3.1 Real Human Capital and Real Labor Force Human Capital for Beijing

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table BJ-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.63 times that for female in 2010.

Table BJ-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Beijing

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1985	43.98	51.61	34.81	43.98	51.61	34.81

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1986	49.43	58.50	38.63	46.28	54.76	36.17
1987	56.01	66.64	43.43	48.29	57.44	37.45
1988	63.74	75.92	49.67	45.63	54.35	35.57
1989	72.56	86.44	56.84	44.33	52.82	34.73
1990	83.31	99.57	65.02	48.29	57.71	37.69
1991	93.56	111.90	73.12	48.47	57.98	37.88
1992	104.66	125.21	82.05	49.34	59.03	38.69
1993	118.04	141.81	92.22	46.76	56.18	36.53
1994	132.58	160.01	103.09	42.05	50.76	32.70
1995	148.92	180.57	115.27	40.27	48.83	31.17
1996	168.60	205.70	128.11	40.84	49.85	31.04
1997	193.79	237.74	144.72	44.58	54.70	33.30
1998	223.56	275.88	163.89	50.24	61.98	36.82
1999	253.58	313.03	184.34	56.64	69.90	41.16
2000	290.90	359.91	208.31	62.78	77.68	44.94
2001	328.30	404.78	239.40	68.71	84.74	50.11
2002	381.42	470.87	279.58	81.31	100.35	59.58
2003	445.62	552.24	324.21	94.78	117.47	68.97
2004	511.32	634.40	372.67	107.70	133.62	78.49
2005	558.97	695.37	407.27	116.02	144.27	84.50
2006	717.17	885.08	529.99	147.48	182.00	108.98
2007	864.70	1058.53	645.94	173.69	212.62	129.72
2008	1028.08	1250.94	774.04	196.48	238.97	147.91
2009	1213.52	1472.91	913.21	235.39	285.75	177.14
2010	1328.02	1614.22	990.96	251.65	305.80	187.69

Table BJ-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.16 times that for rural in 2010.

Table BJ-3.3 Nominal and Real Average Labor Force Human Capital by Region for Beijing

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	43.98	44.96	41.21	43.98	44.96	41.21
1986	49.43	50.61	46.02	46.28	47.39	43.09
1987	56.01	57.51	51.60	48.29	49.58	44.49
1988	63.74	65.82	57.18	45.63	47.13	40.95
1989	72.56	75.42	63.21	44.33	46.08	38.62
1990	83.31	87.13	70.45	48.29	50.51	40.84
1991	93.56	98.43	77.70	48.47	50.99	40.25
1992	104.66	110.90	85.06	49.34	52.28	40.09
1993	118.04	126.15	93.60	46.76	49.97	37.08
1994	132.58	142.90	102.43	42.05	45.32	32.49
1995	148.92	161.81	112.25	40.27	43.75	30.35
1996	168.60	184.12	122.73	40.84	44.61	29.73
1997	193.79	212.71	135.55	44.58	48.94	31.19
1998	223.56	246.22	150.28	50.24	55.32	33.76
1999	253.58	279.64	165.37	56.64	62.46	36.93
2000	290.90	321.65	181.87	62.78	69.41	39.25
2001	328.30	362.14	201.32	68.71	75.80	42.14
2002	381.42	420.93	224.10	81.31	89.72	47.77
2003	445.62	491.41	250.62	94.78	104.53	53.31
2004	511.32	562.57	279.47	107.70	118.48	58.86
2005	558.97	610.46	312.37	116.02	126.67	64.81
2006	717.17	784.86	365.83	147.48	161.40	75.23
2007	864.70	945.72	425.46	173.69	189.93	85.44
2008	1028.08	1121.20	494.82	196.48	214.24	94.55
2009	1213.52	1320.93	576.39	235.39	256.25	111.81
2010	1328.02	1440.13	667.26	251.65	272.82	126.41

Chapter 8　　Human capital for Tianjin

1. Total human capital

Human capital stocks of Tianjin are calculated using estimated income parameters and a 4.58% discount rate. The results are reported in Table TJ-1.1. Column 1 and column 2 contain the nominal human capital; column 3 and column 4 contain the real human capital deflated by CPI (in 1985 Yuan).[38] Column 5 is the real physical capital for Tianjin.

Table TJ-1.1 Real physical capital, Nominal and Real Human Capital for Tianjin

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	412		412		36
1986	474		443		43
1987	543		476		49
1988	638		478		56
1989	739		483		63
1990	889		565		71
1991	1,001		577		82
1992	1,132		586		95
1993	1,290		567		111
1994	1,459		518		134
1995	1,653		508		163

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[38] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	1,859		524		195
1997	2,096		574		239
1998	2,365		651		285
1999	2,707		753		331
2000	3,131	3,211	874	896	381
2001	3,684	3,788	1,016	1,045	433
2002	4,345	4,472	1,204	1,239	491
2003	5,118	5,224	1,403	1,433	560
2004	5,982	6,127	1,604	1,643	651
2005	6,938	7,171	1,832	1,894	761
2006	8,346	8,683	2,172	2,259	896
2007	9,895	10,436	2,471	2,606	1,066
2008	11,581	12,241	2,744	2,901	1,309
2009	13,516	14,297	3,236	3,423	1,641
2010	15,371	16,497	3,554	3,815	2,063

2. Human capital per capita

The increase in the human capital can be caused by population growth, demographic change (like retirement population scale), urbanization (like region migration), higher educational attainment, higher return to education, higher return to on-the-job training, etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital divided by non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factors to a large extent, thus it can serve as a better indicator of the average human capital.

Table TJ-2.1 presents the trends of human capital per capita

measured in nominal and real terms for Tianjin classified by gender. Human capital per capita for male remains higher than that for female. Real human capital per capita values for male increases from 64,802 Yuan to 328,429 Yuan, increasing by around 5.00 times; real human capital per capita for female increases from 48,941 Yuan to 236,411 Yuan, increasing by around 4.70 times.

Table TJ-2.1 Nominal and Real Human Capital Per Capita by Gender for Tianjin

Year	Nominal human capital per capita (Thousands of Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	64.80	78.84	48.94	64.80	78.84	48.94
1986	72.64	88.64	54.57	68.00	82.99	51.10
1987	81.30	99.80	60.62	71.28	87.51	53.14
1988	91.97	113.58	67.85	68.98	85.21	50.89
1989	103.14	127.88	75.64	67.45	83.62	49.44
1990	115.00	143.31	83.68	73.00	90.99	53.12
1991	127.92	159.44	93.22	73.68	91.84	53.69
1992	143.16	178.68	104.26	74.03	92.38	53.89
1993	161.73	202.65	117.10	71.11	89.10	51.50
1994	181.56	228.22	130.95	64.39	80.93	46.44
1995	204.04	256.92	146.90	62.74	79.02	45.17
1996	226.19	285.52	161.94	63.81	80.57	45.68
1997	252.31	319.45	179.50	69.05	87.43	49.12
1998	281.42	357.00	198.99	77.42	98.21	54.73
1999	318.35	403.38	225.15	88.53	112.19	62.62
2000	361.32	455.94	256.76	100.89	127.30	71.69
2001	412.91	519.60	293.24	113.91	143.35	80.91
2002	473.85	595.65	335.66	131.28	165.00	92.97
2003	543.76	681.97	384.28	149.10	187.08	105.38
2004	620.29	774.15	440.22	166.32	207.53	118.01

2005	702.72	875.56	497.94	185.58	231.29	131.54
2006	829.82	1031.44	589.01	215.99	268.47	153.25
2007	965.12	1192.50	690.47	241.01	297.85	172.44
2008	1110.30	1363.21	800.07	263.11	322.96	189.60
2009	1275.63	1564.09	918.26	305.45	374.37	219.75
2010	1420.31	1734.43	1022.10	328.42	401.13	236.41

Figure TJ-2.1 shows that the real human capital per capita for male is higher than that for female for Tianjin from 1985 to 2010. Before 1997, different human capital all grow quite slowly, starting from 1997, both the growth of human capital for male and female accelerate, the gender gap, which has been fairly stable, then appears to be expanding.
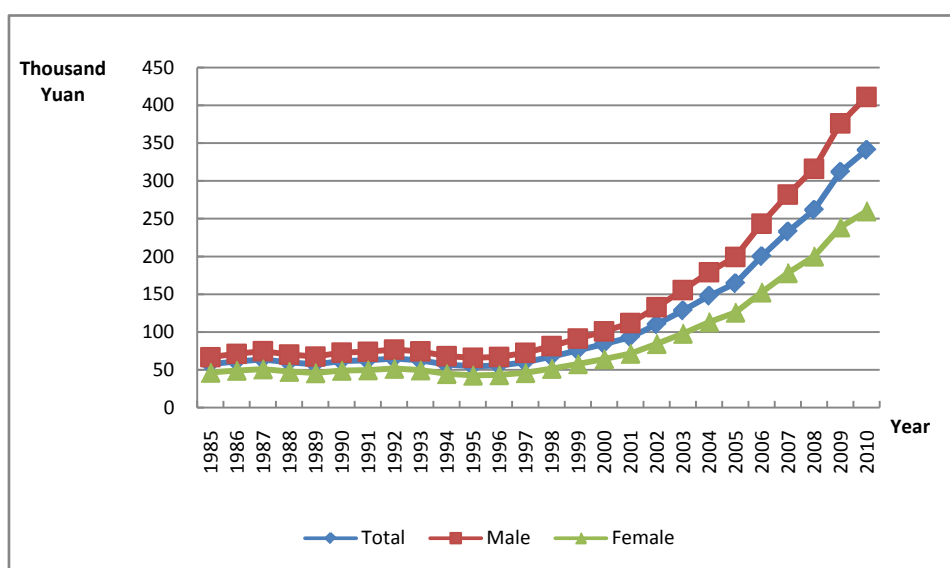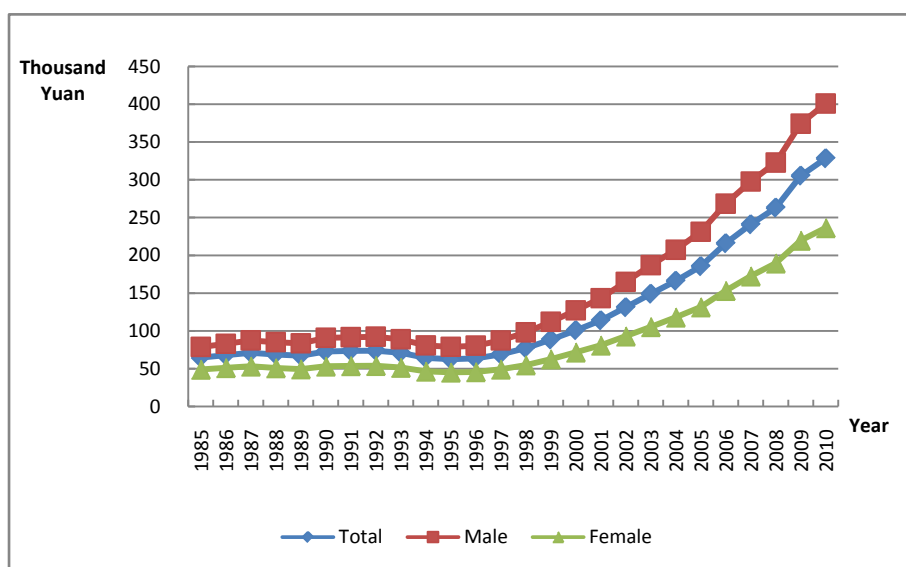

Figure TJ-2.1 Human Capital Per Capita by Gender for Tianjin

Table TJ-2.2 reports the results of human capital per capita measured in nominal and real terms for Tianjin classified by region.

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From 1985 to 2010, the human capital per capita in urban areas is significantly larger than that for rural. The real urban human capital per capita increases from 77,917 Yuan to 424,211 Yuan, the rural human capital per capita increases from 48,932 Yuan to 174,731 Yuan. The human capital per capita in urban areas grows much faster than the one for rural.

Table TJ-2.2 Nominal and Real Human Capital Per Capita by Region for Tianjin

Year	Nominal human capital per capita (Thousands of 1985 Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	64.80	77.91	48.93	64.80	77.91	48.93
1986	72.64	87.54	54.92	68.00	81.97	51.42
1987	81.30	97.55	62.06	71.28	85.53	54.41
1988	91.97	110.32	69.54	68.98	82.74	52.15
1989	103.14	123.88	77.55	67.45	81.00	50.71
1990	115.00	137.94	86.80	73.00	87.56	55.10
1991	127.92	153.43	96.38	73.68	88.38	55.52
1992	143.16	172.41	106.88	74.03	89.16	55.27
1993	161.73	196.00	119.05	71.11	86.19	52.35
1994	181.56	221.08	132.11	64.39	78.40	46.85
1995	204.04	249.13	147.33	62.74	76.62	45.31
1996	226.19	277.36	160.80	63.81	78.26	45.37
1997	252.31	311.27	176.34	69.05	85.19	48.26
1998	281.42	349.71	191.95	77.42	96.19	52.79
1999	318.35	399.04	209.96	88.53	110.98	58.39
2000	361.32	455.28	233.63	100.89	127.13	65.24
2001	412.91	525.52	258.09	113.91	145.00	71.21
2002	473.85	607.25	287.34	131.28	168.22	79.60
2003	543.76	699.09	320.95	149.10	191.74	88.03

2004	620.29	798.23	361.03	166.32	214.01	96.80
2005	702.72	903.74	408.45	185.58	238.72	107.89
2006	829.82	1076.93	458.33	215.99	280.27	119.28
2007	965.12	1256.90	517.59	241.01	313.92	129.27
2008	1110.30	1448.98	583.52	263.11	343.35	138.27
2009	1275.63	1664.52	663.13	305.45	398.41	158.72
2010	1420.31	1834.34	755.56	328.42	424.21	174.73

Figure TJ-2.2 reflects the trend of human capital per capita measured in real terms and classified by region. As is shown in the graph, the size of the difference between urban and rural expanded rapidly after 1997. Based on five education categories, the ratio of urban to rural increases from 1.59 in 1985 to 2.43 in 2010, which indicates a rising size of region gap of human capital per capita.

Figure TJ-2.2 Real Human Capital Per Capita by Region for Tianjin

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimated approach of labor force human capital is the same as that of human capital we illustrated above. Based on the income parameter for Tianjin and the discount rate valued at 4.58%，the labor force human capital for Tianjin is reported in Table TJ-3.1. The real values in this table are calculated by using CPI as the deflator with respect to nominal values. We also calculate the ratio of labor force human capital measured in nominal terms to nominal GDP. The results are reported in the last column of Table TJ-3.1.

Table TJ-3.1 Nominal and Real Labor Force Human Capital and GDP for Tianjin

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	190		190	
1986	222		208	
1987	262		230	
1988	301		226	
1989	344		225	
1990	417		264	
1991	468		270	
1992	519		269	
1993	580		255	
1994	650		230	

Year				
1995	731		225	
1996	815		230	
1997	924		253	
1998	1,069		294	
1999	1,233		343	
2000	1,441	1,432	402	400
2001	1,703	1,696	470	468
2002	2,043	2,037	566	565
2003	2,434	2,434	668	668
2004	2,854	2,848	765	763
2005	3,264	3,296	862	871
2006	4,110	4,099	1,070	1,067
2007	4,999	4,984	1,249	1,245
2008	6,000	5,983	1,421	1,418
2009	7,151	7,126	1,712	1,706
2010	8,009	8,178	1,852	1,892

The trends of human capital in both real term and real labor force for Tianjin are presented in Figure TJ-3.1. From 1985 to 2010, labor force human capital keeps rising.

Figure TJ-3.1 Real human capital and real labor force human capital for Tianjin,1985-2010

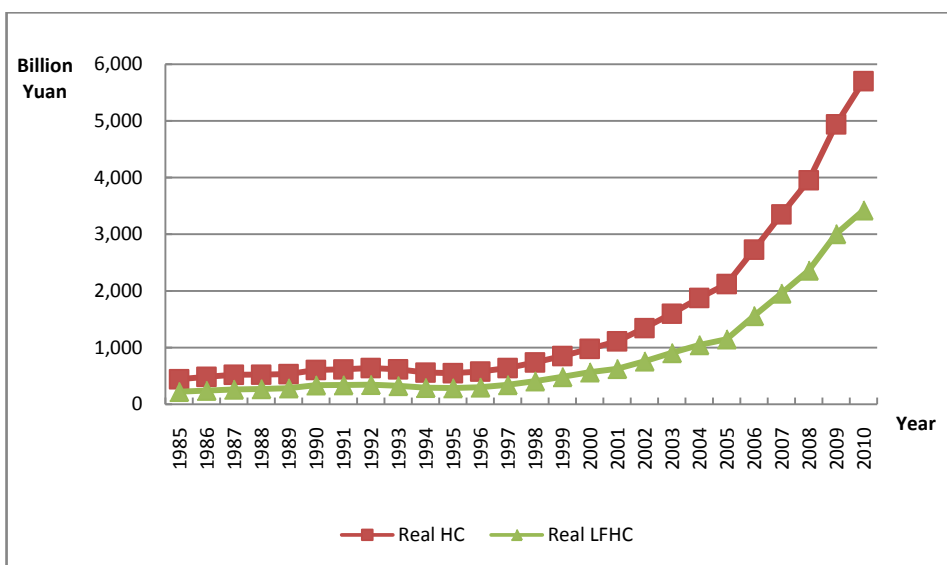## 3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. Here the average labor force human capital means labor force human capital divided by the number of the population that are over 15 years old, non-retired and out of school.

Table TJ-3.2 reports the real average labor force human capital classified by gender. And the average labor force human capital for female is smaller than that for male. More specifically, the number for male is about 1.82 times that for female in 2010.

Table TJ-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Tianjin

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1985	46.87	56.04	36.61	46.87	56.04	36.61
1986	52.68	63.52	40.60	49.33	59.48	38.02
1987	59.59	72.53	45.29	52.25	63.57	39.70
1988	66.07	81.05	49.64	49.55	60.78	37.23
1989	73.14	90.18	54.51	47.81	58.97	35.64
1990	81.86	101.66	60.24	51.96	64.53	38.24
1991	90.45	112.54	66.50	52.10	64.81	38.29
1992	99.16	123.85	72.53	51.28	64.05	37.52
1993	109.43	137.63	79.29	48.11	60.50	34.87
1994	121.07	153.24	86.85	42.92	54.34	30.80
1995	134.01	170.74	95.20	41.22	52.50	29.28
1996	147.10	188.33	103.36	41.50	53.15	29.16

1997	163.29	209.93	113.55	44.69	57.45	31.08
1998	183.47	237.03	126.08	50.47	65.17	34.67
1999	205.81	266.77	139.83	57.25	74.18	38.88
2000	232.24	301.08	156.89	64.86	84.06	43.81
2001	266.29	344.23	179.67	73.49	94.99	49.59
2002	308.46	397.73	207.40	85.45	110.14	57.46
2003	354.90	456.61	237.31	97.35	125.24	65.08
2004	403.63	517.15	269.51	108.22	138.65	72.26
2005	449.09	576.69	295.79	118.63	152.33	78.14
2006	545.44	693.92	364.96	141.97	180.59	94.97
2007	642.48	811.13	433.57	160.48	202.57	108.29
2008	746.98	937.92	505.11	176.96	222.26	119.70
2009	865.72	1083.84	584.34	207.25	259.41	139.88
2010	944.19	1180.34	633.02	218.31	273.02	146.39

Table TJ-3.3 reports the real average Labor force human capital classified by region separately. The average labor force human capital is much smaller in rural area than in urban area. The number for urban is about 1.91 times that for rural in 2010.

Table TJ-3.3 Nominal and Real Average Labor Force Human Capital by Region for Tianjin

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	46.87	53.96	36.05	46.87	53.96	36.05
1986	52.68	60.84	40.71	49.33	56.97	38.11
1987	59.59	68.95	45.89	52.25	60.45	40.23
1988	66.07	76.47	50.68	49.55	57.35	38.01
1989	73.14	84.88	55.92	47.81	55.50	36.56
1990	81.86	95.42	62.08	51.96	60.57	39.41

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1991	90.45	105.16	68.89	52.10	60.58	39.68
1992	99.16	115.12	76.18	51.28	59.53	39.39
1993	109.43	127.07	84.52	48.11	55.87	37.16
1994	121.07	140.70	93.50	42.92	49.89	33.16
1995	134.01	155.61	103.59	41.22	47.86	31.86
1996	147.10	170.76	113.76	41.50	48.18	32.10
1997	163.29	190.21	125.63	44.69	52.06	34.38
1998	183.47	214.93	138.92	50.47	59.12	38.21
1999	205.81	242.32	152.56	57.25	67.39	42.43
2000	232.24	275.20	168.01	64.86	76.84	46.91
2001	266.29	318.73	189.44	73.49	87.94	52.27
2002	308.46	373.39	214.63	85.45	103.44	59.46
2003	354.90	432.56	244.14	97.35	118.64	66.96
2004	403.63	493.09	276.83	108.22	132.20	74.22
2005	449.09	544.20	315.49	118.63	143.75	83.34
2006	545.44	674.50	361.18	141.97	175.54	94.00
2007	642.48	800.34	410.64	160.48	199.89	102.56
2008	746.98	933.93	466.04	176.96	221.31	110.43
2009	865.72	1082.10	532.79	207.25	259.00	127.53
2010	944.19	1157.12	606.31	218.31	267.60	140.21

Chapter 9   Human Capital for Liaoning

1. Total human capital

Human capital stocks of Liaoning are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table LN-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[39] Column 5 is the real physical capital for Liaoning.

Table LN-1.1 Real physical capital, Nominal and Real Human Capital for Liaoning

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	1,534		1,534		101
1986	1,710		1,608		114
1987	1,940		1,681		130
1988	2,158		1,582		149
1989	2,382		1,479		168
1990	2,648		1,590		188
1991	2,924		1,667		211
1992	3,228		1,736		240
1993	3,601		1,690		285
1994	3,992		1,510		340
1995	4,418		1,439		396
1996	4,910		1,481		460

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[39] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1997	5,453		1,589		531
1998	5,967		1,746		605
1999	6,619		1,957		684
2000	7,400	7,488	2,183	2,206	775
2001	8,233	8,326	2,423	2,447	866
2002	9,202	9,305	2,730	2,757	967
2003	10,284	10,387	2,982	3,009	1,086
2004	11,507	11,617	3,207	3,234	1,279
2005	12,638	12,814	3,461	3,507	1,515
2006	14,358	14,471	3,881	3,909	1,821
2007	16,519	16,668	4,238	4,275	2,210
2008	18,876	19,068	4,622	4,666	2,873
2009	21,534	21,738	5,263	5,311	3,439
2010	24,350	24,886	5,774	5,895	4,140

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table LN-2.1 presents the trend of human capital per capita for Liaoning by gender in both nominal and real terms. Human capital per

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capita of male remains larger than that of female. Real human capital per capita for male increases 2.51 times from 56,580 Yuan to 198,870 Yuan. For female, it increases almost 2.49 times from 34,560 Yuan to 120,650 Yuan. From 1985 to 2010, the average annual growth rate is 5.03% for male, and 5.00% for female.

Table LN-2.1 Nominal and Real Human Capital Per Capita by Gender for Liaoning

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	46.12	56.58	34.56	46.12	56.58	34.56
1986	50.93	62.32	38.40	47.89	58.57	36.10
1987	56.57	69.00	42.94	48.99	59.79	37.21
1988	62.33	76.03	47.23	45.69	55.72	34.62
1989	68.25	83.12	51.79	42.36	51.59	32.15
1990	74.99	91.27	56.89	45.02	54.80	34.16
1991	82.42	100.71	62.17	46.98	57.40	35.44
1992	90.65	110.90	68.29	48.74	59.64	36.74
1993	100.90	123.97	75.53	47.37	58.18	35.48
1994	111.68	137.74	83.13	42.24	52.06	31.46
1995	123.34	152.15	91.79	40.17	49.55	29.91
1996	136.71	168.76	101.63	41.24	50.92	30.67
1997	151.79	187.75	112.45	44.24	54.73	32.78
1998	166.09	206.87	121.48	48.59	60.49	35.55
1999	184.29	229.88	134.07	54.49	67.95	39.67
2000	204.02	254.79	148.03	60.20	75.18	43.68
2001	228.10	285.13	165.33	67.13	83.93	48.68
2002	256.68	322.19	184.73	76.15	95.57	54.82
2003	289.16	363.19	207.94	83.85	105.32	60.31
2004	327.23	410.46	235.80	91.19	114.40	65.70
2005	362.38	451.25	264.77	99.25	123.65	72.47
2006	410.04	512.73	295.58	110.84	138.65	79.88
2007	470.64	584.67	341.88	120.75	150.03	87.68
2008	536.83	664.77	391.35	131.45	162.77	95.77

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2009	613.02	755.43	448.58	149.82	184.69	109.61
2010	685.56	838.31	509.26	162.56	198.87	120.65

Figure LN-2.1 shows that the real human capital per capita of male is larger than that of female for Liaoning from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
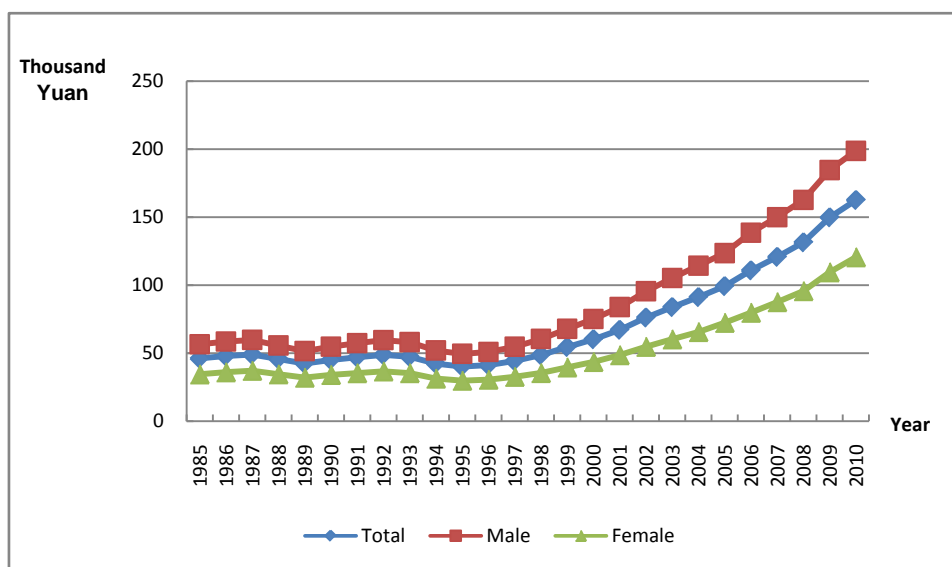
Figure LN-2.1 Real Human Capital Per Capita by Gender for Liaoning

Table LN-2.2 reports the results of human capital per capita by region for Liaoning in both nominal and real terms. From 1985 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 56,540 Yuan to 206,920 Yuan, the per capita rural human capital increases from 31,480

Yuan to 89,550 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table LN-2.2 Nominal and Real Human Capital Per Capita by Region for Liaoning

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	46.12	56.54	31.48	46.12	56.54	31.48
1986	50.93	63.20	34.84	47.89	59.07	33.18
1987	56.57	70.75	38.71	48.99	60.22	34.91
1988	62.33	78.66	43.13	45.69	55.98	33.56
1989	68.25	87.07	47.46	42.36	52.87	30.75
1990	74.99	96.78	52.19	45.02	57.00	32.48
1991	82.42	106.16	57.64	46.98	58.98	34.43
1992	90.65	117.21	62.95	48.74	60.24	36.76
1993	100.90	131.03	69.51	47.37	57.71	36.60
1994	111.68	145.61	76.34	42.24	50.86	33.24
1995	123.34	161.22	83.89	40.17	48.50	31.49
1996	136.71	179.54	90.97	41.24	49.92	31.98
1997	151.79	200.37	98.52	44.24	53.67	33.92
1998	166.09	219.37	105.94	48.59	58.88	36.95
1999	184.29	244.71	114.04	54.49	66.55	40.47
2000	204.02	271.44	123.40	60.20	73.82	43.92
2001	228.10	301.76	136.41	67.13	82.14	48.45
2002	256.68	339.03	149.50	76.15	93.31	53.80
2003	289.16	381.45	163.82	83.85	103.75	56.85
2004	327.23	430.31	180.73	91.19	113.85	59.00
2005	362.38	473.31	199.18	99.25	124.23	62.53
2006	410.04	534.25	223.02	110.84	138.70	68.91
2007	470.64	614.92	247.76	120.75	152.62	71.54

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	536.83	703.70	273.44	131.45	167.29	74.84
2009	613.02	802.85	306.20	149.82	190.87	83.56
2010	685.56	894.73	341.27	162.56	206.92	89.55

Figure LN-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 1.80 in 1985 to 2.31 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 5.19% for the urban area, and 4.18% for the rural area.
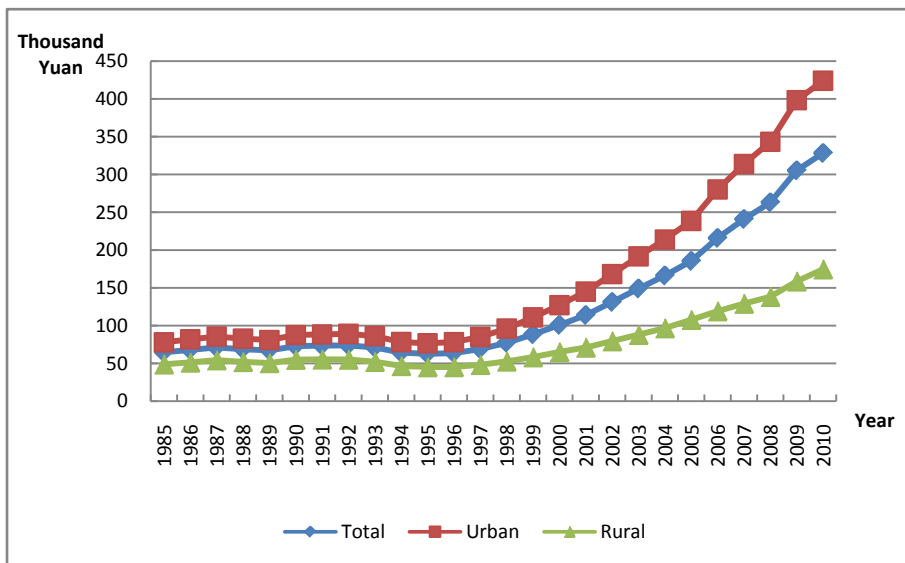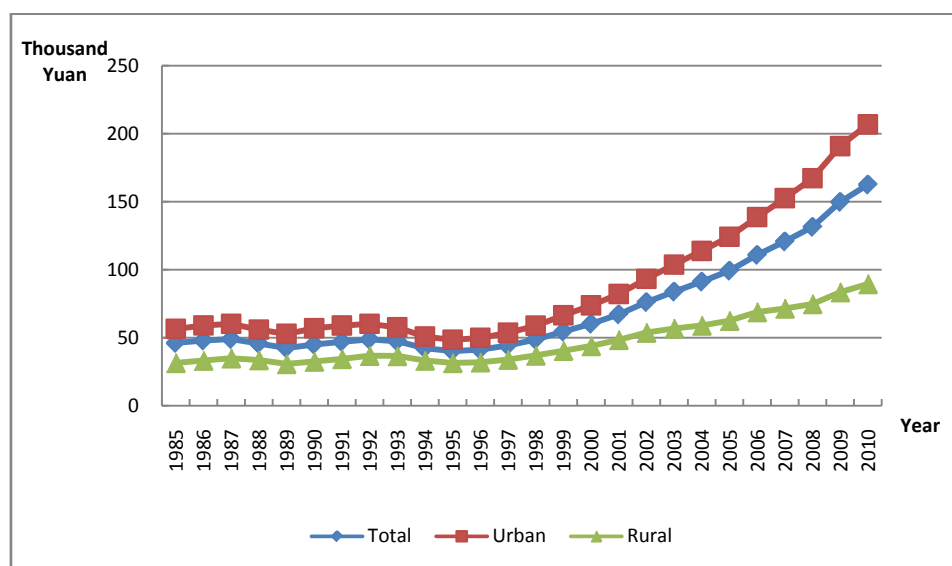

Figure LN-2.2 Real Human Capital Per Capita by Region for Liaoning

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Liaoning is reported in Table LN-3.1. The real values in this table are calculated by using CPI as the deflator.

Table LN-3.1 Nominal and Real Labor Force Human Capital for Liaoning

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	749		749	
1986	858		806	
1987	1,002		867	
1988	1,130		826	
1989	1,258		779	
1990	1,414		848	
1991	1,570		893	
1992	1,723		924	
1993	1,900		890	
1994	2,088		789	
1995	2,303		751	
1996	2,559		773	
1997	2,867		838	
1998	3,241		949	
1999	3,592		1,064	
2000	3,974	3,941	1,175	1,165

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
2001	4,349	4,317	1,283	1,273
2002	4,783	4,753	1,425	1,416
2003	5,298	5,274	1,546	1,538
2004	5,770	5,755	1,619	1,614
2005	6,309	6,354	1,738	1,749
2006	7,304	7,283	1,985	1,978
2007	8,384	8,361	2,162	2,155
2008	9,744	9,715	2,397	2,389
2009	11,438	11,399	2,807	2,796
2010	13,206	13,452	3,142	3,198

The trends of real human capital and real labor force human capital for Liaoning are presented in Figure LN-3.1.
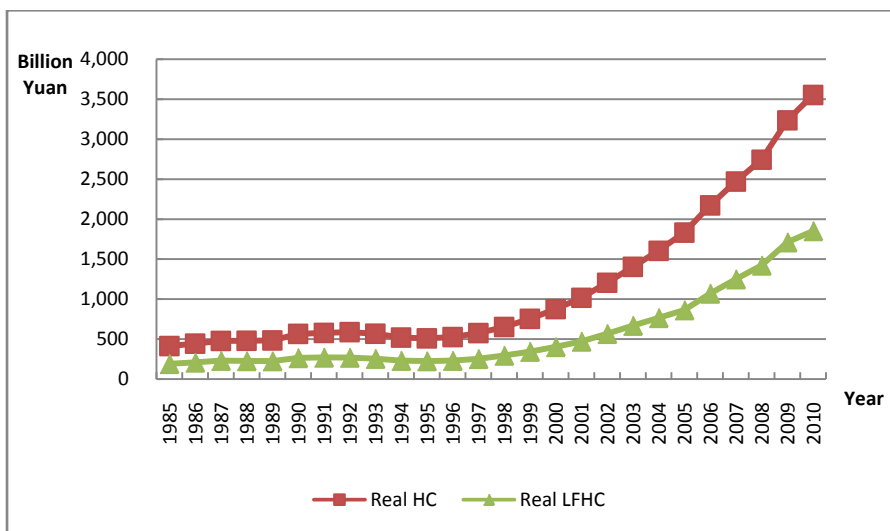

Figure LN-3.1 Real Human Capital and Real Labor Force Human Capital for Liaoning

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table LN-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.68 times that for female in 2010.

Table LN-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Liaoning

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	36.31	44.40	27.51	36.31	44.40	27.51
1986	40.54	49.38	30.98	38.08	46.39	29.10
1987	45.49	55.17	35.11	39.35	47.72	30.35
1988	50.11	60.79	38.55	36.61	44.42	28.15
1989	54.69	66.39	41.94	33.88	41.13	25.97
1990	59.94	72.91	45.70	35.94	43.71	27.41
1991	65.55	80.04	49.67	37.29	45.54	28.26
1992	71.39	87.51	53.82	38.31	46.95	28.88
1993	77.98	96.09	58.25	36.55	45.03	27.31
1994	84.85	104.99	62.98	32.08	39.68	23.80
1995	92.51	114.75	68.46	30.17	37.43	22.32
1996	101.92	126.89	74.82	30.79	38.34	22.61
1997	112.49	140.63	81.82	32.88	41.09	23.92
1998	124.63	156.38	90.02	36.51	45.80	26.37
1999	136.49	171.71	97.89	40.43	50.87	28.99
2000	148.81	187.95	105.79	44.00	55.57	31.27

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2001	164.10	207.71	116.44	48.39	61.26	34.33
2002	180.23	228.82	127.43	53.71	68.21	37.96
2003	198.99	253.06	140.44	58.05	73.85	40.96
2004	218.85	278.50	154.32	61.39	78.13	43.25
2005	240.50	304.11	171.64	66.23	83.78	47.23
2006	275.99	349.44	195.14	74.99	94.96	52.98
2007	315.10	396.48	224.09	81.24	102.30	57.74
2008	362.29	453.09	259.13	89.11	111.51	63.70
2009	421.15	525.17	301.05	103.35	128.87	73.83
2010	474.97	583.91	349.17	113.01	138.98	82.96

Table LN-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 1.96 times that for rural in 2010.

Table LN-3.3 Nominal and Real Average Labor Force Human Capital by Region for Liaoning

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	36.31	43.04	24.82	36.31	43.04	24.82
1986	40.54	48.55	27.76	38.08	45.37	26.43
1987	45.49	55.03	31.01	39.35	46.84	27.97
1988	50.11	61.21	34.39	36.61	43.56	26.76
1989	54.69	67.50	37.96	33.88	40.99	24.59
1990	59.94	74.72	41.99	35.94	44.01	26.14
1991	65.55	81.68	46.18	37.29	45.38	27.58
1992	71.39	88.83	50.59	38.31	45.66	29.54

1993	77.98	97.12	55.56	36.55	42.78	29.25
1994	84.85	105.70	60.84	32.08	36.92	26.49
1995	92.51	115.25	66.82	30.17	34.67	25.08
1996	101.92	127.42	72.30	30.79	35.43	25.41
1997	112.49	141.45	78.28	32.88	37.89	26.95
1998	124.63	157.24	84.61	36.51	42.20	29.51
1999	136.49	172.88	90.51	40.43	47.01	32.12
2000	148.81	188.91	96.64	44.00	51.37	34.39
2001	164.10	207.29	105.56	48.39	56.43	37.49
2002	180.23	227.00	115.57	53.71	62.48	41.59
2003	198.99	249.59	127.12	58.05	67.88	44.12
2004	218.85	273.00	139.17	61.39	72.23	45.43
2005	240.50	298.70	152.11	66.23	78.40	47.75
2006	275.99	343.81	171.44	74.99	89.26	52.97
2007	315.10	394.52	191.87	81.24	97.92	55.40
2008	362.29	456.22	213.95	89.11	108.46	58.56
2009	421.15	532.96	240.07	103.35	126.70	65.51
2010	474.97	599.03	268.91	113.01	138.53	70.56

Chapter 10   Human Capital for `Jilin`

1. Total human capital

Human capital stocks of Jilin are calculated using estimated income parameters and a 4.58% discount rate. The results are reported in Table JL-1.1. Column 1 and column 2 contain the nominal human capital; column 3 and column 4 contain the real human capital deflated by CPI (in 1985 Yuan).[40] Column 5 is the real physical capital for Jilin.

Table JL-1.1 Real physical capital, Nominal and Real Human Capital for Jilin

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	972		972		40
1986	1,095		1,036		45
1987	1,229		1,084		50
1988	1,383		1,014		57
1989	1,547		965		63
1990	1,759		1,044		71
1991	1,961		1,091		79
1992	2,188		1,130		90
1993	2,469		1,138		106
1994	2,774		1,052		126
1995	3,065		1,008		149

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[40] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	3,415		1,047		175
1997	3,849		1,135		203
1998	4,181		1,242		234
1999	4,686		1,417		272
2000	5,297	5,382	1,621	1,646	317
2001	5,903	6,013	1,782	1,814	363
2002	6,599	6,735	2,001	2,041	416
2003	7,545	7,736	2,259	2,313	473
2004	8,486	8,716	2,442	2,505	548
2005	9,337	9,573	2,647	2,711	660
2006	10,517	10,794	2,939	3,014	847
2007	11,883	12,236	3,168	3,259	1,114
2008	13,262	13,669	3,360	3,461	1,491
2009	14,956	15,455	3,786	3,909	1,905
2010	16,788	17,370	4,104	4,242	2,403

2. Human capital per capita

The increase in the human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital divided by non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factors to a large extent.   Thus it can serve as a better indicator of the average human capital.

Table JL-2.1 resents the trend of human capital per capita for Jilin by gender in both nominal and real terms. Human capital per capita for male remains higher than that for female. Real human capital per capita values for

male increases from 55,168 Yuan to 219,769 Yuan, increasing by around 3 times; Real human capital per capita for female increases from 34,301 Yuan to 131,163 Yuan, increasing by around 2.8 times. From 1985 to 2010, the annual growth rate is 5.53% for male, and 5.37% for female.

Table JL-2.1 Nominal and Real Human Capital Per Capita by Gender for Jilin

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	45.30	55.17	34.30	45.30	55.17	34.30
1986	50.73	61.74	38.38	47.97	58.38	36.30
1987	56.47	68.83	42.55	49.81	60.70	37.54
1988	62.77	76.66	47.20	46.03	56.21	34.63
1989	69.52	84.83	52.53	43.36	52.89	32.77
1990	77.91	95.24	58.84	46.23	56.49	34.90
1991	86.26	105.88	64.88	48.01	58.92	36.12
1992	95.69	117.96	71.64	49.41	60.90	37.02
1993	107.43	133.29	79.90	49.53	61.43	36.86
1994	120.40	150.27	88.99	45.65	56.95	33.80
1995	132.45	166.21	97.51	43.58	54.63	32.13
1996	146.60	183.58	107.87	44.93	56.21	33.11
1997	164.65	206.00	120.84	48.55	60.68	35.68
1998	178.04	223.87	128.92	52.87	66.40	38.37
1999	198.76	249.29	143.87	60.09	75.25	43.54
2000	221.61	277.11	160.26	67.80	84.73	49.11
2001	247.28	308.79	179.40	74.65	93.17	54.24
2002	277.04	346.66	199.99	84.02	105.12	60.74
2003	317.46	394.58	232.06	95.04	118.06	69.50
2004	358.25	444.35	262.56	103.11	127.83	75.58
2005	396.22	490.28	290.89	112.30	138.99	82.48
2006	448.66	556.62	327.14	125.37	155.51	91.46
2007	509.71	629.40	374.22	135.90	167.73	99.80
2008	572.63	703.81	422.94	145.06	178.31	107.22

2009	651.57	801.95	479.55	164.97	203.05	121.47
2010	729.48	898.91	536.21	178.36	219.77	131.16

Figure JL-2.1 shows that the real human capital per capita for male is higher than that for female for Jilin from 1985 to 2010. Before 1997, different human capital all grow quite slowly, starting from 1997, both the growth of human capital for male and female accelerate, the gender gap, which has been fairly stable, then appears to be expanding.
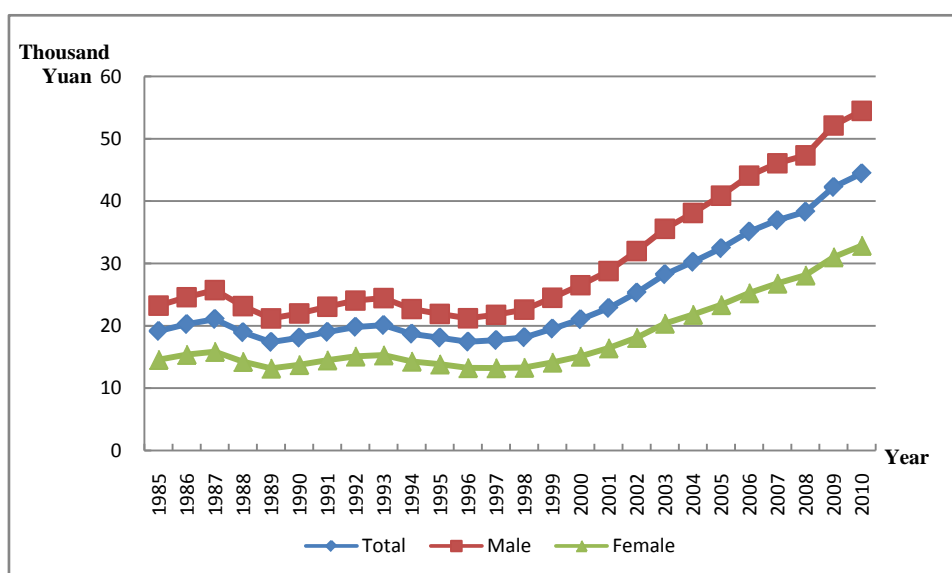
Figure JL-2.1 Human Capital Per Capita by Gender for Jilin

Table JL-2.2 reports the results of human capital per capita measured in nominal and real terms for Jilin classified by region. From 1985 to 2010, the human capital per capita in urban areas is significantly larger than that for rural. The real urban human capital per capita increases from 80,127 Yuan to 279,041 Yuan, the rural human capital per capita increases from 21,720 Yuan to 65,781 Yuan. The human capital per capita in urban areas grows much faster than the one for rural.

Table JL-2.2 Nominal and Real Human Capital Per Capita by Region for Jilin

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	45.30	80.13	21.72	45.30	80.13	21.72
1986	50.73	89.48	24.26	47.97	84.41	23.09
1987	56.47	99.18	27.09	49.81	86.63	24.48
1988	62.77	109.55	30.08	46.03	78.70	23.21
1989	69.52	120.69	33.35	43.36	74.16	21.57
1990	77.91	134.59	36.96	46.23	79.60	22.09
1991	86.26	147.08	40.97	48.01	81.22	23.28
1992	95.69	161.57	45.19	49.41	81.63	24.72
1993	107.43	180.41	50.00	49.53	80.52	25.13
1994	120.40	200.64	55.31	45.65	72.69	23.74
1995	132.45	218.76	60.92	43.58	68.85	22.62
1996	146.60	241.03	65.92	44.93	70.44	23.13
1997	164.65	270.30	71.39	48.55	76.17	24.16
1998	178.04	288.97	77.08	52.87	82.01	26.35
1999	198.76	321.52	83.43	60.09	93.21	28.93
2000	221.61	356.98	90.69	67.80	105.28	31.57
2001	247.28	397.21	99.99	74.65	115.41	34.64
2002	277.04	443.75	110.22	84.02	129.97	38.06
2003	317.46	509.70	121.72	95.04	147.66	41.41
2004	358.25	574.14	134.69	103.11	160.55	43.61
2005	396.22	632.02	148.56	112.30	174.30	47.20
2006	448.66	714.85	164.45	125.37	194.80	51.22
2007	509.71	812.24	181.88	135.90	212.01	53.39
2008	572.63	910.69	200.49	145.06	226.18	55.90
2009	651.57	1036.98	223.20	164.97	257.80	61.79
2010	729.48	1160.59	247.34	178.36	279.04	65.78

Figure JL-2.2 reflects the trend of real human capital per capita by region. As is shown in the graph, the size of the difference between urban and rural expanded rapidly after 1997. Based on five education categories, the ratio of urban to rural increases from 3.15 in 1985 to 4.24 in 2010, which indicates a rising size of region gap of human capital per capita. From 1985 to 2010, the annual growth rate is 4.99% for the urban area, and 4.43% for the rural area.
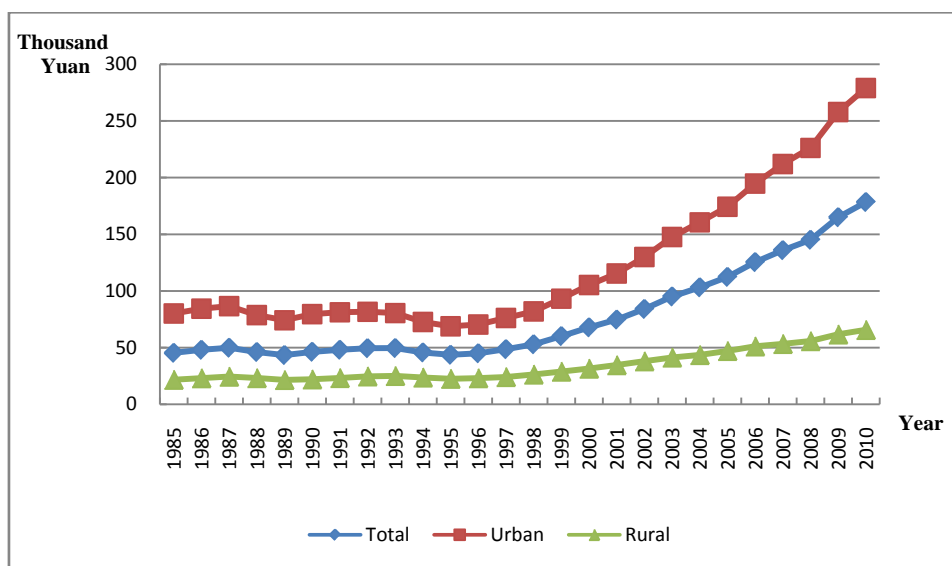
Figure JL-2.2 Real Human Capital Per Capita by Region for Jilin

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Jilin is reported in Table JL-3.1. The real values in this table are calculated by using CPI as the deflator.

Table JL-3.1 Nominal and Real Labor Force Human Capital for Jilin

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	416		416	
1986	475		450	
1987	549		485	
1988	640		470	
1989	736		460	
1990	856		508	
1991	962		536	
1992	1,068		553	
1993	1,188		551	
1994	1,323		506	
1995	1,475		489	
1996	1,633		505	
1997	1,810		540	
1998	2,031		609	
1999	2,270		693	
2000	2,576	2,547	796	787
2001	2,853	2,835	870	865
2002	3,135	3,134	962	961
2003	3,470	3,494	1,052	1,059
2004	3,848	3,871	1,122	1,128
2005	4,289	4,319	1,231	1,239
2006	4,782	4,821	1,353	1,363
2007	5,262	5,308	1,419	1,430
2008	5,853	5,907	1,501	1,514
2009	6,652	6,721	1,701	1,717
2010	7,725	7,822	1,905	1,928

The trends of real labor force human capital and real human capital for Jilin are presented in Figure JL-3.1. From 1985 to 2010, labor force human capital keeps rising.
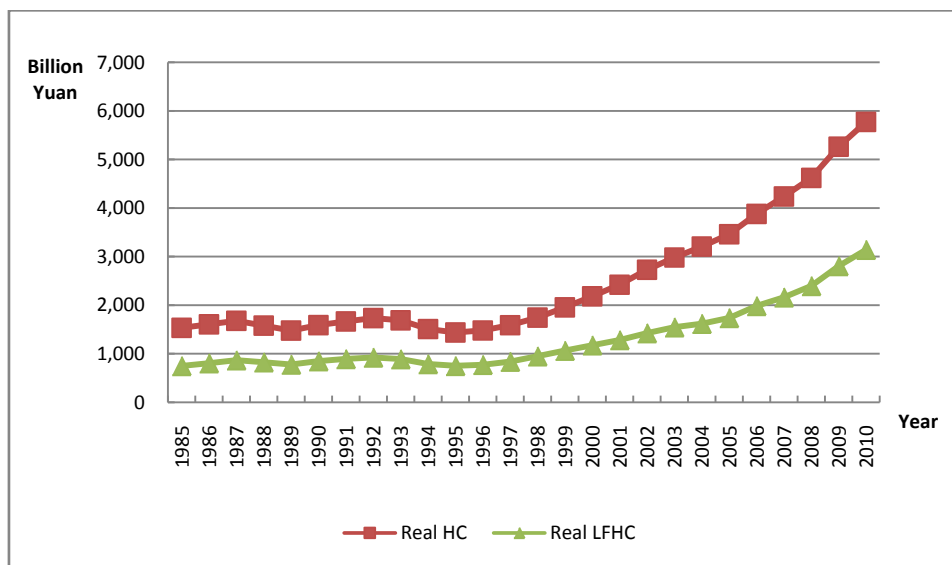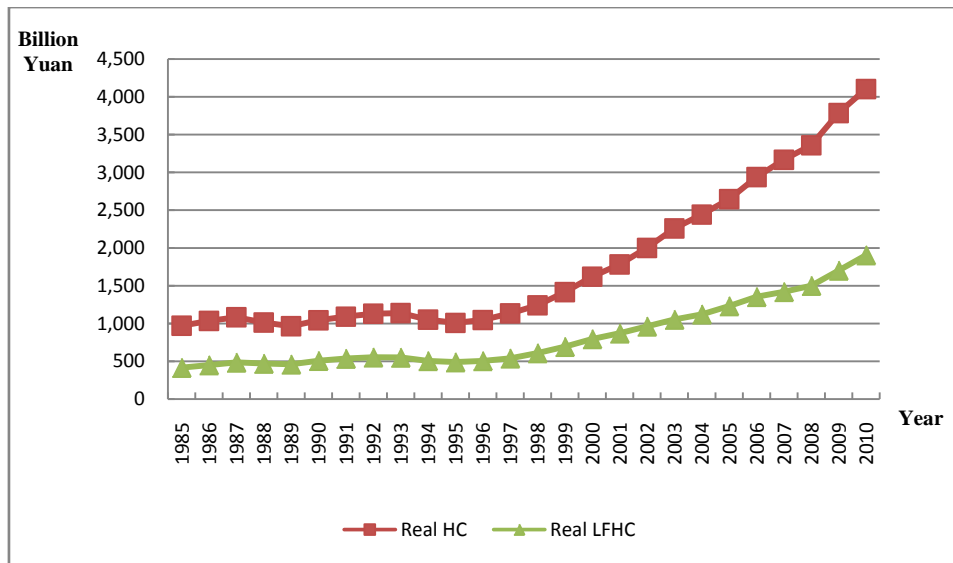

Figure JL-3.1 Real human capital and real labor force human capital for Jilin,1985-2010

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. Here the average labor force human capital means labor force human capital divided by the number of the population that are over 15 years old, non-retired and out of school.

Table JL-3.2 reports the real average labor force human capital classified by gender. And the average labor force human capital for female is smaller than that for male. More specifically, the number for male is about 1.80 times that for female in 2010.

Table JL-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Jilin

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	33.28	40.25	25.59	33.28	40.25	25.59
1986	37.33	45.14	28.61	35.31	42.71	27.07
1987	42.15	51.00	32.20	37.23	45.04	28.43
1988	47.30	57.31	36.18	34.77	42.13	26.58
1989	52.75	63.92	40.46	32.94	39.93	25.26
1990	59.34	72.21	45.33	35.20	42.84	26.91
1991	65.14	79.67	49.60	36.29	44.38	27.63
1992	70.88	87.19	53.73	36.70	45.15	27.82
1993	77.54	96.14	58.32	35.92	44.55	27.04
1994	85.09	106.39	63.45	32.53	40.66	24.27
1995	93.36	117.52	69.24	30.95	38.95	22.97
1996	101.77	128.41	74.64	31.48	39.69	23.12
1997	111.12	140.62	80.56	33.12	41.87	24.05
1998	122.07	154.92	87.30	36.62	46.43	26.24
1999	134.39	170.98	94.82	41.01	52.12	29.01
2000	148.69	189.74	103.38	45.91	58.53	31.99
2001	163.76	209.23	113.66	49.96	63.76	34.76
2002	178.79	228.93	123.64	54.85	70.13	38.02
2003	196.36	251.00	136.04	59.54	76.02	41.35
2004	217.50	277.61	150.78	63.40	80.84	44.05
2005	242.06	307.92	168.61	69.47	88.28	48.47
2006	269.45	342.64	187.28	76.24	96.86	53.10
2007	298.18	378.08	207.85	80.41	101.87	56.16
2008	332.26	419.87	232.40	85.19	107.55	59.68
2009	377.48	477.33	263.04	96.54	122.00	67.40
2010	432.30	545.24	302.44	106.58	134.37	74.69

Table JL-3.3 reports the real average labor force human capital classified by region separately. The average labor force human capital is much smaller in rural area than in urban area. The number for urban is about 2.68 times that for rural in 2010.

Table JL-3.3 Nominal and Real Average Labor Force Human Capital by Region for Jilin

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	33.28	51.90	19.03	33.28	51.90	19.03
1986	37.33	58.37	21.32	35.31	55.06	20.28
1987	42.15	66.14	23.86	37.23	57.78	21.56
1988	47.30	73.79	26.53	34.77	53.01	20.47
1989	52.75	81.99	29.39	32.94	50.38	19.01
1990	59.34	91.84	32.60	35.20	54.32	19.49
1991	65.14	99.70	36.00	36.29	55.06	20.46
1992	70.88	107.40	39.62	36.70	54.26	21.67
1993	77.54	116.67	43.73	35.92	52.07	21.98
1994	85.09	126.97	48.05	32.53	46.00	20.63
1995	93.36	138.31	52.71	30.95	43.53	19.57
1996	101.77	150.16	56.97	31.48	43.88	20.00
1997	111.12	163.87	61.66	33.12	46.18	20.87
1998	122.07	179.94	66.73	36.62	51.07	22.81
1999	134.39	197.77	71.92	41.01	57.33	24.94
2000	148.69	219.11	77.70	45.91	64.62	27.05
2001	163.76	240.67	85.75	49.96	69.93	29.70
2002	178.79	262.34	94.75	54.85	76.84	32.72
2003	196.36	288.00	105.11	59.54	83.44	35.77
2004	217.50	319.07	116.49	63.40	89.22	37.71
2005	242.06	355.86	128.92	69.47	98.14	40.96
2006	269.45	396.06	143.61	76.24	107.93	44.73
2007	298.18	437.68	158.69	80.41	114.24	46.59

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	332.26	487.43	175.21	85.19	121.06	48.85
2009	377.48	554.93	194.52	96.54	137.96	53.85
2010	432.30	638.12	215.12	106.58	153.42	57.21

Chapter 11   Human Capital for Heilongjiang

1. Total human capital

Human capital stocks of Heilongjiang are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table HLJ-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[41] Column 5 is the real physical capital for Heilongjiang.

Table HLJ-1.1 Real physical capital, Nominal and Real Human Capital for Heilongjiang

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	893		893		85
1986	1,010		948		95
1987	1,146		991		105
1988	1,305		959		117
1989	1,477		946		130
1990	1,677		1,015		143
1991	1,868		1,055		157
1992	2,078		1,083		174
1993	2,322		1,055		195
1994	2,579		962		221
1995	2,865		921		254

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[41] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	3,153		946		294
1997	3,472		999		348
1998	3,823		1,093		410
1999	4,229		1,248		472
2000	4,743	4,774	1,424	1,432	537
2001	5,308	5,352	1,582	1,593	604
2002	5,952	6,013	1,783	1,799	676
2003	6,767	6,893	2,006	2,041	746
2004	7,505	7,693	2,138	2,188	837
2005	8,442	8,608	2,374	2,418	946
2006	9,558	9,721	2,633	2,675	1,083
2007	10,913	11,099	2,847	2,893	1,263
2008	12,368	12,603	3,053	3,108	1,493
2009	13,647	13,906	3,362	3,424	1,814
2010	15,873	16,197	3,762	3,836	2,154

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table HLJ-2.1 presents the trend of human capital per capita for Heilongjiang by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 3.03 times from 34,650 Yuan to 39,720 Yuan. For female, it increases 3.00 times from 21,860 Yuan to 88,310 Yuan. From 1985 to 2010, the average annual growth rate is 5.82% for male, and 5.64% for female.

Table HLJ-2.1 Nominal and Real Human Capital Per Capita by Gender for Heilongjiang

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	28.52	34.65	21.86	28.52	34.65	21.86
1986	32.09	39.10	24.44	30.11	36.69	22.94
1987	35.99	43.98	27.29	31.12	38.03	23.60
1988	40.62	49.59	30.80	29.84	36.43	22.63
1989	45.66	55.62	34.74	29.26	35.65	22.27
1990	51.46	62.66	39.12	31.14	37.92	23.67
1991	57.27	69.95	43.32	32.33	39.50	24.46
1992	63.68	77.92	48.07	33.19	40.61	25.06
1993	71.22	87.41	53.48	32.36	39.72	24.30
1994	79.26	97.49	59.25	29.56	36.35	22.11
1995	88.23	108.69	65.78	28.36	34.94	21.15
1996	97.33	120.03	72.35	29.22	36.03	21.73
1997	107.39	132.78	79.63	30.90	38.18	22.92
1998	118.43	146.83	87.28	33.86	41.98	24.98
1999	131.25	162.70	96.75	38.73	48.01	28.57
2000	146.18	181.25	107.74	43.89	54.40	32.34
2001	162.66	201.37	120.23	48.46	59.99	35.83
2002	181.53	225.08	133.80	54.38	67.41	40.09
2003	205.62	254.43	152.08	60.95	75.39	45.06
2004	227.84	281.11	169.15	64.90	80.05	48.17

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2005	255.95	314.30	191.30	71.97	88.37	53.77
2006	291.58	356.95	218.72	80.31	98.31	60.22
2007	335.31	407.32	254.50	87.47	106.32	66.36
2008	383.57	463.77	293.14	94.69	114.54	72.33
2009	427.56	516.82	326.18	105.34	127.40	80.34
2010	488.13	589.47	372.91	115.68	139.72	88.31

Figure HLJ-2.1 shows that the real human capital per capita of male is larger than that of female for Heilongjiang from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
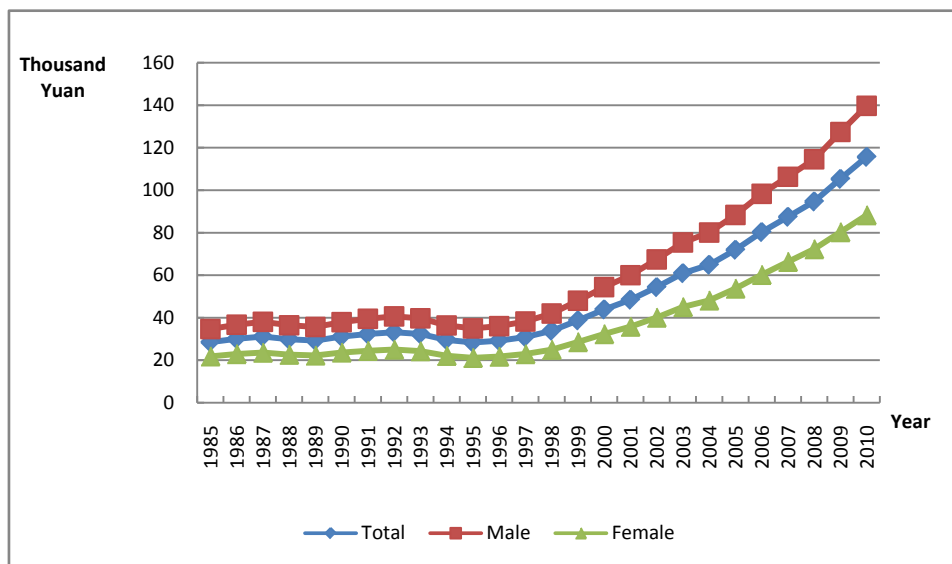
Figure HLJ-2.1 Human Capital Per Capita by Gender for Heilongjiang

Table HLJ-2.2 reports the results of human capital per capita by region for Heilongjiang in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for

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rural. The real human capital per capita for urban increases from 40,690 Yuan to 160,540 Yuan, the per capita rural human capital increases from 19,220 Yuan to 60,210 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table HLJ-2.2 Nominal and Real Human Capital Per Capita by Region for Heilongjiang

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	28.52	40.69	19.22	28.52	40.69	19.22
1986	32.09	45.53	21.46	30.11	42.95	19.96
1987	35.99	50.96	23.90	31.12	43.82	20.86
1988	40.62	57.04	26.83	29.84	41.36	20.16
1989	45.66	63.69	29.93	29.26	40.30	19.63
1990	51.46	71.31	33.47	31.14	42.73	20.65
1991	57.27	78.98	37.33	32.33	43.74	21.87
1992	63.68	87.64	41.45	33.19	44.24	22.93
1993	71.22	97.93	46.07	32.36	42.91	22.42
1994	79.26	108.84	51.07	29.56	39.09	20.49
1995	88.23	121.09	56.58	28.36	37.53	19.53
1996	97.33	134.10	61.33	29.22	38.62	20.01
1997	107.39	148.54	66.62	30.90	40.94	20.94
1998	118.43	164.15	72.42	33.86	44.84	22.83
1999	131.25	182.89	78.53	38.73	51.50	25.71
2000	146.18	205.25	85.51	43.89	58.56	28.81
2001	162.66	228.57	94.13	48.46	64.70	31.58
2002	181.53	255.71	103.53	54.38	72.89	34.91
2003	205.62	291.77	114.11	60.95	82.51	38.02
2004	227.84	323.12	125.67	64.90	88.28	39.81

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2005	255.95	363.88	139.58	71.97	98.63	43.22
2006	291.58	414.77	155.57	80.31	110.44	47.04
2007	335.31	478.78	172.83	87.47	120.95	49.58
2008	383.57	549.09	191.75	94.69	132.10	51.31
2009	427.56	607.49	214.49	105.34	146.44	56.72
2010	488.13	689.95	238.86	115.68	160.54	60.21

Figure HLJ-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 2.11 in 1985 to 2.67 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 6.62% for the urban area, and 3.77% for the rural area.
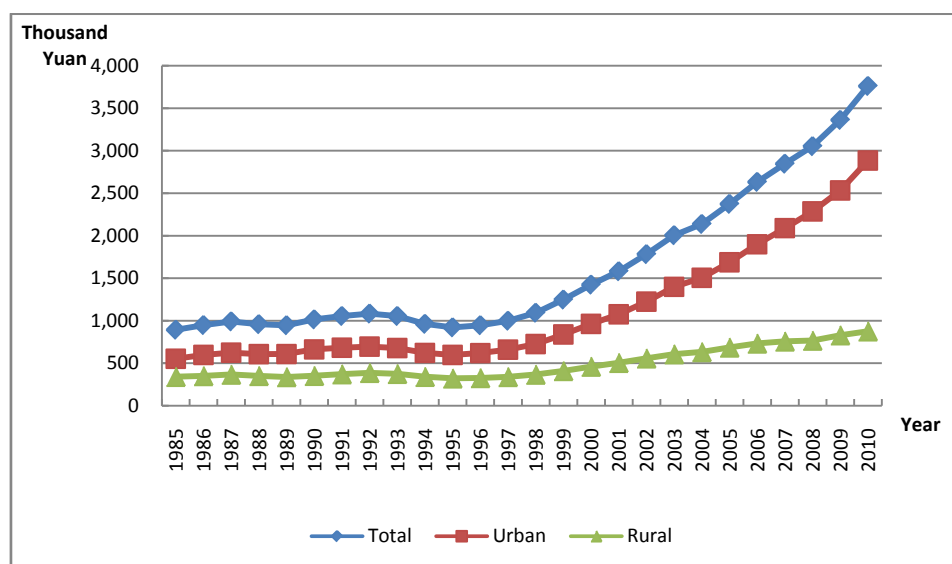
Figure HLJ-2.2 Real Human Capital Per Capita by Region for Heilongjiang

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Heilongjiang is reported in Table HLJ-3.1. The real values in this table are calculated by using CPI as the deflator.

Table HLJ-3.1 Nominal and Real Labor Force Human Capital for Heilongjiang

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	438		438	
1986	504		473	
1987	584		505	
1988	688		505	
1989	806		516	
1990	939		568	
1991	1,065		601	
1992	1,196		622	
1993	1,344		610	
1994	1,498		558	
1995	1,675		538	
1996	1,849		555	
1997	2,026		583	
1998	2,242		642	
1999	2,461		727	

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
2000	2,753	2,710	829	816
2001	3,059	3,025	915	905
2002	3,405	3,381	1,026	1,019
2003	3,803	3,796	1,136	1,134
2004	4,197	4,209	1,205	1,208
2005	4,677	4,690	1,325	1,328
2006	5,205	5,223	1,445	1,450
2007	5,761	5,785	1,518	1,524
2008	6,478	6,515	1,613	1,621
2009	7,466	7,523	1,851	1,865
2010	8,969	9,065	2,134	2,156

The trends of real labor force human capital and real human capital for Heilongjiang are presented in Figure HLJ-3.1. From 1985 to 2010, the real human capital keeps rising rapidly, while the real labor force human capital increases slowly.
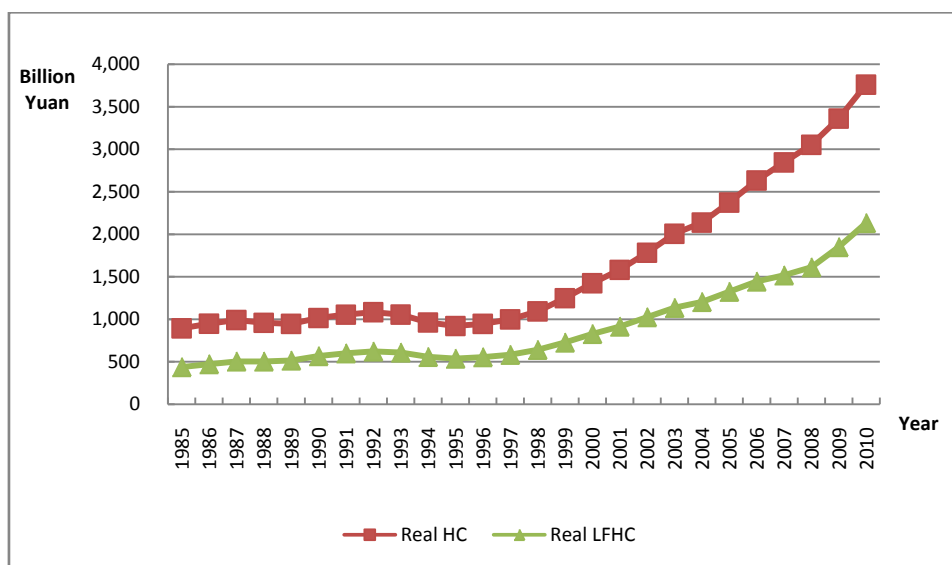
Figure HLJ-3.1 Real Human Capital and Real Labor Force Human Capital for Heilongjiang

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table HLJ-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.71 times that for female in 2010.

Table HLJ-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Heilongjiang

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1985	24.46	29.61	19.00	24.46	29.61	19.00

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1986	27.59	33.59	21.21	25.91	31.52	19.92
1987	31.17	38.12	23.74	26.94	32.95	20.51
1988	35.36	43.17	26.98	25.95	31.70	19.80
1989	39.99	48.68	30.60	25.60	31.18	19.58
1990	45.28	55.14	34.55	27.39	33.35	20.90
1991	50.27	61.42	38.12	28.36	34.65	21.50
1992	55.54	68.03	41.92	28.90	35.41	21.81
1993	61.59	75.78	46.11	27.95	34.39	20.92
1994	68.11	84.08	50.64	25.38	31.33	18.87
1995	75.35	93.32	55.73	24.21	29.98	17.91
1996	82.20	102.24	60.29	24.69	30.69	18.11
1997	89.88	112.26	65.41	25.87	32.31	18.84
1998	98.55	123.70	71.07	28.20	35.38	20.35
1999	107.15	134.91	76.83	31.67	39.85	22.73
2000	116.82	147.68	83.00	35.17	44.43	25.01
2001	127.97	162.07	90.68	38.29	48.47	27.16
2002	139.86	177.46	98.72	42.14	53.45	29.79
2003	153.61	194.86	108.38	45.89	58.20	32.41
2004	168.65	214.01	118.70	48.42	61.40	34.13
2005	185.89	235.57	130.79	52.67	66.69	37.11
2006	208.62	263.98	146.65	57.93	73.27	40.78
2007	233.29	293.67	165.20	61.47	77.32	43.59
2008	264.21	330.27	189.19	65.78	82.20	47.14
2009	306.35	381.87	219.94	75.96	94.66	54.56
2010	357.32	443.03	258.61	85.03	105.45	61.58

Table HLJ-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.11 times that for rural in 2010.

Table HLJ-3.3 Nominal and Real Average Labor Force Human Capital by Region for Heilongjiang

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	24.46	32.47	17.09	24.46	32.47	17.09
1986	27.59	36.55	19.03	25.91	34.49	17.70
1987	31.17	41.30	21.20	26.94	35.52	18.50
1988	35.36	46.58	23.85	25.95	33.78	17.93
1989	39.99	52.56	26.71	25.60	33.26	17.52
1990	45.28	59.20	29.94	27.39	35.47	18.47
1991	50.27	65.69	33.36	28.36	36.38	19.55
1992	55.54	72.51	36.97	28.90	36.60	20.45
1993	61.59	80.39	41.06	27.95	35.22	19.98
1994	68.11	88.69	45.44	25.38	31.86	18.23
1995	75.35	98.06	50.26	24.21	30.39	17.35
1996	82.20	107.26	54.59	24.69	30.89	17.81
1997	89.88	117.51	59.09	25.87	32.39	18.58
1998	98.55	129.01	64.03	28.20	35.24	20.19
1999	107.15	140.49	69.07	31.67	39.56	22.62
2000	116.82	154.16	74.74	35.17	43.98	25.18
2001	127.97	168.65	82.41	38.29	47.74	27.65
2002	139.86	184.40	90.84	42.14	52.56	30.63
2003	153.61	202.52	100.31	45.89	57.27	33.42
2004	168.65	221.94	110.59	48.42	60.64	35.03
2005	185.89	244.12	121.97	52.67	66.17	37.76
2006	208.62	273.88	136.65	57.93	72.92	41.32
2007	233.29	306.70	152.49	61.47	77.48	43.74
2008	264.21	349.45	169.45	65.78	84.07	45.35
2009	306.35	409.45	189.01	75.96	98.70	49.98
2010	357.32	479.46	209.95	85.03	111.57	52.93

Chapter 12   Human Capital for Shanghai

1. Total human capital

Human capital stocks of Shanghai are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table SH-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[42] Column 5 is the real physical capital for Shanghai.

Table SH-1.1 Real physical capital, Nominal and Real Human Capital for Shanghai

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	890		890		56
1986	1,014		954		68
1987	1,165		1,014		82
1988	1,324		960		101
1989	1,506		941		118
1990	1,710		1,006		137
1991	1,913		1,018		156
1992	2,138		1,034		182
1993	2,394		964		225
1994	2,672		868		301
1995	3,056		836		413

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[42] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	3,505		879		516
1997	4,074		993		655
1998	4,732		1,154		785
1999	5,585		1,342		917
2000	6,656	6,877	1,560	1,612	1,054
2001	7,580	7,834	1,777	1,836	1,189
2002	8,670	8,954	2,022	2,088	1,336
2003	10,180	10,780	2,372	2,511	1,483
2004	11,910	12,890	2,716	2,939	1,682
2005	13,950	14,970	3,149	3,379	1,911
2006	17,010	18,880	3,793	4,211	2,171
2007	21,160	24,140	4,574	5,216	2,479
2008	25,960	29,760	5,302	6,080	2,803
2009	31,490	36,270	6,459	7,438	3,193
2010	37,870	43,760	7,533	8,703	3,564

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table SH-2.1 presents the trend of human capital per capita for Shanghai by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 4.52 times from 91,120 Yuan to 503,325 Yuan. For female, it increases almost 2.93 times from 71,729 Yuan to 281,796 Yuan.

From 1985 to 2010, the average annual growth rate is 7.08% for male, and 5.63% for female.

Table SH-2.1 Nominal and Real Human Capital Per Capita by Gender for Shanghai

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	85.13	97.10	71.73	85.13	97.10	71.73
1986	96.38	110.42	80.69	90.67	103.88	75.90
1987	109.99	126.34	91.67	95.73	109.96	79.77
1988	122.99	141.85	101.57	89.14	102.78	73.60
1989	137.74	158.48	113.61	86.10	99.08	71.04
1990	154.38	177.82	126.47	90.82	104.63	74.39
1991	172.10	199.83	139.69	91.58	106.40	74.36
1992	191.96	224.93	154.04	92.84	108.82	74.53
1993	214.96	254.92	169.60	86.52	102.61	68.27
1994	239.82	287.47	186.53	77.91	93.38	60.60
1995	274.17	330.25	212.36	75.04	90.38	58.13
1996	300.51	364.55	229.72	75.34	91.37	57.57
1997	334.74	408.83	251.80	81.61	99.67	61.40
1998	373.83	458.16	278.32	91.17	111.71	67.86
1999	424.85	518.92	316.97	102.09	124.66	76.13
2000	488.29	594.77	364.23	114.44	139.32	85.35
2001	547.61	669.19	407.49	128.38	156.85	95.49
2002	617.73	758.87	456.34	144.07	176.96	106.42
2003	716.37	887.06	522.50	166.92	206.62	121.72
2004	829.25	1028.12	604.76	189.10	234.41	137.83
2005	961.72	1195.32	698.08	217.09	269.80	157.61
2006	1104.85	1378.04	793.54	246.37	307.19	176.91
2007	1302.17	1623.87	931.29	281.48	350.96	201.27
2008	1519.51	1897.88	1076.31	310.34	387.72	219.83
2009	1764.47	2204.37	1243.65	361.91	452.03	254.98
2010	2024.40	2530.34	1417.21	402.69	503.32	281.80

Figure SH-2.1 shows that the real human capital per capita of male is larger than that of female for Shanghai from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.

Figure SH-2.1 Human Capital Per Capita by Gender for Shanghai

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 16 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Shanghai is reported in Table SH-3.1. The real values in this table are calculated by using CPI as the deflator.

Table SH-3.1 Nominal and Real Labor Force Human Capital for Shanghai

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	474		474	
1986	534		502	
1987	602		524	
1988	686		497	
1989	779		487	
1990	884		520	
1991	972		518	
1992	1,067		516	
1993	1,178		474	
1994	1,299		422	
1995	1,437		393	
1996	1,696		425	
1997	2,038		497	
1998	2,461		600	
1999	2,911		699	
2000	3,472	3,356	814	787
2001	3,994	3,902	936	915
2002	4,611	4,569	1,075	1,065
2003	5,404	5,441	1,259	1,268
2004	6,245	6,397	1,424	1,458
2005	7,315	7,514	1,651	1,696
2006	9,168	9,461	2,045	2,110
2007	11,540	11,960	2,493	2,585
2008	14,490	15,080	2,959	3,081
2009	17,950	18,760	3,680	3,848
2010	22,080	23,190	4,391	4,613

The trend of real human capital and real labor force human capital for Shanghai are presented in Figure SH-3.1.
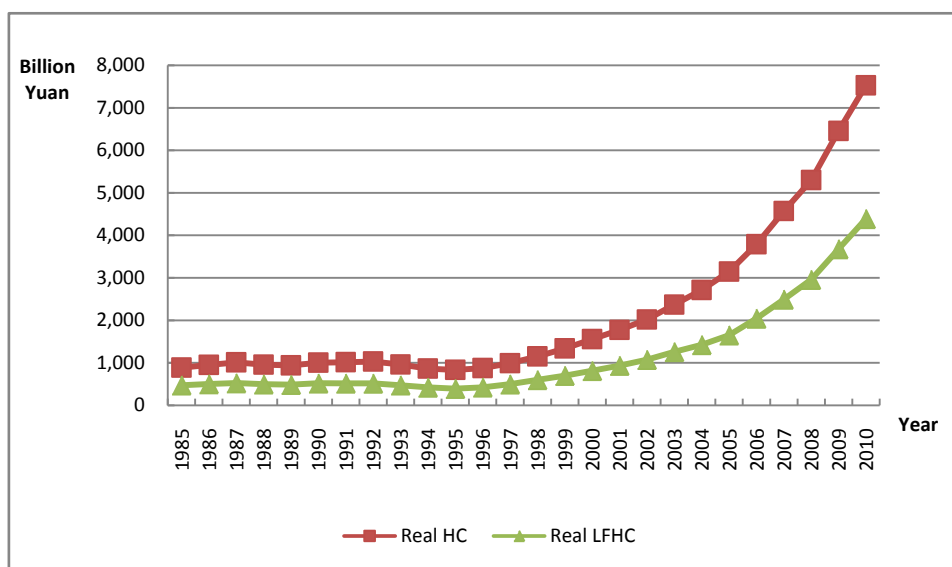
Figure SH-3.1 Real Human Capital and Real Labor Force Human Capital for Shanghai

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 16 years old, non-retired and out of school.

Table SH-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.82 times that for female in 2010.

Table SH-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Shanghai

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1985	62.54	71.25	52.95	62.54	71.25	52.95
1986	70.13	80.50	58.76	65.98	75.75	55.26
1987	78.88	91.14	65.38	68.64	79.31	56.88
1988	88.13	102.15	72.30	63.86	74.02	52.39
1989	98.10	113.96	79.71	61.33	71.24	49.83
1990	109.56	127.80	87.79	64.44	75.16	51.62
1991	120.19	141.42	95.27	63.97	75.27	50.72
1992	131.87	156.60	103.26	63.80	75.77	49.96
1993	145.86	175.35	112.36	58.70	70.59	45.23
1994	160.95	195.90	121.98	52.29	63.65	39.62
1995	177.31	217.87	132.78	48.52	59.63	36.34
1996	198.93	246.35	146.18	49.86	61.74	36.64
1997	225.11	280.79	162.42	54.88	68.44	39.59
1998	254.88	319.24	181.36	62.13	77.85	44.21
1999	285.44	357.97	201.68	68.57	85.99	48.44
2000	322.46	406.11	224.22	75.58	95.15	52.53
2001	364.85	459.65	254.46	85.51	107.74	59.61
2002	413.82	521.69	289.54	96.48	121.67	67.51
2003	475.43	600.40	332.53	110.76	139.86	77.45
2004	542.35	686.15	378.33	123.67	156.43	86.24
2005	624.92	789.75	437.36	141.04	178.25	98.72
2006	736.55	930.79	513.24	164.29	207.53	114.47
2007	872.20	1098.08	608.70	188.42	237.29	131.56
2008	1030.33	1294.72	717.71	210.40	264.43	146.60
2009	1212.54	1523.17	839.94	248.59	312.32	172.24
2010	1410.54	1769.95	973.35	280.51	352.13	193.60

Chapter 13   Human capital for Jiangsu

1. Total human capital

Human capital stocks of Jiangsu are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table JS-1.1. Column 1 and column 2 contain the nominal human capital; column 3 and column 4 contain the real human capital deflated by CPI (in 1985 Yuan). [943] Column 5 is the real physical capital for Jiangsu.

Table JS-1.1 Real physical capital, Nominal and Real Human Capital for Jiangsu

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	3,134		3,134		88
1986	3,549		3,308		108
1987	3,924		3,368		132
1988	4,601		3,242		161
1989	5,240		3,138		186
1990	6,078		3,529		214
1991	6,877		3,836		248
1992	7,714		4,051		299
1993	8,718		3,878		375
1994	9,848		3,548		462
1995	11,083		3,445		576

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[943] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	12,695		3,599		706
1997	14,770		4,078		882
1998	16,673		4,593		1,075
1999	18,784		5,209		1,286
2000	21,525	22,119	5,941	6,090	1,512
2001	24,557	25,234	6,700	6,870	1,739
2002	28,205	28,766	7,732	7,876	1,994
2003	32,071	33,637	8,671	9,074	2,318
2004	36,415	38,825	9,440	10,039	2,767
2005	41,078	42,647	10,405	10,786	3,331
2006	47,829	49,271	11,906	12,249	3,971
2007	56,606	58,359	13,489	13,891	4,706
2008	65,242	67,287	14,749	15,194	5,623
2009	75,539	77,948	17,133	17,660	6,710
2010	86,582	89,960	18,927	19,643	8,019

2. Human capital per capita

The increase in the human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital divided by non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factors to a large extent, thus it can serve as a better indicator of the average human capital.

Table JS-2.1 presents the trends of human capital per capita

measured in nominal and real terms for Jiangsu classified by gender. Human capital per capita of male remains larger than that for female. Real human capital per capita values for male increases from 68,030 Yuan to 366,720 Yuan, increasing by around 4.40 times; real human capital per capita for female increases from 46,700 Yuan to 217,420 Yuan, increasing by around 3.70 times. From 1985 to 2010, the average annual growth rate is 6.74% for male, and 6.15% for female.

Table JS-2.1 Nominal and Real Human Capital Per Capita by Gender for Jiangsu

Year	Nominal human capital per capita (Thousands of Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1985	58.03	68.03	46.70	58.03	68.03	46.70
1986	64.58	76.03	51.65	60.21	70.89	48.14
1987	69.65	82.54	55.13	59.78	70.83	47.33
1988	80.16	94.94	63.51	56.48	66.87	44.76
1989	89.82	106.48	71.02	53.79	63.77	42.53
1990	102.31	121.63	80.51	59.40	70.61	46.75
1991	114.79	136.94	89.94	64.02	76.35	50.21
1992	127.69	153.25	99.29	67.05	80.41	52.21
1993	143.39	173.35	110.42	63.78	77.04	49.18
1994	161.15	196.09	123.02	58.07	70.59	44.39
1995	180.54	220.96	136.85	56.12	68.63	42.59
1996	205.93	252.68	155.16	58.38	71.58	44.05
1997	239.61	293.85	180.52	66.16	81.13	49.86
1998	270.41	333.13	202.06	74.50	91.77	55.67
1999	305.04	376.05	227.13	84.59	104.30	62.97
2000	343.50	423.62	255.04	94.81	116.99	70.32
2001	391.91	485.32	289.76	106.92	132.45	79.01
2002	451.74	561.83	332.06	123.84	154.07	90.99
2003	517.33	646.41	378.60	139.87	174.84	102.28
2004	592.34	743.80	431.32	153.55	192.90	111.72

Year	Nominal human capital per capita (Thousands of Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2005	671.77	842.91	491.78	170.16	213.65	124.42
2006	776.15	972.79	567.21	193.20	242.34	140.99
2007	912.44	1138.07	669.34	217.44	271.41	159.28
2008	1047.05	1303.66	767.66	236.70	294.92	173.31
2009	1210.56	1502.22	888.57	274.56	340.99	201.22
2010	1354.57	1676.19	996.15	296.11	366.72	217.42

Figure JS-2.1 shows that the real human capital per capita for male is higher than that for female for Jiangsu from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.

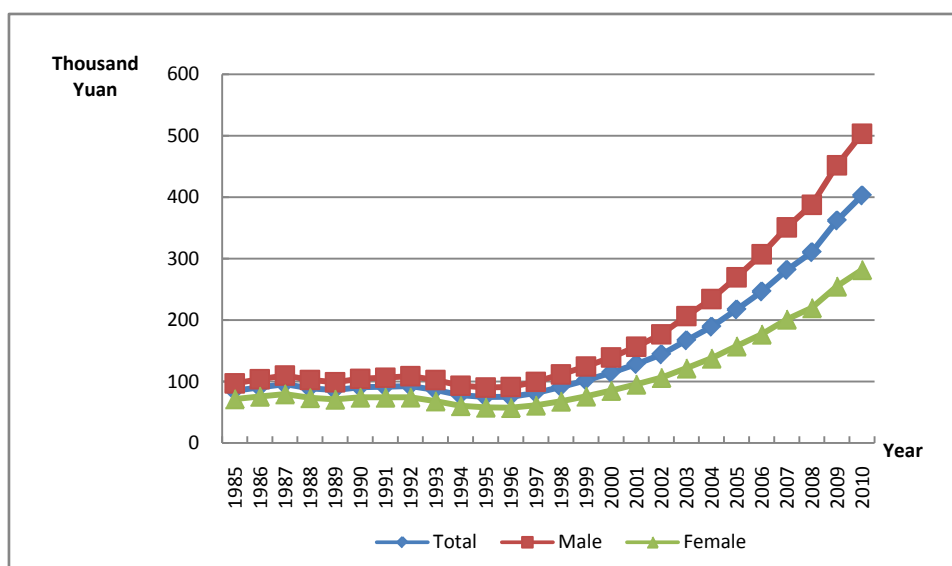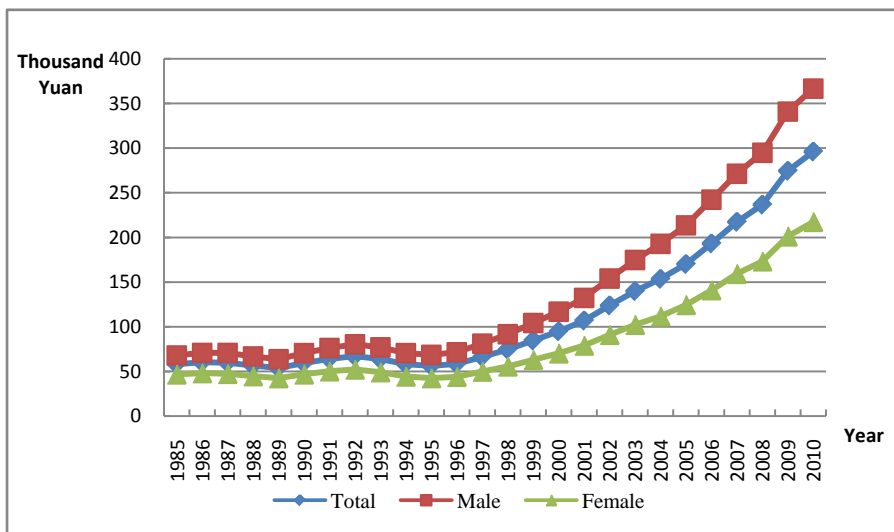**Figure JS-2.1 Human Capital Per Capita by Gender for Jiangsu**

Table JS-2.2 reports the results of human capital per capita measured in nominal and real terms for Jiangsu classified by region. From 1985 to 2010, the human capital per capita in urban areas is

significantly larger than that for rural. The real urban human capital per capita increases from 96,740 Yuan to 386,240 Yuan, the rural human capital per capita increases from 48,730 Yuan to 149,310 Yuan. The human capital per capita in urban areas grows much faster than the one for rural.

Table JS-2.2 Nominal and Real Human Capital Per Capita by Region for Jiangsu

Year	Nominal human capital per capita (Thousands of 1985 Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	58.03	96.74	48.73	58.03	96.74	48.73
1986	64.58	107.53	53.98	60.21	101.06	50.12
1987	69.65	114.31	58.44	59.78	97.23	50.38
1988	80.16	133.61	66.29	56.48	92.69	47.08
1989	89.82	150.72	73.56	53.79	90.14	44.08
1990	102.31	172.93	82.85	59.40	100.02	48.21
1991	114.79	195.67	90.82	64.02	105.09	51.86
1992	127.69	216.94	99.40	67.05	107.08	54.37
1993	143.39	242.21	110.07	63.78	100.72	51.32
1994	161.15	272.56	121.37	58.07	90.46	46.50
1995	180.54	302.91	134.37	56.12	86.51	44.65
1996	205.93	341.62	145.71	58.38	88.06	45.21
1997	239.61	396.06	158.56	66.16	100.78	48.23
1998	270.41	435.72	171.92	74.50	110.87	52.82
1999	305.04	479.05	186.45	84.59	123.63	57.98
2000	343.50	527.23	205.26	94.81	136.06	63.77
2001	391.91	590.02	224.69	106.92	152.12	68.77
2002	451.74	668.66	245.96	123.84	175.20	75.13
2003	517.33	749.40	270.61	139.87	194.60	81.68
2004	592.34	838.57	299.61	153.55	209.99	86.46
2005	671.77	928.35	334.21	170.16	227.91	94.18
2006	776.15	1062.93	380.07	193.20	256.84	105.31

Year	Nominal human capital per capita (Thousands of 1985 Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2007	912.44	1244.55	429.21	217.44	288.88	113.48
2008	1047.05	1418.57	481.36	236.70	313.00	120.52
2009	1210.56	1626.17	549.61	274.56	360.24	138.30
2010	1354.57	1806.30	618.86	296.11	386.24	149.31

Figure JS-2.2 reflects the trend of human capital per capita measured in real terms and classified by region. As is shown in the graph, the size of the difference between urban and rural expanded rapidly after 1997. Based on five education categories, the ratio of urban to rural increases from 1.99 in 1985 to 2.59 in 2010, which indicates a rising size of region gap of human capital per capita. From 1985 to 2010, the annual growth rate is 5.54% for the urban area, and 4.48% for the rural area.
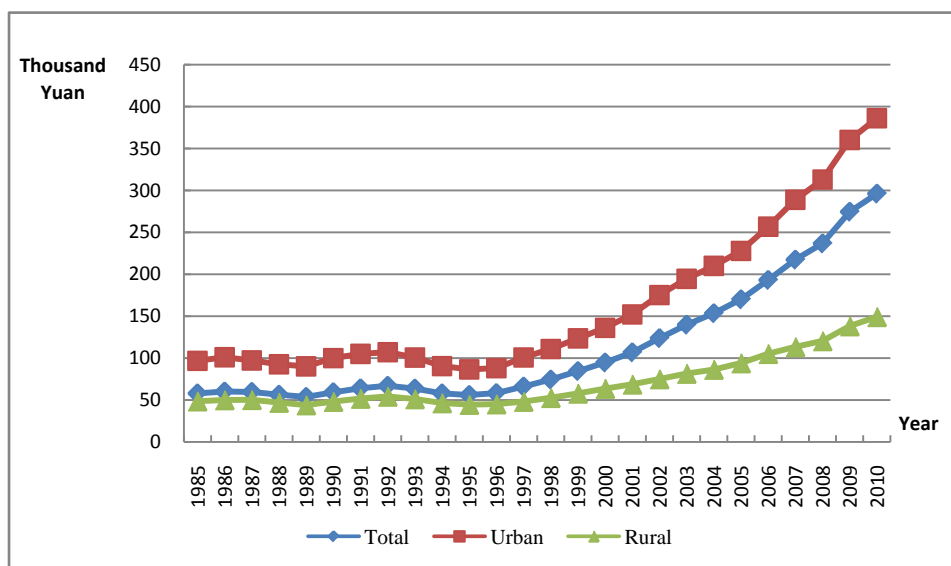
Figure JS-2.2 Real Human Capital Per Capita by Region for Jiangsu

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimated approach of labor force human capital is the same as that of human capital we illustrated above. Based on the income parameter for Jiangsu and the discount rate valued at 4.58%，the labor force human capital for Jiangsu is reported in Table JS-3.1. The real values in this table are calculated by using CPI as the deflator with respect to nominal values.

Table JS-3.1 Nominal and Real Labor Force Human Capital and GDP for Jiangsu

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	1,426		1,426	
1986	1,661		1,548	
1987	1,951		1,676	
1988	2,276		1,605	
1989	2,589		1,550	
1990	2,925		1,698	
1991	3,260		1,824	
1992	3,622		1,915	
1993	4,041		1,811	
1994	4,505		1,639	
1995	5,027		1,577	
1996	5,595		1,606	
1997	6,282		1,760	

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1998	7,003		1,961	
1999	7,878		2,217	
2000	8,957	8,881	2,505	2,484
2001	9,852	9,805	2,722	2,708
2002	10,865	10,829	3,016	3,005
2003	11,976	11,955	3,280	3,272
2004	13,356	13,303	3,500	3,485
2005	14,955	15,027	3,824	3,839
2006	17,408	17,340	4,380	4,361
2007	20,640	20,558	4,973	4,952
2008	24,384	24,283	5,570	5,545
2009	29,169	29,049	6,678	6,648
2010	34,461	34,908	7,597	7,690

The trends of real labor force human capital and real human capital for Jiangsu are presented in Figure JS-3.1. From 1997 to 2010, the real human capital keeps rising rapidly, while the labor force human capital increases slowly.
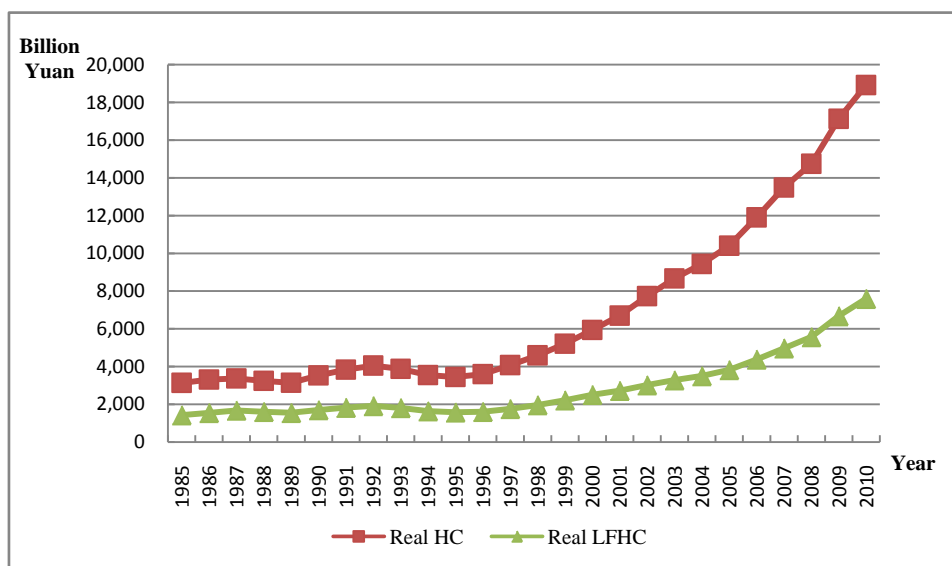
Figure JS-3.1 Real Human Capital and Real Labor Force Human Capital for Jiangsu

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table JS-3.2 reports the real and nominal average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.88 times that for female in 2010.

Table JS-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Jiangsu

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	40.42	47.80	31.99	40.42	47.80	31.99
1986	45.55	54.08	35.87	42.44	50.40	33.41
1987	51.35	61.22	40.24	44.10	52.57	34.56
1988	57.63	68.82	45.06	40.64	48.52	31.79
1989	64.21	76.77	50.08	38.46	45.98	29.99
1990	71.70	86.04	55.50	41.64	49.97	32.23
1991	79.07	95.23	61.05	44.26	53.27	34.21
1992	86.86	105.12	66.79	45.91	55.51	35.36
1993	96.10	117.00	73.50	43.07	52.39	32.99
1994	106.28	130.24	80.80	38.66	47.32	29.44
1995	117.60	144.91	89.01	36.89	45.40	27.97
1996	131.30	162.94	97.86	37.69	46.71	28.16
1997	146.78	183.26	107.97	41.13	51.28	30.32
1998	162.23	203.98	117.65	45.43	57.04	33.02
1999	180.73	228.63	129.07	50.86	64.25	36.42
2000	199.92	254.33	140.84	55.92	71.04	39.50
2001	223.52	285.98	156.60	61.76	78.92	43.37
2002	248.69	320.61	172.46	69.03	88.88	47.99
2003	275.95	356.30	192.10	75.57	97.47	52.71
2004	309.52	400.90	215.64	81.12	104.98	56.60
2005	346.10	449.81	241.22	88.49	114.92	61.76
2006	401.90	521.75	278.46	101.12	131.23	70.11
2007	474.20	613.46	327.46	114.26	147.77	78.94
2008	553.81	714.43	381.41	126.51	163.17	87.17
2009	653.53	843.85	444.39	149.63	193.14	101.81
2010	740.83	950.59	507.21	163.32	209.54	111.84

Table JS-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and

real terms. The real values for urban is about 1.84 times that for rural in 2010.

Table JS-3.3 Nominal and Real Average Labor Force Human Capital by Region for Jiangsu

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	40.42	57.58	36.31	40.42	57.58	36.31
1986	45.55	65.29	40.69	42.44	61.36	37.78
1987	51.35	74.24	45.61	44.10	63.14	39.32
1988	57.63	83.22	51.01	40.64	57.74	36.22
1989	64.21	92.96	56.57	38.46	55.60	33.90
1990	71.70	104.84	62.49	41.64	60.64	36.36
1991	79.07	114.97	68.43	44.26	61.75	39.07
1992	86.86	126.03	74.69	45.91	62.21	40.85
1993	96.10	139.87	81.81	43.07	58.16	38.14
1994	106.28	155.86	89.03	38.66	51.73	34.11
1995	117.60	173.33	96.92	36.89	49.51	32.20
1996	131.30	191.90	105.05	37.69	49.47	32.59
1997	146.78	211.55	114.19	41.13	53.83	34.73
1998	162.23	228.15	124.04	45.43	58.05	38.11
1999	180.73	250.06	133.76	50.86	64.54	41.59
2000	199.92	272.60	144.70	55.92	70.35	44.95
2001	223.52	302.65	157.30	61.76	78.03	48.15
2002	248.69	333.82	170.73	69.03	87.46	52.15
2003	275.95	365.41	186.03	75.57	94.89	56.15
2004	309.52	405.24	201.46	81.12	101.48	58.13
2005	346.10	445.72	219.95	88.49	109.42	61.98
2006	401.90	513.15	258.68	101.12	123.99	71.68
2007	474.20	606.46	300.27	114.26	140.77	79.39
2008	553.81	707.01	344.08	126.51	156.00	86.15
2009	653.53	832.25	394.63	149.63	184.37	99.30
2010	740.83	933.64	449.44	163.32	199.64	108.43

Chapter 14   Human Capital for Zhejiang

1. Total human capital

Human capital stocks of Zhejiang are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table ZJ-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[44] Column 5 is the real physical capital for Zhejiang.

Table ZJ-1.1 Real physical capital, Nominal and Real Human Capital for Zhejiang

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	2,354		2,354		52
1986	2,648		2,493		62
1987	2,981		2,594		73
1988	3,370		2,418		86
1989	3,729		2,259		100
1990	4,180		2,481		114
1991	4,754		2,734		131
1992	5,317		2,865		155
1993	5,916		2,675		199
1994	6,459		2,338		262
1995	7,151		2,217		351

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[44] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	8,509		2,413		453
1997	9,858		2,686		585
1998	11,122		3,004		720
1999	12,453		3,365		867
2000	14,192	14,390	3,771	3,817	1,033
2001	17,104	17,361	4,530	4,592	1,210
2002	19,628	19,917	5,232	5,301	1,423
2003	22,247	22,596	5,832	5,914	1,691
2004	24,724	25,169	6,254	6,356	2,053
2005	27,500	28,085	6,843	6,977	2,456
2006	32,982	33,611	8,094	8,236	2,905
2007	38,388	38,905	9,037	9,148	3,422
2008	45,342	45,993	10,145	10,278	4,007
2009	53,557	54,387	12,124	12,298	4,637
2010	61,850	63,360	13,451	13,764	5,381

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table ZJ-2.1 presents the trend of human capital per capita for Zhejiang by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 3.54 times from 79,890 Yuan to 362,870 Yuan. For female, it increases almost 4.03 times from 54,140 Yuan to 218,360 Yuan. From 1985

to 2010, the average annual growth rate is 6.05% for male, and 5.58% for female.

Table ZJ-2.1 Nominal and Real Human Capital Per Capita by Gender for Zhejiang

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	67.78	79.89	54.14	67.78	79.89	54.14
1986	75.08	89.21	59.25	70.69	84.01	55.80
1987	83.28	99.73	65.02	72.47	86.73	56.66
1988	93.54	111.86	73.05	67.13	80.20	52.52
1989	103.22	123.26	80.65	62.54	74.63	48.91
1990	114.33	136.44	89.16	67.86	80.97	52.97
1991	129.02	154.52	100.11	74.20	88.82	57.63
1992	143.35	172.54	110.55	77.24	92.90	59.64
1993	159.04	192.53	121.64	71.91	86.97	55.06
1994	173.58	211.72	131.36	62.82	76.56	47.58
1995	192.15	235.79	144.24	59.57	73.07	44.75
1996	224.25	275.97	167.33	63.59	78.21	47.45
1997	256.39	316.51	190.24	69.86	86.21	51.82
1998	286.60	355.58	210.64	77.41	96.02	56.90
1999	319.30	396.26	234.38	86.28	107.08	63.23
2000	357.92	444.23	262.19	95.10	118.19	69.49
2001	424.10	524.12	313.38	112.32	139.03	82.73
2002	481.59	597.77	353.07	128.37	159.60	93.85
2003	543.72	672.95	400.88	142.54	176.70	104.74
2004	605.21	747.75	447.66	153.09	189.50	112.80
2005	676.61	832.87	504.35	168.37	207.73	124.91
2006	792.47	974.31	589.23	194.48	239.79	143.87
2007	903.33	1112.24	668.61	212.65	262.41	156.60
2008	1046.06	1286.02	774.10	234.05	288.39	172.39
2009	1216.36	1490.11	903.87	275.35	338.23	203.62
2010	1358.96	1663.45	1009.22	295.54	362.87	218.36

Figure ZJ-2.1 shows that the real human capital per capita of male is larger than that of female for Zhejiang from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
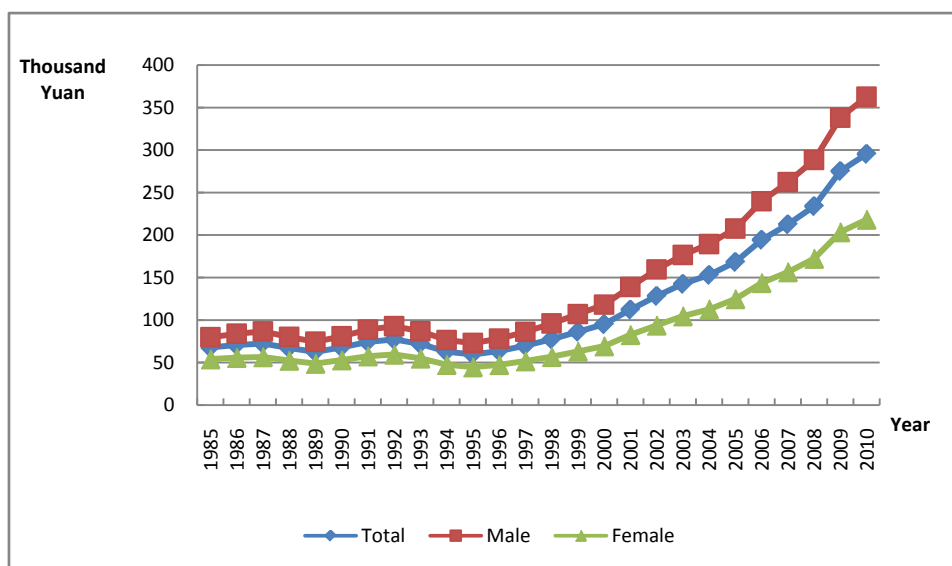
Figure ZJ-2.1 Real Human Capital Per Capita by Gender for Zhejiang

Table ZJ-2.2 reports the results of human capital per capita by region for Zhejiang in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 91,260Yuan to 366,130Yuan, the per capita rural human capital increases from 58,050Yuan to 170,350 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table ZJ-2.2 Nominal and Real Human Capital Per Capita by Region for Zhejiang

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	67.78	91.26	58.05	67.78	91.26	58.05
1986	75.08	100.78	63.94	70.69	94.81	60.27
1987	83.28	110.71	70.94	72.47	93.91	62.84
1988	93.54	125.71	79.09	67.13	86.42	58.48
1989	103.22	139.37	87.10	62.54	82.02	53.85
1990	114.33	154.81	96.10	67.86	89.24	58.25
1991	129.02	177.75	106.70	74.20	97.03	63.72
1992	143.35	200.21	116.89	77.24	100.08	66.61
1993	159.04	224.19	128.30	71.91	92.31	62.27
1994	173.58	245.14	139.32	62.82	80.94	54.14
1995	192.15	271.90	153.53	59.57	76.74	51.25
1996	224.25	320.22	169.50	63.59	82.31	52.89
1997	256.39	363.17	185.35	69.86	89.67	56.64
1998	286.60	399.82	199.53	77.41	98.23	61.40
1999	319.30	438.80	213.42	86.28	108.35	66.68
2000	357.92	483.68	232.98	95.10	118.36	72.00
2001	424.10	576.10	263.69	112.32	141.55	81.49
2002	481.59	649.65	292.74	128.37	161.56	91.10
2003	543.72	730.98	319.41	142.54	180.88	96.60
2004	605.21	807.82	347.07	153.09	194.45	100.35
2005	676.61	893.78	382.79	168.37	211.96	109.37
2006	792.47	1043.69	432.32	194.48	244.82	122.29
2007	903.33	1178.88	484.80	212.65	266.15	131.36
2008	1046.06	1360.56	540.57	234.05	293.10	139.10
2009	1216.36	1573.30	607.75	275.35	343.39	159.25
2010	1358.96	1744.61	674.17	295.54	366.13	170.35

Figure ZJ-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 1.57 in 1985 to 2.15 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 5.56% for the urban area, and 4.31% for the rural area.
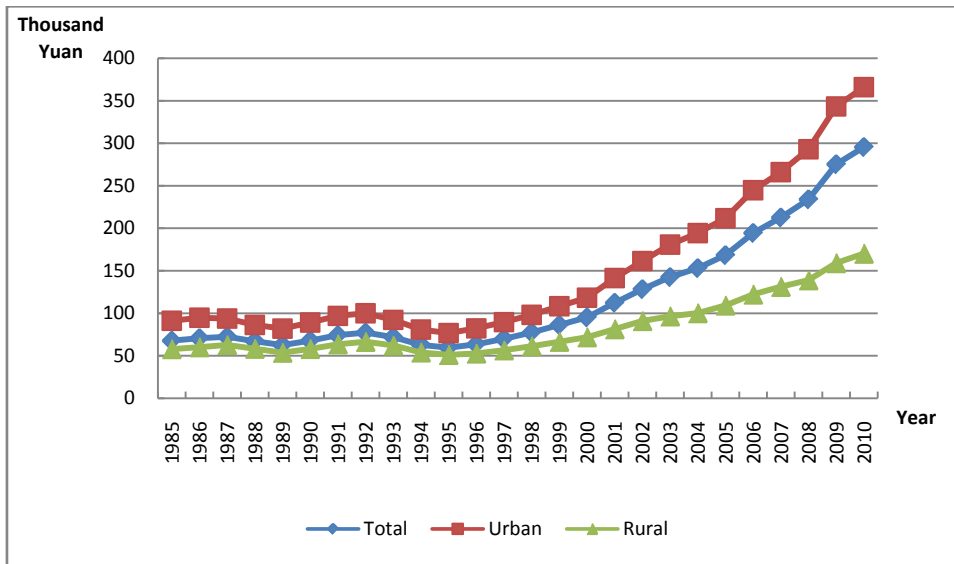
Figure ZJ-2.2 Real Human Capital Per Capita by Region for Zhejiang

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Zhejiang is reported in Table ZJ-3.1. The real values in this table are calculated by using CPI as the deflator.

Table ZJ-3.1 Nominal and Real Labor Force Human Capital for Zhejiang

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	1,104		1,104	
1986	1,260		1,187	
1987	1,444		1,259	
1988	1,627		1,171	
1989	1,831		1,111	
1990	2,081		1,236	
1991	2,280		1,314	
1992	2,485		1,346	
1993	2,737		1,248	
1994	3,036		1,109	
1995	3,396		1,063	
1996	3,696		1,061	
1997	4,174		1,150	
1998	4,913		1,340	
1999	5,802		1,580	
2000	6,817	6,770	1,822	1,809
2001	7,234	7,190	1,930	1,918
2002	7,995	7,956	2,145	2,134
2003	8,914	8,876	2,355	2,346
2004	10,154	10,122	2,590	2,581
2005	11,680	11,726	2,933	2,943
2006	14,222	14,175	3,519	3,506
2007	16,912	16,853	4,011	3,996
2008	20,207	20,134	4,554	4,535
2009	24,187	24,102	5,511	5,489
2010	28,391	28,801	6,216	6,300

The trends of labor force human capital in real terms and the real human capital for Zhejiang are presented in Figure ZJ-3.1. From 1985 to 2010, the human capital keeps rising rapidly, while the real labor force human capital increases slowly.
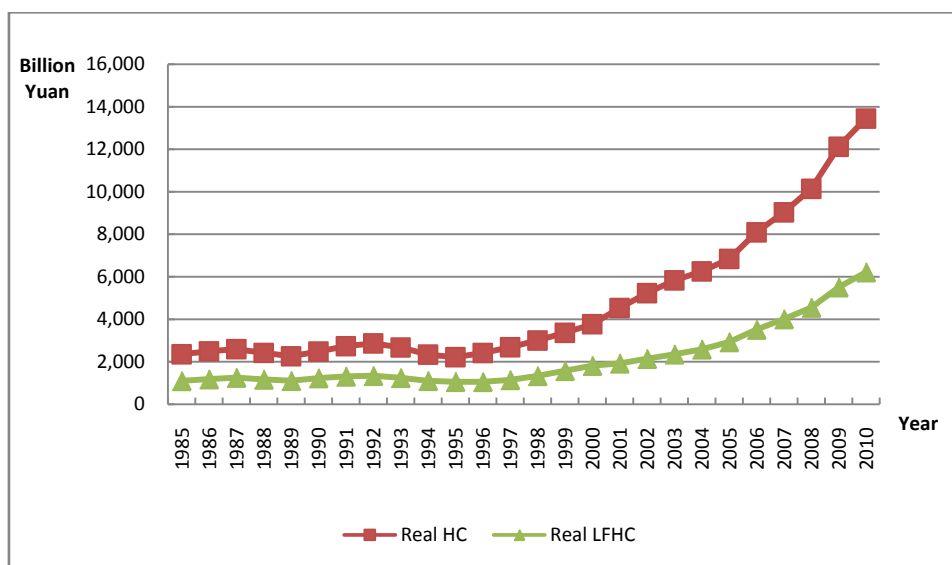
Figure ZJ-3.1 Real Human Capital and Real Labor Force Human Capital for Zhejiang

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table ZJ-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.83 times that for female in 2010.

Table ZJ-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Zhejiang

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	47.89	56.41	38.27	47.89	56.41	38.27
1986	53.32	63.38	42.15	50.22	59.69	39.70
1987	59.58	71.46	46.60	51.94	62.23	40.67
1988	66.47	79.68	51.84	47.83	57.27	37.36
1989	74.13	88.64	57.80	44.96	53.75	35.09
1990	82.69	98.96	64.17	49.13	58.77	38.15
1991	90.46	108.70	69.86	52.14	62.63	40.32
1992	98.92	119.48	75.90	53.58	64.69	41.17
1993	108.10	131.62	82.10	49.31	59.98	37.49
1994	117.57	144.24	88.41	42.96	52.66	32.33
1995	128.20	158.46	95.43	40.11	49.55	29.88
1996	143.26	178.44	104.87	41.10	51.19	30.13
1997	162.56	204.14	117.26	44.80	56.21	32.36
1998	185.61	234.61	132.07	50.60	63.95	36.05
1999	209.50	265.47	148.18	57.04	72.25	40.35
2000	231.94	294.86	162.58	61.98	78.81	43.44
2001	258.47	328.83	181.31	68.95	87.79	48.29
2002	290.32	369.90	203.17	77.88	99.33	54.38
2003	320.82	408.99	224.08	84.77	108.21	59.08
2004	354.22	452.23	246.79	90.37	115.48	62.79
2005	387.66	495.08	269.95	97.35	124.52	67.61
2006	461.49	588.51	320.07	114.19	145.94	78.95
2007	539.14	684.98	374.69	127.87	162.75	88.53
2008	629.77	796.49	440.04	141.93	179.86	98.71
2009	736.54	930.63	513.32	167.82	212.57	116.43
2010	823.58	1040.41	571.77	180.32	228.34	124.61

Table ZJ-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 1.74 times that for rural in 2010.

Table ZJ-3.3 Nominal and Real Average Labor Force Human Capital by Region for Zhejiang

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	47.89	57.22	44.06	47.89	57.22	44.06
1986	53.32	64.03	48.73	50.22	60.23	45.93
1987	59.58	71.89	54.02	51.94	60.98	47.85
1988	66.47	81.13	59.79	47.83	55.77	44.21
1989	74.13	91.88	65.96	44.96	54.07	40.78
1990	82.69	103.46	72.79	49.13	59.64	44.12
1991	90.46	112.81	79.79	52.14	61.58	47.65
1992	98.92	123.57	87.25	53.58	61.77	49.72
1993	108.10	134.65	95.63	49.31	55.44	46.41
1994	117.57	146.37	104.01	42.96	48.33	40.42
1995	128.20	159.39	113.05	40.11	44.98	37.74
1996	143.26	180.36	122.23	41.10	46.36	38.14
1997	162.56	207.60	132.49	44.80	51.26	40.49
1998	185.61	238.41	144.10	50.60	58.57	44.35
1999	209.50	268.15	155.51	57.04	66.21	48.59
2000	231.94	293.96	166.68	61.98	71.94	51.51
2001	258.47	327.69	181.47	68.95	80.51	56.08
2002	290.32	368.35	198.20	77.88	91.60	61.68
2003	320.82	403.72	218.79	84.77	99.90	66.17
2004	354.22	441.49	241.21	90.37	106.27	69.74
2005	387.66	476.93	265.01	97.35	113.10	75.72
2006	461.49	571.82	302.11	114.19	134.13	85.46
2007	539.14	670.23	341.45	127.87	151.31	92.52

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2008	629.77	784.22	384.42	141.93	168.94	98.92
2009	736.54	915.22	433.52	167.82	199.76	113.60
2010	823.58	1013.90	485.12	180.32	212.78	122.58

Chapter 15   Human Capital for Anhui

1. Total human capital

Human capital stocks of Anhui are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table AH-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[45] Column 5 is the real physical capital for Anhui.

Table AH-1.1 Real physical capital, Nominal and Real Human Capital for Anhui

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real Physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	1,075		1,075		44
1986	1,219		1,147		52
1987	1,387		1,199		60
1988	1,602		1,155		70
1989	1,828		1,120		78
1990	2,108		1,257		87
1991	2,402		1,360		96
1992	2,732		1,428		111
1993	3,116		1,416		130
1994	3,520		1,262		154
1995	3,962		1,240		188

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[45] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real Physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	4,451		1,266		234
1997	4,996		1,402		294
1998	5,561		1,556		353
1999	6,068		1,734		415
2000	7,111	7,128	2,013	2,017	481
2001	8,279	8,321	2,323	2,334	547
2002	9,553	9,615	2,703	2,720	618
2003	11,001	11,081	3,053	3,073	696
2004	12,620	12,716	3,345	3,369	815
2005	14,344	14,448	3,749	3,775	956
2006	16,270	16,401	4,199	4,233	1,125
2007	18,606	18,796	4,557	4,603	1,338
2008	20,884	21,114	4,817	4,869	1,612
2009	23,481	23,773	5,465	5,531	1,917
2010	26,893	27,257	6,068	6,150	2,302

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table AH-2.1 presents the trend of human capital per capita for Anhui

by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 4.62 times from 26, 254 Yuan to 147,421 Yuan. For female, it increases almost 4.22 times from 18,465 Yuan to 96,392 Yuan. From 1985 to 2010, the average annual growth rate is 7.41% for male, and 7.10% for female.

Table AH-2.1 Nominal and Real Human Capital Per Capita by Gender for Anhui

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	22.59	26.25	18.46	22.59	26.25	18.46
1986	25.29	29.41	20.62	23.80	27.68	19.40
1987	28.47	33.18	23.16	24.61	28.68	20.03
1988	32.41	37.71	26.37	23.36	27.17	19.02
1989	36.48	42.46	29.65	22.34	26.01	18.16
1990	41.54	48.31	33.84	24.77	28.81	20.18
1991	46.81	54.44	38.14	26.50	30.81	21.61
1992	52.74	61.45	42.86	27.57	32.11	22.42
1993	59.59	69.61	48.22	27.08	31.63	21.92
1994	66.83	78.40	53.72	23.96	28.10	19.27
1995	74.73	87.85	59.96	23.39	27.49	18.78
1996	84.44	99.58	67.40	24.02	28.32	19.18
1997	95.18	112.70	75.49	26.70	31.60	21.19
1998	107.09	127.26	84.35	29.96	35.60	23.61
1999	119.52	142.66	93.54	34.15	40.76	26.74
2000	137.20	164.59	106.28	38.83	46.59	30.09
2001	159.85	191.40	124.66	44.85	53.70	34.97
2002	184.22	221.29	143.33	52.12	62.63	40.54
2003	213.32	257.04	165.47	59.20	71.35	45.90
2004	246.28	297.78	190.37	65.28	78.96	50.45
2005	280.05	340.34	215.19	73.20	88.97	56.22
2006	320.54	390.63	245.10	82.73	100.83	63.25

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2007	371.71	446.44	289.84	91.04	109.42	70.95
2008	423.00	506.29	331.39	97.57	116.84	76.40
2009	483.27	578.69	377.73	112.48	134.75	87.83
2010	546.26	652.88	427.50	123.26	147.42	96.39

Figure AH-2.1 shows that the real human capital per capita of male is larger than that of female for Anhui from 1985 to 2010. Starting from 1995, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
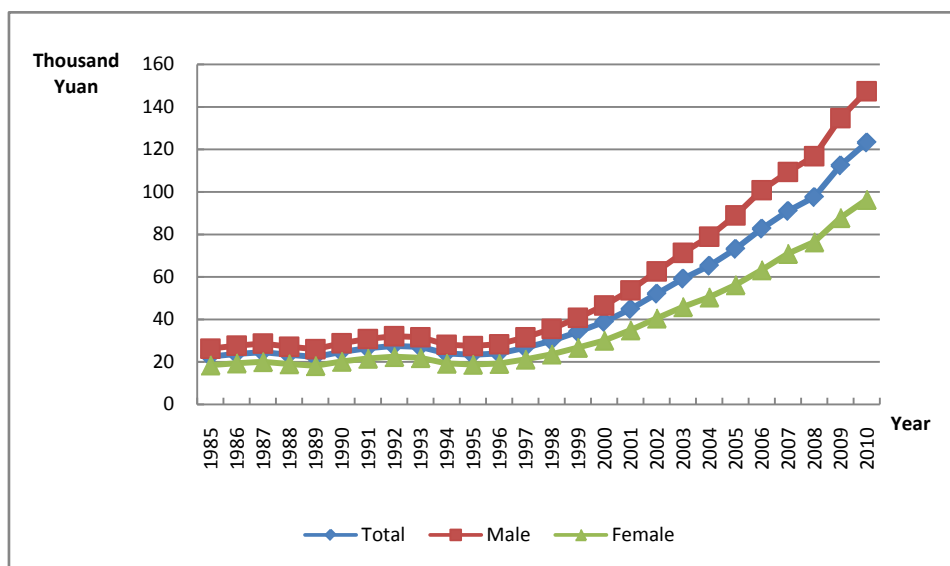
Figure AH-2.1 Real Human Capital Per Capita by Gender for Anhui

Table AH-2.2 reports the results of human capital per capita by region for Anhui in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 50,364 Yuan to

199,697 Yuan, the per capita rural human capital increases from 17,473 Yuan to 62,813 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table AH-2.2 Nominal and Real Human Capital Per Capita by Region for Anhui

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	22.59	50.36	17.47	22.59	50.36	17.47
1986	25.29	55.52	19.55	23.80	52.47	18.36
1987	28.47	61.35	21.96	24.61	52.77	19.04
1988	32.41	69.46	24.83	23.36	49.21	18.07
1989	36.48	76.88	28.01	22.34	47.07	17.16
1990	41.54	87.58	31.54	24.77	52.27	18.80
1991	46.81	98.10	35.54	26.50	54.51	20.35
1992	52.74	110.17	39.93	27.57	56.27	21.17
1993	59.59	124.60	44.93	27.08	55.63	20.64
1994	66.83	139.29	50.25	23.96	48.81	18.28
1995	74.73	156.18	55.88	23.39	47.22	17.88
1996	84.44	175.08	61.15	24.02	48.08	17.83
1997	95.18	194.49	67.09	26.70	52.41	19.43
1998	107.09	214.73	73.46	29.96	57.69	21.30
1999	119.52	240.99	80.34	34.15	66.34	23.77
2000	137.20	268.17	89.19	38.83	73.17	26.25
2001	159.85	304.25	98.87	44.85	83.01	28.73
2002	184.22	341.70	109.56	52.12	94.07	32.26
2003	213.32	383.59	121.40	59.20	103.74	35.14
2004	246.28	429.08	135.16	65.28	111.26	37.33
2005	280.05	470.50	151.90	73.20	120.79	41.17

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2006	320.54	533.58	172.82	82.73	135.09	46.43
2007	371.71	618.86	194.12	91.04	148.80	49.57
2008	423.00	701.46	215.65	97.57	159.11	51.76
2009	483.27	795.83	241.62	112.48	182.56	58.33
2010	546.26	896.65	269.05	123.26	199.70	62.81

Figure AH-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1995. This is partly due to the long-term stagnant status in the rural area before 1995. Based on five education categories, the ratio of urban to rural increases from 2.88 in 1985 to 3.18 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 5.91% for the urban area, and 5.45% for the rural area.
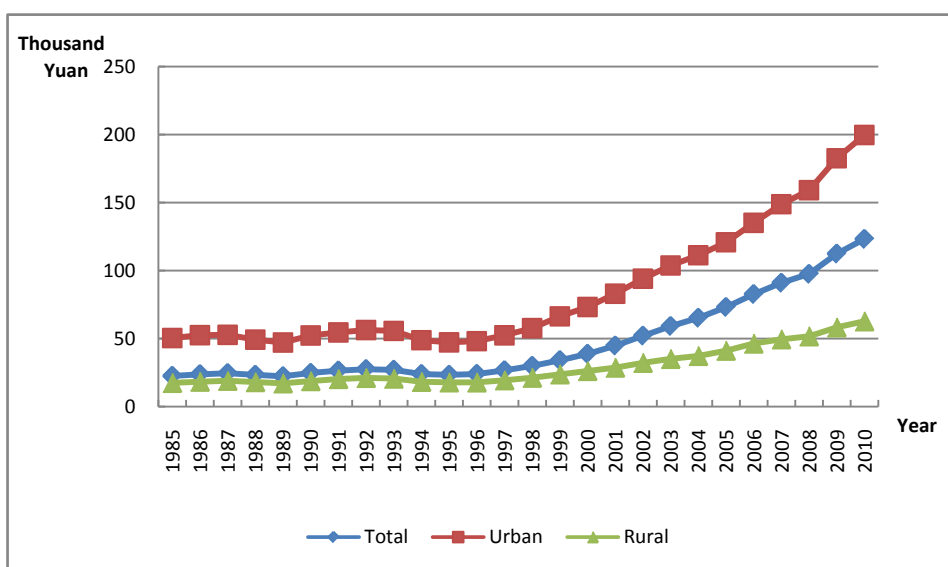
Figure AH-2.2 Real Human Capital Per Capita by Region for Anhui

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Anhui is reported in Table AH-3.1. The real values in this table are calculated by using CPI as the deflator.

Table AH-3.1 Nominal and Real Labor Force Human Capital for Anhui

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	463		463	
1986	551		519	
1987	656		567	
1988	774		559	
1989	908		556	
1990	1,053		628	
1991	1,197		679	
1992	1,351		708	
1993	1,527		695	
1994	1,707		614	
1995	1,909		600	
1996	2,104		602	
1997	2,322		656	
1998	2,548		718	
1999	2,704		779	
2000	3,170	3,118	903	889
2001	3,495	3,453	986	975

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
2002	3,944	3,911	1,123	1,113
2003	4,489	4,468	1,253	1,247
2004	4,964	4,961	1,323	1,322
2005	5,599	5,597	1,469	1,468
2006	6,447	6,452	1,671	1,672
2007	7,525	7,534	1,852	1,854
2008	8,666	8,682	2,009	2,012
2009	9,837	9,865	2,301	2,306
2010	11,565	11,622	2,621	2,633

The trends of real labor force human capital and real human capital for Anhui are presented in Figure AH-3.1. From 1985 to 2010, the real human capital keeps rising rapidly, while the real labor force human capital increases slowly after 1996.
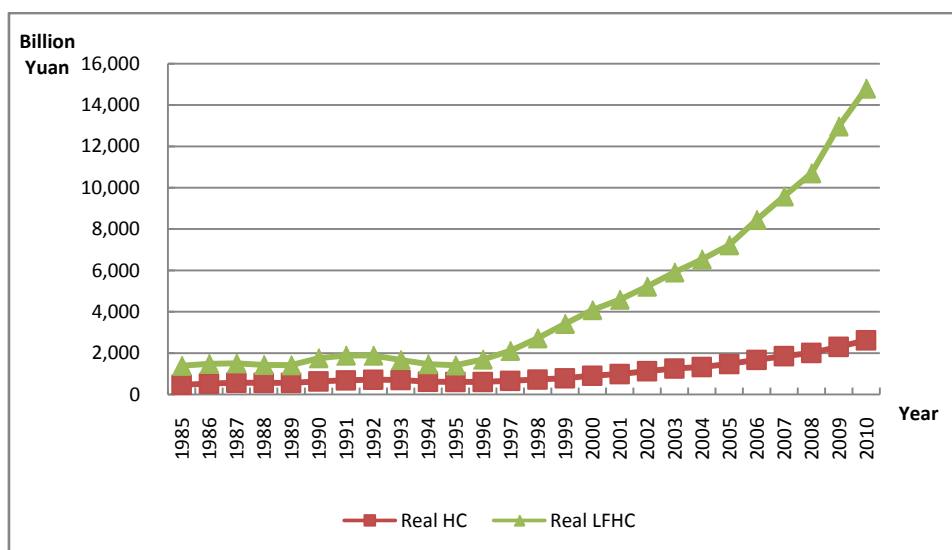
Figure AH-3.1 Real Human Capital and Real Labor Force Human Capital for Anhui

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table AH-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.62 times that for female in 2010.

Table AH-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Anhui

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	17.12	20.10	13.67	17.12	20.10	13.67
1986	19.43	22.84	15.53	18.28	21.49	14.61
1987	22.23	26.21	17.70	19.23	22.67	15.30
1988	25.41	29.90	20.26	18.34	21.58	14.63
1989	28.90	34.03	23.02	17.71	20.85	14.11
1990	32.95	38.76	26.27	19.65	23.11	15.66
1991	36.84	43.30	29.45	20.89	24.55	16.71
1992	41.10	48.41	32.83	21.53	25.35	17.21
1993	45.93	54.29	36.58	20.91	24.70	16.66
1994	50.89	60.35	40.42	18.30	21.69	14.54
1995	56.41	67.05	44.75	17.74	21.07	14.08
1996	62.61	74.78	49.22	17.90	21.38	14.09
1997	69.46	83.38	54.15	19.62	23.54	15.31
1998	76.96	92.95	59.35	21.69	26.19	16.74
1999	83.69	101.81	63.77	24.10	29.31	18.38
2000	95.12	116.80	71.04	27.10	33.26	20.28

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2001	107.53	132.97	79.86	30.34	37.49	22.56
2002	120.81	150.29	89.23	34.39	42.76	25.43
2003	137.80	171.92	101.66	38.45	47.97	28.40
2004	153.85	193.13	113.21	40.99	51.42	30.18
2005	172.24	216.24	127.30	45.19	56.72	33.43
2006	200.81	253.48	145.95	52.06	65.69	37.86
2007	233.04	292.88	169.72	57.36	72.08	41.80
2008	267.12	334.11	195.64	61.91	77.45	45.35
2009	303.82	379.73	221.89	71.06	88.80	51.88
2010	345.66	431.59	252.13	78.33	97.82	57.13

Table AH-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 3.00 times that for rural in 2010.

Table AH-3.3 Nominal and Real Average Labor Force Human Capital by Region for Anhui

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	17.12	32.39	14.51	17.12	32.39	14.51
1986	19.43	36.27	16.40	18.28	34.28	15.40
1987	22.23	40.95	18.56	19.23	35.22	16.09
1988	25.41	46.71	21.14	18.34	33.09	15.39
1989	28.90	52.83	23.97	17.71	32.35	14.69
1990	32.95	59.58	27.09	19.65	35.56	16.15
1991	36.84	66.41	30.36	20.89	36.90	17.38
1992	41.10	73.60	33.92	21.53	37.59	17.99

1993	45.93	81.96	38.00	20.91	36.59	17.46
1994	50.89	90.20	42.31	18.30	31.61	15.39
1995	56.41	99.57	47.11	17.74	30.10	15.07
1996	62.61	109.46	51.61	17.90	30.06	15.05
1997	69.46	120.33	56.42	19.62	32.43	16.34
1998	76.96	131.71	61.45	21.69	35.39	17.81
1999	83.69	143.45	66.49	24.10	39.49	19.67
2000	95.12	163.00	72.28	27.10	44.47	21.27
2001	107.53	178.02	79.03	30.34	48.57	22.96
2002	120.81	196.90	86.38	34.39	54.21	25.43
2003	137.80	219.62	94.84	38.45	59.40	27.46
2004	153.85	239.05	103.20	40.99	61.99	28.51
2005	172.24	262.37	112.86	45.19	67.36	30.59
2006	200.81	303.44	131.36	52.06	76.83	35.29
2007	233.04	352.14	151.22	57.36	84.67	38.62
2008	267.12	402.95	171.63	61.91	91.40	41.19
2009	303.82	455.60	193.85	71.06	104.51	46.79
2010	345.66	519.98	216.91	78.33	115.81	50.64

Chapter 16   Human capital for Jiangxi

1. Total human capital

Human capital stocks of Jiangxi are calculated using estimated income parameters and a 4.58% discount rate. The results are reported in Table JX-1.1. Column 1 and column 2 contain the nominal human capital; column 3 and column 4 contain the real human capital deflated by CPI (in 1985 Yuan).[46] Column 5 is the real physical capital for Jiangxi.

Table JX-1.1 Real physical capital, Nominal and Real Human Capital for Jiangxi

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	988		988		28
1986	1,127		1,053		32
1987	1,279		1,128		37
1988	1,468		1,071		42
1989	1,673		1,027		48
1990	1,906		1,142		53
1991	2,162		1,266		60
1992	2,450		1,368		68
1993	2,774		1,362		80
1994	3,132		1,211		94
1995	3,502		1,157		113

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[46] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	3,836		1,168		137
1997	4,239		1,258		174
1998	4,703		1,381		211
1999	5,269		1,568		252
2000	5,918	5,930	1,754	1,756	296
2001	6,769	6,787	2,005	2,009	342
2002	7,696	7,722	2,268	2,274	403
2003	8,434	8,452	2,463	2,467	482
2004	9,504	9,528	2,675	2,681	592
2005	10,712	10,745	2,953	2,959	716
2006	11,952	11,957	3,252	3,252	863
2007	13,644	13,648	3,528	3,527	1,035
2008	14,971	14,987	3,644	3,645	1,239
2009	16,670	16,692	4,086	4,088	1,501
2010	19,295	19,340	4,583	4,592	1,801

2. Human capital per capita

The increase in the human capital can be caused by population growth, demographic change (like retirement population scale), urbanization (like region migration), higher educational attainment, higher return to education, higher return to on-the-job training, etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital divided by non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factors to a large extent, thus it can serve as a better indicator of the average human capital.

Table JX-2.1 presents the trends of human capital per capita measured

in nominal and real terms for Jiangxi classified by gender. Human capital per capita for male remains higher than that for female. Real human capital per capita values for male increases from 30,648 Yuan to 118,819 Yuan, increasing by around 3.60 times; real human capital per capita for female increases from 24,361 Yuan to 85,033 Yuan, increasing by around 2.49 times.

Table JX-2.1 Nominal and Real Human Capital Per Capita by Gender for Jiangxi

Year	Nominal human capital per capita (Thousands of Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	30.64	36.40	24.36	30.64	36.40	24.36
1986	34.40	41.02	27.17	32.16	38.36	25.40
1987	38.55	46.16	30.28	34.02	40.73	26.73
1988	43.62	52.01	34.39	31.83	37.95	25.11
1989	48.94	58.05	38.85	30.03	35.61	23.83
1990	55.15	65.18	43.89	33.04	39.05	26.30
1991	62.32	73.74	49.45	36.49	43.18	28.96
1992	70.16	83.25	55.40	39.18	46.47	30.95
1993	79.07	94.16	61.99	38.83	46.21	30.46
1994	88.88	106.00	69.53	34.38	40.99	26.90
1995	98.89	118.33	76.96	32.67	39.08	25.43
1996	108.28	130.13	83.67	32.96	39.61	25.47
1997	119.27	143.86	91.54	35.40	42.72	27.16
1998	131.97	159.97	100.47	38.74	46.97	29.46
1999	147.67	179.82	111.38	43.94	53.57	33.08
2000	163.42	199.14	122.91	48.42	59.11	36.32
2001	185.20	225.42	139.94	54.86	66.91	41.32
2002	209.16	255.08	157.78	61.64	75.34	46.33
2003	228.45	280.65	170.16	66.71	82.08	49.55
2004	256.94	316.62	190.38	72.32	89.29	53.43
2005	288.86	355.89	214.75	79.63	98.30	58.97
2006	319.92	398.19	233.13	87.05	108.48	63.27
2007	363.93	453.63	264.35	94.10	117.44	68.17

2008	398.45	493.82	292.17	96.98	120.31	70.95
2009	443.40	552.06	320.89	108.68	135.47	78.45
2010	500.21	624.16	358.65	118.81	148.49	85.03

Figure JX-2.1 shows that the real human capital per capita for male is higher than that for female for Jiangxi from 1985 to 2010. Before 1997, different human capital all grow quite slowly, starting from 1997, both the growth of human capital for male and female accelerate, the gender gap, which has been fairly stable, then appears to be expanding.
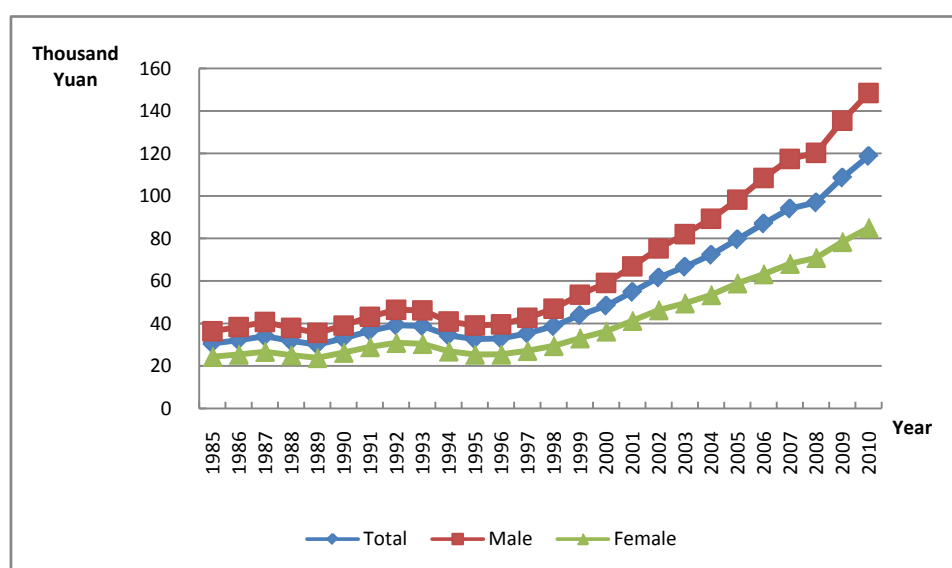
Figure JX-2.1 Human Capital Per Capita by Gender for Jiangxi

Table JX-2.2 reports the results of human capital per capita measured in nominal and real terms for Jiangxi classified by region. From 1985 to 2010, the human capital per capita in urban areas is significantly larger than that for rural. The real urban human capital per capita increases from 46,857 Yuan to 147,391 Yuan, the rural human capital per capita increases from 26,650 Yuan to 96,381 Yuan. The human capital per capita in urban areas

grows much faster than the one for rural.

Table JX-2.2 Nominal and Real Human Capital Per Capita by Region for Jiangxi

Year	Nominal human capital per capita (Thousands of 1985 Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	30.64	46.85	26.65	30.64	46.85	26.65
1986	34.40	52.75	29.87	32.16	49.76	27.81
1987	38.55	58.93	33.50	34.02	51.53	29.68
1988	43.62	67.21	37.70	31.83	47.50	27.90
1989	48.94	75.62	42.22	30.03	45.60	26.10
1990	55.15	85.54	47.33	33.04	50.83	28.47
1991	62.32	96.99	52.99	36.49	55.20	31.47
1992	70.16	109.78	58.96	39.18	58.12	33.82
1993	79.07	123.77	65.79	38.83	56.59	33.55
1994	88.88	139.69	73.09	34.38	50.33	29.41
1995	98.89	154.42	80.92	32.67	47.59	27.84
1996	108.28	167.42	88.28	32.96	47.73	27.96
1997	119.27	183.84	96.57	35.40	50.88	29.96
1998	131.97	203.72	105.81	38.74	55.83	32.50
1999	147.67	228.92	116.98	43.94	63.31	36.63
2000	163.42	255.87	127.85	48.42	69.30	40.39
2001	185.20	290.40	139.85	54.86	78.81	44.54
2002	209.16	323.93	154.15	61.64	87.74	49.15
2003	228.45	339.46	169.80	66.71	91.12	53.81
2004	256.94	374.01	189.47	72.32	97.19	58.02
2005	288.86	412.79	211.48	79.63	105.68	63.36
2006	319.92	444.24	237.59	87.05	112.72	70.06
2007	363.93	499.61	268.87	94.10	121.43	74.94
2008	398.45	540.11	293.99	96.98	123.96	77.09
2009	443.40	586.80	332.98	108.68	135.49	88.01

| | **2010** | 500.21 | 656.99 | 376.71 | 118.81 | 147.39 | 96.38 |

Figure JX-2.2 reflects the trend of human capital per capita measured in real terms and classified by region. As is shown in the graph, the size of the difference between urban and rural expanded rapidly after 1997. Based on five education categories, the ratio of urban to rural increases from 1.76 in 1985 to 1.53 in 2010, which indicates an identical development in urban and rural human capital per capita.
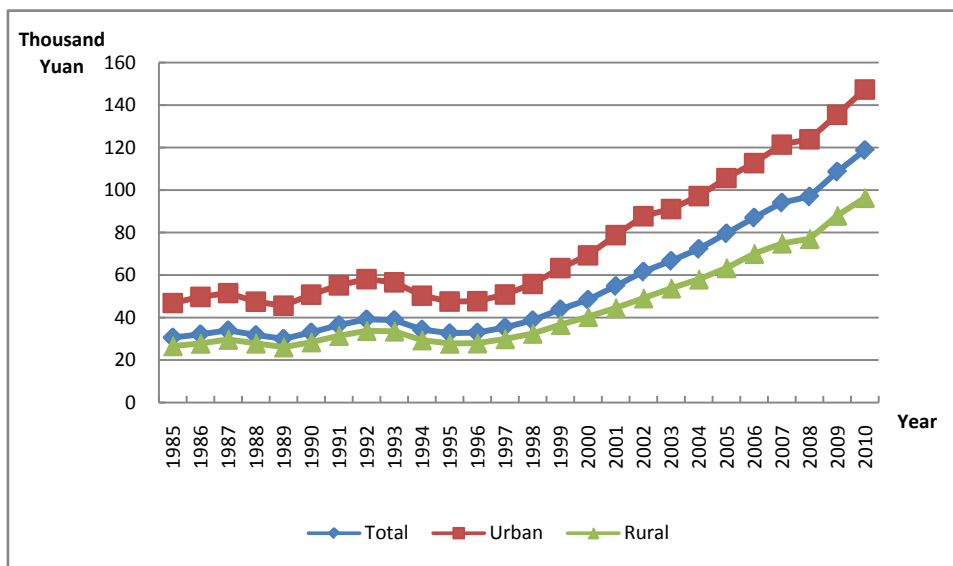
Figure JX-2.2 Real Human Capital Per Capita by Region for Jiangxi

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimated approach of labor force human capital is the same as that of human capital we illustrated above. Based on the income parameter for

Jiangxi and the discount rate valued at 4.58%，the labor force human capital for Jiangxi is reported in Table JX-3.1. The real values in this table are calculated by using CPI as the deflator with respect to nominal values. We also calculate the ratio of labor force human capital measured in nominal terms to nominal GDP. The results are reported in the last column of Table JX-3.1.

Table JX-3.1 Nominal and Real Labor Force Human Capital and GDP for Jiangxi

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	395		395	
1986	454		424	
1987	521		460	
1988	612		447	
1989	720		442	
1990	842		505	
1991	962		564	
1992	1,102		618	
1993	1,259		623	
1994	1,423		556	
1995	1,608		536	
1996	1,773		545	
1997	1,947		584	
1998	2,150		637	
1999	2,361		710	

2000	2,623	2,616	787	785
2001	2,861	2,862	862	861
2002	3,135	3,134	941	940
2003	3,428	3,424	1,017	1,016
2004	3,731	3,723	1,065	1,062
2005	4,119	4,112	1,148	1,145
2006	4,859	4,852	1,338	1,335
2007	5,676	5,668	1,486	1,483
2008	6,559	6,557	1,616	1,615
2009	8,155	8,166	2,012	2,013
2010	10,527	10,574	2,503	2,512

The trends of human capital in both real and real labor force terms for Jiangxi are presented in Figure JX-3.1. From 1985 to 2010, labor force human capital keeps rising.
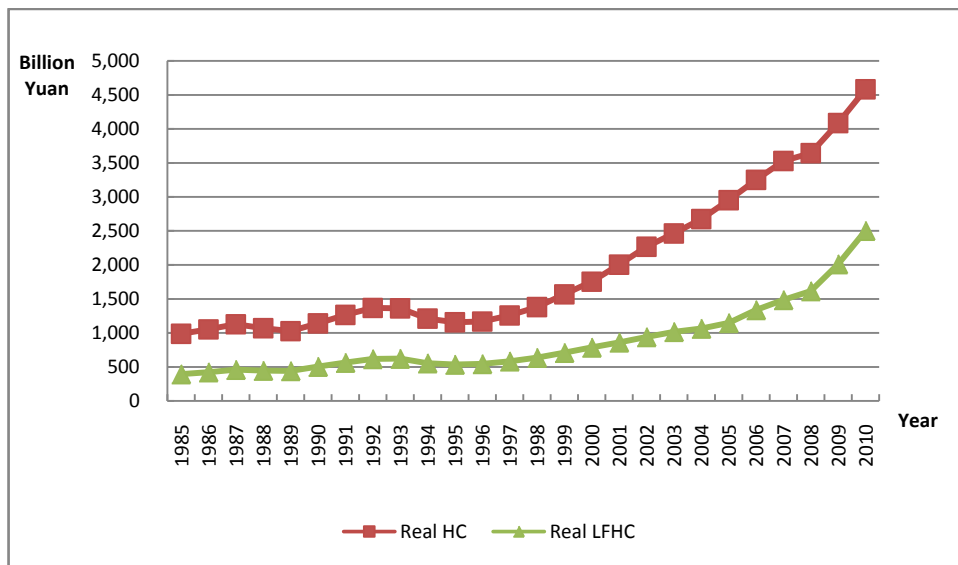
Figure JX-3.1 Real human capital and real labor force human capital for Jiangxi,1985-2010

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. Here the average labor force human capital means labor force human capital divided by the number of the population that are over 15 years old, non-retired and out of school.

Table JX-3.2 reports the real average labor force human capital classified by gender. And the average labor force human capital for female is smaller than that for male. More specifically, the number for male is about 1.80 times that for female in 2010.

Table JX-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Jiangxi

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	22.79	27.63	17.44	22.79	27.63	17.44
1986	25.54	31.09	19.46	23.87	29.06	18.18
1987	28.71	35.11	21.72	25.34	30.99	19.18
1988	32.56	39.62	24.73	23.79	28.95	18.07
1989	36.87	44.57	28.18	22.64	27.36	17.31
1990	41.87	50.39	32.10	25.10	30.20	19.24
1991	46.91	56.50	35.92	27.52	33.15	21.08
1992	52.54	63.47	39.99	29.47	35.60	22.46
1993	58.89	71.35	44.55	29.14	35.29	22.08
1994	65.48	79.48	49.47	25.57	31.01	19.34
1995	72.99	88.90	54.90	24.34	29.63	18.33
1996	79.76	97.68	59.57	24.50	30.00	18.31
1997	87.03	107.23	64.41	26.09	32.13	19.32
1998	95.09	118.03	69.47	28.18	34.97	20.60

1999	103.41	129.13	74.85	31.10	38.83	22.51
2000	112.98	141.89	80.89	33.92	42.62	24.28
2001	123.82	156.26	88.46	37.30	47.08	26.62
2002	135.43	171.70	96.44	40.63	51.53	28.92
2003	148.46	188.93	105.31	44.05	56.08	31.23
2004	162.85	207.91	115.45	46.46	59.33	32.91
2005	178.91	228.39	127.40	49.84	63.68	35.45
2006	208.17	266.88	146.38	57.32	73.54	40.23
2007	240.39	307.75	168.74	62.93	80.64	44.07
2008	275.80	352.78	192.95	67.97	87.06	47.42
2009	327.41	419.04	227.34	80.77	103.54	55.95
2010	394.62	501.95	276.60	93.83	119.59	65.54

Table JX-3.3 reports the real average Labor force human capital classified by region separately. The average labor force human capital is much smaller in rural area than in urban area. The number for urban is about 1.49 times that for rural in 2010.

Table JX-3.3 Nominal and Real Average Labor Force Human Capital by Region for Jiangxi

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	22.79	31.89	20.49	22.79	31.89	20.49
1986	25.54	35.64	23.01	23.87	33.62	21.42
1987	28.71	40.01	25.83	25.34	34.98	22.88
1988	32.56	45.15	29.32	23.79	31.91	21.70
1989	36.87	51.04	33.21	22.64	30.78	20.53
1990	41.87	58.11	37.58	25.10	34.53	22.60
1991	46.91	64.49	42.27	27.52	36.70	25.10
1992	52.54	72.06	47.41	29.47	38.15	27.20
1993	58.89	80.69	53.14	29.14	36.89	27.10
1994	65.48	89.24	59.19	25.57	32.15	23.82

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1995	72.99	99.61	65.73	24.34	30.70	22.61
1996	79.76	109.40	71.38	24.50	31.19	22.61
1997	87.03	119.70	77.40	26.09	33.13	24.01
1998	95.09	131.42	84.02	28.18	36.02	25.81
1999	103.41	143.60	90.82	31.10	39.71	28.44
2000	112.98	154.17	98.85	33.92	41.76	31.23
2001	123.82	167.76	107.45	37.30	45.53	34.22
2002	135.43	182.72	116.09	40.63	49.49	37.01
2003	148.46	199.71	125.42	44.05	53.61	39.75
2004	162.85	218.46	134.67	46.46	56.77	41.24
2005	178.91	238.26	145.21	49.84	61.00	43.51
2006	208.17	271.04	172.01	57.32	68.77	50.72
2007	240.39	308.16	200.52	62.93	74.90	55.89
2008	275.80	349.51	230.44	67.97	80.21	60.42
2009	327.41	416.42	264.45	80.77	96.15	69.90
2010	394.62	513.75	301.11	93.83	115.25	77.04

Chapter 17   Human Capital for Shandong

1. Total human capital

Human capital stocks of Shandong are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table SD-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[47] Column 5 is the real physical capital for Shandong.

Table SD-1.1 Nominal and Real Human Capital, Real physical capital for Shandong

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital(Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	3,069		3,069		108
1986	3,532		3,381		126
1987	3,997		3,540		150
1988	4,486		3,353		179
1989	5,039		3,203		204
1990	5,793		3,560		232
1991	6,651		3,892		267
1992	7,645		4,202		312
1993	8,767		4,278		373
1994	9,945		3,926		447
1995	11,210		3,763		540

[47] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital(Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	12,350		3,768		649
1997	13,496		4,000		805
1998	14,813		4,408		976
1999	16,248		4,856		1,174
2000	18,136	18,303	5,380	5,422	1,409
2001	20,874	21,110	6,065	6,126	1,647
2002	23,919	24,261	6,978	7,066	1,925
2003	27,568	28,070	7,924	8,057	2,237
2004	31,243	31,838	8,655	8,808	2,692
2005	34,420	35,040	9,380	9,540	3,262
2006	40,500	41,300	10,918	11,120	3,932
2007	46,750	47,730	12,072	12,311	4,682
2008	53,360	54,540	13,092	13,370	5,580
2009	60,310	61,680	14,786	15,117	6,711
2010	68,530	70,130	16,327	16,688	8,027

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table SD-2.1 presents the trend of human capital per capita for Shandong by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 4.10 times from 49,668 Yuan to 253,101 Yuan. For female, it increases almost 3.17 times from 36,667 Yuan to 152,789 Yuan. From 1985 to 2010, the average annual growth rate is 6.73% for male, and 5.87% for female.

Table SD-2.1 Nominal and Real Human Capital Per Capita by Gender for Shandong

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1985	43.37	49.67	36.67	43.37	49.67	36.67
1986	49.05	56.36	41.24	46.95	53.95	39.48
1987	55.40	63.88	46.31	49.06	56.57	41.00
1988	60.77	70.48	50.29	45.42	52.68	37.60
1989	67.52	78.35	55.76	42.92	49.81	35.44
1990	76.67	88.83	63.27	47.12	54.58	38.88
1991	87.20	101.33	71.63	51.02	59.31	41.92
1992	99.38	115.88	81.30	54.62	63.72	44.67
1993	112.99	132.62	91.65	55.14	64.73	44.71
1994	127.41	150.20	102.62	50.30	59.28	40.50
1995	143.16	169.22	114.92	48.06	56.82	38.57
1996	157.55	187.21	125.58	48.07	57.15	38.31
1997	171.73	205.20	135.89	50.90	60.81	40.27
1998	188.18	225.70	147.99	56.00	67.16	44.04
1999	206.57	249.01	161.09	61.74	74.44	48.13
2000	230.90	278.41	178.90	68.50	82.70	52.98
2001	264.21	319.47	204.14	76.77	92.97	59.18
2002	301.95	366.46	232.27	88.09	107.00	67.61
2003	349.05	424.05	268.40	100.33	121.97	77.02
2004	398.14	484.70	304.80	110.29	134.43	84.29

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2005	440.23	536.10	337.23	119.97	146.24	91.74
2006	514.32	627.80	392.87	138.65	169.40	105.73
2007	592.11	723.60	450.51	152.90	186.95	116.19
2008	676.65	826.22	513.16	166.02	202.86	125.77
2009	769.33	945.47	575.98	188.62	232.04	141.12
2010	862.93	1061.69	642.05	205.59	253.10	152.79

Figure SD-2.1 shows that the real human capital per capita of male is larger than that of female for Shandong from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
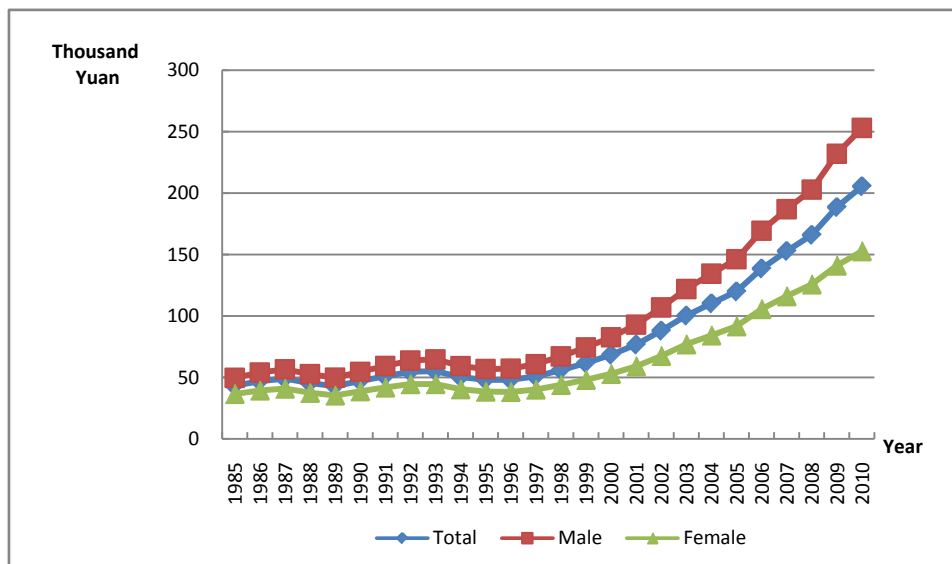
Figure SD-2.1 Human Capital Per Capita by Gender for Shandong

Table SD-2.2 reports the results of human capital per capita by region for Shandong in both nominal and real terms. From 1985 to 2010, the

human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 73,379 Yuan to 291,595 Yuan, the per capita rural human capital increases from 34,468 Yuan to 115,779 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table SD-2.2 Nominal and Real Human Capital Per Capita by Region for Shandong

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	43.37	73.38	34.47	43.37	73.38	34.47
1986	49.05	82.07	38.68	46.95	78.17	37.16
1987	55.40	92.01	43.27	49.06	80.32	38.70
1988	60.77	98.27	47.68	45.42	71.13	36.45
1989	67.52	106.98	53.06	42.92	66.93	34.12
1990	76.67	121.57	59.61	47.12	74.13	36.85
1991	87.20	137.58	66.88	51.02	78.99	39.76
1992	99.38	155.98	75.01	54.62	82.46	42.63
1993	112.99	176.19	84.26	55.14	81.28	43.26
1994	127.41	196.89	94.01	50.30	72.43	39.66
1995	143.16	220.23	104.33	48.06	69.37	37.33
1996	157.55	241.99	112.42	48.07	68.98	36.90
1997	171.73	261.26	121.60	50.90	72.16	38.98
1998	188.18	285.27	131.29	56.00	79.03	42.51
1999	206.57	312.36	141.70	61.74	86.53	46.53
2000	230.90	355.16	152.20	68.50	97.23	50.33
2001	264.21	401.84	169.33	76.77	108.81	54.69
2002	301.95	457.58	186.49	88.09	125.53	60.29
2003	349.05	529.38	204.37	100.33	144.22	65.09
2004	398.14	598.26	225.98	110.29	158.55	68.81
2005	440.23	651.18	248.59	119.97	170.70	73.92

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2006	514.32	757.64	286.28	138.65	196.64	84.28
2007	592.11	871.10	322.11	152.90	217.80	90.06
2008	676.65	991.70	361.54	166.02	236.83	95.18
2009	769.33	1124.24	406.25	188.62	268.63	106.87
2010	862.93	1255.72	452.87	205.59	291.60	115.78

Figure SD-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 2.13 in 1985 to 2.52 in 2010.
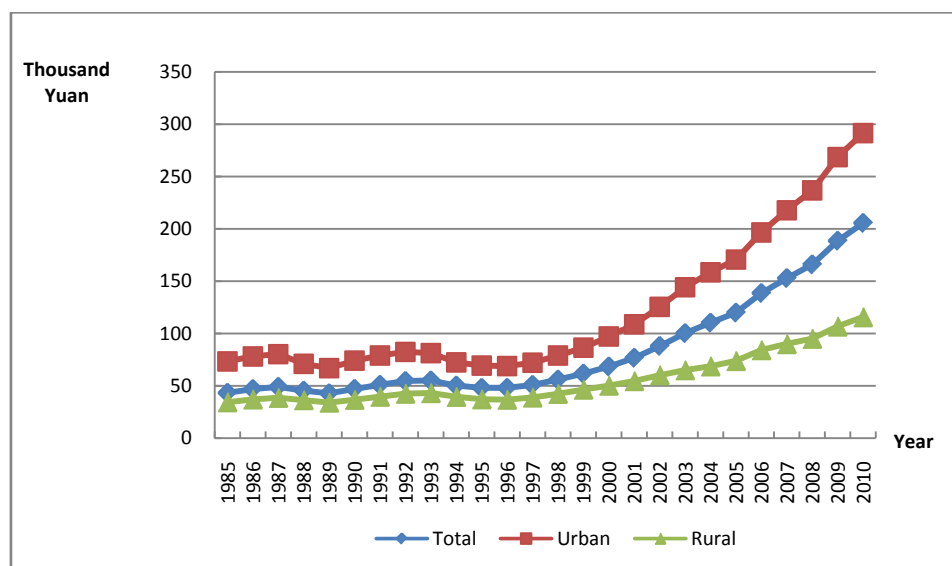
Figure SD-2.2 Real Human Capital Per Capita by Region for Shandong

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 16 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Shandong is reported in Table SD-3.1. The real values in this table are calculated by using CPI as the deflator.

Table SD-3.1 Nominal and Real Labor Force Human Capital for Shandong

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	995		995	
1986	1,156		1,107	
1987	1,336		1,184	
1988	1,587		1,188	
1989	1,854		1,179	
1990	2,256		1,387	
1991	2,497		1,463	
1992	2,750		1,516	
1993	3,016		1,480	
1994	3,282		1,306	
1995	3,625		1,226	
1996	3,947		1,215	
1997	4,341		1,297	
1998	4,829		1,449	
1999	5,410		1,630	
2000	6,546	6,432	1,965	1,932

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
2001	7,206	7,119	2,121	2,096
2002	8,068	8,005	2,387	2,368
2003	9,065	9,028	2,649	2,637
2004	10,207	10,214	2,870	2,871
2005	11,649	11,655	3,213	3,213
2006	12,921	12,947	3,531	3,536
2007	14,592	14,640	3,818	3,827
2008	16,659	16,737	4,133	4,150
2009	19,444	19,559	4,816	4,840
2010	23,625	23,811	5,672	5,713

The trend of real human capital and real labor force human capital for Shandong are presented in Figure SD-3.1.
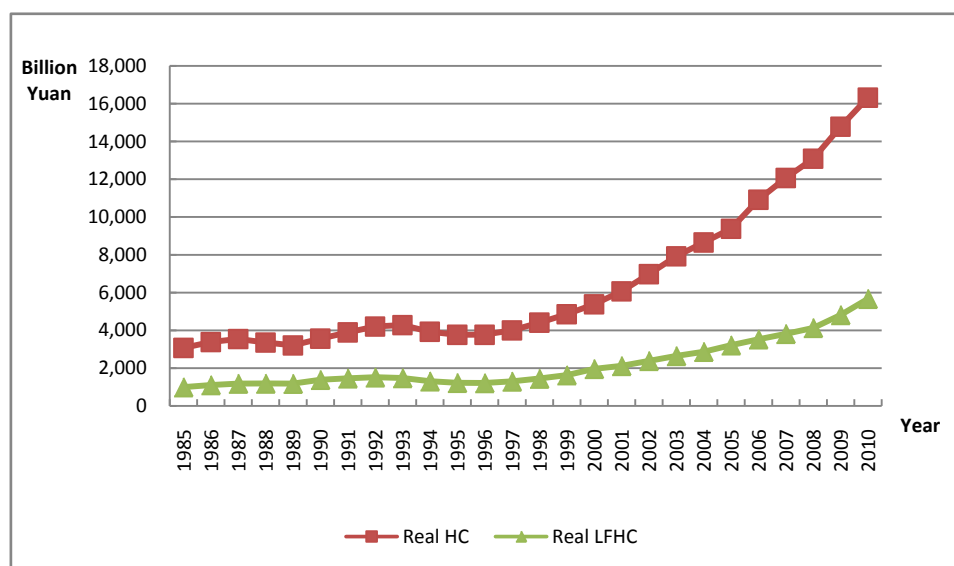
Figure SD-3.1 Real Human Capital and Real Labor Force Human Capital for Shandong

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 16 years old, non-retired and out of school.

Table SD-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.84 times that for female in 2010.

Table SD-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Shandong

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	28.85	33.80	23.44	28.85	33.80	23.44
1986	32.65	38.34	26.41	31.27	36.71	25.30
1987	37.18	43.92	29.84	32.96	38.91	26.47
1988	42.16	49.88	33.70	31.56	37.31	25.27
1989	47.45	56.11	37.92	30.17	35.66	24.14
1990	53.07	63.00	42.14	32.62	38.72	25.92
1991	58.90	70.22	46.46	34.51	41.12	27.25
1992	65.57	78.45	51.46	36.16	43.19	28.43
1993	72.83	87.55	56.67	35.73	42.87	27.89
1994	80.25	96.89	62.01	31.93	38.45	24.76
1995	89.14	108.16	68.31	30.15	36.52	23.18
1996	97.65	119.37	74.18	30.06	36.67	22.92
1997	107.04	131.47	80.67	31.99	39.20	24.20
1998	117.44	145.16	87.57	35.23	43.45	26.37
1999	128.33	160.04	94.40	38.67	48.12	28.56
2000	140.67	175.80	102.76	42.22	52.65	30.98

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2001	155.41	195.25	112.65	45.74	57.36	33.28
2002	171.12	215.95	123.07	50.63	63.78	36.54
2003	188.53	238.71	134.54	55.09	69.65	39.46
2004	209.59	266.55	148.47	58.93	74.87	41.87
2005	234.39	299.11	165.13	64.65	82.42	45.66
2006	266.41	340.79	186.01	72.80	93.02	50.95
2007	303.37	386.87	211.44	79.38	101.11	55.42
2008	346.34	439.53	243.03	85.93	108.97	60.36
2009	401.74	512.04	279.08	99.50	126.78	69.17
2010	469.68	597.53	325.17	112.76	143.41	78.14

Table SD-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about1.88 times that for rural in 2010.

Table SD-3.3 Nominal and Real Average Labor Force Human Capital by Region for Shandong

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	28.85	43.25	24.65	28.85	43.25	24.65
1986	32.65	48.60	27.71	31.27	46.28	26.62
1987	37.18	55.30	31.17	32.96	48.28	27.88
1988	42.16	62.16	34.97	31.56	44.99	26.74
1989	47.45	69.22	39.03	30.17	43.31	25.10
1990	53.07	76.76	43.52	32.62	46.80	26.90
1991	58.90	84.48	48.29	34.51	48.50	28.70
1992	65.57	93.73	53.39	36.16	49.55	30.34

1993	72.83	104.07	59.04	35.73	48.01	30.31
1994	80.25	114.25	64.82	31.93	42.03	27.34
1995	89.14	127.33	71.44	30.15	40.11	25.56
1996	97.65	140.04	76.79	30.06	39.92	25.20
1997	107.04	153.71	82.83	31.99	42.46	26.55
1998	117.44	168.33	89.42	35.23	46.64	28.95
1999	128.33	183.18	96.23	38.67	50.75	31.60
2000	140.67	201.47	104.34	42.22	55.15	34.51
2001	155.41	219.93	114.57	45.74	59.55	37.00
2002	171.12	238.70	125.86	50.63	65.49	40.69
2003	188.53	257.71	138.99	55.09	70.21	44.27
2004	209.59	283.43	152.82	58.93	75.11	46.53
2005	234.39	314.30	168.16	64.65	82.39	50.00
2006	266.41	353.64	193.40	72.80	91.78	56.94
2007	303.37	403.29	219.29	79.38	100.84	61.31
2008	346.34	461.89	245.63	85.93	110.30	64.67
2009	401.74	540.82	275.75	99.50	129.23	72.54
2010	469.68	638.49	308.10	112.76	148.27	78.77

Chapter 18   Human Capital for Henan

1. Total human capital

Human capital stocks of Henan are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table HeN-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[48] Column 5 is the real physical capital for Henan.

Table HeN-1.1 Real physical capital, Nominal and Real Human Capital for Henan

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	1,710		1,710		70
1986	1,936		1,839		82
1987	2,243		2,004		95
1988	2,577		1,929		110
1989	2,957		1,858		126
1990	3,448		2,151		143
1991	3,890		2,388		163
1992	4,399		2,586		186
1993	4,998		2,661		217
1994	5,610		2,398		259
1995	6,264		2,301		315

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[48] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	6,978		2,315		380
1997	8,074		2,576		476
1998	9,105		2,972		579
1999	10,343		3,469		688
2000	11,555	11,606	3,899	3,913	808
2001	13,054	13,258	4,371	4,432	927
2002	15,001	15,395	4,995	5,117	1,055
2003	17,436	18,263	5,700	5,952	1,197
2004	20,070	21,409	6,208	6,600	1,405
2005	23,408	25,389	7,071	7,637	1,697
2006	26,940	29,640	8,021	8,784	2,088
2007	30,890	34,370	8,706	9,641	2,616
2008	35,400	40,170	9,301	10,507	3,302
2009	40,690	46,990	10,743	12,354	4,153
2010	48,020	48,770	12,219	12,400	5,173

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table HeN-2.1 presents the trend of human capital per capita for Henan by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 5.51 times from 29,050 Yuan to 189,000 Yuan. For female, it increases almost 4.49 times from 20,470 Yuan to 112,450 Yuan. From 1985 to 2010, the average annual growth rate is 7.49% for male, and 6.81% for

female.

Table HeN-2.1 Nominal and Real Human Capital Per Capita by Gender for Henan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	24.94	29.05	20.47	24.94	29.05	20.47
1986	27.95	32.70	22.77	26.55	31.06	21.63
1987	31.61	37.18	25.53	28.25	33.21	22.83
1988	36.30	42.57	29.39	27.18	31.83	22.03
1989	40.57	47.34	33.03	25.50	29.73	20.76
1990	44.73	51.95	36.59	27.90	32.41	22.83
1991	50.54	58.84	41.17	31.02	36.08	25.30
1992	57.15	66.62	46.37	33.60	39.13	27.29
1993	65.01	76.14	52.19	34.61	40.53	27.84
1994	73.08	86.03	58.34	31.23	36.74	24.98
1995	81.54	96.34	64.90	29.95	35.35	23.87
1996	90.81	107.76	71.71	30.12	35.71	23.83
1997	104.07	124.13	81.46	33.20	39.56	26.03
1998	116.82	139.85	91.00	38.13	45.61	29.73
1999	132.06	159.37	101.30	44.29	53.40	34.03
2000	146.94	179.53	110.37	49.58	60.48	37.33
2001	166.56	203.15	125.64	55.77	67.95	42.14
2002	190.51	232.91	143.04	63.44	77.49	47.70
2003	220.62	270.36	165.21	72.12	88.34	54.05
2004	252.76	309.55	189.46	78.18	95.79	58.66
2005	290.56	357.37	216.54	87.77	107.98	65.41
2006	335.53	412.66	250.13	99.90	122.83	74.46
2007	386.60	477.85	285.63	108.96	134.63	80.57
2008	445.25	551.22	328.64	116.99	144.81	86.39
2009	514.51	640.41	375.77	135.84	169.06	99.23
2010	599.95	742.79	441.88	152.66	189.00	112.45

Figure HeN-2.1 shows that the real human capital per capita of male is larger than that of female for Henan from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
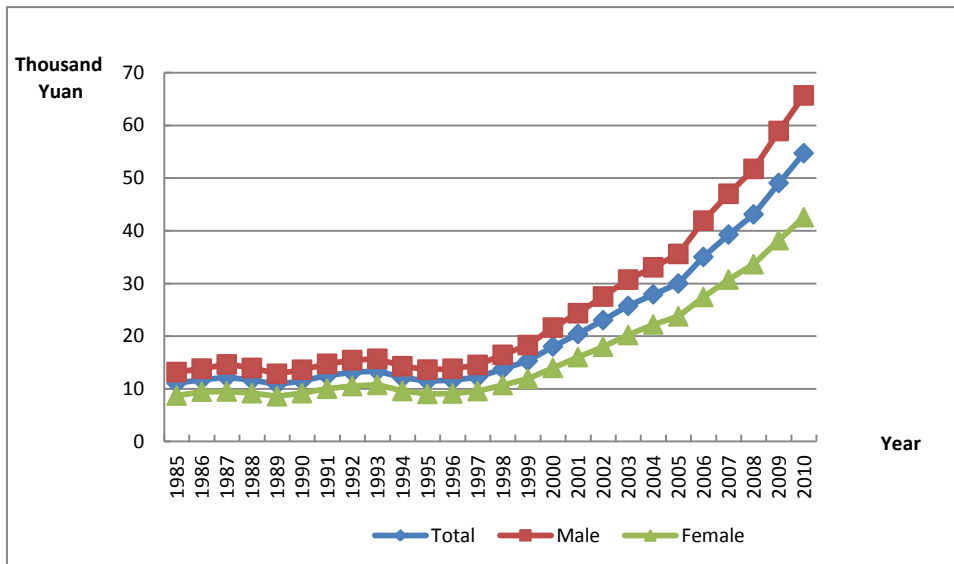
Figure HeN-2.1 Human Capital Per Capita by Gender for Henan

Table HeN-2.2 reports the results of human capital per capita by region for Henan in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 51,490 Yuan to 250,040 Yuan, the per capita rural human capital increases from 18,920Yuan to 89,760 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table HeN-2.2 Nominal and Real Human Capital Per Capita by Region for Henan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	24.94	51.49	18.92	24.94	51.49	18.92
1986	27.95	56.76	21.13	26.55	53.14	20.26
1987	31.61	62.42	23.70	28.25	54.21	21.58
1988	36.30	71.75	27.25	27.18	51.29	21.01
1989	40.57	82.70	31.06	25.50	51.46	19.63
1990	44.73	97.66	35.09	27.90	60.46	21.98
1991	50.54	110.88	39.57	31.02	65.31	24.78
1992	57.15	126.22	44.71	33.60	69.03	27.21
1993	65.01	143.15	50.91	34.61	70.79	28.10
1994	73.08	160.73	57.50	31.23	62.39	25.69
1995	81.54	178.43	64.71	29.95	59.25	24.86
1996	90.81	205.60	70.49	30.12	62.35	24.42
1997	104.07	234.94	77.17	33.20	69.57	25.73
1998	116.82	254.47	84.30	38.13	76.97	28.95
1999	132.06	282.67	91.79	44.29	88.51	32.46
2000	146.94	305.38	100.59	49.58	96.49	35.86
2001	166.56	350.36	112.59	55.77	109.93	39.86
2002	190.51	387.40	125.47	63.44	121.80	44.16
2003	220.62	437.41	140.91	72.12	135.22	48.90
2004	252.76	485.36	159.16	78.18	142.36	52.40
2005	290.56	521.40	180.55	87.77	149.78	58.22
2006	335.53	609.07	202.94	99.90	172.89	64.48
2007	386.60	688.10	230.00	108.96	185.29	69.33
2008	445.25	781.28	259.00	116.99	197.54	72.36
2009	514.51	886.20	296.51	135.84	226.74	82.51
2010	599.95	1010.49	334.84	152.66	250.04	89.76

Figure HeN-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 2.72 in 1985 to 2.79 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 3.86% for the urban area, and 3.74% for the rural area.
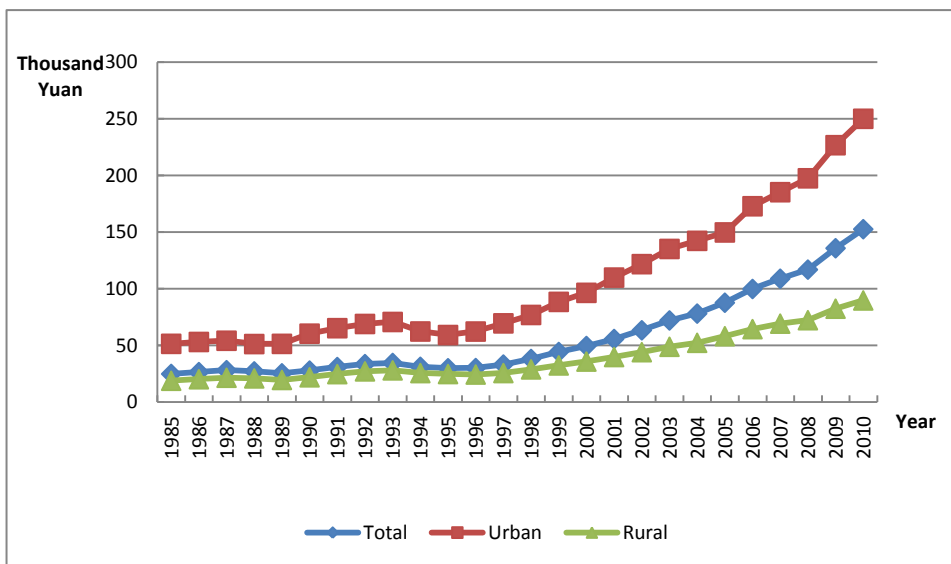
Figure HeN-2.2 Real Human Capital Per Capita by Region for Henan

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Henan is reported in Table HeN-3.1. The real values in this table are calculated by

using CPI as the deflator.

Table HeN-3.1 Nominal and Real Labor Force Human Capital for Henan

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	725		725	
1986	854		812	
1987	1,024		916	
1988	1,181		886	
1989	1,383		870	
1990	1,637		1,022	
1991	1,823		1,124	
1992	2,017		1,195	
1993	2,236		1,202	
1994	2,463		1,066	
1995	2,769		1,031	
1996	2,996		1,010	
1997	3,337		1,084	
1998	3,750		1,248	
1999	4,164		1,423	
2000	4,632	4,604	1,592	1,583
2001	5,097	5,081	1,740	1,734
2002	5,797	5,805	1,964	1,966
2003	6,822	6,880	2,267	2,284
2004	7,871	7,975	2,473	2,502
2005	9,639	9,832	2,948	3,002
2006	10,740	11,015	3,246	3,324
2007	12,257	12,661	3,512	3,619

2008	13,926	14,519	3,713	3,863
2009	16,067	16,955	4,288	4,515
2010	19,455	19,546	4,990	5,011

The trends of real human capital and real labor force human capital for Henan are presented in Figure HeN-3.1. The trends are similar, especially after 1997, real HC and real LFHC both increase.
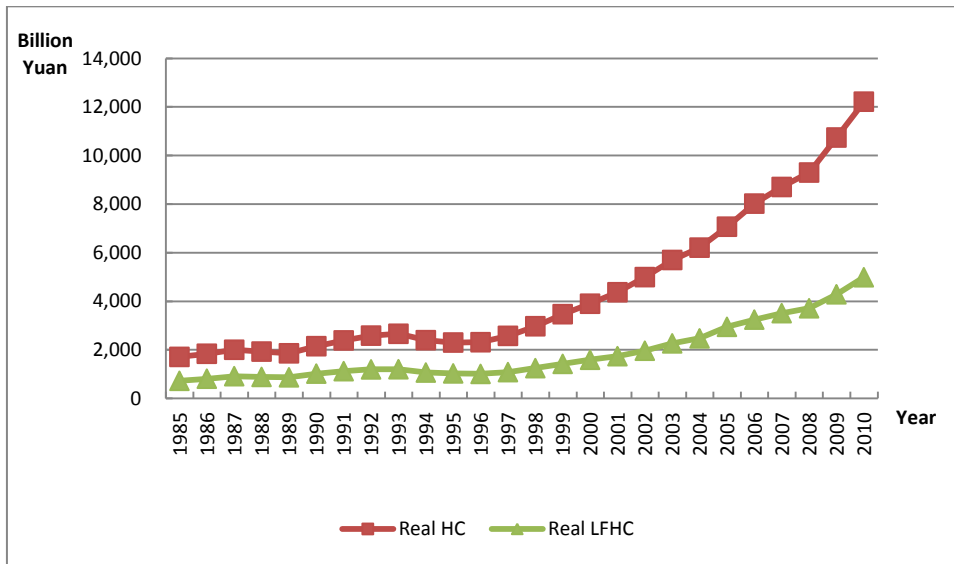
Figure HeN-3.1 Real Human Capital and Labor Force Human Capital for Henan

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table HeN-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about

1.77 times that for female in 2010.

Table HeN-3.2Nominal and Real Average Labor Force Human Capital by Gender for Henan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	18.60	21.81	15.16	18.60	21.81	15.16
1986	21.11	24.89	17.07	20.08	23.67	16.24
1987	24.22	28.82	19.32	21.68	25.79	17.31
1988	27.74	32.83	22.21	20.82	24.62	16.69
1989	31.09	36.60	25.01	19.55	23.01	15.73
1990	34.26	40.15	27.64	21.38	25.06	17.26
1991	38.20	44.93	30.71	23.54	27.67	18.94
1992	42.43	49.97	34.00	25.15	29.59	20.19
1993	47.49	56.23	37.78	25.53	30.20	20.34
1994	52.64	62.73	41.50	22.78	27.13	17.99
1995	58.49	69.87	45.94	21.77	25.99	17.12
1996	63.19	75.89	49.27	21.31	25.57	16.63
1997	69.64	84.03	53.91	22.62	27.28	17.53
1998	77.41	93.94	59.41	25.75	31.23	19.78
1999	85.06	103.73	64.78	29.06	35.43	22.16
2000	94.19	115.76	71.03	32.38	39.75	24.44
2001	104.21	128.53	78.17	35.58	43.85	26.72
2002	118.16	146.34	87.96	40.03	49.55	29.85
2003	136.28	169.74	100.50	45.29	56.39	33.46
2004	155.05	194.07	113.47	48.71	60.93	35.70
2005	181.71	228.58	131.87	55.58	69.84	40.39
2006	206.18	259.64	148.89	62.31	78.43	45.09
2007	236.23	297.32	170.93	67.69	85.09	49.05
2008	270.55	340.20	196.31	72.14	90.67	52.41
2009	315.51	398.98	226.27	84.20	106.38	60.46
2010	374.84	474.23	268.03	96.14	121.54	68.82

Table HeN-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.09 times that for rural in 2010.

Table HeN-3.3 Nominal and Real Average Labor Force Human Capital by Region for Henan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	18.60	33.48	15.29	18.60	33.48	15.29
1986	21.11	37.46	17.24	20.08	35.08	16.53
1987	24.22	42.10	19.47	21.68	36.57	17.73
1988	27.74	48.55	22.29	20.82	34.71	17.18
1989	31.09	55.98	25.44	19.55	34.83	16.08
1990	34.26	64.37	28.94	21.38	39.85	18.13
1991	38.20	71.23	32.63	23.54	41.96	20.44
1992	42.43	78.52	36.63	25.15	42.95	22.30
1993	47.49	86.98	41.23	25.53	43.01	22.75
1994	52.64	95.26	46.12	22.78	36.97	20.61
1995	58.49	104.95	51.71	21.77	34.85	19.87
1996	63.19	114.20	56.36	21.31	34.63	19.52
1997	69.64	127.24	61.52	22.62	37.68	20.51
1998	77.41	139.65	66.99	25.75	42.24	23.00
1999	85.06	151.93	72.27	29.06	47.57	25.56
2000	94.19	163.36	78.82	32.38	51.62	28.10
2001	104.21	181.67	87.17	35.58	57.00	30.86
2002	118.16	203.45	96.42	40.03	63.96	33.93
2003	136.28	230.44	108.14	45.29	71.24	37.53
2004	155.05	256.56	120.79	48.71	75.25	39.77
2005	181.71	287.99	136.48	55.58	82.73	44.01
2006	206.18	326.07	157.71	62.31	92.56	50.11
2007	236.23	368.27	179.91	67.69	99.17	54.23

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	270.55	418.78	203.62	72.14	105.89	56.89
2009	315.51	489.32	230.43	84.20	125.20	64.12
2010	374.84	581.69	256.67	96.14	143.94	68.81

Chapter 19　　Human Capital for Hubei

1. Total human capital

Human capital stocks of Hubei are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table HB-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[49] Column 5 is the real physical capital for Hubei.

Table HB-1.1 Real physical capital, Nominal and Real Human Capital for Hubei

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	1,373		1,373		60
1986	1,576		1,504		68
1987	1,822		1,616		79
1988	2,113		1,576		90
1989	2,428		1,559		99
1990	2,796		1,745		110
1991	3,129		1,860		122
1992	3,503		1,903		138
1993	3,954		1,816		162
1994	4,472		1,634		200
1995	5,054		1,538		255

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[49] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	5,655		1,573		312
1997	6,400		1,723		398
1998	7,227		1,974		488
1999	8,179		2,284		587
2000	9,393	9,480	2,635	2,658	692
2001	10,452	10,561	2,924	2,953	798
2002	11,572	11,691	3,244	3,276	906
2003	13,043	13,201	3,573	3,615	1,011
2004	14,510	14,692	3,786	3,833	1,154
2005	15,872	16,062	4,024	4,071	1,328
2006	17,899	18,122	4,465	4,519	1,550
2007	19,988	20,248	4,754	4,813	1,826
2008	22,235	22,541	4,985	5,053	2,165
2009	25,081	25,468	5,650	5,736	2,585
2010	28,180	28,656	6,170	6,272	3,105

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table HB-2.1 presents the trend of human capital per capita for Hubei by

gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 3.49 times from 35,520 Yuan to 159,430 Yuan. For female, it increases almost 2.83 times from 24,600 Yuan to 94,150 Yuan. From 1985 to 2010.

Table HB-2.1 Nominal and Real Human Capital Per Capita by Gender for Hubei

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	30.37	35.52	24.60	30.37	35.52	24.60
1986	34.54	40.62	27.77	32.96	38.76	26.51
1987	39.39	46.53	31.52	34.93	41.25	27.96
1988	44.67	52.65	35.76	33.31	39.23	26.68
1989	50.32	59.25	40.26	32.32	38.05	25.87
1990	56.73	66.77	45.23	35.41	41.68	28.24
1991	62.88	74.38	49.78	37.38	44.21	29.62
1992	69.62	82.74	54.80	37.83	44.92	29.81
1993	77.89	93.10	60.79	35.78	42.72	27.96
1994	87.28	104.99	67.47	31.89	38.32	24.69
1995	97.95	118.04	75.48	29.80	35.88	23.01
1996	108.90	131.60	83.48	30.28	36.55	23.25
1997	122.98	148.91	93.78	33.11	40.06	25.29
1998	138.40	168.27	104.64	37.81	45.93	28.62
1999	156.01	189.71	117.65	43.57	52.95	32.88
2000	176.58	214.81	132.73	49.54	60.26	37.25
2001	198.65	241.36	149.73	55.57	67.50	41.91
2002	223.08	272.27	166.67	62.54	76.32	46.74
2003	255.21	311.32	190.96	69.91	85.31	52.34
2004	288.37	351.82	215.79	75.24	91.81	56.32
2005	320.37	391.13	239.62	81.22	99.21	60.78
2006	364.04	447.83	268.71	90.81	111.73	67.03
2007	409.57	503.86	302.26	97.41	119.84	71.92
2008	460.38	567.18	339.27	103.21	127.15	76.08

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2009	524.85	647.99	384.85	118.23	146.00	86.71
2010	589.01	728.15	430.16	128.96	159.43	94.15

Figure HB-2.1 shows that the real human capital per capita of male is larger than that of female for Hubei from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
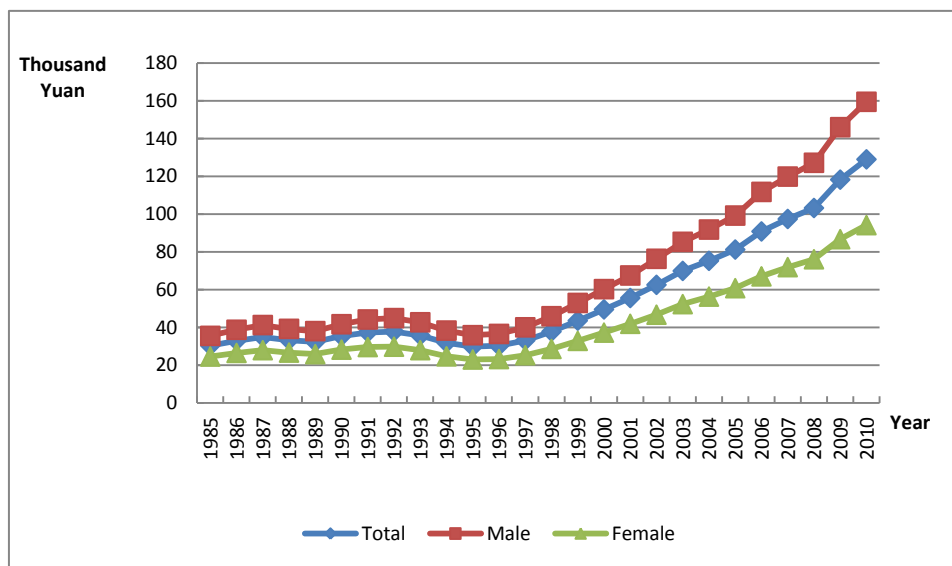
Figure HB-2.1 Human Capital Per Capita by Gender for Hubei

Table HB-2.2 reports the results of human capital per capita by region for Hubei in both nominal and real terms. From 1985 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 65,670 Yuan to 193,240 Yuan, the per capita rural human capital increases from 20,021 Yuan to 63,010 Yuan.

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Table HB-2.2 Nominal and Real Human Capital Per Capita by Region for Hubei

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	30.37	65.67	20.21	30.37	65.67	20.21
1986	34.54	72.77	22.59	32.96	69.04	21.68
1987	39.39	81.54	25.27	34.93	71.17	22.79
1988	44.67	90.55	28.33	33.31	65.59	21.80
1989	50.32	99.42	31.73	32.32	63.11	20.66
1990	56.73	109.69	35.53	35.41	68.07	22.35
1991	62.88	119.80	39.44	37.38	70.00	23.95
1992	69.62	131.43	43.67	37.83	69.50	24.53
1993	77.89	145.94	48.66	35.78	64.96	23.24
1994	87.28	162.87	54.27	31.89	57.08	20.89
1995	97.95	181.66	60.47	29.80	53.01	19.41
1996	108.90	196.35	65.91	30.28	52.00	19.61
1997	122.98	216.81	72.34	33.11	55.96	20.77
1998	138.40	239.28	78.97	37.81	63.08	22.91
1999	156.01	265.02	86.16	43.57	71.88	25.42
2000	176.58	295.94	94.75	49.54	80.27	28.47
2001	198.65	332.05	104.90	55.57	89.71	31.59
2002	223.08	369.94	116.85	62.54	100.75	34.90
2003	255.21	423.19	129.84	69.91	112.33	38.29
2004	288.37	475.29	144.57	75.24	120.73	40.29
2005	320.37	524.45	160.14	81.22	129.71	43.21
2006	364.04	587.45	178.31	90.81	143.29	47.21
2007	409.57	650.61	198.63	97.41	151.57	50.04
2008	460.38	718.72	220.52	103.21	158.71	51.73
2009	524.85	807.21	247.90	118.23	179.50	58.15
2010	589.01	893.29	276.96	128.96	193.24	63.01

Figure HB-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997.
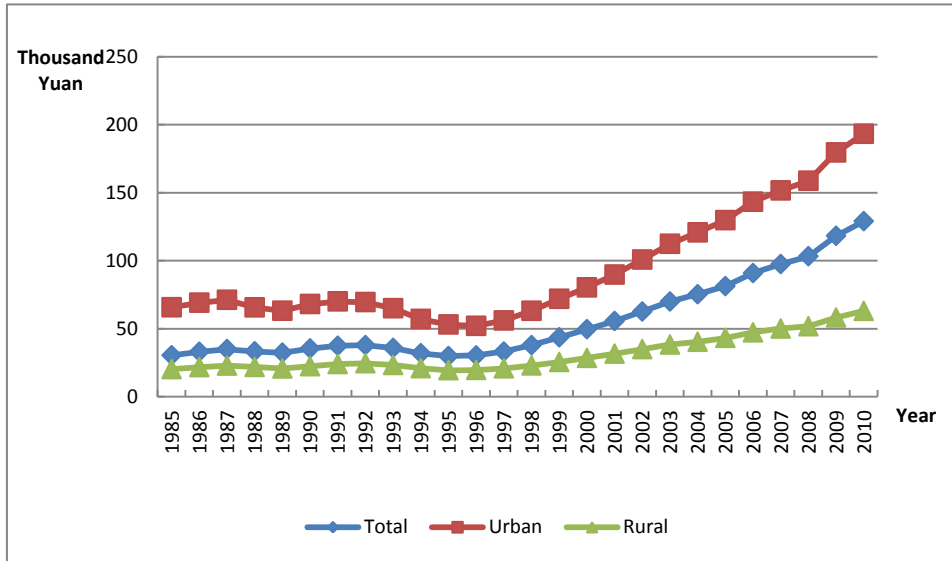
Figure HB-2.2 Real Human Capital Per Capita by Region for Hubei

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Hubei is reported in Table HB-3.1. The real values in this table are calculated by using CPI as the deflator.

Table HB-3.1 Nominal and Real Labor Force Human Capital for Hubei

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	598		598	
1986	701		669	
1987	830		737	
1988	996		745	
1989	1,173		754	
1990	1,379		862	
1991	1,547		921	
1992	1,719		936	
1993	1,909		879	
1994	2,102		772	
1995	2,315		708	
1996	2,583		723	
1997	2,946		798	
1998	3,417		938	
1999	3,919		1,099	
2000	4,578	4,479	1,291	1,263
2001	4,949	4,857	1,394	1,369
2002	5,345	5,272	1,509	1,489
2003	5,825	5,785	1,612	1,601
2004	6,278	6,291	1,656	1,658
2005	6,881	6,901	1,763	1,767
2006	7,722	7,749	1,946	1,951
2007	8,522	8,556	2,046	2,053
2008	9,543	9,590	2,155	2,165
2009	10,998	11,066	2,492	2,506
2010	13,067	13,174	2,873	2,896

The trends of real human capital and real labor force human capital for Hubei are presented in Figure HB-3.1. Before 1997, both the real human capital and real labor force human capital keep upside and downside, after 1997, both keep rising steadily.
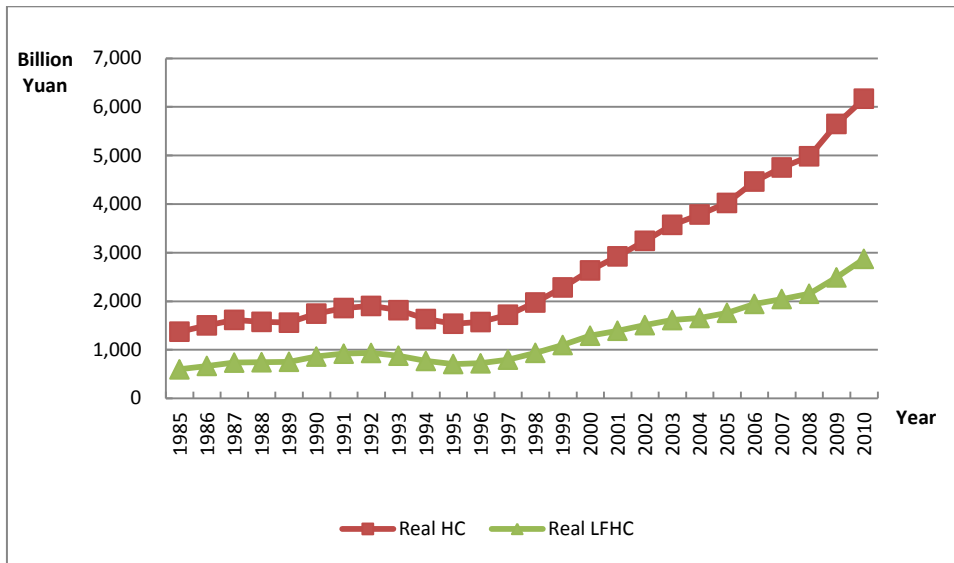
Figure HB-3.1 Nominal and Real Labor Force Human Capital for Hubei

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table HB-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.62 times that for female in 2010.

Table HB-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Hubei

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	22.73	26.88	18.01	22.73	26.88	18.01
1986	26.09	30.99	20.61	19.91	29.60	19.69
1987	30.00	35.81	23.61	26.66	31.81	20.98
1988	34.29	40.81	26.98	25.64	30.52	20.20
1989	39.00	46.35	30.66	25.08	29.79	19.72
1990	44.39	52.70	34.76	27.73	32.91	21.72
1991	48.97	58.56	38.03	29.15	34.85	22.65
1992	53.51	64.28	41.33	29.14	34.98	22.54
1993	58.89	71.20	45.09	27.13	32.78	20.81
1994	64.46	78.68	48.77	23.66	28.83	17.93
1995	70.75	86.84	53.11	21.64	26.51	16.27
1996	78.63	96.90	58.39	21.99	27.07	16.38
1997	87.97	108.56	64.95	23.83	29.37	17.63
1998	99.31	123.22	72.41	27.26	33.79	19.91
1999	111.04	137.96	80.40	31.14	38.66	22.58
2000	119.63	155.39	89.38	35.13	43.77	25.24
2001	137.23	171.63	97.96	38.64	48.28	27.62
2002	150.48	188.61	106.88	42.48	53.21	30.21
2003	166.10	208.42	117.90	45.98	57.65	32.67
2004	182.62	229.65	129.07	48.16	60.53	34.08
2005	202.31	254.03	143.41	51.82	65.03	36.77
2006	227.32	286.40	160.26	57.28	72.11	40.41
2007	253.22	318.90	178.55	60.80	76.54	42.90
2008	284.68	359.20	200.28	64.28	81.09	45.25
2009	327.51	414.77	228.14	74.20	93.98	51.72
2010	378.67	480.67	262.16	83.26	105.66	57.68

Table HB-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 3.00 times that for rural in 2010.

Table HB-3.3 Nominal and Real Average Labor Force Human Capital by Region for Hubei

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	20.09	43.72	14.36	20.09	43.72	14.36
1986	22.59	48.41	16.13	21.34	45.41	15.31
1987	25.71	54.02	18.16	22.58	46.41	16.23
1988	29.23	61.39	20.45	21.71	43.91	15.64
1989	33.10	69.01	22.92	20.56	41.98	14.49
1990	37.49	77.32	25.67	22.75	45.84	15.89
1991	41.72	84.83	28.62	23.83	46.87	16.83
1992	46.16	93.00	31.79	24.18	46.20	17.42
1993	51.26	102.59	35.25	23.66	44.71	17.10
1994	56.89	113.15	38.95	20.74	38.47	15.09
1995	63.46	125.67	42.97	19.41	36.21	13.88
1996	69.86	137.66	46.59	19.41	35.96	13.73
1997	77.43	151.92	50.56	20.53	37.72	14.33
1998	85.91	166.86	55.02	23.08	42.40	15.70
1999	96.23	182.32	59.65	26.36	47.67	17.30
2000	106.93	202.56	65.11	29.34	52.80	19.08
2001	115.61	214.42	71.80	31.32	55.84	20.44
2002	127.16	230.71	78.99	34.71	61.18	22.40
2003	139.37	247.03	86.96	37.30	64.99	23.83
2004	152.73	263.69	95.40	39.64	67.35	25.33
2005	171.01	288.82	104.95	43.81	73.11	27.37
2006	199.35	334.64	121.18	50.32	82.97	31.48
2007	229.80	384.82	139.08	55.17	90.69	34.37

2008	267.20	444.60	158.18	60.26	98.66	36.64
2009	311.71	514.72	180.45	69.79	114.23	41.06
2010	380.60	624.32	204.72	81.84	133.60	44.49

Chapter 20   Human Capital for Hunan

1. Total human capital

Human capital stocks of Hunan are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table HuN-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[50] Column 5 is the real physical capital for Hunan.

Table HuN-1.1 Real physical capital, Nominal and Real Human Capital for Hunan

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	1,424		1,424		52
1986	1,596		1,516		59
1987	1,793		1,555		68
1988	2,056		1,420		78
1989	2,341		1,364		86
1990	2,729		1,585		96
1991	3,066		1,707		107
1992	3,415		1,734		123
1993	3,806		1,654		143
1994	4,257		1,475		169
1995	4,728		1,376		203

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[50] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	5,372		1,446		242
1997	6,092		1,593		297
1998	6,882		1,790		359
1999	7,781		2,008		430
2000	8,838	8,879	2,249	2,258	509
2001	9,812	9,852	2,518	2,527	590
2002	11,057	11,105	2,848	2,860	679
2003	12,342	12,381	3,099	3,109	772
2004	13,408	13,414	3,214	3,215	895
2005	14,908	14,936	3,490	3,497	1,059
2006	16,987	16,990	3,919	3,919	1,258
2007	18,715	18,685	4,082	4,075	1,511
2008	21,068	21,038	4,321	4,314	1,867
2009	22,909	22,870	4,716	4,707	2,299
2010	25,483	25,592	5,086	5,108	2,854

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table HuN-2.1 presents the trend of human capital per capita for Hunan by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 2.56 times from 32,140 Yuan to 114,400 Yuan. For female, it increases almost 1.97 times from 23,250 Yuan to 69,000 Yuan. From 1985 to 2010, the average annual growth rate is 5.36% for male, and 4.63% for

female.

Table HuN-2.1 Nominal and Real Human Capital Per Capita by Gender for Hunan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	27.99	32.14	23.25	27.99	32.14	23.25
1986	31.28	36.03	25.86	29.70	34.22	24.55
1987	35.04	40.43	28.88	30.38	35.05	25.05
1988	39.20	45.26	32.28	27.09	31.26	22.30
1989	43.81	50.60	36.01	25.52	29.47	20.98
1990	49.47	57.13	40.63	28.72	33.16	23.59
1991	55.27	64.01	45.22	30.77	35.64	25.19
1992	61.22	71.11	49.93	31.08	36.08	25.36
1993	68.00	79.38	55.02	29.55	34.49	23.94
1994	75.92	88.96	61.12	26.31	30.82	21.19
1995	84.17	99.11	67.26	24.50	28.85	19.60
1996	95.25	112.62	75.49	25.64	30.31	20.34
1997	107.63	128.20	84.26	28.14	33.51	22.04
1998	121.69	145.29	94.80	31.65	37.78	24.65
1999	137.23	163.93	106.55	35.42	42.31	27.50
2000	153.44	184.24	118.03	39.05	46.88	30.01
2001	170.03	204.76	130.41	43.63	52.54	33.45
2002	192.14	232.67	146.32	49.49	59.94	37.68
2003	215.20	261.37	163.28	54.04	65.64	40.99
2004	234.48	286.79	176.23	56.21	68.74	42.24
2005	259.50	319.37	193.82	60.75	74.76	45.37
2006	298.63	367.35	222.14	68.90	84.77	51.26
2007	332.91	412.12	244.37	72.61	89.88	53.29
2008	381.08	469.96	280.89	78.16	96.37	57.61
2009	420.56	516.16	311.81	86.58	106.23	64.20
2010	467.13	573.19	345.57	93.23	114.40	69.00

Figure HuN-2.1 shows that the real human capital per capita of male is larger than that of female for Hunan from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
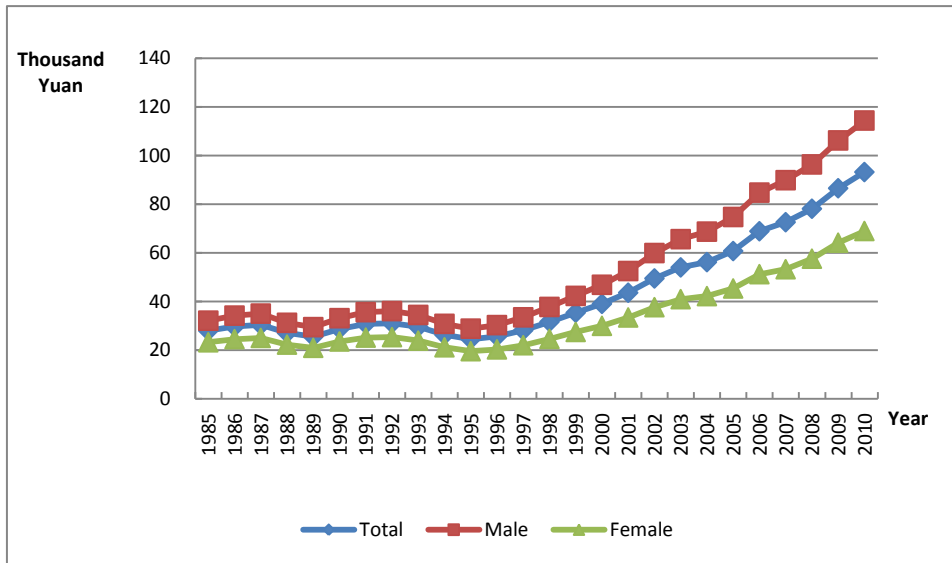
Figure HuN-2.1 Real Human Capital Per Capita by Gender for Hunan

Table HuN-2.2 reports the results of human capital per capita by region for Hunan in both nominal and real terms. From 1985 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 62,150 Yuan to 140,020 Yuan, the per capita rural human capital increases from 22,930 Yuan to 55,930 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table HuN-2.2 Nominal and Real Human Capital Per Capita by Region for Hunan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	27.99	62.15	22.93	27.99	62.15	22.93
1986	31.28	69.51	25.62	29.70	65.95	24.33
1987	35.04	77.92	28.72	30.38	66.42	25.07
1988	39.20	86.71	31.87	27.09	58.80	22.19
1989	43.81	95.42	35.50	25.52	55.16	20.75
1990	49.47	104.69	39.65	28.72	60.16	23.13
1991	55.27	116.18	43.85	30.77	63.53	24.64
1992	61.22	127.09	48.39	31.08	61.23	25.20
1993	68.00	138.24	53.78	29.55	56.73	24.06
1994	75.92	154.11	59.53	26.31	50.67	21.21
1995	84.17	167.06	66.22	24.50	46.51	19.74
1996	95.25	185.88	71.84	25.64	48.28	19.79
1997	107.63	205.24	78.31	28.14	51.75	21.05
1998	121.69	227.28	85.06	31.65	57.02	22.84
1999	137.23	252.61	92.34	35.42	63.64	24.45
2000	153.44	274.24	101.47	39.05	68.20	26.50
2001	170.03	297.37	111.03	43.63	74.77	29.20
2002	192.14	331.77	122.31	49.49	83.76	32.36
2003	215.20	365.35	134.56	54.04	90.96	34.20
2004	234.48	386.78	147.86	56.21	92.50	35.55
2005	259.50	422.42	162.23	60.75	98.95	37.95
2006	298.63	479.78	183.40	68.90	110.62	42.39
2007	332.91	521.03	206.22	72.61	114.19	44.59
2008	381.08	587.95	231.46	78.16	121.79	46.59
2009	420.56	640.02	253.79	86.58	132.98	51.30
2010	467.13	694.82	285.60	93.23	140.02	55.93

Figure HuN-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural decreases from 2.71 in 1985 to 2.50 in 2010. From 1985 to 2010, the annual growth rate is 8.45% for the urban area, and 2.07% for the rural area.
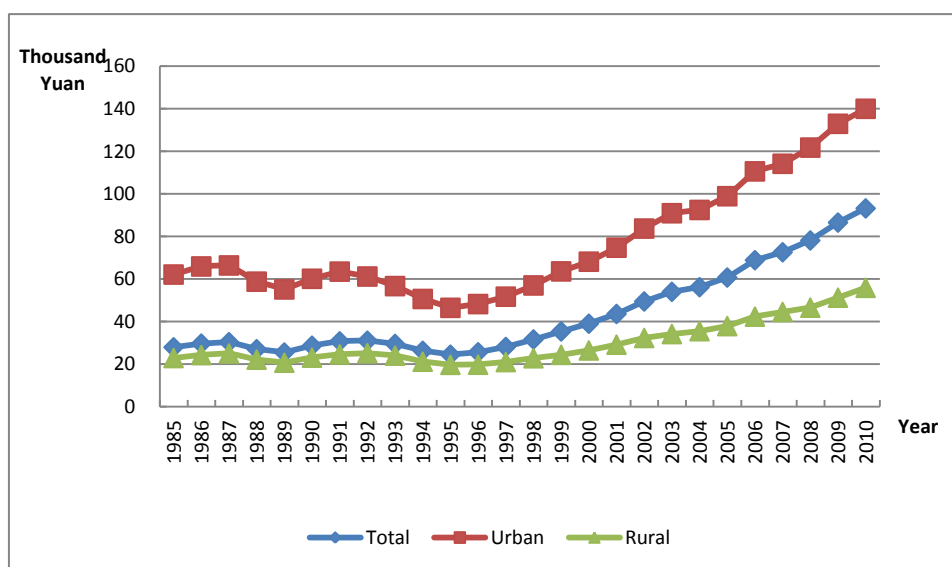
Figure HuN-2.2 Real Human Capital Per Capita by Region for Hunan

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Hunan is reported in Table HuN-3.1. The real values in this table are calculated by using CPI as the deflator.

Table HuN-3.1 Nominal and Real Labor Force Human Capital for Hunan

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	633		633	
1986	724		688	
1987	825		717	
1988	969		671	
1989	1,116		651	
1990	1,319		767	
1991	1,484		828	
1992	1,660		848	
1993	1,847		808	
1994	2,029		707	
1995	2,248		657	
1996	2,517		681	
1997	2,862		753	
1998	3,272		856	
1999	3,733		968	
2000	4,324	4,287	1,105	1,095
2001	4,759	4,723	1,226	1,216
2002	5,275	5,240	1,364	1,355
2003	5,864	5,831	1,475	1,467
2004	6,554	6,524	1,572	1,564
2005	7,453	7,446	1,745	1,743
2006	8,391	8,349	1,937	1,927
2007	9,301	9,251	2,025	2,014
2008	10,518	10,462	2,152	2,141
2009	11,923	11,854	2,449	2,435
2010	14,134	14,221	2,818	2,836

The trends of human capital and labor force human capital in real terms for Hunan are presented in Figure HuN-3.1. Before 1995, both the real and real labor force human capital keeps upside and downside, after 1995, both keep rising steadily.
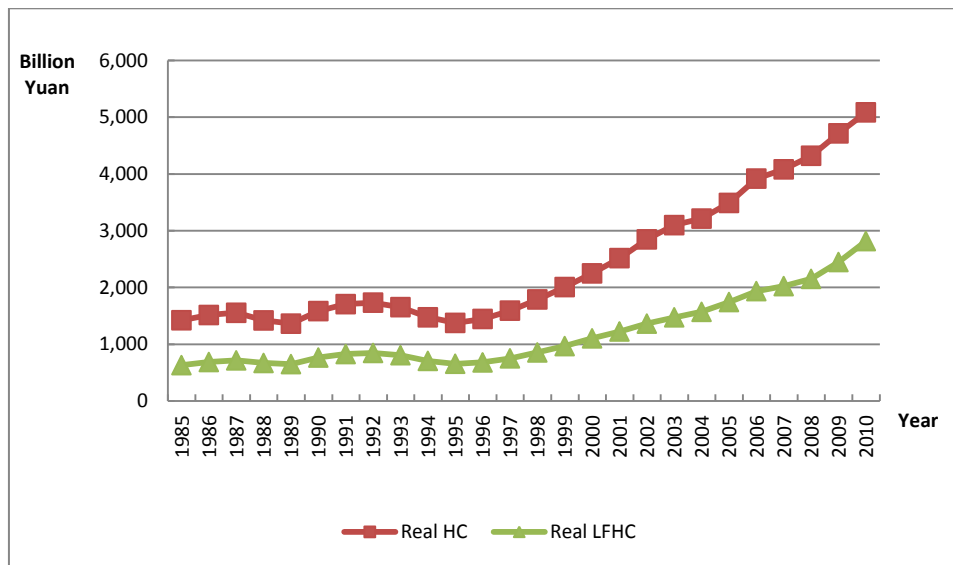
Figure HuN-3.1 Real Human Capital and Real Labor Force Human Capital for Hunan

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table HuN-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.66 times that for female in 2010.

Table HuN-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Hunan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	21.27	24.50	17.56	21.27	24.50	17.56
1986	23.99	27.79	19.65	22.78	26.39	18.66
1987	27.19	31.62	22.14	23.61	27.46	19.23
1988	30.31	35.24	24.62	20.98	24.39	17.05
1989	33.88	39.46	27.41	19.75	23.01	15.98
1990	38.41	44.81	30.92	22.32	26.04	17.98
1991	42.56	49.79	34.24	23.76	27.79	19.11
1992	47.03	55.08	37.74	24.01	28.12	19.29
1993	51.95	61.11	41.44	22.73	26.73	18.14
1994	57.15	67.60	45.21	19.92	23.56	15.77
1995	62.93	74.94	49.36	18.40	21.91	14.44
1996	70.06	83.87	54.39	18.94	22.68	14.71
1997	78.34	94.63	59.97	20.60	24.88	15.77
1998	87.89	106.63	66.57	23.00	27.91	17.43
1999	97.88	119.36	73.34	25.39	30.96	19.02
2000	109.17	133.86	80.83	27.89	34.19	20.65
2001	120.55	148.32	89.06	31.05	38.20	22.94
2002	133.45	165.67	97.41	34.51	42.85	25.20
2003	147.49	183.29	107.81	37.10	46.10	27.13
2004	163.12	203.37	119.04	39.11	48.77	28.55
2005	180.17	225.88	131.08	42.17	52.88	30.68
2006	206.06	258.25	149.06	47.56	59.62	34.41
2007	233.57	292.32	168.76	50.86	63.66	36.76
2008	269.08	335.47	194.91	55.06	68.62	39.88
2009	310.58	385.57	225.40	63.79	79.19	46.31
2010	361.13	447.83	262.30	72.00	89.28	52.32

Table HuN-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.50 times that for rural in 2010.

Table HuN-3.3 Nominal and Real Average Labor Force Human Capital by Region for Hunan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	21.27	37.71	19.35	21.27	37.71	19.35
1986	23.99	42.95	21.67	22.78	40.75	20.58
1987	27.19	49.14	24.32	23.61	41.89	21.22
1988	30.31	53.84	27.20	20.98	36.51	18.94
1989	33.88	59.52	30.28	19.75	34.41	17.70
1990	38.41	67.14	33.77	22.32	38.59	19.70
1991	42.56	73.48	37.34	23.76	40.18	20.98
1992	47.03	80.93	41.06	24.01	38.99	21.38
1993	51.95	88.65	45.19	22.73	36.38	20.22
1994	57.15	96.80	49.37	19.92	31.83	17.59
1995	62.93	105.95	53.98	18.40	29.50	16.09
1996	70.06	116.20	58.93	18.94	30.18	16.24
1997	78.34	129.10	64.52	20.60	32.55	17.34
1998	87.89	142.31	70.73	23.00	35.70	18.99
1999	97.88	157.52	76.81	25.39	39.68	20.34
2000	109.17	173.34	83.40	27.89	43.11	21.78
2001	120.55	188.56	91.38	31.05	47.41	24.03
2002	133.45	206.42	99.91	34.51	52.11	26.43
2003	147.49	225.26	109.69	37.10	56.08	27.88
2004	163.12	247.57	120.27	39.11	59.21	28.92
2005	180.17	270.84	132.37	42.17	63.44	30.96
2006	206.06	307.01	150.71	47.56	70.78	34.83
2007	233.57	345.68	170.31	50.86	75.76	36.82

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	269.08	395.80	191.47	55.06	81.99	38.54
2009	310.58	454.64	215.34	63.79	94.46	43.52
2010	361.13	520.06	240.38	72.00	104.80	47.08

Chapter 21　　Human Capital for Guangdong

1. Total human capital

Human capital stocks of Guangdong are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table GD-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[51] Column 5 is the real physical capital for Guangdong.

Table GD-1.1 Real physical capital, Nominal and Real Human Capital for Guangdong

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	3,566		3,566		99
1986	3,982		3,791		116
1987	4,453		3,818		134
1988	5,286		3,499		161
1989	6,210		3,362		188
1990	7,314		4,059		218
1991	8,071		4,424		254
1992	8,898		4,543		321
1993	9,874		4,150		429
1994	10,906		3,766		570
1995	12,077		3,657		726

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[51] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	14,494		4,097		878
1997	17,364		4,809		1,050
1998	20,705		5,825		1,240
1999	24,299		6,950		1,458
2000	28,330	28,393	7,963	7,979	1,685
2001	31,697	31,758	8,962	8,979	1,911
2002	35,822	35,889	10,264	10,282	2,155
2003	40,724	40,805	11,581	11,603	2,438
2004	46,552	46,665	12,859	12,889	2,808
2005	52,795	53,093	14,274	14,351	3,274
2006	61,720	61,880	16,384	16,421	3,803
2007	71,680	71,850	18,345	18,390	4,421
2008	82,740	82,940	20,050	20,102	5,127
2009	95,440	95,680	23,681	23,735	6,001
2010	109,770	110,980	26,409	26,690	7,048

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table GD-2.1 presents the trend of human capital per capita for Guangdong by gender in both nominal and real terms. Human capital per

capita of male remains larger than that of female. Real human capital per capita for male increases 3.34 times from 82.750 Yuan to 35.929 Yuan. For female, it increases almost 2.58 times from 56,330 Yuan to 201,400 Yuan. From 1985 to 2010, the average annual growth rate is 8.32% for male, and 7.44% for female.

Table GD-2.1 Nominal and Real Human Capital Per Capita by Gender for Guangdong

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Male**	**Female**	**Total**	**Male**	**Female**
1985	70.33	82.75	56.33	70.33	82.75	56.33
1986	77.94	91.92	62.17	74.20	87.52	59.18
1987	86.60	102.33	68.93	74.25	87.70	59.13
1988	98.82	117.32	78.08	65.41	77.65	51.71
1989	112.05	133.57	88.06	60.66	72.30	47.70
1990	126.81	151.88	98.78	70.37	84.27	54.84
1991	140.64	168.89	109.10	77.09	92.50	59.84
1992	156.16	188.29	120.39	79.73	96.06	61.54
1993	174.51	211.35	133.61	73.35	88.75	56.23
1994	194.18	235.73	147.77	67.05	81.38	51.09
1995	216.80	263.92	164.27	65.65	79.88	49.78
1996	241.67	295.00	182.37	68.31	83.35	51.58
1997	271.01	333.18	202.85	75.06	92.26	56.20
1998	302.93	373.55	225.71	85.22	105.09	63.52
1999	335.26	416.36	247.08	95.89	119.10	70.69
2000	367.88	459.27	268.71	103.41	129.09	75.57
2001	406.53	509.38	295.17	114.94	144.01	83.49
2002	453.28	569.31	327.67	129.88	163.11	93.90
2003	509.68	642.49	366.21	144.94	182.72	104.20
2004	576.68	728.23	413.44	159.29	201.24	114.22
2005	647.26	818.02	463.13	175.00	221.10	125.18
2006	737.45	930.95	525.04	195.76	247.20	139.37
2007	835.83	1055.63	592.28	213.91	270.17	151.59
2008	943.07	1186.24	669.62	228.53	287.42	162.27

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2009	1065.13	1339.35	752.89	264.28	332.28	186.80
2010	1188.52	1493.40	837.35	285.94	359.29	201.40

Figure GD-2.1 shows that the real human capital per capita of male is larger than that of female for Guangdong from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
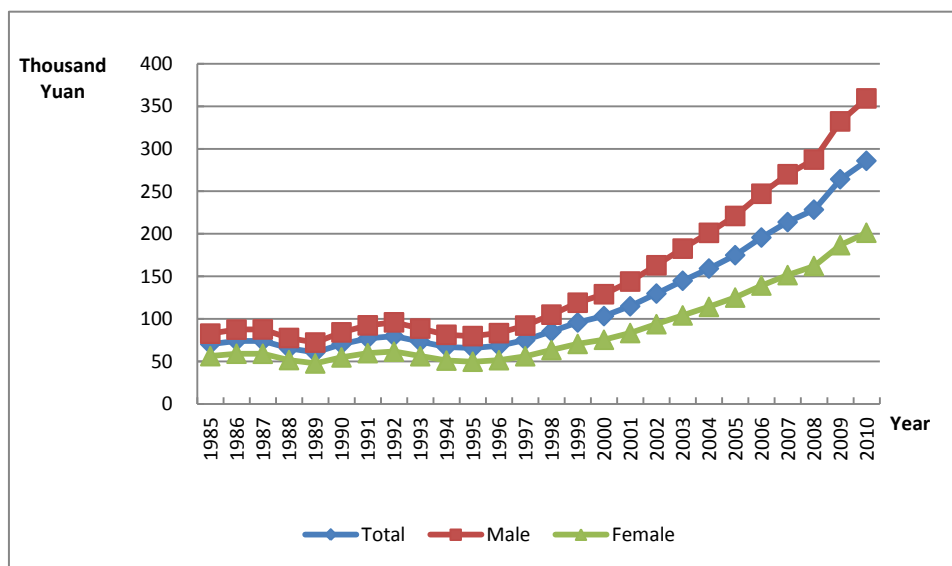
Figure GD-2.1 Real Human Capital Per Capita by Gender for Guangdong

Table GD-2.2 reports the results of human capital per capita by region for Guangdong in both nominal and real terms. From 1985 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 121,380 Yuan to 355,180 Yuan, the per capita rural human capital increases from 53,820 Yuan to 143,280 Yuan. The human capital per capita in urban area grows much

faster than the one for rural.

Table GD-2.2 Nominal and Real Human Capital Per Capita by Region for Guangdong

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	70.33	121.38	53.82	70.33	121.38	53.82
1986	77.94	135.34	59.28	74.20	129.27	56.29
1987	86.60	151.37	65.32	74.25	128.17	56.54
1988	98.82	165.41	71.93	65.41	108.15	48.16
1989	112.05	179.74	79.10	60.66	96.41	43.27
1990	126.81	195.73	87.21	70.37	107.79	48.88
1991	140.64	216.71	96.04	77.09	116.66	53.88
1992	156.16	240.63	105.17	79.73	119.50	55.72
1993	174.51	269.82	115.67	73.35	109.83	50.81
1994	194.18	299.77	127.60	67.05	100.85	45.75
1995	216.80	334.62	140.84	65.65	99.53	43.80
1996	241.67	361.92	151.66	68.31	100.42	44.29
1997	271.01	393.94	163.98	75.06	107.05	47.18
1998	302.93	430.19	176.52	85.22	118.93	51.77
1999	335.26	462.43	190.11	95.89	129.92	57.07
2000	367.88	492.10	207.33	103.41	135.28	62.24
2001	406.53	538.01	225.57	114.94	149.09	67.98
2002	453.28	596.05	246.52	129.88	167.52	75.35
2003	509.68	665.85	269.77	144.94	185.84	82.13
2004	576.68	748.25	298.94	159.29	203.54	87.76
2005	647.26	833.01	330.10	175.00	222.16	94.37
2006	737.45	944.78	369.69	195.76	247.51	104.02
2007	835.83	1066.48	410.76	213.91	269.43	111.67
2008	943.07	1197.56	455.47	228.53	286.77	117.03

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2009	1065.13	1345.60	507.53	264.28	330.14	133.34
2010	1188.52	1492.53	562.79	285.94	355.18	143.28

Figure GD-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 2.26 in 1985 to 2.48 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 10.75% for the urban area, and 2.97% for the rural area.
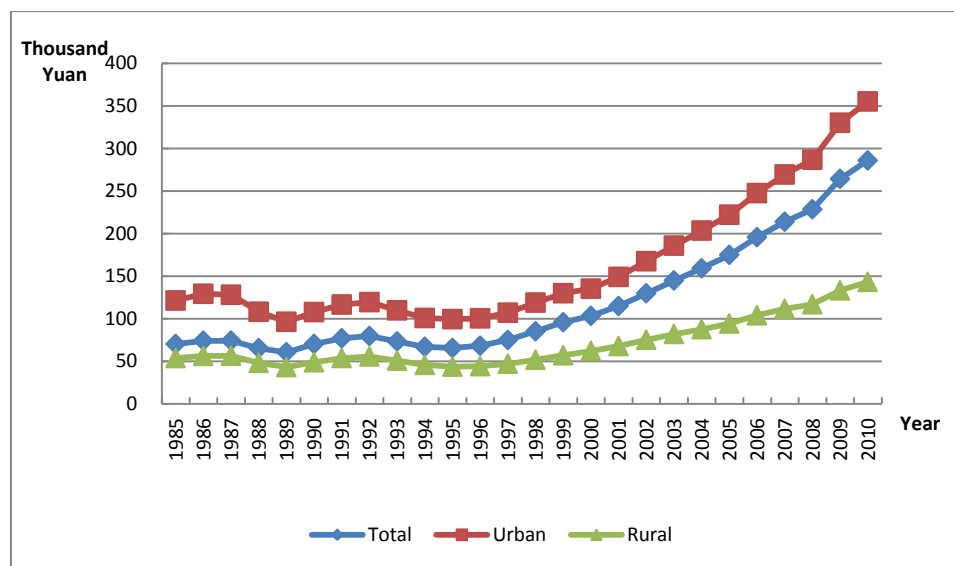
Figure GD-2.2 Real Human Capital Per Capita by Region for Guangdong

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Guangdong is reported in Table GD-3.1. The real values in this table are calculated by using CPI as the deflator.

Table GD-3.1 Nominal and Real Labor Force Human Capital for Guangdong

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	1,390		1,390	
1986	1,559		1,484	
1987	1,757		1,507	
1988	2,163		1,432	
1989	2,621		1,419	
1990	3,169		1,757	
1991	3,438		1,883	
1992	3,691		1,883	
1993	3,977		1,671	
1994	4,258		1,469	
1995	4,657		1,410	
1996	5,992		1,693	
1997	7,636		2,112	
1998	9,681		2,719	
1999	11,970		3,416	
2000	14,582	14,562	4,083	4,079

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
2001	16,274	16,264	4,588	4,584
2002	18,275	18,265	5,219	5,217
2003	20,836	20,826	5,907	5,906
2004	23,705	23,705	6,532	6,532
2005	26,785	26,955	7,222	7,268
2006	31,890	31,890	8,445	8,445
2007	37,533	37,533	9,585	9,585
2008	44,244	44,244	10,701	10,701
2009	52,406	52,406	12,971	12,971
2010	61,658	62,568	14,800	15,020

The trends of human capital and labor force human capital in real terms for Guangdong are presented in Figure GD-3.1. Before 1995, both the real and real labor force human capital keeps upside and downside, after 1995, both keep rising steadily.
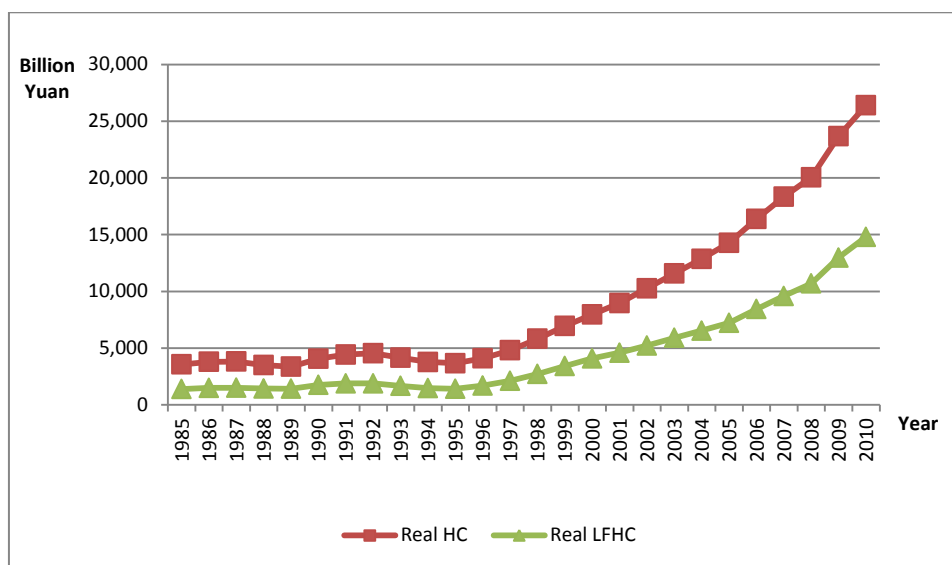
Figure GD-3.1 Real Human Capital and Real Labor Force Human Capital for Guangdong

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table GD-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.78 times that for female in 2010.

Table GD-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Guangdong

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	49.59	58.80	39.21	49.59	58.80	39.21

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1986	54.74	65.01	43.18	52.11	61.90	41.10
1987	60.92	72.56	47.88	52.24	62.23	41.08
1988	70.22	84.03	54.93	46.49	55.61	36.37
1989	80.56	96.56	62.91	43.61	52.26	34.06
1990	92.19	110.92	71.50	51.12	61.52	39.68
1991	100.57	121.16	77.85	55.07	66.34	42.66
1992	109.10	132.06	84.17	55.66	67.33	42.98
1993	119.08	144.79	91.33	50.02	60.77	38.40
1994	130.22	158.83	99.50	44.94	54.78	34.37
1995	143.81	176.05	108.97	43.54	53.29	33.00
1996	167.07	205.74	125.26	47.20	58.09	35.38
1997	193.77	239.75	144.43	53.59	66.29	39.95
1998	222.14	274.93	165.75	62.40	77.20	46.56
1999	251.63	313.48	186.53	71.81	89.45	53.23
2000	280.90	351.32	206.79	78.66	98.37	57.94
2001	309.35	389.70	225.39	87.21	109.84	63.52
2002	340.27	429.56	246.60	97.17	122.69	70.45
2003	379.94	481.69	274.15	107.71	136.59	77.75
2004	425.14	540.45	305.84	117.15	148.91	84.27
2005	473.72	602.47	340.11	127.73	162.49	91.70
2006	544.64	693.81	385.68	144.23	183.77	102.13
2007	620.18	789.36	436.56	158.38	201.56	111.47
2008	706.79	895.03	497.55	170.95	216.46	120.35
2009	808.16	1022.05	565.67	200.03	253.10	140.07
2010	910.66	1150.91	634.62	218.59	276.27	152.31

Table GD-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.50 times that for rural in 2010.

**Table GD-3.3 Nominal and Real Average Labor Force Human Capital
by Region for Guangdong**

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	49.59	76.00	39.94	49.59	76.00	39.94
1986	54.74	84.40	44.08	52.11	80.61	41.87
1987	60.92	94.37	48.87	52.24	79.91	42.31
1988	70.22	106.14	53.72	46.49	69.40	35.97
1989	80.56	119.25	58.75	43.61	63.96	32.14
1990	92.19	133.46	64.29	51.12	73.50	36.03
1991	100.57	145.08	70.17	55.07	78.10	39.37
1992	109.10	156.71	76.08	55.66	77.82	40.30
1993	119.08	170.95	82.66	50.02	69.58	36.31
1994	130.22	186.39	89.63	44.94	62.70	32.14
1995	143.81	203.96	99.35	43.54	60.67	30.90
1996	167.07	233.97	108.53	47.20	64.92	31.69
1997	193.77	266.80	118.77	53.59	72.50	34.17
1998	222.14	300.45	129.38	62.40	83.06	37.94
1999	251.63	331.57	139.86	71.81	93.16	41.98
2000	280.90	361.39	151.39	78.66	99.35	45.44
2001	309.35	394.50	163.96	87.21	109.32	49.41
2002	340.27	432.69	177.68	97.17	121.61	54.31
2003	379.94	480.97	193.44	107.71	134.24	58.89
2004	425.14	535.49	210.24	117.15	145.67	61.72
2005	473.72	591.57	229.69	127.73	157.77	65.66
2006	544.64	676.33	259.07	144.23	177.18	72.89
2007	620.18	767.90	290.70	158.38	193.99	79.03
2008	706.79	871.96	325.12	170.95	208.80	83.54
2009	808.16	991.64	365.01	200.03	243.30	95.90
2010	910.66	1108.93	408.19	218.59	263.89	103.92

Chapter 22   Human Capital for Guangxi

1. Total human capital

Human capital stocks of Guangxi are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table GX-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[52] Column 5 is the real physical capital for Guangxi.

Table GX-1.1 Real physical capital, Nominal and Real Human Capital for Guangxi

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	1,030		1,030		29
1986	1,165		1,097		33
1987	1,317		1,157		37
1988	1,521		1,114		43
1989	1,736		1,040		48
1990	1,975		1,157		54
1991	2,249		1,280		60
1992	2,557		1,374		70
1993	2,915		1,298		88
1994	3,277		1,157		113
1995	3,663		1,093		141

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[52] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	4,098		1,145		172
1997	4,574		1,269		209
1998	5,068		1,450		250
1999	5,623		1,646		297
2000	6,268	6,283	1,839	1,844	345
2001	7,089	7,114	2,069	2,076	393
2002	7,947	7,971	2,341	2,347	446
2003	9,246	9,316	2,692	2,713	503
2004	10,480	10,592	2,923	2,954	584
2005	11,552	11,684	3,143	3,180	693
2006	13,053	13,157	3,503	3,532	834
2007	14,970	15,108	3,789	3,822	1,017
2008	17,002	17,169	3,988	4,027	1,248
2009	19,257	19,440	4,618	4,663	1,615
2010	21,864	22,152	5,088	5,157	2,133

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table GX-2.1 presents the trend of human capital per capita for Guangxi by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 3.66 times from 33,440 Yuan to 155,750 Yuan. For female, it increases almost 3.08 times from 24,430Yuan to 99,600 Yuan. From 1985 to 2010, the average annual growth rate is 6.15% for male, and 5.62% for

female.

Table GX-2.1 Nominal and Real Human Capital Per Capita by Gender for Guangxi

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	29.21	33.44	24.43	29.21	33.44	24.43
1986	32.54	37.35	27.10	30.64	35.17	25.51
1987	36.19	41.61	30.08	31.79	36.54	26.44
1988	41.10	47.15	34.22	30.11	34.50	25.09
1989	46.21	52.78	38.61	27.69	31.62	23.15
1990	51.55	58.76	43.09	30.19	34.41	25.23
1991	57.94	66.28	48.17	32.98	37.73	27.41
1992	65.14	74.83	53.82	35.00	40.19	28.91
1993	73.37	84.60	60.11	32.66	37.66	26.78
1994	81.78	94.79	66.45	28.87	33.46	23.47
1995	90.73	105.54	73.38	27.06	31.47	21.89
1996	102.10	119.35	81.88	28.54	33.35	22.89
1997	114.59	134.31	91.36	31.78	37.25	25.34
1998	127.95	150.55	101.17	36.60	43.07	28.94
1999	142.92	168.60	112.29	41.84	49.35	32.87
2000	158.32	187.57	123.28	46.46	55.04	36.18
2001	178.50	211.46	139.46	52.10	61.71	40.71
2002	199.62	238.07	154.41	58.80	70.10	45.48
2003	232.48	275.87	181.70	67.69	80.35	52.91
2004	264.39	312.70	208.12	73.74	87.22	58.05
2005	291.88	345.85	229.22	79.41	94.15	62.37
2006	331.39	395.65	256.84	88.93	106.22	68.91
2007	382.22	456.21	295.74	96.74	115.48	74.85
2008	437.77	521.65	339.64	102.68	122.35	79.65
2009	500.00	597.57	385.22	119.91	143.35	92.38
2010	558.59	669.12	428.03	129.99	155.75	99.60

Figure GX-2.1 shows that the real human capital per capita of male is larger than that of female for Guangxi from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
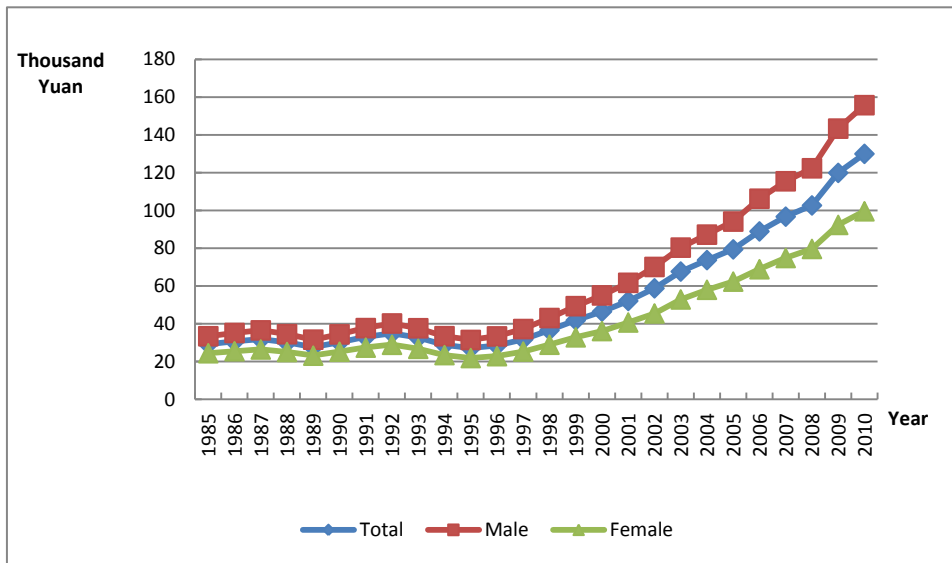
Figure GX-2.1 Real Human Capital Per Capita by Gender for Guangxi

Table GX-2.2 reports the results of human capital per capita by region for Guangxi in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 69,010Yuan to 223,220 Yuan, the per capita rural human capital increases from 23,150Yuan to 65,530 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table GX-2.2 Nominal and Real Human Capital Per Capita by Region for Guangxi

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	29.21	69.01	23.15	29.21	69.01	23.15
1986	32.54	76.11	25.68	30.64	71.67	24.18
1987	36.19	84.70	28.35	31.79	72.38	25.23
1988	41.10	95.21	32.13	30.11	65.98	24.15
1989	46.21	106.20	35.98	27.69	61.48	21.94
1990	51.55	116.95	40.26	30.19	68.88	23.51
1991	57.94	130.26	44.61	32.98	74.70	25.29
1992	65.14	144.94	49.47	35.00	77.68	26.61
1993	73.37	161.18	55.31	32.66	70.06	24.98
1994	81.78	176.27	61.38	28.87	61.10	21.92
1995	90.73	190.62	68.04	27.06	55.99	20.48
1996	102.10	210.24	73.88	28.54	58.54	20.71
1997	114.59	231.41	80.20	31.78	63.99	22.30
1998	127.95	251.68	86.96	36.60	71.67	24.98
1999	142.92	275.35	94.25	41.84	80.67	27.57
2000	158.32	296.82	103.13	46.46	86.96	30.32
2001	178.50	333.50	112.77	52.10	96.45	33.29
2002	199.62	369.32	123.34	58.80	108.00	36.66
2003	232.48	436.74	135.26	67.69	126.57	39.69
2004	264.39	495.00	148.94	73.74	137.81	41.66
2005	291.88	536.43	164.28	79.41	144.99	45.23
2006	331.39	597.79	182.62	88.93	159.01	49.82
2007	382.22	682.67	203.08	96.74	171.96	51.88
2008	437.77	772.46	225.35	102.68	180.84	53.06
2009	500.00	868.99	252.04	119.91	207.80	60.86
2010	558.59	960.56	280.61	129.99	223.22	65.53

Figure GX-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 2.98 in 1985 to 3.41 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 4.70% for the urban area, and 4.16% for the rural area.
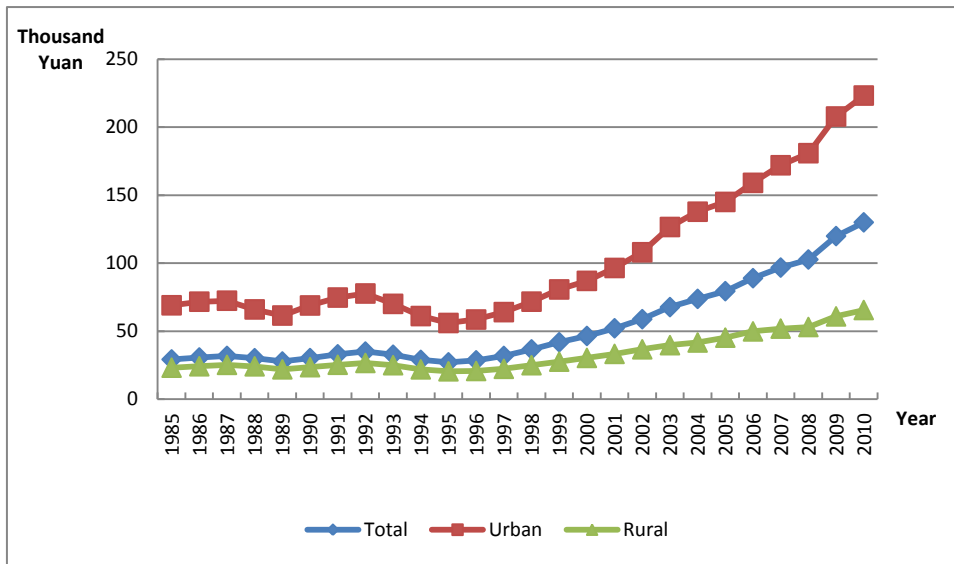
Figure GX-2.2 Real Human Capital Per Capita by Region for Guangxi

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Guangxi is reported in Table GX-3.1. The real values in this table are calculated by using CPI as the deflator.

Table GX-3.1 Nominal and Real Labor Force Human Capital for Guangxi

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	449		449	
1986	521		490	
1987	605		532	
1988	690		507	
1989	781		469	
1990	890		521	
1991	1,005		572	
1992	1,119		601	
1993	1,248		557	
1994	1,393		493	
1995	1,574		470	
1996	1,765		494	
1997	1,981		550	
1998	2,229		638	
1999	2,504		733	
2000	2,857	2,839	839	833
2001	3,167	3,152	926	921
2002	3,498	3,482	1,031	1,027
2003	3,837	3,821	1,119	1,114
2004	4,206	4,187	1,174	1,168
2005	4,650	4,649	1,267	1,267
2006	5,301	5,279	1,426	1,420
2007	5,987	5,964	1,517	1,512
2008	6,760	6,732	1,587	1,580
2009	7,699	7,663	1,848	1,840
2010	8,830	8,865	2,056	2,064

The trends of labor force human capital in real term and the real human capital for Guangxi are presented in Figure GX-3.1. From 1985 to 2010, the real human capital keeps rising rapidly, while the real labor force human capital increases slowly.
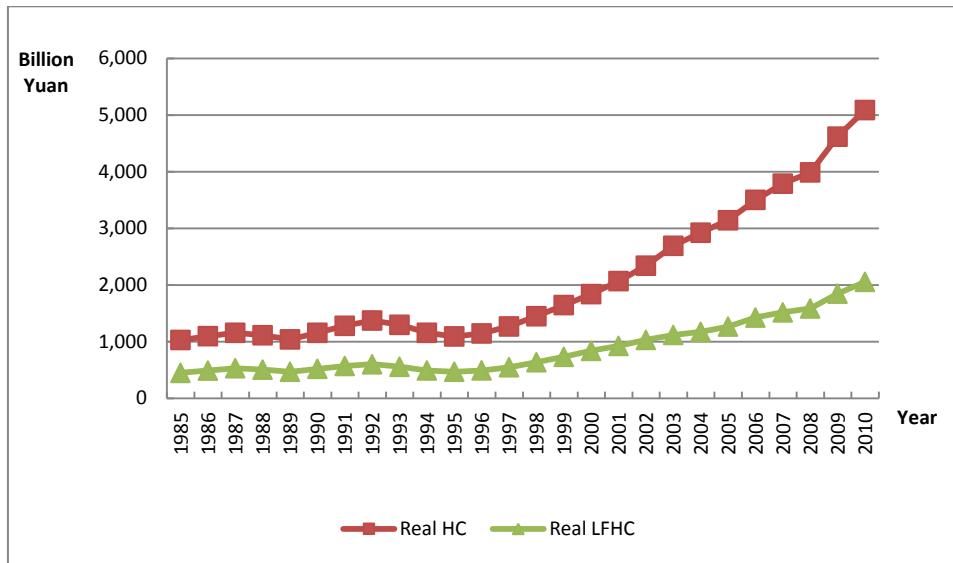
Figure GX-3.1 Real Human Capital and Real Labor Force Human Capital for Guangxi

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table GX-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.71 times that for female in 2010.

**Table GX-3.2 Nominal and Real Average Labor Force Human Capital
by Gender for Guangxi**

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	22.35	25.77	18.43	22.35	25.77	18.43
1986	25.02	29.01	20.48	23.56	27.31	19.29
1987	28.14	32.79	22.86	24.76	28.84	20.12
1988	31.81	36.96	25.89	23.37	27.13	19.05
1989	35.85	41.47	29.26	21.53	24.90	17.59
1990	40.45	46.65	33.04	23.68	27.32	19.33
1991	44.58	51.57	36.28	25.36	29.33	20.63
1992	48.96	56.87	39.63	26.30	30.55	21.29
1993	53.95	62.84	43.44	24.08	28.05	19.40
1994	59.67	69.87	47.68	21.10	24.71	16.87
1995	66.50	78.20	52.84	19.86	23.35	15.78
1996	73.98	87.39	58.21	20.68	24.44	16.28
1997	82.22	97.53	64.14	22.81	27.06	17.80
1998	91.88	109.77	70.70	26.30	31.42	20.24
1999	102.50	122.90	77.94	30.00	35.98	22.81
2000	114.28	137.92	85.72	33.54	40.48	25.16
2001	125.66	152.02	94.37	36.73	44.41	27.59
2002	137.26	166.83	102.65	40.47	49.19	30.27
2003	150.15	182.96	112.10	43.78	53.36	32.69
2004	165.44	202.47	122.98	46.17	56.48	34.31
2005	182.55	224.53	134.52	49.76	61.18	36.67
2006	208.17	255.75	153.36	56.00	68.81	41.25
2007	236.53	290.61	173.32	59.95	73.65	43.94
2008	268.96	329.83	197.19	63.12	77.39	46.27
2009	308.11	378.64	224.21	73.97	90.92	53.82
2010	345.69	426.51	249.32	80.50	99.30	58.04

Table GX-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.52 times that for rural in 2010.

Table GX-3.3 Nominal and Real Average Labor Force Human Capital by Region for Guangxi

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	22.35	45.84	18.94	22.35	45.84	18.94
1986	25.02	51.20	21.02	23.56	48.21	19.79
1987	28.14	57.42	23.37	24.76	49.07	20.80
1988	31.81	63.45	26.46	23.37	43.97	19.89
1989	35.85	70.12	29.80	21.53	40.60	18.17
1990	40.45	78.31	33.56	23.68	46.12	19.60
1991	44.58	85.33	36.98	25.36	48.94	20.96
1992	48.96	92.35	40.66	26.30	49.49	21.87
1993	53.95	100.85	44.87	24.08	43.84	20.26
1994	59.67	110.41	49.31	21.10	38.27	17.61
1995	66.50	121.50	54.34	19.86	35.69	16.36
1996	73.98	133.26	59.34	20.68	37.10	16.63
1997	82.22	146.42	64.64	22.81	40.49	17.97
1998	91.88	161.25	70.10	26.30	45.92	20.14
1999	102.50	177.61	75.58	30.00	52.03	22.11
2000	114.28	194.56	82.12	33.54	57.00	24.14
2001	125.66	212.03	89.81	36.73	61.32	26.51
2002	137.26	229.81	97.64	40.47	67.20	29.02
2003	150.15	249.34	106.00	43.78	72.26	31.10
2004	165.44	272.81	114.42	46.17	75.95	32.01
2005	182.55	297.95	123.90	49.76	80.53	34.11
2006	208.17	338.06	140.68	56.00	89.92	38.38
2007	236.53	384.80	157.95	59.95	96.93	40.35

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	268.96	436.45	176.36	63.12	102.17	41.52
2009	308.11	496.82	196.54	73.97	118.80	47.46
2010	345.69	550.82	217.30	80.50	128.00	50.75

Chapter 23   Human Capital for Hainan

1. Total human capital

Human capital stocks of Hainan are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table HN-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[53] Column 5 is the real physical capital for Hainan.

Table HN-1.1 Real physical capital, Nominal and Real Human Capital for Hainan

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	357		357		3
1986	394		376		4
1987	438		381		5
1988	511		349		7
1989	584		314		9
1990	664		339		12
1991	745		368		16
1992	845		396		22
1993	959		377		35
1994	1,076		333		49
1995	1,192		321		63

[53] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	1,312		339		77
1997	1,446		371		89
1998	1,602		423		101
1999	1,797		484		114
2000	1,956	2,007	522	535	128
2001	2,200	2,260	595	611	140
2002	2,493	2,551	677	693	154
2003	2,824	2,923	768	795	168
2004	3,190	3,316	832	866	186
2005	3,618	3,739	932	963	208
2006	4,074	4,235	1,034	1,075	233
2007	4,590	4,806	1,109	1,162	263
2008	5,103	5,345	1,154	1,210	309
2009	5,698	5,975	1,297	1,362	366
2010	6,418	6,731	1,393	1,464	441

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table HN-2.1 presents the trend of human capital per capita for Hainan by gender in both nominal and real terms. Human capital per capita of male

remains larger than that of female. Real human capital per capita for male increases 1.78 times from 80,200 Yuan to 223,420 Yuan. For female, it increases almost 1.40 times from 57,350 Yuan to 137,820 Yuan. From 1985 to 2010, the average annual growth rate is 4.10% for male, and 3.51% for female.

Table HN-2.1 Nominal and Real Human Capital Per Capita by Gender for Hainan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	69.53	80.20	57.35	69.53	80.20	57.35
1986	76.15	88.01	62.55	72.64	83.98	59.64
1987	84.05	97.22	68.93	73.02	84.47	59.89
1988	93.44	108.03	76.57	63.93	73.91	52.38
1989	102.23	118.14	83.71	54.98	63.53	45.01
1990	111.54	129.23	90.79	56.88	65.99	46.25
1991	123.38	143.32	99.96	60.83	70.68	49.23
1992	137.78	160.39	111.24	64.57	75.17	52.12
1993	154.10	180.05	123.55	60.60	70.79	48.61
1994	170.93	200.55	136.08	52.83	61.97	42.07
1995	187.60	221.01	148.36	50.46	59.48	39.88
1996	204.18	241.92	159.87	52.77	62.55	41.29
1997	222.63	265.60	172.17	57.08	68.11	44.13
1998	244.19	293.38	186.31	64.51	77.52	49.21
1999	271.45	326.36	206.71	73.04	87.79	55.62
2000	289.67	347.48	220.97	77.25	92.64	58.91
2001	320.69	385.32	243.96	86.71	104.18	65.93
2002	357.32	431.11	270.02	97.06	117.09	73.35
2003	399.62	483.76	299.51	108.65	131.46	81.42
2004	447.01	542.43	333.63	116.61	141.48	87.08
2005	501.06	607.94	374.58	129.02	156.49	96.49
2006	559.01	678.13	418.12	141.81	171.98	106.17
2007	625.51	755.51	471.55	151.09	182.38	114.01
2008	691.19	834.18	521.47	156.27	188.40	118.12
2009	769.38	930.14	577.34	175.10	211.55	131.63

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2010	850.03	1030.19	633.64	184.52	223.42	137.82

Figure HN-2.1 shows that the real human capital per capita of male is larger than that of female for Hainan from 1985 to 2010. Starting from 1996, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
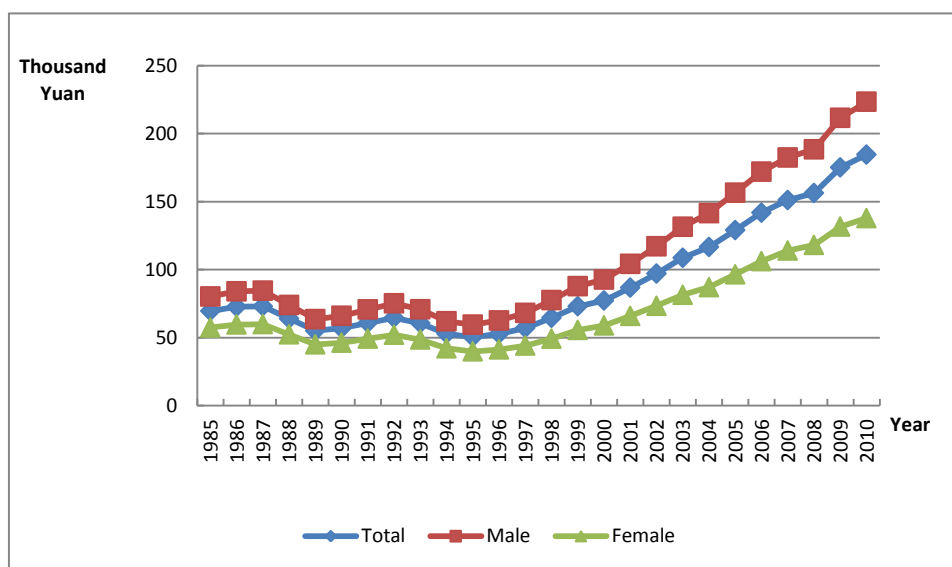
Figure HN-2.1 Real Human Capital Per Capita by Gender for Hainan

Table HN-2.2 reports the results of human capital per capita by region for Hainan in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 85,650 Yuan to 266,320 Yuan, the per capita rural human capital increases from 66,530 Yuan to 101,480 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table HN-2.2 Nominal and Real Human Capital Per Capita by Region for Hainan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	69.53	85.65	66.53	69.53	85.65	66.53
1986	76.15	94.68	72.67	72.64	91.30	69.14
1987	84.05	107.73	79.55	73.02	94.61	68.94
1988	93.44	119.42	87.32	63.93	81.11	59.87
1989	102.23	126.92	95.31	54.98	68.25	51.25
1990	111.54	136.57	103.46	56.88	73.74	51.46
1991	123.38	153.58	112.54	60.83	79.74	54.03
1992	137.78	174.65	123.17	64.57	83.19	57.19
1993	154.10	198.51	134.79	60.60	76.44	53.72
1994	170.93	221.03	147.14	52.83	67.76	45.74
1995	187.60	242.51	159.53	50.46	67.22	41.89
1996	204.18	264.57	170.91	52.77	69.98	43.28
1997	222.63	289.90	182.91	57.08	75.54	46.18
1998	244.19	321.69	195.33	64.51	85.89	51.05
1999	271.45	362.59	210.33	73.04	97.69	56.49
2000	289.67	384.17	223.60	77.25	101.97	59.94
2001	320.69	423.88	239.71	86.71	113.88	65.37
2002	357.32	471.70	257.17	97.06	128.01	69.99
2003	399.62	524.80	278.34	108.65	143.28	75.07
2004	447.01	581.75	303.28	116.61	153.90	76.88
2005	501.06	645.69	333.52	129.02	168.63	83.13
2006	559.01	734.59	360.75	141.81	189.57	87.90
2007	625.51	838.09	391.69	151.09	206.77	89.87
2008	691.19	941.04	423.93	156.27	218.82	89.40
2009	769.38	1064.86	462.85	175.10	248.85	98.59
2010	850.03	1190.89	504.04	184.52	266.32	101.48

Figure HN-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 1.45 in 1985 to 2.62 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 4.54% for the urban area, and 1.69% for the rural area.
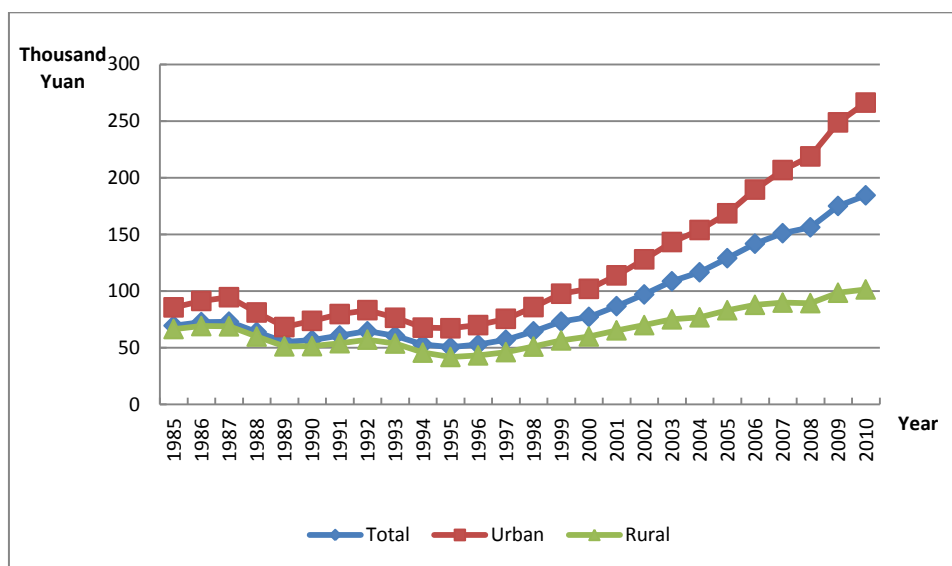
Figure HN-2.2 Real Human Capital Per Capita by Region for Hainan

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Hainan is reported in Table HN-3.1. The real values in this table are calculated by using CPI as the deflator.

Table HN-3.1 Nominal and Real Labor Force Human Capital for Hainan

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	117		117	
1986	132		126	
1987	150		130	
1988	177		121	
1989	207		111	
1990	245		125	
1991	271		134	
1992	301		141	
1993	335		132	
1994	373		115	
1995	413		111	
1996	457		118	
1997	509		130	
1998	574		151	
1999	647		174	
2000	721	709	192	189
2001	804	793	218	214
2002	903	894	245	243
2003	1,013	1,007	275	274
2004	1,118	1,120	291	291
2005	1,273	1,275	327	327
2006	1,431	1,435	361	362
2007	1,592	1,597	382	383
2008	1,804	1,810	404	405
2009	2,078	2,085	469	471
2010	2,439	2,449	525	528

The trends of labor force human capital in both real and real labor force terms for Hainan are presented in Figure HN-3.1. Before 1996, the real human capital and the real labor force human capital increase slowly, while after 1996 both increase rapidly.
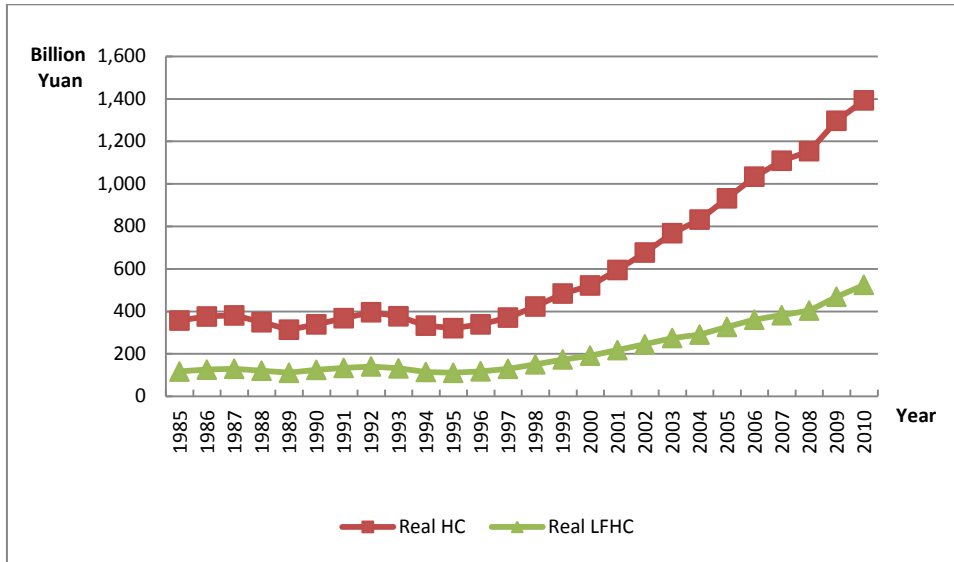
Figure HN-3.1 Real Human Capital and Real Labor Force Human Capital for Hainan

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table HN-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.87 times that for female in 2010.

Table HN-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Hainan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	44.79	52.75	35.61	44.79	52.75	35.61
1986	49.24	58.07	38.97	46.96	55.38	37.15
1987	54.23	64.11	42.71	47.11	55.67	37.09
1988	59.69	70.44	47.11	40.84	48.20	32.23
1989	65.73	77.31	52.05	35.34	41.58	27.98
1990	73.12	86.11	57.67	37.28	43.93	29.37
1991	79.82	94.24	62.63	39.29	46.42	30.80
1992	87.35	103.46	68.16	40.90	48.47	31.91
1993	96.16	114.52	74.19	37.86	45.08	29.23
1994	105.83	126.43	81.20	32.73	39.11	25.12
1995	116.25	139.46	88.54	31.18	37.43	23.74
1996	126.11	152.35	95.06	32.52	39.29	24.50
1997	137.22	166.90	102.13	35.14	42.73	26.14
1998	149.84	183.66	109.93	39.55	48.48	29.02
1999	162.96	200.99	118.07	43.83	54.07	31.77
2000	177.24	220.09	126.87	47.28	58.71	33.84
2001	192.62	240.15	137.05	52.11	64.98	37.07
2002	210.91	264.34	148.90	57.29	71.82	40.45
2003	232.37	293.12	161.30	63.11	79.61	43.82
2004	254.14	321.55	175.39	66.11	83.65	45.62
2005	282.39	357.48	194.64	72.50	91.76	49.99
2006	312.18	395.10	214.90	78.84	99.76	54.30
2007	342.42	431.78	236.89	82.13	103.52	56.86
2008	380.22	477.86	264.19	85.16	106.99	59.22
2009	428.57	540.47	294.04	96.71	121.97	66.39
2010	483.34	611.85	327.71	104.08	131.71	70.58

Table HN-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.10 times that for rural in 2010.

Table HN-3.3 Nominal and Real Average Labor Force Human Capital by Region for Hainan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	44.79	48.58	44.16	44.79	48.58	44.16
1986	49.24	53.42	48.53	46.96	51.52	46.18
1987	54.23	60.03	53.23	47.11	52.72	46.13
1988	59.69	66.99	58.06	40.84	45.50	39.81
1989	65.73	75.08	63.17	35.34	40.38	33.97
1990	73.12	86.26	68.78	37.28	46.57	34.21
1991	79.82	94.12	74.70	39.29	48.87	35.86
1992	87.35	104.45	80.79	40.90	49.75	37.52
1993	96.16	116.95	87.69	37.86	45.03	34.95
1994	105.83	129.82	95.34	32.73	39.80	29.64
1995	116.25	143.69	103.55	31.18	39.83	27.19
1996	126.11	156.34	111.06	32.52	41.35	28.12
1997	137.22	170.70	118.95	35.14	44.48	30.03
1998	149.84	186.48	127.90	39.55	49.79	33.42
1999	162.96	202.70	136.85	43.83	54.61	36.76
2000	177.24	219.82	147.43	47.28	58.35	39.52
2001	192.62	236.49	159.34	52.11	63.54	43.45
2002	210.91	259.29	171.45	57.29	70.36	46.66
2003	232.37	285.85	185.02	63.11	78.04	49.91
2004	254.14	310.43	199.77	66.11	82.13	50.64
2005	282.39	343.12	217.28	72.50	89.61	54.16
2006	312.18	384.51	239.84	78.84	99.23	58.44
2007	342.42	427.49	262.58	82.13	105.47	60.24

2008	380.22	483.93	286.29	85.16	112.53	60.37
2009	428.57	558.61	313.03	96.71	130.54	66.68
2010	483.34	644.07	340.16	104.08	144.03	68.48

Chapter 24　Human Capital for Chongqing

1. Total human capital

Human capital stocks of Chongqing are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table CQ-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[54]

Table CQ-1.1　Nominal and Real Human Capital for Chongqing

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	729		729	
1986	835		801	
1987	953		833	
1988	1,091		777	
1989	1,257		765	
1990	1,451		870	
1991	1,640		920	
1992	1,855		935	
1993	2,121		901	
1994	2,424		794	
1995	2,740		752	

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[54] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Chongqing was a city of Sichuan before 1997, therefore we cannot estimate the physical capital of Chongqing and Sichuan from 1985 to 2010 separately.

1996	3,021		755	
1997	3,358		813	
1998	3,729		936	
1999	4,158		1,051	
2000	4,702	4,727	1,230	1,236
2001	5,221	5,245	1,342	1,349
2002	5,836	5,871	1,507	1,516
2003	6,308	6,345	1,619	1,628
2004	6,927	6,966	1,714	1,724
2005	7,661	7,711	1,881	1,893
2006	8,608	8,636	2,063	2,070
2007	9,963	9,997	2,281	2,289
2008	11,076	11,132	2,401	2,414
2009	12,414	12,496	2,735	2,753
2010	14,408	14,525	3,076	3,102

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table CQ-2.1 presents the trend of human capital per capita for Chongqing by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 3.08 times from 40,007 Yuan to 163,430 Yuan. For female, it increases almost 2.47 times from 29,110 Yuan to 100,900 Yuan.

Table CQ-2.1 Nominal and Real Human Capital Per Capita by Gender for Chongqing

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	35.13	40.07	29.11	35.13	40.07	29.11
1986	39.40	45.24	32.37	37.81	43.42	31.07
1987	43.97	50.86	35.79	38.43	44.45	31.28
1988	49.31	57.15	40.07	35.13	40.71	28.54
1989	55.74	64.49	45.46	33.91	39.23	27.65
1990	63.13	73.02	51.54	37.87	43.81	30.92
1991	70.66	81.95	57.48	39.62	45.95	32.23
1992	79.17	92.15	64.07	39.92	46.46	32.30
1993	89.87	105.04	72.28	38.17	44.62	30.70
1994	102.02	119.49	81.79	33.41	39.14	26.79
1995	114.63	134.52	91.64	31.44	36.90	25.13
1996	125.83	148.30	99.86	31.46	37.09	24.97
1997	139.12	164.64	109.75	33.67	39.84	26.57
1998	153.77	182.76	120.38	38.61	45.88	30.23
1999	170.85	203.55	133.05	43.20	51.47	33.64
2000	190.73	227.07	148.80	49.88	59.38	38.91
2001	214.84	257.20	166.57	55.24	66.13	42.83
2002	244.30	293.58	188.99	63.07	75.78	48.79
2003	269.53	326.76	206.09	69.18	83.85	52.87
2004	303.39	370.89	229.53	75.08	91.77	56.80
2005	343.64	421.07	259.85	84.38	103.37	63.79
2006	384.45	476.56	283.76	92.15	114.24	68.02
2007	444.92	550.60	328.07	101.88	126.08	75.12
2008	494.89	607.65	368.59	107.29	131.72	79.92
2009	555.52	680.14	415.05	122.40	149.86	91.44
2010	628.25	765.43	472.46	134.11	163.43	100.90

Figure CQ-2.1 shows that the real human capital per capita of male is larger than that of female for Chongqing from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
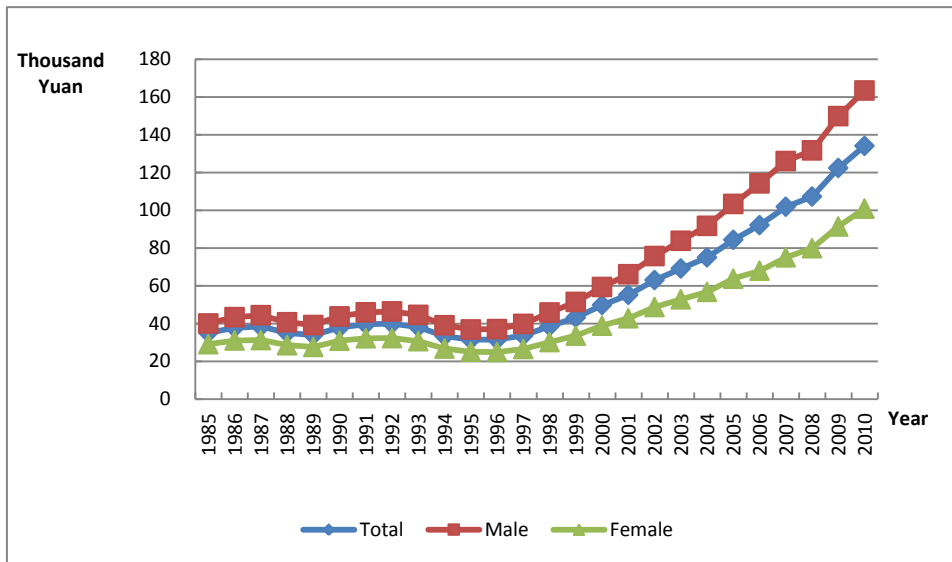
Figure CQ-2.1 Human Capital Per Capita by Gender for Chongqing

Table CQ-2.2 reports the results of human capital per capita by region for Chongqing in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 64,330 Yuan to 184,030 Yuan, the per capita rural human capital increases from 26,330 Yuan to 72,530 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table CQ-2.2 Nominal and Real Human Capital Per Capita by Region for Chongqing

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	35.13	64.33	26.33	35.13	64.33	26.33
1986	39.40	71.93	29.35	37.81	69.03	28.17
1987	43.97	79.67	32.70	38.43	69.64	28.58
1988	49.31	88.91	36.51	35.13	63.33	26.01
1989	55.74	100.26	41.03	33.91	60.99	24.96
1990	63.13	113.92	46.01	37.87	68.34	27.60
1991	70.66	126.23	50.73	39.62	70.77	28.44
1992	79.17	140.45	55.85	39.92	70.82	28.16
1993	89.87	158.81	62.03	38.17	67.46	26.35
1994	102.02	179.64	68.85	33.41	58.83	22.55
1995	114.63	200.91	76.00	31.44	55.11	20.85
1996	125.83	217.55	82.58	31.46	54.40	20.65
1997	139.12	238.04	90.19	33.67	57.62	21.83
1998	153.77	260.79	98.32	38.61	65.48	24.69
1999	170.85	287.50	107.54	43.20	72.70	27.19
2000	190.73	323.81	116.77	49.88	84.67	30.53
2001	214.84	356.83	127.64	55.24	91.75	32.82
2002	244.30	398.33	139.92	63.07	102.83	36.12
2003	269.53	424.55	153.10	69.18	108.94	39.29
2004	303.39	466.46	167.72	75.08	115.43	41.50
2005	343.64	517.71	183.54	84.38	127.09	45.06
2006	384.45	561.44	210.36	92.15	134.60	50.43
2007	444.92	639.19	240.39	101.88	146.36	55.04
2008	494.89	698.10	265.74	107.29	151.37	57.62
2009	555.52	768.60	300.40	122.40	169.37	66.19
2010	628.25	861.85	339.68	134.11	184.03	72.53

Figure CQ-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 2.44 in 1985 to 2.53 in 2010. It means that the gap between urban and rural doesn't increase so much.
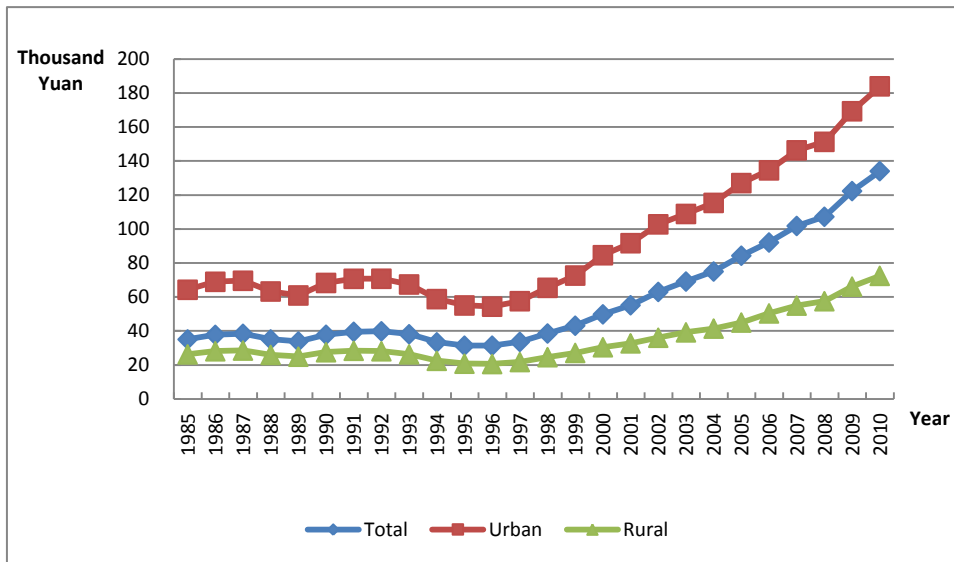
Figure CQ-2.2 Real Human Capital Per Capita by Region for Chongqing

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Chongqing is reported in Table CQ-3.1. The real values in this table are calculated by using CPI as the deflator.

Table CQ-3.1 Nominal and Real Labor Force Human Capital for Chongqing

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	339		339	
1986	384		369	
1987	444		388	
1988	532		379	
1989	626		381	
1990	732		439	
1991	845		474	
1992	957		483	
1993	1,079		459	
1994	1,201		393	
1995	1,327		364	
1996	1,447		362	
1997	1,588		384	
1998	1,752		440	
1999	1,917		485	
2000	2,114	2,122	553	555
2001	2,249	2,264	578	582
2002	2,430	2,439	627	630
2003	2,621	2,627	673	674
2004	2,819	2,820	697	698
2005	3,085	3,090	757	759
2006	3,596	3,607	862	865
2007	4,187	4,206	959	963
2008	4,893	4,926	1,061	1,068
2009	6,233	6,300	1,374	1,389
2010	8,316	8,435	1,775	1,801

The trends of real human capital and real labor force human capital for Chongqing are presented in Figure CQ-3.1. Before 1997, both the real human capital and real labor force human capital keep upside and downside. After 1997, both of them keep rising steadily.
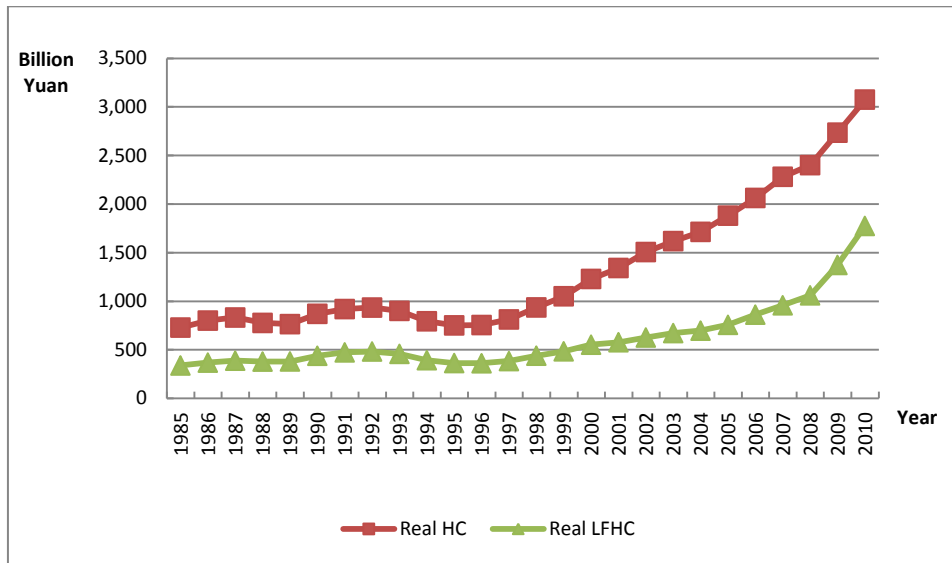
Figure CQ-3.1 Real Human Capital and Real Labor Force Human Capital for Chongqing

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table CQ-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.60 times that for female in 2010.

Table CQ-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Chongqing

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	25.58	29.49	20.59	25.58	29.49	20.59
1986	28.57	33.09	22.88	27.42	31.77	21.96
1987	32.26	37.62	25.69	28.20	32.87	22.45
1988	36.70	42.83	29.23	26.14	30.51	20.82
1989	41.34	48.27	32.99	25.15	29.36	20.07
1990	46.55	54.46	37.07	27.93	32.67	22.24
1991	52.34	61.41	41.56	29.35	34.43	23.30
1992	58.22	68.46	46.11	29.36	34.52	23.26
1993	65.15	76.94	51.26	27.68	32.68	21.77
1994	72.32	85.65	56.63	23.69	28.05	18.55
1995	79.85	94.94	62.18	21.91	26.04	17.06
1996	87.04	103.98	67.24	21.76	26.00	16.81
1997	95.23	114.38	72.91	23.05	27.68	17.65
1998	104.20	125.76	79.07	26.16	31.58	19.85
1999	113.50	137.47	85.56	28.70	34.76	21.63
2000	123.38	150.32	92.08	32.27	39.30	24.08
2001	134.82	165.23	100.14	34.67	42.49	25.74
2002	148.01	182.40	109.51	38.20	47.09	28.27
2003	162.80	201.77	120.06	41.77	51.76	30.81
2004	179.91	224.32	131.98	44.51	55.50	32.66
2005	200.50	251.21	146.65	49.22	61.67	36.00
2006	234.95	294.85	170.26	56.33	70.67	40.82
2007	275.37	343.90	199.74	63.05	78.74	45.75
2008	323.63	400.98	236.80	70.18	86.92	51.34
2009	397.84	488.08	295.63	87.68	107.55	65.16
2010	495.74	601.86	375.15	105.83	128.51	80.08

Table CQ-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 2.82 times that for rural in 2010.

Table CQ-3.3 Nominal and Real Average Labor Force Human Capital by Region for Chongqing

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	25.58	42.27	20.27	25.58	42.27	20.27
1986	28.57	47.32	22.52	27.42	45.41	21.61
1987	32.26	53.66	25.24	28.20	46.90	22.06
1988	36.70	60.78	28.58	26.14	43.30	20.36
1989	41.34	68.18	32.13	25.15	41.48	19.55
1990	46.55	76.68	36.03	27.93	46.00	21.61
1991	52.34	85.30	40.30	29.35	47.83	22.59
1992	58.22	93.79	44.76	29.36	47.29	22.57
1993	65.15	104.58	49.47	27.68	44.42	21.01
1994	72.32	115.48	54.16	23.69	37.82	17.74
1995	79.85	127.24	59.22	21.91	34.90	16.24
1996	87.04	138.24	63.58	21.76	34.57	15.90
1997	95.23	150.53	68.49	23.05	36.44	16.58
1998	104.20	164.74	73.92	26.16	41.36	18.56
1999	113.50	179.81	79.14	28.70	45.47	20.01
2000	123.38	191.98	84.86	32.27	50.20	22.19
2001	134.82	206.02	91.28	34.67	52.97	23.47
2002	148.01	222.29	98.74	38.20	57.38	25.49
2003	162.80	240.86	106.42	41.77	61.81	27.31
2004	179.91	263.48	113.35	44.51	65.20	28.05
2005	200.50	290.92	121.04	49.22	71.42	29.71
2006	234.95	336.45	140.55	56.33	80.66	33.69
2007	275.37	389.46	161.85	63.05	89.18	37.06

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	323.63	452.03	184.78	70.18	98.01	40.06
2009	397.84	549.06	212.15	87.68	120.99	46.75
2010	495.74	681.44	241.99	105.83	145.50	51.67

Chapter 25　　Human Capital for Sichuan

1. Total human capital

Human capital stocks of Sichuan are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table SC-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[55]

Table SC-1.1　　Nominal and Real Human Capital for Sichuan

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	1,983		1,983	
1986	2,258		2,156	
1987	2,575		2,296	
1988	2,930		2,178	
1989	3,319		2,053	
1990	3,766		2,244	
1991	4,222		2,445	
1992	4,740		2,575	
1993	5,373		2,496	
1994	6,039		2,248	
1995	6,739		2,112	

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[55] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Chongqing was a city of Sichuan before 1997, therefore we cannot estimate the physical capital of Chongqing and Sichuan from 1985 to 2010 separately.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1996	7,354		2,104	
1997	8,038		2,187	
1998	8,779		2,393	
1999	9,682		2,672	
2000	10,897	10,910	2,997	2,999
2001	12,150	12,176	3,259	3,263
2002	13,504	13,539	3,624	3,630
2003	15,039	15,091	3,971	3,982
2004	16,660	16,744	4,188	4,205
2005	18,172	18,256	4,493	4,508
2006	20,849	20,935	5,019	5,037
2007	24,011	24,150	5,439	5,465
2008	27,370	27,567	5,885	5,922
2009	31,100	31,340	6,625	6,670
2010	35,840	36,170	7,387	7,448

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table SC-2.1 presents the trend of human capital per capita for Sichuan by gender in both nominal and real terms. Human capital per capita of male

remains larger than that of female. Real human capital per capita for male increases 3.16 times from 32,890 Yuan to 136,960 Yuan. For female, it increases almost 2.58 times from 24,240 Yuan to 86,70 Yuan.

Table SC-2.1 Nominal and Real Human Capital Per Capita by Gender for Sichuan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	28.84	32.89	24.24	28.84	32.89	24.24
1986	32.49	37.19	27.17	31.01	35.51	25.94
1987	36.41	41.91	30.27	32.47	37.35	27.01
1988	40.90	47.12	33.89	30.40	35.00	25.23
1989	45.78	52.71	37.96	28.32	32.59	23.51
1990	51.29	59.10	42.42	30.56	35.22	25.29
1991	57.55	66.49	47.43	33.33	38.48	27.48
1992	64.67	74.96	52.96	35.14	40.68	28.82
1993	73.55	85.53	59.95	34.16	39.69	27.88
1994	82.80	96.62	67.14	30.82	35.92	25.03
1995	92.88	108.63	74.99	29.11	34.00	23.54
1996	101.76	119.57	81.55	29.11	34.17	23.37
1997	111.69	131.89	88.78	30.39	35.83	24.20
1998	122.43	145.30	96.47	33.37	39.58	26.34
1999	136.01	162.01	106.46	37.53	44.70	29.41
2000	151.83	180.74	118.89	41.76	49.69	32.71
2001	171.25	203.90	134.44	45.93	54.69	36.07
2002	192.64	230.53	150.36	51.70	61.86	40.35
2003	217.70	261.24	169.52	57.48	69.00	44.75
2004	245.94	295.31	191.86	61.82	74.27	48.20
2005	273.24	329.55	212.42	67.56	81.51	52.46
2006	315.58	382.32	242.44	75.97	92.11	58.31
2007	367.13	443.22	282.83	83.16	100.46	63.99
2008	423.81	509.70	327.46	91.13	109.70	70.35
2009	488.40	588.59	375.02	104.04	125.50	79.74
2010	550.65	663.79	421.43	113.49	136.96	86.70

Figure SC-2.1 shows that the real human capital per capita of male is larger than that of female for Sichuan from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
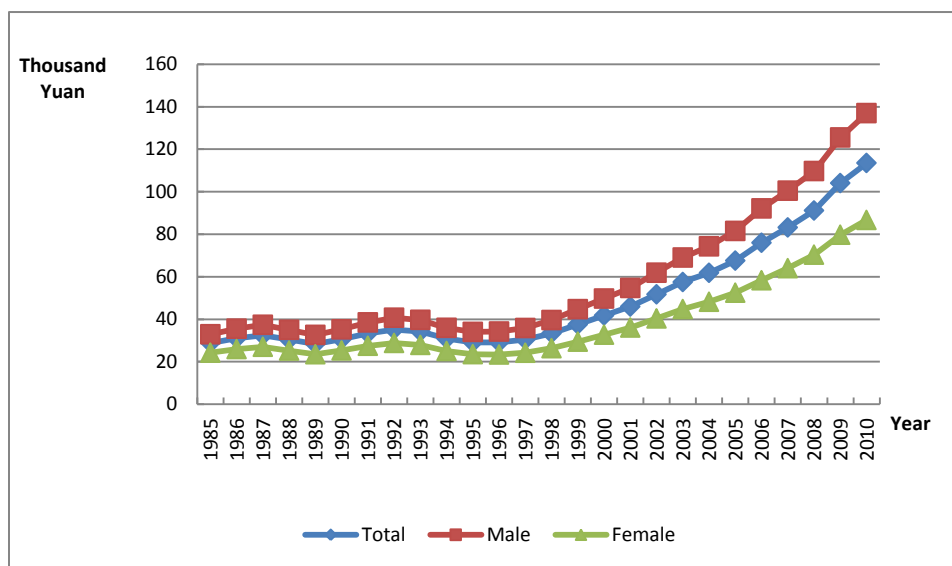
Figure SC-2.1 Human Capital Per Capita by Gender for Sichuan

Table SC-2.2 reports the results of human capital per capita by region for Sichuan in both nominal and real terms. From 1985 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 57,660 Yuan to 172,550 Yuan, the per capita rural human capital increases from 23,200 Yuan to 71,340 Yuan.

Table SC-2.2 Nominal and Real Human Capital Per Capita by Region for Sichuan

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	28.84	57.66	23.20	28.84	57.66	23.20

1986	32.49	64.49	25.98	31.01	61.54	24.82
1987	36.41	71.90	29.02	32.47	62.32	26.25
1988	40.90	80.14	32.51	30.40	56.51	24.81
1989	45.78	88.33	36.42	28.32	52.87	22.92
1990	51.29	98.65	40.66	30.56	58.18	24.37
1991	57.55	110.07	45.04	33.33	62.24	26.44
1992	64.67	123.44	49.78	35.14	63.57	27.93
1993	73.55	140.68	55.40	34.16	61.98	26.64
1994	82.80	157.45	61.56	30.82	54.23	24.16
1995	92.88	174.99	68.10	29.11	50.65	22.59
1996	101.76	188.12	74.41	29.11	49.59	22.63
1997	111.69	202.96	81.33	30.39	50.91	23.56
1998	122.43	219.56	88.71	33.37	55.18	25.82
1999	136.01	241.34	97.36	37.53	61.83	28.63
2000	151.83	272.15	106.80	41.76	69.93	31.22
2001	171.25	308.08	117.10	45.93	77.76	33.33
2002	192.64	345.70	129.10	51.70	87.70	36.74
2003	217.70	391.17	142.57	57.48	97.38	40.21
2004	245.94	438.78	158.55	61.82	104.43	42.51
2005	273.24	477.03	177.17	67.56	111.64	46.75
2006	315.58	539.63	199.17	75.97	123.33	51.38
2007	367.13	618.14	224.34	83.16	133.40	54.60
2008	423.81	698.17	252.24	91.13	143.91	58.13
2009	488.40	784.02	287.61	104.04	160.53	65.65
2010	550.65	870.84	322.10	113.49	172.55	71.34

Figure SC-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997.
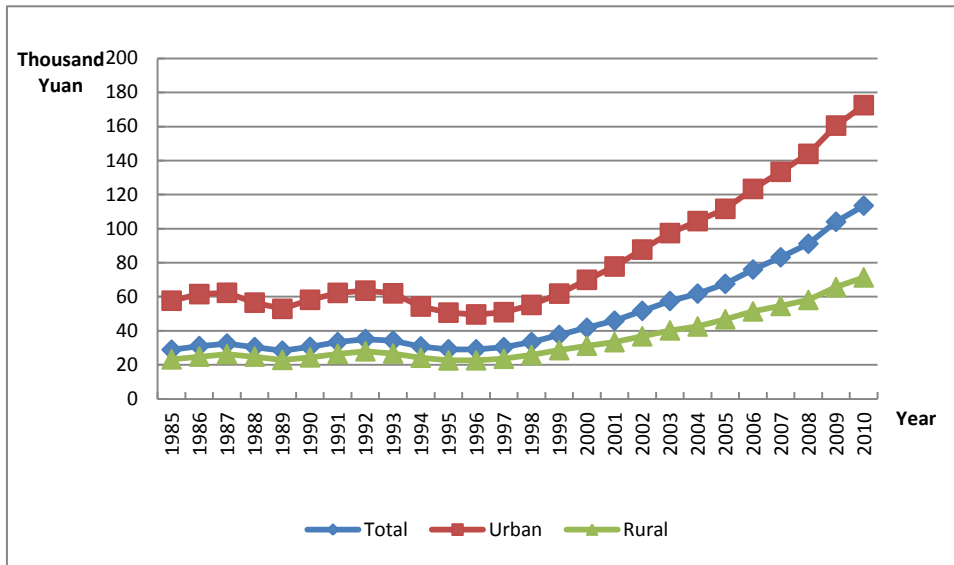
Figure SC-2.2 Real Human Capital Per Capita by Region for Sichuan

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Sichuan is reported in Table SC-3.1. The real values in this table are calculated by using CPI as the deflator.

Table SC-3.1 Nominal and Real Labor Force Human Capital for Sichuan

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	936		936	
1986	1,060		1,012	
1987	1,228		1,097	
1988	1,460		1,089	
1989	1,707		1,057	
1990	2,003		1,194	
1991	2,295		1,331	
1992	2,587		1,413	
1993	2,894		1,352	
1994	3,176		1,193	
1995	3,471		1,099	
1996	3,730		1,079	
1997	4,036		1,109	
1998	4,386		1,207	
1999	4,724		1,315	
2000	5,231	5,187	1,448	1,435
2001	5,530	5,494	1,494	1,484
2002	5,894	5,869	1,595	1,587
2003	6,266	6,256	1,672	1,668
2004	6,606	6,583	1,677	1,670
2005	7,028	7,008	1,752	1,746
2006	8,199	8,183	1,996	1,990
2007	9,420	9,407	2,162	2,156
2008	10,882	10,885	2,368	2,368
2009	12,834	12,850	2,762	2,763
2010	15,678	15,736	3,260	3,269

The trends of real human capital and real labor force human capital for Sichuan are presented in Figure SC-3.1. Before 1997, both the real human capital and real labor force human capital keep upside and downside, after 1997, both keep rising steadily.
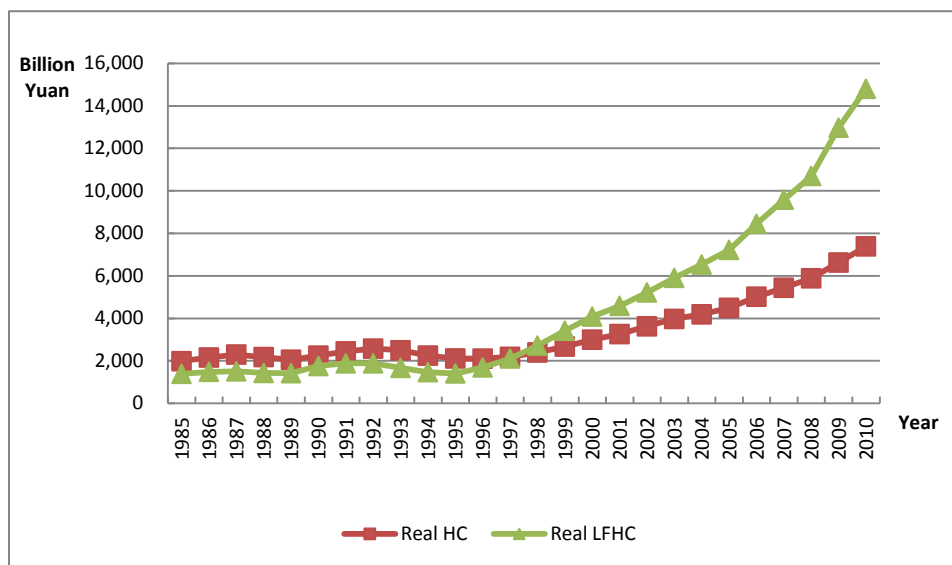
Figure SC-3.1 Real Human Capital and Real Labor Force Human Capital for Sichuan

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table SC-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.70 times that for female in 2010.

Table SC-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Sichuan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	21.73	24.98	17.95	21.73	24.98	17.95
1986	24.41	28.20	20.08	23.31	26.93	19.17
1987	27.68	32.13	22.65	24.71	28.68	20.24
1988	31.43	36.56	25.65	23.44	27.23	19.15
1989	35.53	41.29	28.96	22.01	25.57	17.97
1990	40.19	46.76	32.68	23.96	27.88	19.49
1991	45.03	52.58	36.43	26.11	30.48	21.14
1992	50.16	58.82	40.27	27.38	32.06	22.03
1993	55.99	65.95	44.64	26.16	30.77	20.90
1994	61.87	73.05	49.11	23.25	27.41	18.50
1995	68.46	81.04	54.10	21.68	25.62	17.18
1996	74.33	88.40	58.27	21.50	25.53	16.89
1997	81.13	96.97	63.07	22.29	26.60	17.37
1998	88.47	106.35	68.02	24.35	29.24	18.77
1999	96.34	116.28	73.53	26.82	32.34	20.51
2000	105.82	128.55	79.86	29.28	35.54	22.13
2001	114.99	140.10	86.67	31.07	37.82	23.45
2002	124.91	152.83	93.97	33.80	41.33	25.44
2003	135.43	166.58	101.26	36.14	44.43	27.06
2004	147.22	181.59	110.11	37.38	46.08	27.99
2005	160.81	199.16	120.31	40.10	49.63	30.03
2006	187.60	233.35	138.34	45.66	56.77	33.69
2007	217.05	269.49	159.38	49.81	61.83	36.57
2008	252.49	312.43	185.32	54.94	68.02	40.33
2009	297.48	367.91	217.15	64.02	79.20	46.69
2010	347.57	429.77	252.73	72.27	89.41	52.49

Table SC-3.3 reports the nominal and real average labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 1.93 times that for rural in 2010.

Table SC-3.3 Nominal and Real Average Labor Force Human Capital by Region for Sichuan

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	21.73	38.59	18.52	21.73	38.59	18.52
1986	24.41	43.15	20.66	23.31	41.17	19.73
1987	27.68	48.87	23.26	24.71	42.36	21.04
1988	31.43	55.12	26.39	23.44	38.87	20.14
1989	35.53	61.82	29.73	22.01	37.00	18.71
1990	40.19	69.84	33.55	23.96	41.19	20.11
1991	45.03	77.20	37.53	26.11	43.65	22.03
1992	50.16	85.66	41.68	27.38	44.12	23.39
1993	55.99	95.37	46.19	26.16	42.01	22.21
1994	61.87	105.23	50.78	23.25	36.25	19.93
1995	68.46	115.74	55.71	21.68	33.50	18.48
1996	74.33	125.52	60.01	21.50	33.09	18.25
1997	81.13	136.35	64.84	22.29	34.20	18.78
1998	88.47	148.01	70.09	24.35	37.20	20.40
1999	96.34	159.71	75.21	26.82	40.92	22.11
2000	105.82	174.29	80.87	29.28	44.78	23.64
2001	114.99	187.97	87.27	31.07	47.45	24.84
2002	124.91	202.95	94.56	33.80	51.48	26.91
2003	135.43	218.32	102.50	36.14	54.35	28.91
2004	147.22	234.86	110.28	37.38	55.90	29.57
2005	160.81	253.78	119.02	40.10	59.39	31.41
2006	187.60	290.42	138.99	45.66	66.37	35.86
2007	217.05	330.30	161.02	49.81	71.28	39.19

2008	252.49	378.58	184.27	54.94	78.03	42.47
2009	297.48	442.00	211.01	64.02	90.50	48.17
2010	347.57	514.94	238.90	72.27	102.03	52.91

Chapter 26   Human Capital for Guizhou

1. Total human capital

Human capital stocks of Guizhou are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table GZ-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[56] Column 5 is the real physical capital for Guizhou.

Table GZ-1.1 Real physical capital, Nominal and Real Human Capital for Guizhou

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	676		676		19
1986	764		724		22
1987	864		758		25
1988	983		723		29
1989	1,111		690		32
1990	1,267		772		36
1991	1,475		860		41
1992	1,698		917		46
1993	1,942		903		53
1994	2,235		847		63
1995	2,548		794		74

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[56] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	2,843		809		88
1997	3,127		861		109
1998	3,414		938		134
1999	3,733		1,033		164
2000	4,128	4,143	1,147	1,152	198
2001	4,747	4,761	1,294	1,297	237
2002	5,403	5,428	1,486	1,492	281
2003	5,847	5,870	1,588	1,594	327
2004	6,474	6,503	1,689	1,696	383
2005	7,207	7,247	1,860	1,871	445
2006	7,955	7,949	2,018	2,018	517
2007	8,989	8,983	2,146	2,144	602
2008	9,789	9,788	2,175	2,174	708
2009	10,642	10,634	2,395	2,394	837
2010	11,674	11,729	2,553	2,566	995

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table GZ-2.1 presents the trend of human capital per capita for Guizhou by gender in both nominal and real terms. Human capital per capita of male remains larger than that of female. Real human capital per capita for male increases 2.63 times from 28,980 Yuan to 100,521 Yuan. For female, it increases almost 2.42 times from 18,870 Yuan to 64,530 Yuan. From 1985 to 2010, the average annual growth rate is 5.48% for male, and 5.03% for

female.

Table GZ-2.1 Nominal and Real Human Capital Per Capita by Gender for Guizhou

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	24.15	28.98	18.87	24.15	28.98	18.87
1986	27.03	32.36	21.19	25.60	30.65	20.08
1987	30.08	36.00	23.68	26.41	31.58	20.82
1988	33.77	40.16	26.81	24.82	29.48	19.76
1989	37.77	44.57	30.30	23.46	27.64	18.87
1990	42.45	49.52	34.61	25.87	30.14	21.13
1991	48.74	56.79	39.77	28.42	33.08	23.21
1992	55.42	64.73	44.97	29.92	34.91	24.32
1993	62.68	73.51	50.46	29.15	34.16	23.52
1994	71.45	83.73	57.52	27.07	31.70	21.83
1995	80.48	94.24	64.91	25.08	29.36	20.23
1996	89.63	104.90	72.32	25.50	29.84	20.59
1997	98.62	115.65	79.35	27.14	31.79	21.85
1998	107.93	126.79	86.49	29.65	34.79	23.79
1999	118.37	139.44	94.28	32.76	38.57	26.13
2000	130.22	153.81	103.30	36.19	42.73	28.74
2001	149.14	175.85	118.71	40.64	47.88	32.38
2002	169.99	200.08	135.72	46.75	54.98	37.37
2003	184.18	218.13	145.43	50.01	59.21	39.53
2004	204.68	243.20	160.85	53.39	63.42	41.98
2005	226.09	268.57	177.69	58.35	69.33	45.85
2006	253.29	306.83	192.13	64.26	77.88	48.73
2007	291.83	355.01	219.47	69.66	84.81	52.33
2008	324.42	393.55	245.09	72.07	87.49	54.34
2009	360.66	439.35	269.98	81.17	98.95	60.65
2010	394.56	480.46	295.57	86.29	105.21	64.53

Figure GZ-2.1 shows that the real human capital per capita of male is larger than that of female for Guizhou from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
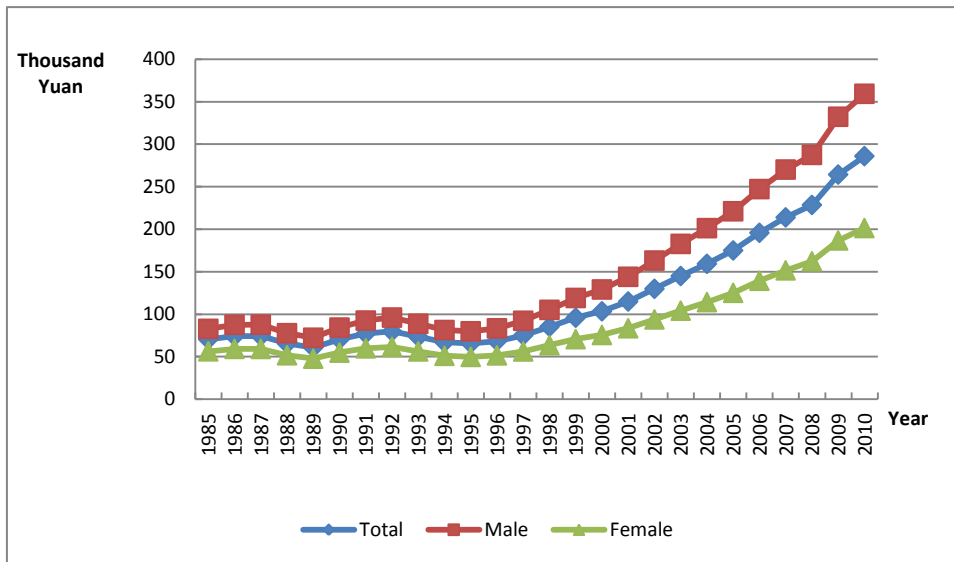
Figure GZ-2.1 Real Human Capital Per Capita by Gender for Guizhou

Table GZ-2.2 reports the results of human capital per capita by region for Guizhou in both nominal and real terms. From 1985 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 66,500 Yuan to 829,600 Yuan, the per capita rural human capital increases from 13,820 Yuan to 164,380 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table GZ-2.2 Nominal and Real Human Capital Per Capita by Region for Guizhou

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	24.15	66.50	13.82	24.15	66.50	13.82
1986	27.03	74.86	15.36	25.60	70.36	14.68
1987	30.08	83.77	17.07	26.41	71.77	15.43
1988	33.77	94.94	19.04	24.82	66.94	14.68
1989	37.77	106.87	21.18	23.46	63.92	13.74
1990	42.45	121.81	23.58	25.87	72.06	14.89
1991	48.74	137.00	26.47	28.42	78.00	15.90
1992	55.42	152.69	29.54	29.92	79.98	16.60
1993	62.68	168.76	33.06	29.15	76.34	15.99
1994	71.45	189.82	36.84	27.07	70.38	14.41
1995	80.48	209.61	41.00	25.08	65.03	12.86
1996	89.63	236.78	44.38	25.50	66.42	12.92
1997	98.62	262.36	48.17	27.14	71.18	13.56
1998	107.93	288.18	52.24	29.65	77.80	14.76
1999	118.37	317.40	56.61	32.76	86.64	16.05
2000	130.22	348.55	61.60	36.19	95.91	17.43
2001	149.14	399.60	67.59	40.64	107.38	18.91
2002	169.99	454.83	74.15	46.75	123.57	20.89
2003	184.18	479.96	81.36	50.01	129.24	22.48
2004	204.68	526.69	89.58	53.39	137.03	23.50
2005	226.09	574.25	98.43	58.35	148.51	25.29
2006	253.29	614.11	109.30	64.26	156.32	27.54
2007	291.83	685.34	121.36	69.66	164.73	28.47
2008	324.42	732.54	133.33	72.07	164.56	28.75
2009	360.66	783.22	148.29	81.17	178.45	32.28
2010	394.56	829.60	164.38	86.29	183.69	34.78

Figure GZ-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. From 1985 to 2010, the annual growth rate is 6.56% for the urban area, and 3.09% for the rural area.
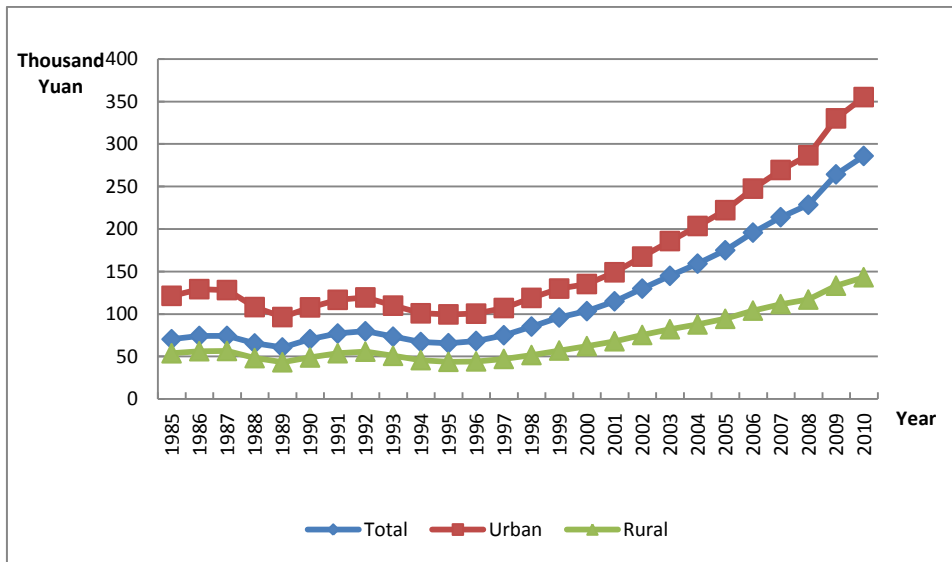

Figure GZ-2.2 Real Human Capital Per Capita by Region for Guizhou

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Shaanxi is reported in Table GZ-3.1. The real values in this table are calculated by using CPI as the deflator.

Table GZ-3.1 Nominal and Real Labor Force Human Capital for Guizhou

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	258		258	
1986	294		279	
1987	339		299	
1988	397		294	
1989	457		286	
1990	527		323	
1991	620		363	
1992	717		390	
1993	825		386	
1994	939		358	
1995	1,072		334	
1996	1,154		330	
1997	1,248		345	
1998	1,351		373	
1999	1,453		404	
2000	1,587	1,583	443	442
2001	1,716	1,711	470	469
2002	1,868	1,862	517	515
2003	2,041	2,034	557	554
2004	2,256	2,246	589	587
2005	2,522	2,524	650	651
2006	2805	2,792	711	708
2007	3,140	3,126	747	744
2008	3,561	3,546	787	784
2009	4,434	4,417	995	991
2010	5,639	5,688	1,232	1,243

The trends of real labor force human capital and real human capital for Guizhou are presented in Figure GZ-3.1. From 1995 to 2010, the real human capital keeps rising rapidly, while the real labor force human capital increases slowly.
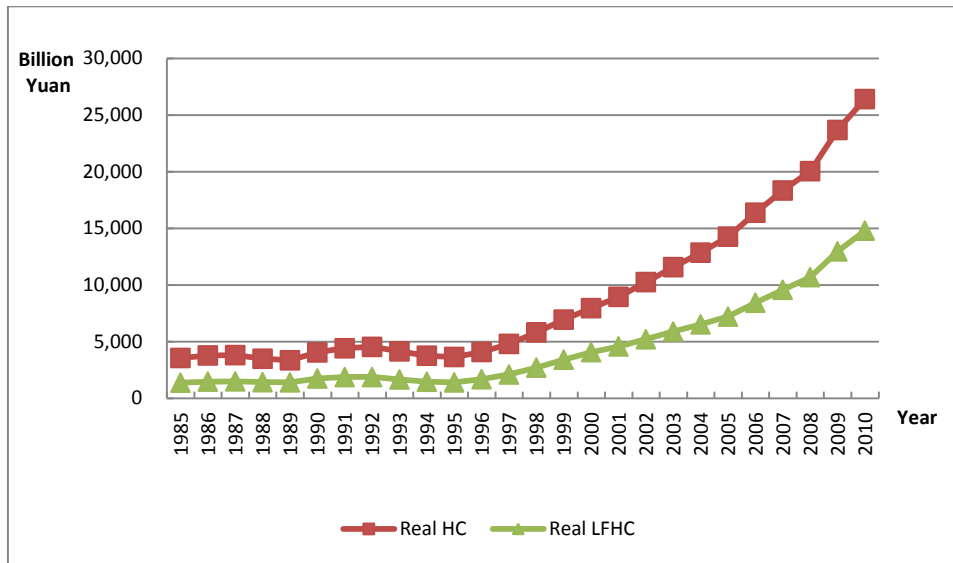

Figure GZ-3.1 Real Human Capital and Real Labor Force Human Capital for Guizhou

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table GZ-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.64 times that for female in 2010.

Table GZ-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Guizhou

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	18.18	22.05	13.73	18.18	22.05	13.73
1986	20.10	24.33	15.30	19.06	23.07	14.52
1987	22.34	27.02	17.12	19.70	23.80	15.11
1988	25.11	30.08	19.49	18.58	22.24	14.45
1989	28.09	33.36	22.06	17.55	20.82	13.81
1990	31.32	36.94	24.82	19.18	22.60	15.22
1991	35.31	41.69	27.95	20.68	24.40	16.40
1992	39.60	46.78	31.31	21.53	25.40	17.05
1993	44.64	52.93	35.09	20.91	24.76	16.46
1994	50.07	59.45	39.21	19.08	22.63	14.96
1995	56.26	66.90	43.92	17.55	20.87	13.71
1996	60.69	72.23	47.35	17.34	20.62	13.54
1997	65.61	78.18	51.11	18.13	21.58	14.15
1998	71.15	85.06	55.10	19.66	23.48	15.25
1999	77.15	92.38	59.48	21.46	25.67	16.57
2000	84.37	101.41	64.61	23.53	28.27	18.04
2001	91.99	110.50	70.70	25.22	30.26	19.42
2002	100.32	120.75	77.01	27.74	33.37	21.33
2003	109.36	131.81	83.99	29.82	35.90	22.92
2004	121.17	146.48	92.58	31.64	38.25	24.19
2005	133.94	162.21	102.14	34.54	41.83	26.33
2006	151.09	184.00	113.87	38.29	46.63	28.84
2007	172.37	210.35	128.99	41.01	50.07	30.64
2008	198.48	241.49	148.88	43.86	53.42	32.84
2009	243.23	296.67	181.55	54.57	66.63	40.66
2010	295.01	360.00	220.17	64.47	78.71	48.03

Table GZ-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 4.59 times that for rural in 2010.

Table GZ-3.3 Nominal and Real Average Labor Force Human Capital by Region for Guizhou

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	18.18	41.89	11.99	18.18	41.89	11.99
1986	20.10	46.31	13.35	19.06	43.52	12.76
1987	22.34	51.81	14.94	19.70	44.39	13.50
1988	25.11	58.62	16.65	18.58	41.33	12.84
1989	28.09	66.00	18.50	17.55	39.47	12.01
1990	31.32	74.20	20.61	19.18	43.90	13.01
1991	35.31	82.73	23.21	20.68	47.10	13.94
1992	39.60	91.48	26.00	21.53	47.92	14.61
1993	44.64	101.67	29.12	20.91	45.99	14.08
1994	50.07	112.33	32.34	19.08	41.65	12.65
1995	56.26	123.94	35.82	17.55	38.45	11.24
1996	60.69	135.11	38.78	17.34	37.90	11.29
1997	65.61	147.74	42.03	18.13	40.08	11.83
1998	71.15	162.35	45.50	19.66	43.83	12.86
1999	77.15	178.23	48.91	21.46	48.65	13.86
2000	84.37	193.39	52.75	23.53	53.21	14.92
2001	91.99	212.52	57.50	25.22	57.11	16.09
2002	100.32	231.43	62.48	27.74	62.88	17.61
2003	109.36	250.92	67.90	29.82	67.57	18.76
2004	121.17	277.04	73.49	31.64	72.08	19.28
2005	133.94	304.17	79.46	34.54	78.66	20.42
2006	151.09	341.41	89.03	38.29	86.90	22.43
2007	172.37	385.00	99.04	41.01	92.54	23.23

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	198.48	434.45	109.63	43.86	97.59	23.63
2009	243.23	508.92	121.59	54.57	115.95	26.47
2010	295.01	588.90	134.19	64.47	130.39	28.39

Chapter 27   Human Capital for Shaanxi

1. Total human capital

Human capital stocks of Shaanxi are calculated based on estimated income parameters and a 4.58% discount rate. The results are reported in Table SAX-1.1. Column 1 and 2 contain the nominal human capital; column 3 and 4 contain the real human capital deflated by CPI (in 1985 Yuan).[57] Column 5 is the real physical capital for Shaanxi.

Table SAX-1.1 Real physical capital, Nominal and Real Human Capital for Shaanxi

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	758		758		32
1986	861		813		37
1987	986		864		43
1988	1,122		830		50
1989	1,274		790		58
1990	1,468		889		66
1991	1,695		964		76
1992	1,948		1,013		86
1993	2,254		1,030		101
1994	2,580		928		119
1995	2,917		882		141

[57] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1996	3,249		892		167
1997	3,618		947		202
1998	4,032		1,072		244
1999	4,407		1,199		292
2000	5,215	5,280	1,418	1,435	351
2001	5,966	6,062	1,601	1,625	410
2002	6,696	6,805	1,813	1,842	476
2003	7,647	7,790	2,036	2,073	559
2004	8,591	8,758	2,218	2,261	665
2005	9,469	9,645	2,417	2,461	795
2006	11,217	11,432	2,814	2,868	968
2007	13,170	13,437	3,140	3,201	1,171
2008	15,305	15,621	3,429	3,500	1,470
2009	17,393	17,760	3,881	3,963	1,811
2010	20,400	20,879	4,381	4,481	2,257

2. Human capital per capita

The increase in human capital can be caused by changes in demographic structure, education, migration and urbanization etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital to non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factor to a large extent. Thus it can serve as a better indicator of the average human capital.

Table SAX-2.1 presents the trend of human capital per capita for Shaanxi by gender in both nominal and real terms. Human capital per capita

of male remains larger than that of female. Real human capital per capita for male increases 4.05 times from 32,170 Yuan to 162,500 Yuan. For female, it increases almost 4.08 times from 21,620 Yuan to 110,050 Yuan. From 1985 to 2010, the average annual growth rate is 7.08% for male, and 6.92% for female.

Table SAX-2.1 Nominal and Real Human Capital Per Capita by Gender for Shaanxi

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	27.19	32.17	21.67	27.19	32.17	21.67
1986	30.50	35.82	24.65	28.79	33.81	23.27
1987	34.44	41.01	27.12	30.17	35.92	23.77
1988	38.58	45.92	30.37	28.54	33.94	22.50
1989	43.20	51.13	34.29	26.79	31.69	21.29
1990	48.96	57.71	39.06	29.65	34.93	23.68
1991	56.08	66.09	44.80	31.92	37.58	25.52
1992	64.06	75.69	50.90	33.30	39.30	26.52
1993	73.69	87.10	58.56	33.69	39.76	26.81
1994	84.06	99.59	66.45	30.23	35.77	23.96
1995	94.69	112.48	74.54	28.62	33.95	22.58
1996	105.25	125.09	82.80	28.89	34.29	22.77
1997	116.88	139.10	91.69	30.60	36.39	24.06
1998	129.98	154.94	101.68	34.55	41.16	27.07
1999	142.13	169.40	111.19	38.67	46.06	30.28
2000	164.75	195.96	129.08	44.79	53.26	35.12
2001	190.07	225.27	150.10	51.00	60.42	40.29
2002	214.42	255.65	167.98	58.06	69.23	45.52
2003	246.51	293.66	193.89	65.62	78.17	51.62
2004	279.80	331.80	222.17	72.24	85.67	57.36
2005	311.59	370.91	246.21	79.53	94.63	62.83
2006	366.05	436.73	287.22	91.83	109.57	72.07
2007	427.54	507.71	337.60	101.93	121.01	80.46
2008	494.66	584.89	392.31	110.81	131.08	87.88
2009	564.69	666.05	448.76	126.00	148.65	100.14

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
2010	643.48	757.10	512.55	138.19	162.50	110.05

Figure SAX-2.1 shows that the real human capital per capita of male is larger than that of female for Shaanxi from 1985 to 2010. Starting from 1997, both the growth of human capital of male and female accelerate, and the gender gap appears to be expanding.
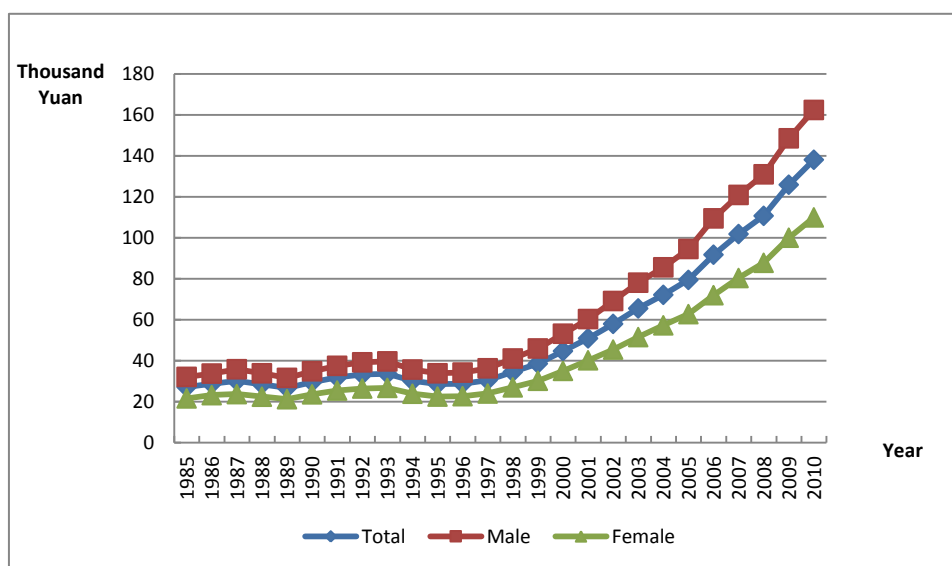

Figure SAX-2.1 Real Human Capital Per Capita by Gender for Shaanxi

Table SAX-2.2 reports the results of human capital per capita by region for Shaanxi in both nominal and real terms. From 1986 to 2010, the human capital per capita in urban area is significantly larger than that for rural. The real human capital per capita for urban increases from 67,020 Yuan to 1,099,530 Yuan, the per capita rural human capital increases from 17,160 Yuan to 53,810 Yuan. The human capital per capita in urban area grows much faster than the one for rural.

Table SAX-2.2 Nominal and Real Human Capital Per Capita by Region for Shaanxi

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	27.19	67.02	17.16	27.19	67.02	17.16
1986	30.50	74.43	19.25	28.79	69.82	18.28
1987	34.44	83.37	21.62	30.17	71.62	19.32
1988	38.58	92.80	24.22	28.54	66.38	18.52
1989	43.20	102.81	27.14	26.79	62.53	17.16
1990	48.96	116.06	30.39	29.65	68.81	18.82
1991	56.08	131.70	33.95	31.92	72.76	19.96
1992	64.06	148.78	37.81	33.30	73.92	20.72
1993	73.69	170.10	42.23	33.69	74.13	20.48
1994	84.06	191.09	47.13	30.23	64.96	18.25
1995	94.69	211.83	52.41	28.62	61.03	16.93
1996	105.25	231.62	57.41	28.89	60.50	16.92
1997	116.88	253.06	62.91	30.60	62.83	17.83
1998	129.98	277.97	68.74	34.55	70.64	19.62
1999	142.13	297.00	75.58	38.67	77.65	21.92
2000	164.75	347.00	83.02	44.79	90.45	24.32
2001	190.07	396.04	91.32	51.00	103.13	26.00
2002	214.42	433.06	100.77	58.06	114.84	28.58
2003	246.51	488.50	110.97	65.62	128.51	30.41
2004	279.80	541.36	122.73	72.24	138.27	32.58
2005	311.59	585.32	136.52	79.53	148.17	35.60
2006	366.05	673.83	154.04	91.83	167.06	40.01
2007	427.54	772.43	173.19	101.93	182.04	42.81
2008	494.66	876.23	194.33	110.81	194.45	45.02
2009	564.69	985.51	219.93	126.00	218.70	50.04
2010	643.48	1,099.53	247.58	138.19	235.30	53.81

Figure SAX-2.2 reflects the trend of real human capital per capita by region. As is shown, the gap between urban and rural expands rapidly after 1997. This is partly due to the long-term stagnant status in the rural area before 1997. Based on five education categories, the ratio of urban to rural increases from 3.90 in 1985 to 4.37 in 2010, which indicates an increasing urban-rural gap. From 1985 to 2010, the annual growth rate is 8.89% for the urban area, and 3.48% for the rural area.
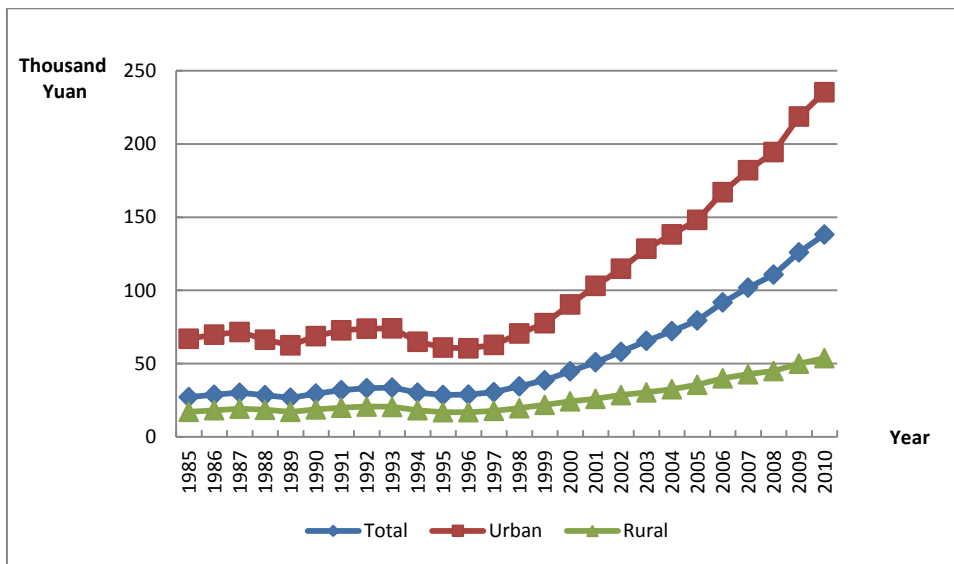

Figure SAX-2.2 Real Human Capital Per Capita by Region for Shaanxi

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimation method is the same as before. The labor force human capital for Shaanxi is reported in Table SAX-3.1. The real values in this table are calculated by using CPI as the deflator.

Table SAX-3.1 Nominal and Real Labor Force Human Capital for Shaanxi

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	330		330	
1986	378		357	
1987	441		387	
1988	519		386	
1989	607		377	
1990	707		429	
1991	794		454	
1992	881		461	
1993	983		454	
1994	1,088		397	
1995	1,216		372	
1996	1,339		372	
1997	1,492		396	
1998	1,676		450	
1999	1,928		528	
2000	2,182	2,115	599	581
2001	2,317	2,261	628	613
2002	2,561	2,522	699	689
2003	2,830	2,812	757	753
2004	3,096	3,102	804	805
2005	3,485	3,493	893	895
2006	4,094	4,108	1,034	1,037
2007	4,745	4,764	1,139	1,144
2008	5,573	5,604	1,257	1,263
2009	6,566	6,598	1,470	1,477
2010	8,489	8,572	1,825	1,844

The trends of real labor force human capital and real human capital for Shaanxi are presented in Figure SAX-3.1. From 1985 to 2010, the real human capital keeps rising rapidly, while the real labor force human capital increases slowly.
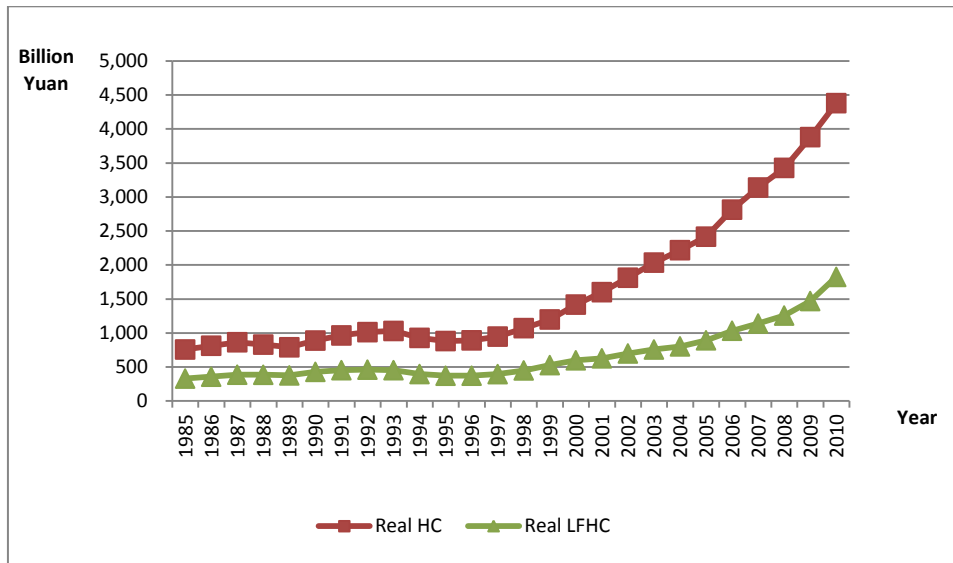

Figure SAX-3.1 Real Human Capital and Real Labor Force Human Capital for Shaanxi

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. The average labor force human capital means the ratio of the labor force human capital divided by the population that are over 15 years old, non-retired and out of school.

Table SAX-3.2 reports the nominal and real average labor force human capital by gender. The real average labor force human capital for female is smaller than that for male. More specifically, the real one for male is about 1.62 times that for female in 2010.

Table SAX-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Shaanxi

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	20.09	24.15	15.59	20.09	24.15	15.59
1986	22.59	27.25	17.42	21.34	25.75	16.46
1987	25.71	31.18	19.67	22.58	27.37	17.29
1988	29.23	35.28	22.50	21.71	26.18	16.74
1989	33.10	39.76	25.64	20.56	24.68	15.94
1990	37.49	44.91	29.09	22.75	27.22	17.67
1991	41.72	49.98	32.38	23.83	28.52	18.52
1992	46.16	55.38	35.76	24.18	28.96	18.78
1993	51.26	61.51	39.65	23.66	28.35	18.35
1994	56.89	68.40	43.84	20.74	24.88	16.03
1995	63.46	76.44	48.78	19.41	23.35	14.96
1996	69.86	84.47	53.30	19.41	23.44	14.86
1997	77.43	93.99	58.65	20.53	24.88	15.60
1998	85.91	104.72	64.60	23.08	28.09	17.40
1999	96.23	117.56	71.94	26.36	32.16	19.75
2000	106.93	131.33	79.10	29.34	35.98	21.76
2001	115.61	141.96	85.89	31.32	38.42	23.31
2002	127.16	156.47	94.48	34.71	42.68	25.83
2003	139.37	171.54	104.02	37.30	45.89	27.87
2004	152.73	188.28	114.05	39.64	48.86	29.63
2005	171.01	211.18	127.72	43.81	54.08	32.74
2006	199.35	246.14	147.89	50.32	62.14	37.37
2007	229.80	282.03	171.47	55.17	67.69	41.18
2008	267.20	326.35	200.13	60.26	73.57	45.15
2009	311.71	380.63	232.18	69.79	85.20	52.01
2010	380.60	462.30	284.81	81.84	99.41	61.25

Table SAX-3.3 reports the nominal and real average Labor force human capital by region. The average labor force human capital is much smaller in rural area than in urban area, for both nominal and real terms. The real values for urban is about 3.00 times that for rural in 2010.

Table SAX-3.3 Nominal and Real Average Labor Force Human Capital by Region for Shaanxi

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	20.09	43.72	14.36	20.09	43.72	14.36
1986	22.59	48.41	16.13	21.34	45.41	15.31
1987	25.71	54.02	18.16	22.58	46.41	16.23
1988	29.23	61.39	20.45	21.71	43.91	15.64
1989	33.10	69.01	22.92	20.56	41.98	14.49
1990	37.49	77.32	25.67	22.75	45.84	15.89
1991	41.72	84.83	28.62	23.83	46.87	16.83
1992	46.16	93.00	31.79	24.18	46.20	17.42
1993	51.26	102.59	35.25	23.66	44.71	17.10
1994	56.89	113.15	38.95	20.74	38.47	15.09
1995	63.46	125.67	42.97	19.41	36.21	13.88
1996	69.86	137.66	46.59	19.41	35.96	13.73
1997	77.43	151.92	50.56	20.53	37.72	14.33
1998	85.91	166.86	55.02	23.08	42.40	15.70
1999	96.23	182.32	59.65	26.36	47.67	17.30
2000	106.93	202.56	65.11	29.34	52.80	19.08
2001	115.61	214.42	71.80	31.32	55.84	20.44
2002	127.16	230.71	78.99	34.71	61.18	22.40
2003	139.37	247.03	86.96	37.30	64.99	23.83
2004	152.73	263.69	95.40	39.64	67.35	25.33
2005	171.01	288.82	104.95	43.81	73.11	27.37
2006	199.35	334.64	121.18	50.32	82.97	31.48
2007	229.80	384.82	139.08	55.17	90.69	34.37

2008	267.20	444.60	158.18	60.26	98.66	36.64
2009	311.71	514.72	180.45	69.79	114.23	41.06
2010	380.60	624.32	204.72	81.84	133.60	44.49

Chapter 28   Human capital for Gansu

1. Total human capital

Human capital stocks of Gansu are calculated using estimated income parameters and a 4.58% discount rate. The results are reported in Table GS-1.1. Column 1 and column 2 contain the nominal human capital; column 3 and column 4 contain the real human capital deflated by CPI (in 1985 Yuan).[58] Column 5 is the real physical capital for Gansu.

Table GS-1.1 Real physical capital, Norminal and Real Human Capital for Gansu

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billion of Yuan)
	Five-education Category (1)	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)	
1985	413		413		19
1986	471		443		22
1987	529		462		25
1988	606		447		28
1989	692		432		32
1990	765		463		35
1991	875		504		40
1992	975		526		44
1993	1,104		515		51
1994	1,240		466		59
1995	1,393		438		70

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[58] Because the provincial human capital is the sum of rural and urban human capital, we use the CPI for rural and urban separately in the estimation.

1996	1,563		447		80
1997	1,788		497		96
1998	1,999		561		113
1999	2,246		645		134
2000	2,520	2,634	727	759	159
2001	2,935	3,044	813	843	183
2002	3,425	3,483	950	965	213
2003	3,985	4,100	1,093	1,124	244
2004	4,591	4,723	1,231	1,267	284
2005	5,144	5,294	1,356	1,397	340
2006	5,749	5,868	1,497	1,529	406
2007	6,466	6,580	1,597	1,627	484
2008	7,194	7,328	1,643	1,674	596
2009	8,027	8,182	1,811	1,848	710
2010	8,943	9,117	1,937	1,976	847

2. Human capital per capita

The increase in the human capital can be caused by population growth, demographic change (like retirement population scale), urbanization (like region migration), higher educational attainment, higher return to education, higher return to on-the-job training, etc. In order to get further information on the dynamics of human capital, we calculate human capital per capita, defined as the ratio of human capital divided by non-retired population. Although the human capital per capita is influenced by the age distribution of the population, it can exclude the influence of population factors to a large extent, thus it can serve as a better indicator of the average human capital.

Table GS-2.1 presents the trends of human capital per capita measured in nominal and real terms for Gansu classified by gender. Human capital per

capita for male remains higher than that for female. Real human capital per capita values for male increases from 19,091 Yuan to 88,350 Yuan, increasing by around 4 times; real human capital per capita for female increases from 15,023 Yuan to 71,203 Yuan, increasing by around 4.7 times.

Table GS-2.1 Nominal and Real Human Capital Per Capita by Gender for Gansu

Year	Nominal human capital per capita (Thousands of Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	19.09	22.91	15.02	19.09	22.91	15.02
1986	21.88	26.14	17.29	20.54	24.54	16.24
1987	24.92	29.73	19.71	21.77	25.96	17.23
1988	28.51	33.79	22.72	21.04	24.92	16.79
1989	32.77	38.67	26.18	20.47	24.14	16.39
1990	36.88	43.42	29.55	22.33	26.27	17.91
1991	41.55	48.77	33.48	23.93	28.06	19.31
1992	45.71	53.74	36.76	24.63	28.92	19.85
1993	51.06	60.11	40.99	23.83	28.02	19.16
1994	56.70	66.65	45.64	21.33	25.05	17.20
1995	62.86	73.83	50.65	19.78	23.21	15.97
1996	70.26	82.48	56.64	20.09	23.56	16.22
1997	79.99	93.36	65.06	22.22	25.91	18.10
1998	89.46	104.14	72.97	25.09	29.20	20.50
1999	100.42	116.48	82.33	28.84	33.44	23.67
2000	111.39	129.40	91.07	32.12	37.29	26.28
2001	129.89	151.12	106.07	35.99	41.85	29.39
2002	151.94	177.30	123.44	42.13	49.14	34.22
2003	177.19	206.97	143.62	48.58	56.75	39.39
2004	204.73	238.39	166.85	54.90	63.95	44.74
2005	230.45	267.97	188.43	60.76	70.67	49.66
2006	258.73	302.29	209.90	67.39	78.78	54.65
2007	292.42	341.16	237.91	72.23	84.29	58.72
2008	327.55	381.81	267.04	74.79	87.24	60.95
2009	368.44	431.35	298.41	83.14	97.39	67.29
2010	407.97	478.93	328.92	88.35	103.80	71.20

Figure GS-2.1 shows that the real human capital per capita for male is higher than that for female for Gansu from 1985 to 2010. Before 1997, different human capital all grow quite slowly, starting from 1997, both the growth of human capital for male and female accelerate, the gender gap, which has been fairly stable, then appears to be expanding.
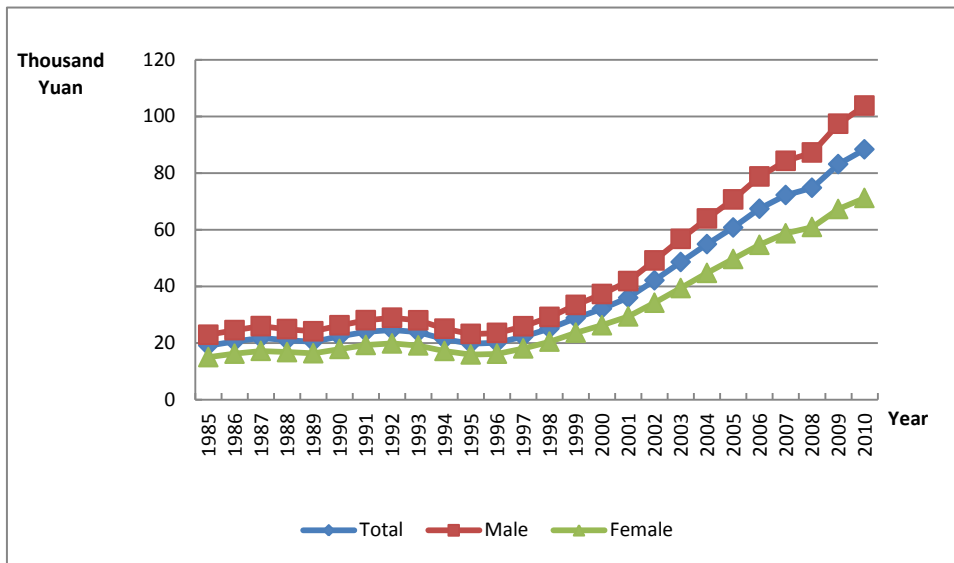

Figure GS-2.1 Human Capital Per Capita by Gender for Gansu

Table GS-2.2 reports the results of human capital per capita measured in nominal and real terms for Gansu classified by region. From 1985 to 2010, the human capital per capita in urban areas is significantly larger than that for rural. The real urban human capital per capita increases from 53,027 Yuan to 176,881 Yuan, the rural human capital per capita increases from 11,690 Yuan to 37,491 Yuan. The human capital per capita in urban areas grows much faster than the one for rural.

Table GS-2.2 Nominal and Real Human Capital Per Capita by Region for Gansu

Year	Nominal human capital per capita (Thousands of 1985 Yuan)			Real human capital per capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1985	19.09	53.02	11.69	19.09	53.02	11.69
1986	21.88	59.78	13.22	20.54	55.87	12.48
1987	24.92	66.16	14.90	21.77	57.04	13.20
1988	28.51	74.83	16.83	21.04	53.49	12.85
1989	32.77	82.95	18.91	20.47	50.17	12.28
1990	36.88	91.71	21.24	22.33	54.43	13.17
1991	41.55	103.58	23.81	23.93	58.16	14.13
1992	45.71	112.15	26.51	24.63	58.69	14.79
1993	51.06	123.98	29.82	23.83	56.32	14.36
1994	56.70	136.08	33.40	21.33	49.61	13.03
1995	62.86	148.45	37.50	19.78	45.52	12.16
1996	70.26	166.37	41.41	20.09	46.25	12.24
1997	79.99	193.09	45.74	22.22	52.22	13.14
1998	89.46	216.97	50.33	25.09	59.27	14.62
1999	100.42	246.11	55.28	28.84	69.16	16.35
2000	111.39	272.31	61.07	32.12	77.14	18.04
2001	129.89	311.80	68.33	35.99	85.76	19.13
2002	151.94	359.00	76.20	42.13	99.44	21.15
2003	177.19	411.23	85.00	48.58	112.89	23.27
2004	204.73	464.80	95.11	54.90	125.96	24.96
2005	230.45	509.49	105.79	60.76	136.43	26.95
2006	258.73	553.63	118.08	67.39	146.49	29.67
2007	292.42	610.12	131.49	72.23	153.46	31.08
2008	327.55	666.79	146.11	74.79	155.29	31.77
2009	368.44	733.69	163.42	83.14	169.35	34.77
2010	407.97	800.05	182.53	88.35	176.88	37.49

Figure GS-2.2 reflects the trend of human capital per capita measured in real terms and classified by region. As is shown in the graph, the size of the difference between urban and rural expanded rapidly after 1997. Based on five education categories, the ratio of urban to rural increases from 4.53 in 1985 to 4.78 in 2010, which indicates a rising size of region gap of human capital per capita.
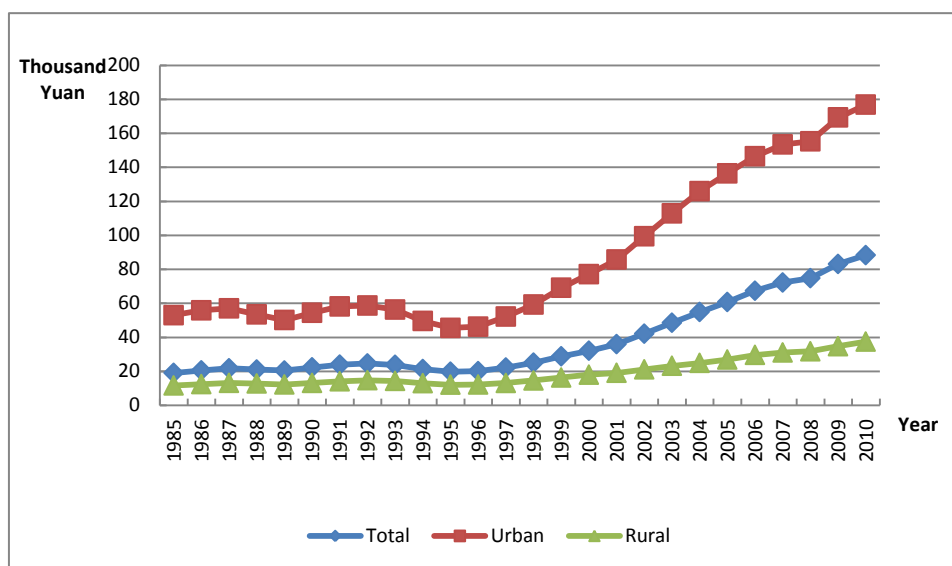

Figure GS-2.2 Real Human Capital Per Capita by Region for Gansu

3. Labor force human capital

3.1 Total labor force human capital

The labor force human capital represents the human capital of population that are over 15 years old, non-retired and out of school. The estimated

approach of labor force human capital is the same as that of human capital we illustrated above. Based on the income parameter for Gansu and the discount rate valued at 4.58%, the labor force human capital for Gansu is reported in Table GS-3.1. The real values in this table are calculated by using CPI as the deflator with respect to nominal values. We also calculate the ratio of labor force human capital measured in nominal terms to nominal GDP. The results are reported in the last column of Table GS-3.1.

Table GS-3.1 Nominal and Real Labor Force Human Capital and GDP for Gansu

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	Five-education Category *(1)*	Six-education Category (2)	Five-education Category (3)	Six-education Category (4)
1985	202		202	
1986	229		215	
1987	262		229	
1988	310		229	
1989	377		236	
1990	417		253	
1991	463		267	
1992	518		280	
1993	581		272	
1994	660		249	
1995	736		232	
1996	793		227	
1997	867		242	
1998	952		268	
1999	1,044		301	

2000	1,157	1,148	335	332
2001	1,252	1,246	348	346
2002	1,383	1,380	384	383
2003	1,531	1,533	420	420
2004	1,706	1,705	455	455
2005	1,925	1,925	503	503
2006	2,143	2,148	553	554
2007	2,414	2,420	590	592
2008	2,736	2,746	618	621
2009	3,196	3,210	713	717
2010	3,742	3,762	803	808

The trends of human capital in both real and real labor force terms for Gansu are presented in Figure GS-3.1. From 1985 to 2010, labor force human capital keeps rising.
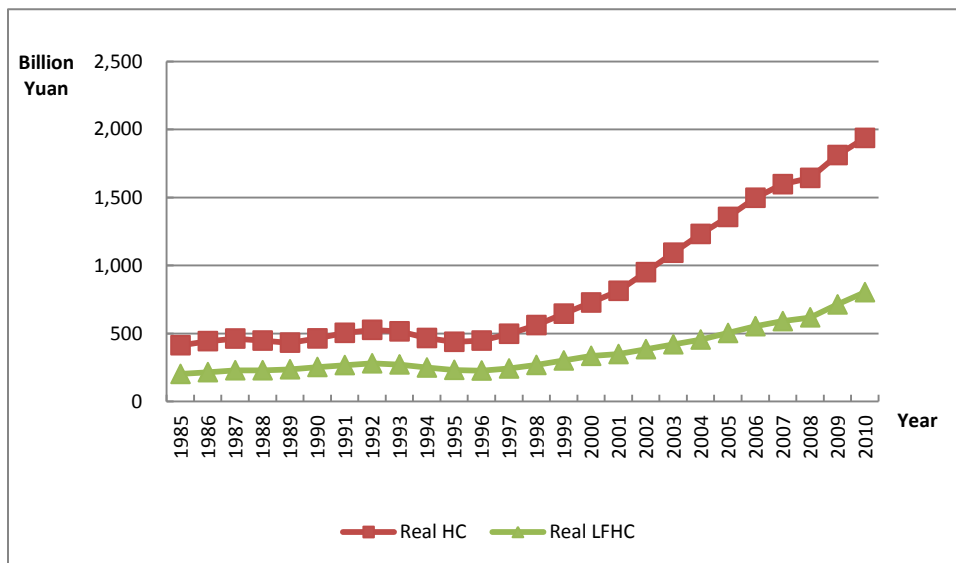
Figure GS-3.1 Real human capital and real labor force human capital for Gansu,1985-2010

3.2 Average labor force human capital

Similar to the analysis of human capital per capita above, we calculate the average labor force human capital. Here the average labor force human capital means labor force human capital divided by the number of the population that are over 15 years old, non-retired and out of school.

Table GS-3.2 reports the real average labor force human capital classified by gender. And the average labor force human capital for female is smaller than that for male. More specifically, the number for male is about 1.56 times that for female in 2010.

Table GS-3.2 Nominal and Real Average Labor Force Human Capital by Gender for Gansu

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	Male	Female	Total	Male	Female
1985	15.92	19.26	12.33	15.92	19.26	12.33
1986	18.05	21.84	13.94	16.95	20.51	13.10
1987	20.63	25.01	15.87	18.05	21.86	13.88
1988	23.77	28.66	18.37	17.57	21.17	13.59
1989	28.32	33.88	21.99	17.71	21.17	13.78
1990	31.61	37.72	24.64	19.15	22.83	14.94
1991	34.54	41.16	27.04	19.93	23.72	15.62
1992	37.93	45.14	29.79	20.48	24.35	16.11
1993	41.96	49.99	32.91	19.62	23.35	15.42
1994	46.78	55.69	36.79	17.63	20.96	13.89
1995	51.60	61.36	40.69	16.26	19.32	12.84
1996	55.95	66.58	44.02	16.04	19.07	12.64
1997	61.15	72.85	47.99	17.05	20.29	13.41
1998	67.03	80.07	52.31	18.89	22.53	14.78
1999	73.15	87.52	56.84	21.10	25.21	16.42
2000	80.07	96.09	61.84	23.18	27.78	17.93
2001	87.88	105.53	67.86	24.39	29.28	18.85

Year						
2002	97.21	117.10	74.65	26.96	32.47	20.70
2003	108.00	130.06	83.07	29.60	35.65	22.77
2004	120.99	145.83	93.02	32.26	38.90	24.77
2005	136.53	164.61	105.01	35.68	43.07	27.39
2006	153.06	185.15	117.20	39.51	47.85	30.18
2007	172.55	208.48	132.37	42.16	51.01	32.27
2008	194.81	235.57	149.34	44.00	53.29	33.66
2009	224.28	272.83	170.14	50.04	60.99	37.82
2010	255.01	311.08	192.65	54.72	66.86	41.21

Table GS-3.3 reports the real average Labor force human capital classified by region separately. The average labor force human capital is much smaller in rural area than in urban area. The number for urban is about 4 times that for rural in 2010.

Table GS-3.3 Nominal and Real Average Labor Force Human Capital by Region for Gansu

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
1985	15.92	40.00	10.44	15.92	40.00	10.44
1986	18.05	44.47	11.79	16.95	41.56	11.12
1987	20.63	49.52	13.32	18.05	42.70	11.80
1988	23.77	56.34	15.10	17.57	40.28	11.53
1989	28.32	65.40	17.03	17.71	39.55	11.06
1990	31.61	71.71	19.17	19.15	42.56	11.89
1991	34.54	78.33	21.39	19.93	43.98	12.69
1992	37.93	84.88	23.79	20.48	44.42	13.27
1993	41.96	92.85	26.55	19.62	42.18	12.79
1994	46.78	101.86	29.56	17.63	37.14	11.53
1995	51.60	110.54	32.90	16.26	33.90	10.67
1996	55.95	120.29	36.17	16.04	33.44	10.69
1997	61.15	131.78	39.85	17.05	35.64	11.45
1998	67.03	144.23	43.78	18.89	39.40	12.72
1999	73.15	157.18	47.84	21.10	44.17	14.15
2000	80.07	171.27	52.48	23.18	48.52	15.50

Year	Nominal average labor force human capital (Thousands of Yuan)			Real average labor force human capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2001	87.88	186.38	58.44	24.39	51.26	16.37
2002	97.21	204.96	65.07	26.96	56.77	18.06
2003	108.00	224.49	72.62	29.60	61.62	19.88
2004	120.99	247.22	80.89	32.26	66.99	21.23
2005	136.53	276.26	89.93	35.68	73.98	22.91
2006	153.06	304.42	100.51	39.51	80.55	25.26
2007	172.55	336.42	111.58	42.16	84.62	26.38
2008	194.81	371.21	123.93	44.00	86.45	26.95
2009	224.28	418.20	138.63	50.04	96.53	29.50
2010	255.01	467.21	155.01	54.72	103.29	31.84

Appendix A   Population imputation

1. Data collection

When estimating population by age, gender and education in urban and rural areas, we use the following data sources:

Data	Sources	Notes
National, urban and rural "population aged 6 and over by age, gender and education attainment": 1982,1987, 1990,1995, 2000,2005,2010	1982,*China Demographic Statistics Yearbook* 1988 edited by Department of Demographic Statistics of National Bureau of Statistics 1987,*China 1987 1% Demographic Sampling* Survey edited by Department of Demographic Statistics of National Bureau of Statistics 1990,*China 1990 Census* edited by Census Office of State Council, and Department of Demographic Statistics of National Bureau of Statistics 1995,*China Demographic Statistics Yearbook*.1998 edited by Department of Demographic and Employment Statistics of National Bureau of Statistics 2000,http://www.stats.gov.cn/tjsj/ndsj/renkoupucha /2000pucha/pucha.htm 2005,http://www.stats.gov.cn/tjsj/ndsj/renkou/2005 /renkou.htm	

	• 2010,*China 2010 Census*	
National, urban and rural population aged 0-5 by age and sex: 1982,1987, 1990,1995, 2000,2005,2010	• 1982,*China 1982 Census* edited by State Department Census Office, Department of Demographic Statistics of National Bureau of Statistics • 1987,*China Demographic Statistics Yearbook.1989* edited by Department of Demographic Statistics of National Bureau of Statistics • 1990,*China 1990 Census* edited by State Department Census Office, Department of Demographic Statistics of National Bureau of Statistics • 1995,*China Demographic Statistics Yearbook.1996* edited by Department of Demographic and Employment Statistics of National Bureau of Statistics • 2000,http://www.stats.gov.cn/tjsj/ndsj/re nkoupucha /2000pucha /pucha.htm • 2005,http://www.stats.gov.cn/tjsj/ndsj/re nkou/2005 /renkou.htm • 2010,*China 2010 Census and China Demographic Statistics Yearbook* 2012	We assume that those aged 0-5 receive no schooling
National, urban and rural population by age and sex: 1982-2010	• *China Demographic Statistics Yearbook.1988-1993* edited by Department of Demographic Statistics of National Bureau of Statistics • *China Demographic Statistics*	

	Yearbook.1994-1998,2006 edited by Department of Demographic and Employment Statistics of National Bureau of Statistics • *China Demographic Statistics Yearbook.1999-2005* edited by Department of Demographic and Social Science Statistics of National Bureau of Statistics • *China Demographic and Employment Statistics Yearbook 2007-2010*edited by Department of Demographic and Employment Statistics of National Bureau of Statistics	
Mortality rate by age and sex: 1986,1989-1990, 1994-2010	• *China Demographic Statistics Yearbook*：*1988-2010*	In the yearbooks of 1988 and 1989, the only mortality rate is of 1986. In the yearbooks of 1992 and 1993, the mortality rate is not separated by age and sex.
Enrollment by education level: 1980-2010	• *Educational Statistics yearbook of China.1987* edited by the Plan and Finance Bureau of National Educational Committee • *Educational Statistics yearbook of China.1989-1992* edited by the Plan and Development Department of National Educational Committee • *Educational Statistics yearbook of*	*Educational Statistics Yearbook of China. 1980-1986,1988, 1992* are downloaded from http://www.pinggu. org/bbs/thread-1406 41-2-1.html

	China 1993-1996 edited by the Plan and Development Department of National Educational Committee • *Educational Statistics yearbook of China 1997* edited by the Plan and Development Department of National Educational Ministry • *Educational Statistics yearbook of China.1998-2010* edited by the Plan and Development Department of National Educational Ministry	
National, urban and rural population and birth rate for each year	• *China Statistics Yearbook 2011.* • *Statistics Summary for 55 years in China.* China Statistics Press	
Students by age and grade of primary and junior school: 2003-2010	• *Educational Statistics yearbook of China.2003-2010* edited by the Plan and Development Department of National Educational Ministry	

2. Data processing

2.1 Basic population data

2.1.1 Census data

Due to direct registration and computer aggregation, the Census data

do not take into account the left-out population.[59] The total populations from the 1982, 1990, 2000 and 2010 census data published at that time are slightly different from the population released in *China Statistics Yearbook 2011*. Thus, some adjustments need to be made to the population data by age, sex and educational attainment. The adjustment is implemented by the following method. The adjusted urban population by age, sex and educational attainment equals the urban population by age, sex and educational attainment from the census data times the ratio of total urban population released in *China Statistics Yearbook 2010* to the total urban population in the census data. A similar formula is applied to the rural population.

2.1.2 1%-Sample data

We adjust the sample data to match the total rural and urban data. Urban population by age, sex and educational attainment is divided by urban sampling ratio, which is the ratio of urban sample population to urban total population released in *China Statistics Yearbook 2008*. The same method is applied to the rural data.

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[59] See Zhang, Weimin and Hongyan Cui(2003),"The estimation accuracy of China Census 2000",*Population Research*, Vol.27, No.4 (July), pp.25-35.

2.2 New enrollment

2.2.1 Educational category in China

There are six education levels in China: no schooling, primary school, junior middle school (including regular junior middle school and vocational junior middle school), senior middle school (including regular senior middle school, regular specialized middle school and vocational high school), college, and university and above. "College" and "university and above" were combined as "college and above" before 2000.

2.2.2 National enrollment data

The new enrollments by gender of primary school from 1985 to 1990 are not available, so it is assumed that the share of females in the new enrollments equals that in Grade 1.

From 1980 to 1983, we have no information about the share of females in the new enrollments, so we use female share in new enrollment of the closest year.

From 1983 to 2003, we only have the total new enrollment of college and university and the total females in college and university. To get the female enrollments in college and university, we assume that the proportion of female is the same as in college and university enrollments.

From 2004 to 2010, the female enrollment data for university and college is available in the statistic yearbooks.

2.2.3 New enrollment data of urban and rural areas

The new enrollments by gender in urban and rural areas in each

educational level are not available. We assume that the proportions of female enrollment in urban and rural areas equal the corresponding proportion at the national level.

The new enrollments of specialized middle school are not separated by urban and rural. So we assume that the ratio of urban to rural new enrollments in specialized middle school is the same as that of regular senior middle school.

From 2003 to 2010, the new enrollments of vocational high school are not separated by urban and rural and the processing method is the same as above.

3. Imputation method

We use the perpetual inventory method to impute the population data.

3.1 Perpetual inventory method

The perpetual inventory formula is:
$$L(y,e,a,s) = L(y-1,e,a,s) \cdot (1-\delta(y,a,s)) + IF(y,e,a,s)$$
$$-OF(y,e,a,s) + EX(e,a,s)$$

where $L(y,e,a,s)$ is the population in year y with education level e, age a and sex s. $\delta(y,a,s)$ is the mortality rate. $IF(y,e,a,s)$ is the inflow of population of age a, sex s and education level e in year y. $OF(y,e,a,s)$ represents the outflow of population of age a and sex s and education level e in year y. $EX(e,a,s)$ is a residual term.

$$IF(y,e,a,s) = \lambda(y,e,a,s) \cdot ERS(y,e,s)$$

$$OF\left(y,e,a,s\right)=\lambda\left(y,e+1,a,s\right)\cdot ERS\left(y,e+1,s\right)$$

ERS is the new enrollment of different education levels, λ is the age distribution of new enrollment of different education levels and

$$\sum_{a}\lambda\left(y,e,a,s\right)=1$$

3.2 Estimate the age distribution λ

We use the data from the *China Educational Statistical Yearbook: 2003-2010* to estimate the age distribution (1982-2010) of new enrollments.

We have the data of new enrollment of primary school by age, region and sex, and the data of new enrollment of junior middle school by age, grade, sex and region from 2003 to 2010.

3.2.1 Estimate the age distribution λ: 2003-2010

For primary school, we assume that the sex ratio of enrolment equals to the sex ratio of entrants. We use rural_2003 as an example; Table A.1 is the raw data. First, we use total enrolments (second column) and total female enrolments (third column) to obtain the sex ratio. Next, we use this ratio to separate total entrants (first column). Finally, we calculate the age distribution in rural area in 2003 (Table A.2).

For junior middle school, we assume that the sex ratio of enrolment equals to the sex ratio in each grade, and we assume that the age distribution of Grade 1 students is the same as that of new enrollments. We use rural_2003 as an example; Table A.3 is the raw data. First, we use total enrolments (first column) and total female enrolments (second column) to

obtain the sex ratio. Next, we use this ratio to separate Grade 1 (third column). Finally, we calculate the age distribution in rural area in 2003 (Table A.4).

For senior middle school, we assume that students in Grade 3 and Grade 4 in junior middle school have the same age distribution as those of new entrants to senior middle school in the same year. For example, in 2003 the age distribution of new entrants to senior middle school is the same as that of Grade 3 and 4 students in junior middle school in 2003 (Table A.5).

For university, we assume that the age distribution of new entrants to university is the same as that of Grade 1 students in senior middle school three years ago. For example, in 2006, the age distribution of new entrants to university is the same as that of Grade 1 students of senior middle school in 2003.

Using the method above, we can get the age distribution of enrollment of each educational level. Table A.6 is the age distribution in rural areas in 2003, Table A.7 is the age distribution in urban areas in 2003 (keep three decimal fraction because the space limitation).

3.2.1 Estimate the age distribution λ: before 2003

We use the data from *China Educational Statistical Yearbook: 2003* instead.

3.2.2.1 for primary school

1995: use the age distribution of Grade 3 in junior school instead. (Table A.3 Grade 3)

1996: use the age distribution of Grade 2 in junior school instead. (Table A.3 Grade 2)

1997: use the age distribution of Grade 1 in junior school instead. (Table A.3 Grade 1)

1998: use the age distribution of Grade 6 in primary school instead. (Table A.1 Grade 6)

1999: use the age distribution of Grade 5 in primary school instead. (Table A.1 Grade 5)

2000: use the age distribution of Grade 4 in primary school instead. (Table A.1 Grade 4)

2001: use the age distribution of Grade 3 in primary school instead. (Table A.1 Grade 3)

2002: use the age distribution of Grade 2 in primary school instead. (Table A.1 Grade 2)

Before 1995: use the age distribution in 1995 instead.

3.2.2.2 for junior middle school

2002: use the age distribution of Grade 2 in junior middle school instead. (Table A.3 Grade 2)

2001: use the age distribution of Grade 3 in junior middle school instead. (Table A.3 Grade 3)

Before 2001: use the age distribution in 2001 instead.

3.2.2.3 for senior middle school

The age distribution of new entrants to senior is the same as that of

junior middle school three years ago.

3.2.2.4 for university

The age distribution of new entrants to university is the same as that of senior middle school three years ago.

3.3 Method of imputing population data: 1985-2010

When adopting the perpetual inventory method to estimate the urban and rural population, we ignore migrants between urban and rural China. To take these migrants into account, we make the following adjustments. For example, from 1982 to 1990, we get the estimated 1990 population data by gender, education and age using the perpetual inventory method. The actual 1990 population by gender, education and age subtracted the estimated 1990 population by gender, education and age gives the net migrants between urban and rural China in these eight years. We assume that the number of immigrants in each year is the same, and then we add the average difference to the estimated population data.

4. Some specific problems

4.1 National, rural and urban population at age zero: 1985-2010

4.1.1 National population at age zero

The total population at the end of the year and the birth rates for each year are obtained from Table 3-1 'Population and Its Composition' and

Table 3-2 'Birth Rate, Death Rate and Natural Growth Rate of Population' in *China Statistic Yearbook 2011*. We assume that the population at the beginning of a given year equals that at the end of the previous year. Thus, the average of the population at the end of the given year and the previous year is the average population of the given year. The product of the average population and the corresponding birth rate gives the new-born population. Multiplying the new-born population by the survival rate of those aged zero at the corresponding year gives the population at age zero at the end of the year.

(Definition: birth rate, also called gross birth rate, refers to the ratio of the new-born population in a given region during a given period, usually one year, and the average population of the same period. The birth rate here is yearly birth rate, which is calculated from the following equation: Birth rate = (new-born population/average population)* 1000‰, where new-born population is the number of the new-born babies who are alive when they are detached from the mothers no matter how long they have been in their mother's body. Average population is the average of the populations at the beginning and at the end of the year, or the population at the middle of the year.)

4.1.2 Rural and urban population at age zero

The data used include total national population for each year from 1983 to 2010, birth rate for each year from 1983 to 2010, national, rural and urban population by age and gender from the population sampling surveys for 1987 and each year from 1989 to 2010.

The share of urban population at age zero in the national population at age zero can be calculated from these sampling data, and this share is assumed to be the true share. In other words, multiplying it with the national population at age zero produces the urban population at age zero. Further, the gender ratio from the sampling data is also assumed to be true, thus we can divide the urban population at age zero into the two genders. Similar steps are used for the rural population at age zero.

Since there is no population sampling data for 1983-1986 and 1988, we assume the numbers of those aged 1, 3, 4, 5, 6 in 1989 equals the new-born population for 1988, 1986, 1985, 1984 and 1983 respectively with the sampling weights adjusted. Migration between urban and rural regions is neglected here.

4.2 The death rate of those aged 65 and over

When imputing the population by age, gender and education level with perpetual inventory method, the number of those aged 65 and over should be multiplied by (1-death rate). The death rate is calculated in the following way. With the population and the death rate, both by age and gender, from the population sampling data for each year, the number of deaths of those aged 65 and over for each year can be calculated, and dividing it by the corresponding total population gives the death rate of those aged 65 and over. Since there is no population sampling data for 1983-1986 , 1988 and 1991-1993, the death rate of the closest year is used.

4.3 Application of the age distributions of every education level for each year

The age distributions are obtained from the macro- and micro-level data, and the enrollment numbers for each year are used with adjustments. They change over time, but do not vary between urban and rural regions.

4.4 STATA programming

The imputation process is realized by a STATA program, which includes adjustments for negative numbers.

Table and figures of appendix A

Table A.1 Number on School-age Population in Primary Schools, Rural, 2003, China Education Statistical Yearbook

	Entrants			Enrolment					
	total	Total	Of which: female	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6
Sum	11924477	76891519	36322339	12159626	12862008	12985923	13295122	13951495	11637345
5	297013	308950	144660	302758	6052	125	8	6	1
6	4754352	5046575	2372386	4782290	257461	6647	165	10	2
7	6350637	11010378	5180829	6444175	4321918	237121	6945	204	15
8	410669	11864959	5605866	492215	7338813	3813008	213075	7553	295
9	74134	12221282	5796024	91262	711394	7682374	3514009	213151	9092
10	22398	12995292	6170350	27731	155006	927169	8067444	3604354	213588
11	8630	13084959	6211805	10868	43937	221535	1082185	8423636	3302798
12	4293	8410789	3979851	5476	17127	65676	295215	1234989	6792306
13	1616	1468214	654151	1948	7153	22371	84281	351020	1001441
14	534	368378	159283	630	2292	7181	23368	89514	245393
15	201	111743	47134	273	855	2716	8427	27058	72414

Table A.2 Age Distribution in Primary School, Rural, 2003

Age	male	female
5	0.025	0.025
6	0.400	0.397
7	0.534	0.530
8	0.034	0.034
9	0.006	0.006
10	0.002	0.002
11	0.001	0.001
12	0.000	0.000
13	0.000	0.000
14	0.000	0.000
15	0.000	0.000

Table A.3 Number of School – age Population and Enrolment in Junior Middle Schools, Rural, 2003, China Education Statistical Yearbook

Rural	Enrolment					
	Total	Of which: female	Grade 1	Grade 2	Grade 3	Grade 4
10	31217107	15243521	10846398	9888047	10008568	474094
11	14636	6715	14222	407	7	0
12	388359	182837	365232	22427	700	0
13	4523447	2172333	4000135	490469	32745	98
14	9974932	4777600	5128966	4317657	524854	3455
15	10015544	4776361	1063487	4758148	4119319	74590
16	5810306	2731587	225263	994786	4272665	317592
17	1169589	507334	38929	182266	883709	64685
18	198706	77478	7742	26440	152300	12224

Table A.4 Age Distribution of New Entrants in Junior Middle School, Rural, 2003

Age	male	female
10	0.001	0.001
11	0.036	0.032
12	0.393	0.363
13	0.505	0.464
14	0.105	0.096
15	0.023	0.020
16	0.004	0.003
17	0.001	0.001
18	0.000	0.000
Total	1	1

Table A.5 Age Distribution of New Entrants in Senior Middle School, Rural, 2003

Age	male	female
11	0.000	0.000
12	0.000	0.000
13	0.003	0.003
14	0.051	0.049
15	0.409	0.391
16	0.453	0.422
17	0.100	0.080
18	0.019	0.013
19	0.003	0.002
Total	1	1

Table A.6 Age Distribution of New Enrollments by Educational Level, rural_2003

Age	Illiterate to primary school		Primary school to junior middle school		Junior middle school to senior middle school		Senior middle school to college		Senior middle school to university	
	male	female	male	female	male	female	male	female	male	female
5	0.025	0.025								
6	0.400	0.397								
7	0.534	0.530								
8	0.034	0.034								
9	0.006	0.006								
10	0.002	0.002	0.001	0.001						
11	0.001	0.001	0.036	0.032						
12			0.393	0.363						
13			0.505	0.464	0.003	0.003				
14			0.105	0.096	0.051	0.049				

15			0.023	0.020	0.409	0.391				
16			0.004	0.003	0.453	0.422				
17			0.001	0.001	0.100	0.080	0.050	0.050	0.050	0.050
18					0.019	0.013	0.456	0.456	0.456	0.456
19					0.003	0.002	0.404	0.404	0.404	0.404
20							0.076	0.076	0.076	0.076
21							0.014	0.014	0.014	0.014
22										
Sum	1	1	1	1	1	1	1	1	1	1

Table A.7 Age Distribution of New Enrollments by Educational Level, urban_2003

Age	Illiterate to primary school		Primary school to junior middle school		Junior middle school to senior middle school		Senior middle school to college		Senior middle school to university	
	male	female	male	female	male	female	male	female	male	female
5	0.025	0.029								
6	0.558	0.568								
7	0.386	0.384								
8	0.021	0.021								
9	0.003	0.003								
10	0.001	0.001	0.002	0.002						
11			0.045	0.050						
12			0.358	0.387						
13			0.462	0.493	0.004	0.004				
14			0.084	0.089	0.066	0.062				

15			0.014	0.015	0.410	0.388				
16			0.002	0.002	0.446	0.436	0.004	0.004	0.004	0.004
17					0.075	0.086	0.065	0.068	0.065	0.068
18					0.009	0.013	0.401	0.414	0.401	0.414
19					0.001	0.002	0.432	0.432	0.432	0.432
20							0.084	0.071	0.084	0.071
21							0.012	0.008	0.012	0.008
22							0.002	0.001	0.002	0.001
Sum	1	1	1	1	1	1	1	1	1	1

Appendix B   Mincer parameters

Main Equation:

$$\ln(inc) = \alpha + \beta \cdot Sch + \gamma \cdot Exp + \delta \cdot Exp^2 + u$$

where *inc* is income; *Sch* is years of schooling; *exp* is years of work experience; α, β, γ, δ are corresponding parameters; *u* is an error term.

1. Samples and methods

1.1 Surveys

(1) The annual Urban Household Survey (UHS);

(2) Chinese Health and Nutrition Survey (CHNS);

(3) Chinese Household Income Project (CHIP).

(4) China Household Finance Survey （CHFS）

1.2 Components of income

(1) Main job and Secondary job salaries;

(2) Other cash income from work;

(3) Pension;

(4) Estimated market value of received items;

(5) Various subsidies;

(6) Individual's share of household income according to working-hour share.

1.3 Work experience

$$exp = \text{age} - Sch - 6.$$

1.4 Selection of sample

(1) 16-60 years old for males, and 16-55 years old for females;

(2) Must have information on income and educational attainment;

(3) Students, retirees, people who are unemployed but looking for a job, the disabled, people who are waiting to enter school and housekeepers are excluded.

1.5 Imputation method

(1) To make all parameters comparable, we first use UHS, CHIP, CHNS and CHFS to obtain all urban and rural parameters by gender and then compute the annual results by weighting the sample sizes of the available data sets for that year. When all four data sets are available for a sample year, we drop CHNS and use UHS, CHIP and CHFS estimates due to the relatively low quality of CHNS income measures, then they are weighted by respective sample sizes.

(2) We use UHS to obtain urban parameters for 1986-1997.

(3) We use CHIP to obtain urban and rural parameters for 1988, 1995, 2002 and 2007.

(4) We use CHNS to obtain urban parameters[60] for 2000, 2004, 2006, 2009, and rural parameters for 1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009.

(5) We use CHFS to obtain urban and rural parameters for 2010.

As an example, for the intercept term,

We estimate the urban intercept $\alpha^u 88$ (UHS) using UHS 1988, with the sample size of $n^u 88$ (UHS). We also could obtain the urban and rural intercepts $\alpha^u 88$ (CHIP), $\alpha^r 88$ (CHIP), with the sample sizes of $n^u 88$(CHIP), $n^r 88$(CHIP) respectively. Then the annual urban and rural intercepts are:

$$\alpha^u 88 = \frac{\alpha^u 88(UHS) \times n^u 88(UHS)}{n^u 88(UHS) + n^u 88(CHIP)} + \frac{\alpha^u 88(CHIP) \times n^u 88(CHIP)}{n^u 88(UHS) + n^u 88(CHIP)}$$

$$\alpha^r 88 = \alpha^r 88(CHIP)$$

The same principle is applied to estimate other relevant parameters for urban and rural areas.

1.6 Parameter α

$$\ln(inc) = \alpha + \beta \cdot Sch + \gamma \cdot Exp + \delta \cdot Exp^2$$

$\hat{y} = \alpha \times e^{\hat{\ln y}}$, where α is an adjustment factor. We estimate it as follows:

(1) Obtain $\hat{\ln} y$ from the regression of $\ln(y_i)$ on all right-hand-side variables.

(2) Obtain $\hat{m}_i = e^{\hat{\ln y}}$.

(3) Regress y_i on $\hat{m}_i$ without the intercept: $\hat{y} = \alpha \times \hat{m}_i$ and keep α.

(4) For given values *Sch*, *Exp*, *Exp^2*, obtain $\hat{\ln} y$.

---

[60] We have urban datasets of UHS for 1989, 1991, 1993 and 1997, so we do not use the CHNS datasets of the above years for urban parameter estimation

(5) $\hat{y} = \alpha \times e^{\widehat{\ln y}}$.

2. Data

We use four well-known household surveys in China. The first one is the annual Urban Household Survey (UHS) conducted by the National Statistical Bureau of China from 1986 to 1997. It records household information about income and consumption expenditure, demographic characteristics, work and employment, accommodation and other family related details. UHS covers 103 cities and 80 counties.

The second one is the China Health and Nutrition Survey (CHNS), which covers nine provinces-Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, Shandong. Four counties are sampled in each province. In addition, the provincial capital and a lower income city are selected when feasible. CHNS was conducted in 1988, 1991, 1993, 1997, 2000, 2004, 2006, 2009. Numbers of households participated in the first five waves are 3,795, 3,616, 3,441, 3,875, and 4,403 respectively.

The CHIP (Chinese Household Income Project) data include 9,009 urban households and 10,258 rural households. Basic information is collected for both the sample households and their members, focusing on income and wage, sources of income and household expenditure. For rural households, information on assets and debts, sales and consumption of products, and purchase of production means are also collected. The rural survey covers 28 provinces, only excluding Xinjiang and Tibet; and the urban survey covers 10 provinces (Beijing, Shanxi, Liaoning, Jiangsu,

Anhui, Henan, Hubei, Guangdong, Yunan and Gansu). The years surveyed include 1988, 1995, 2002, and 2007.

China Household Finance Survey (CHFS) is a national survey administered by the China Household Finance Survey and Research center of Southwestern University of Finance and Economics, its main purpose is to collect information concerning about household finance on microcosmic level, including information of household income, consumption, production, etc. in the year of 2010.This dataset not only consists of both urban and rural households. The samples cover 22 provinces. Among the samples provinces, Guangxi, Guizhou and Shanxi province only sample rural households; Beijing, Tianjin and Qinghai only have urban samples. There are 5194 urban households with 16755 individuals; and 3244 rural households with 12569 individuals.

Table B.1 shows the distribution of the four datasets across years.

3. Key variables

3.1. UHS

3.1.1 Definition of income

1) Salaries from working in the state-owned, collective or other institutions;

2) Other income from working units;

3) Private employment income;

4) Income from re-employment after retirement;

5) Other employment income;

6) Other working income;

7) Pension;

8) Price subsidies;

9) Household avocation production income.

3.1.2 Years of schooling

(1)**1986-1991**

LEVEL	Sch
College	16
Professional school	11
Senior middle school	12
Junior middle school	9
Primary school	6
Others	0

(2)**1992-1997**

LEVEL	Sch
College	16
Community college	15
Professional school	11
Senior middle school	12
Junior middle school	9
Primary school	6
Others	0

3.1.3 Selection of sample

(1) Include male individuals of 16 to 60 years old and female individuals from 16 to 55 years old;

(2) Discard individuals whose value of regular wage is missing, individuals who did not to report education information;

(3) Discard individuals who are self-employed, short term contract workers, the retired, job seekers, the disabled, homemakers, students in school, workers waiting for job assignment, students waiting to enter a higher level school, etc.

3.2 CHIP

3.2.1 Definition of income

Urban income definitions:

In 1988 it includes: employment salary and subsidies, other income from work units, pension;

In 1995 it includes: employment salary and subsidies, other income from work units, other goods from work units, pension;

The same principle is applied in CHIP 2002 and CHIP 2007.

Rural income definitions:

Sum of individual income and household income;

In 1988, individual income includes: regular income, pension, other cash income and other goods from work units; household income is net household income from agriculture.

In 1995, individual income includes: regular income (such as salary, bonus, subsidies), pension, other cash income and received goods from work units; household income is net household income from agriculture.

In 2002, individual income includes: wages, pensions, subsidies, received goods from work units; household income is net household income from agriculture.

In 2007, it only has the total household income, including both non-rural income and rural income.

3.2.2 Years of schooling

(1)**1988**

LEVEL	Sch
College and above	16
Professional school	15
Middle level professional, technical or vocational school	11
Upper middle school	12
Lower middle school	9
Junior middle school	6
4 or more years of elementary school	4
1-3 years of elementary school	2
Illiterate or semi-illiterate	0

LEVEL	Sch
College and above	16
Professional school	15
Middle level professional school	11
Upper middle school	12
Lower middle school	9
Elementary school	6
Illiterate or semi-illiterate	0

(3)**2002**

LEVEL	Sch
College and above	16
Professional school	15
Middle level professional, technical or vocational school	11
Upper middle school	12
Lower middle school	9
Elementary school	6
Illiterate or semi-illiterate	0

(4)**2007**

LEVEL	Sch
Graduate school	18

College and above	16
Professional school	15
Middle level professional, technical or vocational school	11
Upper middle school	12
Lower middle school	9
Elementary school	6
Illiterate or semi-illiterate	0

3.2.3 Selection of sample

(1) Include male individuals of 16 to 60 years old and female individuals from 16 to 55 years old;

(2) Discard individuals whose value of years of schooling is missing, individuals who failed to report education level information;

(3) Keep individuals whose current status is working or employed, or re-employed after retirement;

(4) Discard individuals who are self-employed, private enterprise owners or managers;

(5) Discard individuals whose reported income is 0 or below.

3.3 CHNS

3.3.1 Income variables

Income includes wages, subsidies, other job-related income and household agricultural income. For CHNS, we use the sum of INDINC

(Total net individual income, nominal), INDSUB (Individual subsidies) and individual share of HHSUB (Household subsidies) to generate the variable of final individual income.

3.3.1.1 Total net individual income, nominal (INDINC)

Variable: INDINC - Total net individual income, nominal

Data files: INDBUSN - business income

      INDFARM - farming income

      INDFISH - fishing income

      INDGARD - gardening income

      INDLVST - livestock income

      INDRETIRE - retirement income

      INDWAGE - non-retirement wages

a)   Non-Retirement Wages

Variable: INDWAGE - Total individual income from all non-retirement wages earned by individuals. Annual wage is calculated for each job record in the wages file.

Generally, annual wage income is Months Worked times Average Monthly non-Retirement Wage, annualized, plus Bonuses and Other Cash or In-Kind Income. For 1989, annualized income from piece work is calculated.

Source:

      C3, months worked last year (job level), 1991 - 2006

      C8, average month's wages (job level), 1991 - 2006

      C6, wages per piece of completed work, 1989

C7, average number of pieces completed/work, 1989

I19, value of bonuses received last year (job level), 1989-2006

I101, other cash income (job level), 2006

I103, value of other non-cash income (job level), 2006

B2, B3B, B4, B5, B9, B10, filter questions (person level)

b) Retirement Income

Variable: INDRET - Total Individual Retirement Income

Source:

J5, retirement pensions/salaries (individual), 1989 - 2000

B2D, retirement wage from this job (job level), 2004 - 2006

c) Business Income

Variable: INDBUS - Total individual net income from all businesses operated by household that the individual participated in.

Source:

Individual proportion of net income from household businesses:

H6, Months worked in household business last year

H7, Days per week worked in household business last year

H8, Hours per day worked in household business last year

Total household net income from all household businesses:

H2, Business type

H3, Revenue from this business

H4, Expenses

d) Farming Income

Variable: INDFARM - Total individual net income from farming.

Source:

Individual proportion of net income from household farming:

      E4A, months worked on farm last year

      E4B, days worked on farm per week last year

      E4C, hours worked on farm per day last year

      E2A, worked on HH farm/orchard last year (from 2004 on)

      E4, 12-month average hours worked on farm per week (1989 only)

Total household net income from farming:

      E7, cash for collective farming (individual level), 1989 - 2006

      E9, in-kind for collective farming (individual level), 1989 - 2006

      E13B, expenses to raise crop (crop level), 1989

      E15B, receipts from sale of crop (crop level), 1989

      E17B, receipts if crop kept had been sold (crop level), 1989

      E19B, receipts if crop given away had been sold (crop level), 1989

      E13, kg of crop grown (crop level), 1991-1997

      E14, kg of crop sold to government (crop level), 1991-1997

      E15, government price for crop (crop level), 1991-1997

      E16, kg of crop sold to free market (crop level), 1991-1997

      E17, free-market price for crop (crop level), 1991-1997

      E12, expenses to raise all crops (household level), 1991 - 2006

      E14A, receipts from sale of all crops (household level), 1991 - 2006

      E16A, value of all crops consumed (household level), 1991 - 2006

    e)   **Fishing Income**

Variable: INDFISH - Individual income from fishing.

Source:

Individual proportion of net income from household farming:

G4A, months worked on fishing last year

G4B, days worked on fishing per week last year

G4C, hours worked on fishing per day last year

G2, filter: worked on fishing last year (from 2004 on)

G4, 12-month average hours worked on fishing per week (1989 only)

Total household net income from farming:

G7, wages received from collective fishing (individual)

G9, market value of fish received in-kind from the collective (individual)

G11, revenue from fish sales (household)

G13, value of fish consumed at home (household)

G15, value of fish given as gift (household)

G16, expenses of fishing business (household)

f)   Gardening Income

Variable: INDGARD - Total individual net income from gardening

Source:

Individual proportion of net income from household gardening:

D3A, months worked on gardening last year

D3B, days worked on gardening per week last year

D3C, hours worked on gardening per day last year

D2A, worked in HH garden last year (from 2004 on)

D3, 12-month average hours worked on gardening per week (1989 only)

Total household net income from household garden or orchard

D5, revenue from sale of home garden produce, 1989 - 2006

D6, market value of consumed produce, 1989 - 2006

D7, expenses to grow produce, 1991-2006

g) Livestock Income

Variable: INDLVST - Total individual net income from raising livestock.

Source:

Individual proportion of net HH income (HHLVST) from household livestock business:

F4A, months worked on raising livestock last year

F4B, days worked on raising livestock per week last year

F4C, hours worked on raising livestock per day last year

F2A, raising livestock last year (from 2004 on)

F4, 12-month average hours worked on raising livestock per week (1989 only)

Total household net income from all livestock activities:

F7, wages received from collective animal husbandry (individual)

F9, market value of livestock received in-kind from collective (individual)

F14, expenses to raise livestock (livestock level)

F15, expenses from using home-grown feed (livestock level)

F17, revenue from sale of livestock products (livestock level)

F19, value of livestock products consumed at home (livestock level)

F21, value of livestock products given as gifts (livestock level)

3.3.1.2 Subsidies

The subsidies include INDSUB (Individual subsidies) and individual share of HHSUB (Household subsidies). We distribute household subsidies equally among household individuals, the household subsidies are divided by the number of members in one household.

$$INDSUB=(I9+I11+I12+I13+I13A+I14+I14A+I14B)*12$$

$$HHSUB=I10A+I15A+I16A+I17A+I21+K47$$

Source:

ANNUAL subsidies for the following items, at the Household level:

I10A, one-child subsidy, 1991 - 2006

I15A, gas subsidy, 1993 - 2006

I16A, coal subsidy, 1993 - 2006

I17A, electricity subsidy, 1993 - 2006

I21, food/gift/discounts from work unit, 1989 - 2006

K47, childcare subsidy, 1989 - 2006

MONTHLY subsidies for the following items, at the Individual level:

I9, food subsidy, 1989 - 1997

I11, health subsidy, 1989 - 1997

I12, bath/haircut subsidy, 1989 - 1997

I13, book/newspaper subsidy, 1989 - 1997

I13A, housing subsidy, 1989 - 1997

I14, other subsidy, 1989 - 1997

I14A, average monthly subsidy from job 1, 2000 - 2006

I14B, average monthly subsidy from job 2, 2004 - 2006

3.3.2 Imputing individual share of household income

Agricultural income includes incomes from five sources: gardening, farming, livestock raising, fishing, and small handicraft and commercial household businesses. These incomes come from either collective or household businesses or both.

We assume each individual's contribution to the household income is proportional to his or her share of time allocated to five activities: gardening, farming, raising livestock, fishing and small handicraft and commercial household business. First, we add up all working hours of all family members in each of these activities. Second, we calculate the working hour share of each member in the family's total hours. Third, we multiply the household income by the share to approximate individual income for each category. Finally, we add up individual income from the four categories for each family member.

3.3.3 Years of schooling

Level	Sch
None	0
Completed primary school	6
Junior middle school degree	9
Senior middle school degree	12
Middle technical, professional , or vocational degree	11
3- or 4- year college degree	16
Master's degree or above	18

3.3.4 Selection of sample

(1) Males of 16 to 60 years of age and females of 16 to 55 years of age;

(2) Exclude individuals who fail to provide information on wage and educational attainment, those who are self-employed or business owners;

3.4 CHFS

3.4.1 Definition of income

(1)The income divides into urban income and rural incomes. Urban income mainly includes wage income and social security income; rural income mainly includes wage income, household income from agriculture and social security income.

(2)Wage income mainly includes three components: wages, bonuses and allowances. Social Security income mainly includes three components: social endowment insurance, retirement and pensions.

3.4.2 Personal income distribution of agricultural production

In rural income, wage income and social security income are personal income, but the income of agricultural production is household income, Therefore, it is necessary to determine how the household income is allocated to individuals, and thus calculate the total personal income.

(1) Allocation method

Step 1: statistics for each individual family on farming and agricultural production should be recorded as working as the family labor.

Step 2：Calculation of family practitioners produced income, and apportioned to individual farming, sharing: Family net income of

agricultural production / Labor force engaged in agricultural household production.

3.4.3 Years of schooling

2010

Level	Sch
No school	0
Primary school	6
Junior middle school	9
Senior middle school	12
Middle professional degree	11
Post-secondary professional degree	15
College	16
Master's degree	18
PhD degree	22

3.4.4   Selection of sample

(1) Include male individuals of 16 to 60 years old and female individuals from 16 to 55 years old.

(2) Discard individuals whose value of year of schooling is missing, individuals who did not report education level information.

(3) Keep individuals whose current status is working or employed, or

re-employed after retirement.

(4) First Occupation:

In urban samples, we discard individuals, who work for businesses or private companies; self-employed individuals farmers at home, and other samples, and we delete samples without income data sample. In rural sample, we delete the data sample without income data.

(5) Second Occupation: Urban and rural samples without income data were deleted from the sample.

(6) Family agricultural production and management: Rural sample households engaged in agricultural production but we delete samples without income data.

(7) Social Security Income: Rural and urban samples were deleted with the relevant guaranteed income but without income data.

4. Imputing parameters

4.1. Imputation method of urban parameters

4.1.1 Parameter estimates based on UHS, CHIP, CHNS,CHFS

We use UHS, CHIP, CHNS, CHFS data to estimate the earnings equation by gender and year. Table B.1.1-B.1.4 contain means and standard deviations of each variable for UHS, CHIP, CHNS,CHFS.

4.1.2 General idea about imputation

We use UHS, CHIP, CHNS and CHFS to estimate parameters of the basic Mincer equation, and obtain the fitted values for the intercept, return to education, and experience related terms. They are weighted by respective sample size if more than one sample is available. Then we use the parameter estimates to fit a time trend model, and then obtain the fitted values of each parameter by gender for the years 1985-2010. These fitted values are the final urban imputed parameters.

4.1.3 Specifications

We treat α, β, γ, δ separately and use the parameters of each group as the dependent variable and use time (i.e., year) as the independent variable.

For α, β, γ and δ, we use the linear time trend model. The regression equation is: $Y = a0 + a1 * time + u$.

For α, β, γ and δ, we assume that they increase or decrease at a constant rate each year. Taking the α_male as an example, we assume that the intercept increases at the growth rate of a1 per year.

Figure B.1- Figure B.8 show the parameter estimates of each group and the sample regression lines of the time trend models. The fitted values of the time trend models are the values of our imputed parameters for the period 1985 to 2010.

Tables and figures of appendix B

Table B.1 Micro Datasets

Year	UHS	CHIP	CHNS	CHFS
1985				
1986	U			
1987	U			
1988	U	U/R		
1989	U		U/R	
1990	U			
1991	U		U/R	
1992	U			
1993	U		U/R	
1994	U			
1995	U	U/R		
1996	U			
1997	U		U/R	
1998				
1999				
2000			U/R	
2001				
2002		U/R		
2003				
2004			U/R	
2005				

Year	UHS	CHIP	CHNS	CHFS
2006			U/R	
2007		U/R		
2008				
2009			U/R	
2010				U/R

Note: CHIP: Chinese Household Income Project

UHS: Urban Household Survey

CHNS: China Health and Nutrition Survey

CHFS: China Household Finance Survey

Table B.1.1 Summary Statistics: UHS Samples

Year	Variables	Male		Female	
		Mean	S.D.	Mean	S.D.
1986	inc.	1,487.45	547.41	1,246.27	494.54
	e	10.48	2.92	9.76	2.79
	exp	20.48	11.06	17.80	9.50
	exp2	5,41.69	475.86	407.21	350.80
1987	inc.	1,544.74	610.85	1,295.60	493.33
	e	10.61	2.91	9.84	2.71
	exp	21.04	10.89	18.44	9.46
	exp2	561.17	471.91	429.38	354.03
1988	inc.	1,989.98	846.68	1,656.67	701.53
	e	10.77	2.93	9.94	2.76
	exp	20.73	10.87	18.06	9.32
	exp2	547.81	472.69	413.17	347.26
1989	inc.	2,275.53	1,008.54	1,904.01	859.59
	e	10.93	2.97	10.11	2.69
	exp	20.89	10.91	18.36	9.31
	exp2	555.67	472.23	423.67	347.56
1990	inc.	2,500.75	1,083.87	2,102.95	919.32

	e	11.09	2.93	10.29	2.70
	exp	21.23	10.78	18.56	9.29
	exp2	566.96	471.68	430.56	347.69
1991	inc.	2,744.34	1,165.79	2,336.65	1,003.85
	e	11.26	2.95	10.50	2.65
	exp	20.73	10.51	18.26	9.00
	exp2	540.11	458.11	414.57	336.81
1992	inc.	3,214.50	1,672.14	2,679.03	1,281.81
	e	11.34	2.81	10.56	2.66
	exp	21.70	10.94	19.68	9.60
	exp2	590.52	495.43	479.60	386.43
1993	inc.	3,903.40	2,465.01	3,275.63	1,962.20
	e	11.39	2.72	10.75	2.55
	exp	21.42	10.54	19.12	9.07
	exp2	570.03	463.78	447.86	344.33
1994	inc.	5,454.89	3,612.46	4,494.99	2,948.20
	e	11.51	2.77	10.93	2.49
	exp	21.26	10.53	18.96	9.07
	exp2	562.79	465.25	441.93	346.46
1995	inc.	6,691.21	4,181.29	5,580.39	3,473.61
	e	11.61	2.72	10.97	2.48
	exp	21.49	10.26	19.23	8.94
	exp2	567.26	451.91	449.84	342.59
1996	inc.	7,384.58	5,034.44	6,174.62	4,421.84
	e	11.64	2.69	11.07	2.43
	exp	21.81	10.27	19.58	8.96
	exp2	581.19	454.01	463.63	345.10
1997	inc.	8,554.39	6,037.77	7,109.59	5,311.46
	e	11.64	2.69	11.12	2.42
	exp	22.03	10.10	19.76	8.96
	exp2	587.21	446.74	470.64	346.18

Table B.1.2 Summary Statistics: CHIP samples

Year	Variables	Urban				Rural			
		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1988	inc.	1,935.97	944.34	1,642.17	942.41	967.08	965.16	862.57	810.87
	e	10.71	2.92	10.00	2.74	7.16	3.28	5.02	3.88
	exp	20.96	10.97	18.24	9.42	18.35	12.40	15.40	10.87
	exp2	559.66	480.01	421.58	354.35	490.38	516.81	355.42	390.56
1995	inc.	6,674.31	3,702.17	5,531.86	3,041.36	4,665.49	4,391.55	4,529.42	3,982.85
	e	11.72	2.74	11.04	2.55	7.90	2.83	6.22	3.41
	exp	22.53	10.75	20.69	9.61	21.43	11.95	20.19	11.17
	exp2	623.23	491.87	520.32	393.67	602.00	543.46	532.31	472.15
2002	inc.	12,439.48	7,984.14	9,978.52	6,863.79	5,346.66	5,395.65	3,765.75	4,009.96
	e	12.10	2.82	11.66	2.72	8.52	2.76	6.88	3.68
	exp	24.41	10.28	22.84	9.72	21.88	12.04	19.89	11.03
	exp2	701.72	489.07	615.96	422.51	623.84	542.97	517.29	441.77
2007	inc.	34,387.14	31,291.01	24,596.92	24,984.14	14,316.64	11,105.48	10,808.08	10,300.37
	e	12.49	2.97	12.20	2.91	8.21	2.39	7.55	2.52
	exp	22.66	11.49	20.83	10.93	22.40	12.78	19.42	11.35
	exp2	645.45	525.68	553.17	455.57	665.21	579.10	505.87	447.98

Table B.1.3 Summary Statistics: CHNS samples

Year	Variables	Urban				Rural			
		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1989	inc.	1,820.46	2,352.06	1,552.90	1,888.34	1,441.81	1,517.84	1,207.12	1,210.67
	e	8.97	4.01	8.53	4.01	6.32	4.07	4.63	4.35
	exp	18.87	11.31	16.20	9.48	18.64	11.15	16.59	10.15
	exp2	483.68	498.46	352.24	354.67	471.49	468.50	378.32	379.69
1991	inc.	2,013.74	1,150.68	1,685.14	1,092.29	1,503.47	1,473.03	1,238.76	1,149.77
	e	9.06	4.01	8.44	4.06	6.69	3.94	4.90	4.31

Year									
	exp	20.43	11.60	17.56	9.97	19.52	11.37	17.31	10.26
	exp2	551.89	534.76	407.76	398.34	510.45	488.88	405.12	387.45
1993	inc.	3,032.90	2,712.39	2,625.33	2,348.86	2,091.26	2,083.25	1,758.72	1,726.70
	e	9.49	3.68	8.88	3.74	7.07	3.73	5.28	4.28
	exp	21.20	11.06	18.57	9.53	20.16	11.33	18.25	10.19
	exp2	571.46	517.03	435.50	380.27	534.75	491.67	436.70	393.14
1997	inc.	6,824.82	5,543.44	5,590.67	4,401.66	4,520.24	4,215.10	3,555.43	3,337.10
	e	10.21	3.33	9.70	3.45	7.34	3.54	5.58	4.18
	exp	21.71	10.72	18.97	9.42	21.33	11.53	19.63	10.49
	exp2	586.18	494.63	448.52	373.79	587.83	516.35	495.31	423.99
2000	inc.	9,648.76	10,011.97	7,817.31	6,970.82	5,399.57	5,345.96	4,156.64	3,858.77
	e	10.87	3.25	10.57	3.39	7.97	3.26	6.42	4.11
	exp	22.66	10.65	20.06	9.70	22.18	11.61	20.95	10.43
	exp2	626.88	498.19	496.28	394.35	626.61	526.58	547.50	432.50
2004	inc.	12,895.86	10,894.26	10,813.88	9,460.14	7,151.50	7,648.53	5,698.16	6,451.71
	e	11.12	3.02	10.77	3.08	8.30	3.20	6.80	4.04
	exp	25.25	10.34	23.07	9.69	25.80	10.96	23.49	9.59
	exp2	744.37	505.68	626.04	425.24	785.87	543.71	643.46	428.64
2006	inc.	17,789.37	22,777.65	13,521.59	14,658.02	10,668.79	10,667.64	7,556.52	7,452.54
	e	11.35	3.21	10.99	3.45	8.42	3.63	6.97	4.34
	exp	26.10	9.89	23.84	9.45	26.41	10.66	24.16	9.36
	exp2	779.07	491.93	657.44	425.39	810.87	538.97	671.39	424.51
2009	inc.	26,066.48	31,478.31	18,637.45	17,668.02	15,339.22	14,523.35	12,158.07	10,886.71
	e	11.13	3.22	11.09	3.34	8.28	3.38	7.30	4.13
	exp	27.08	10.25	23.89	9.85	26.75	10.79	24.19	9.56
	exp2	838.14	520.40	667.46	432.81	831.88	550.32	676.41	421.92

Table B.1.4 Summary Statistics: CHFS   samples

Year	Variables	Urban				Rural			
		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
2010	inc.	37059.20	37748.73	30719.60	29662.54	16813.38	20499.11	13063.95	17374.53
	e	11.82	3.48	11.98	3.56	8.49	2.98	7.37	3.62
	exp	21.71	10.22	18.38	8.91	27.81	9.83	25.19	8.88
	exp2	575.72	459.24	417.11	332.42	869.87	524.53	713.36	416.69

Figures B.1-B.4 Parameter Estimates Against Time: Urban sample

Parameter

y = 0.121x - 234.8

Year

Urban_male_intercept

Parameter

y = 0.002x - 4.255

Year

Urban_male_return to education

y = 0.116x - 225.5

Urban_female_intercept

y = 0.002x - 4.066

Urban_female_return to education
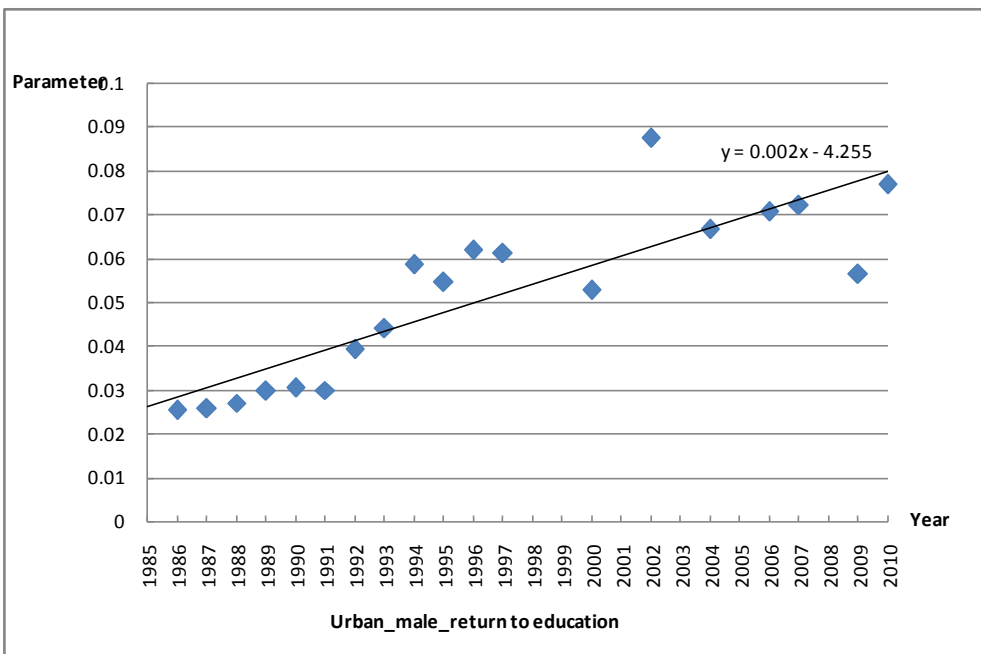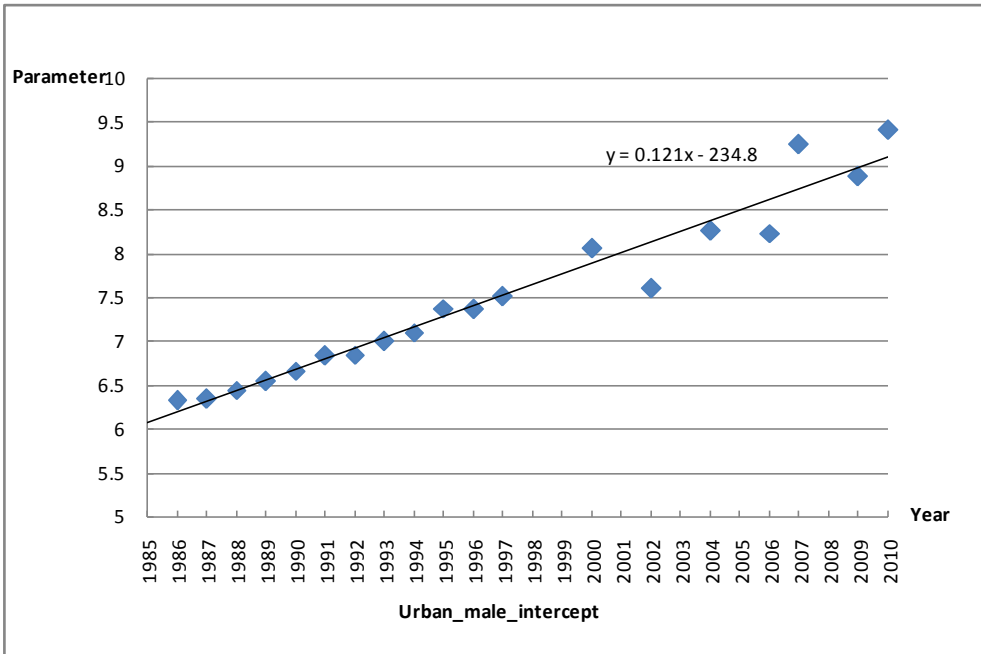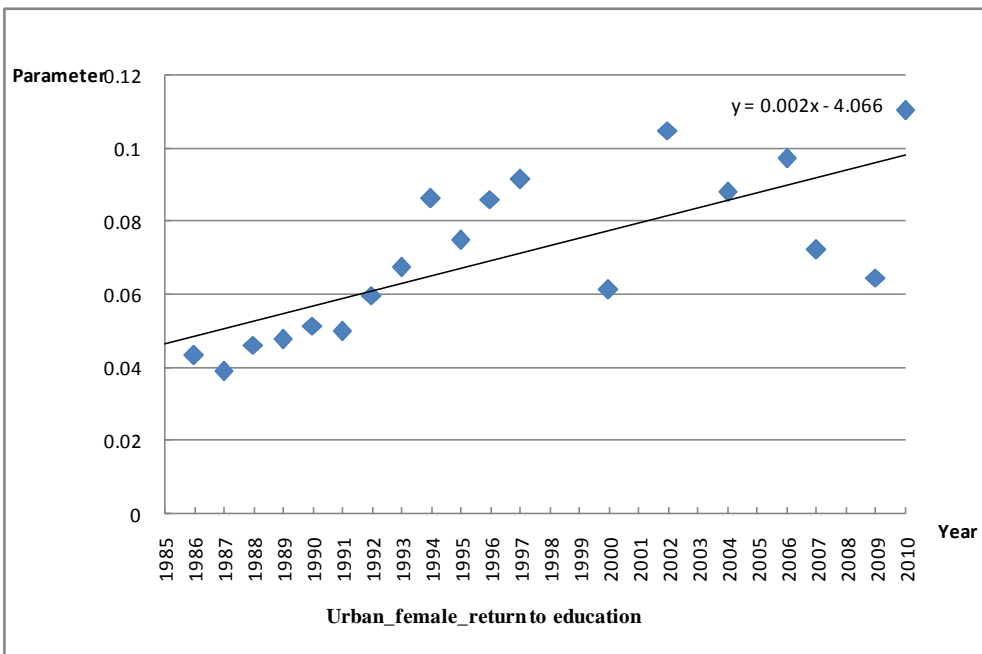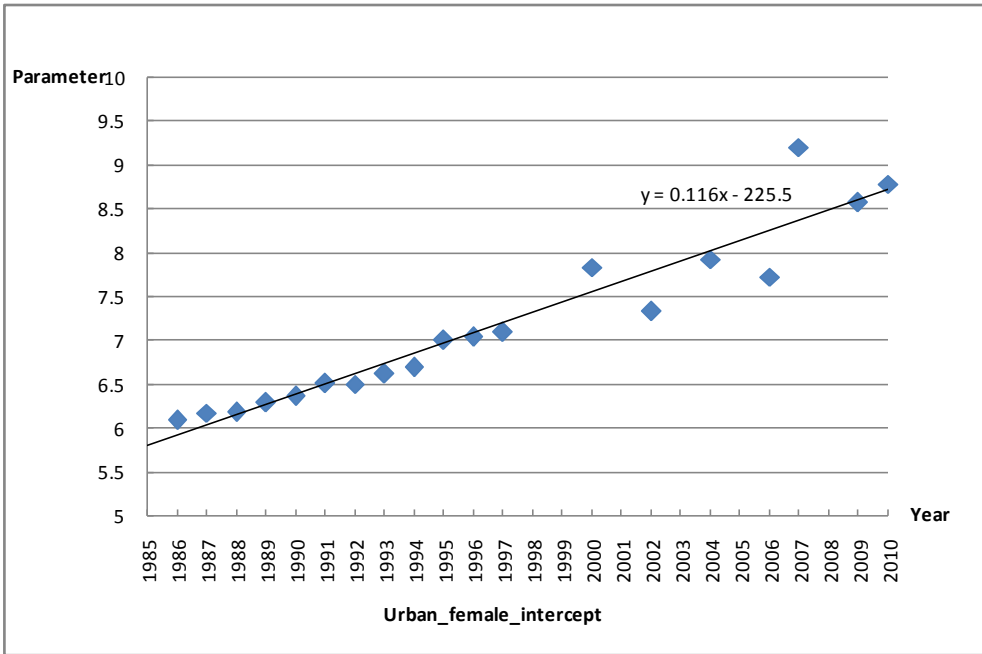
Figures B.5-8 Parameter Estimates Against Time: Rural Samples

$y = 0.135x - 263.2$

Rural_male_intercept

$y = 0.000x - 1.791$

Rural_male_return to education
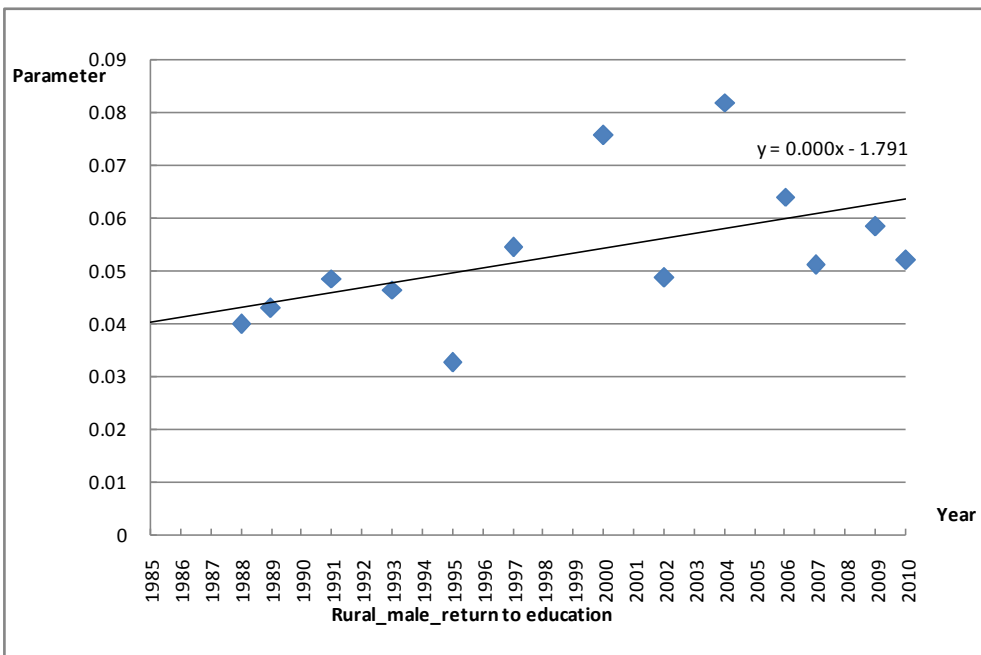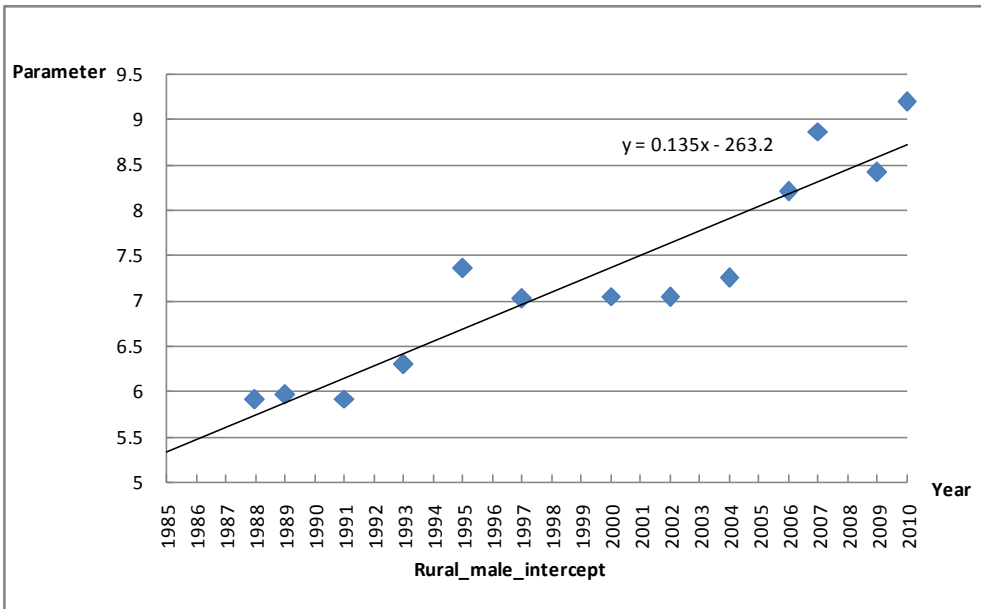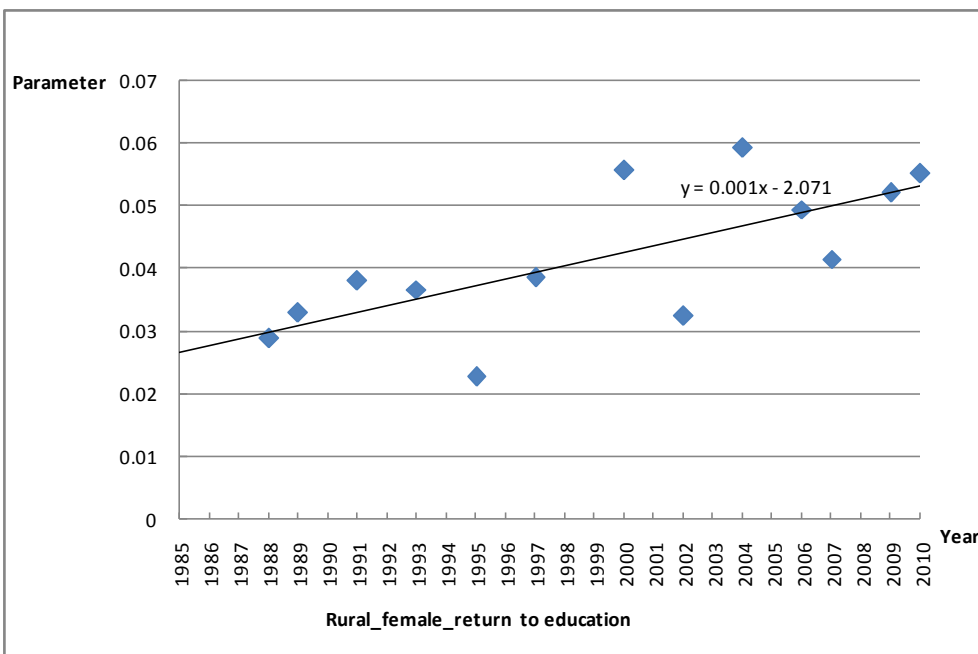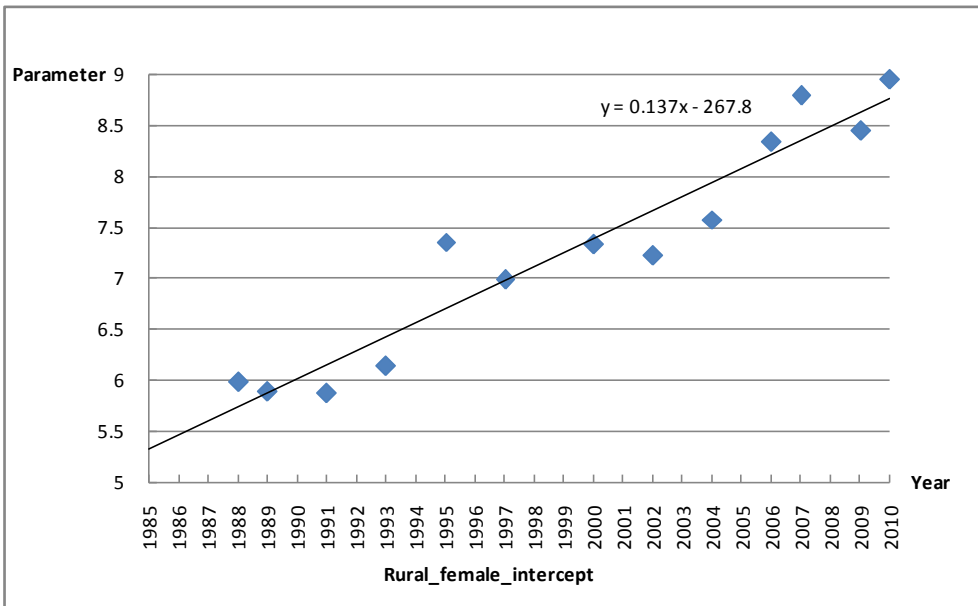
Appendix C   Human capital stock calculation

This section summarizes the basic methods and procedures of estimating China's human capital stock from 1985 to 2010 based on the J-F approach. In particular, it explains the necessary data estimations of the J-F approach based on China's data. We use the following notations:

y = 1980, 1981, 1982, … 2010, calendar year;

s = 1, 2, sex, male or female;

a = 0, 1, …. 60, age;

e: education level, which is further described below.

For years 1985-2010 it is classified into five categories: no schooling (ns), primary school (pri), junior middle school (jm), senior middle school (sm), and college (col). For years 2000-2010, it is classified into six categories: no schooling (ns), primary school (pri), junior middle school (jm), senior middle school (sm), college (col) and university (uni).

Variables used in measuring the human capital stock:

whrs(y,s,a,e): annual market hours worked per employed person in year y, with sex s, age a , and education level e;

empr(y,s,a,e): employment rate in year y, for persons with sex s, age a, and education level e;

mhrs(y,s,a,e): market labor time per capita in year y, for persons with sex s, age a, and education level e;

com(y,s,a,e): hourly compensation net of taxes on labor income;

yinc(y,s,a,e): annual income of the group employed in year y, with sex

s, age a, and education level e;

ymi(y,s,a,e): annual market income per capita net of tax on labor compensation in year y, for persons with sex s, age a , and education level e;

employed(y,s,a,e): the population employed in year y, with sex s, age a, and education level e;

pop(y,s,a,e): the population in year y, with sex s, age a, and education level e;

newEnroll(y,s,a,e): the population enrolled in education level e, in year y, with sex s, age a;

pop_inschool(y,s,a,e-n): the number of the group in school in year y, with sex s, age a, education level e, in grade n+1;

senr(y,s,a,e+1,e-n): the share of the group enrolled in the next education level e+1 in school in year y, with sex s, age a , education level e, and grade n+1;

mi(y,s,a,e): the human capital of the population not in school in year y, with sex s, age a , and education level e;

R = (1+real growth rate of income)/(1+discount rate);

pop_inschool(y,s,a,e): the number of people in school in year y, with sex s, age a, and education level e;

pop_nischool(y,s,a,e): the number of people not in school in year y, with sex s, age a, and education level e;

Le(y)：total population with education level e in year y;

Ls(y)：total population with sex s;

Mi(s): human capital for both sexes (nominal income);

v_e：share of the present value of human capital for the population with

education level e;

$\overline{V}_e$: average share of the present value of human capital for the population with education level e;

$\overline{v}_s$: average share of the present value of human capital for the population with sex s;

ΔlnK： growth rate of the aggregate human capital stock;

Poplog(y,s): the logarithmic growth rate of the population for sex s in year y;

Mitg (y): cumulated growth rate of the aggregate human capital stock;

MiQ(y): total human capital in year y measured in the base year's prices.

1. Schooling and work status by age for calculating human capital using the J-F approach

no school or work	0-5
school only	6-16
work and school	16- a
work only	a -59
Retirement	male： 60+； female： 55+

(1) When calculating the human capital using the J-F approach, the retirement age is 60 for males and 55 for females. The legal retirement ages were set by the second meeting of the fifth NPC Standing Committee on May 24, 1978. Detailed regulations are described in "The Temporary Method of Settling the Old, Weak, Ill, and Disabled Cadre by the State Council" and "The Temporary Method of Settling the Retired Workers by the State Council" (1978, No.104). In general, the legal retirement age is 60

for male and 50 for female workers and 55 for female cadres. However, for workers who work in high temperature, high elevation, highly exhausting conditions, and harmful conditions, the legal retirement age is 55 for males and 45 for females. For people who become disabled due to illness and other reasons, the legal retirement age is 50 for males and 45 for females.

(2) The *a* in the table is the upper bound of "work and school", and the lower bound of "work only". This age is determined according to the calculation of the lower bound of people in school in each year. The method of calculating the people in school is discussed in section 3.2.

2．Estimation of annual market income ymi(y,s,a,e)

2.1 Estimation of annual income of the employed

2.1.1 Estimation of annual income of the employed using Mincer equation.

Using data from CHIP (Chinese Household Income Project), CHNS (China Health and Nutrition Survey), and UHS (Urban Household Survey), we regress the logarithm of yearly income *ln yinc* on years of schooling *s*, work experience *exp* and　work experience squared exp^2 by OLS.

$$\ln yinc = \alpha + \beta s + \gamma \exp + \delta \exp^2 + u$$

We use the fitted value of *ln yinc* from the equation above to obtain $m_i = e^{\ln yinc}$. We regress the yearly income observed in the survey data on m_i

by OLS (without the intercept) to obtain the coefficient estimate for m_i, α[61].

Finally, we estimate the yearly income of the employed as $yinc = \alpha \times e^{\ln yinc}$.

Note that the yearly income used for estimating the Mincer equation is in real terms with1985 as the based year.

2.1.2 Coding of schooling and work experience in the Mincer equation

(1) Years of schooling coding:

	No schooling	Primary school	Junior middle school	Senior middle school	College	University
1985-1999	0	6	9	12	15	
2000-2010	0	6	9	12	15	16

(2) Work experience coding:

For people younger than16, working experience is 0: exp=0;

For people older than16, if s<10, working experience: exp=age-6;

For people older than16, if s≥10, working experience: exp=age-sch-6.

2.2 Estimation of annual market income

When estimate the yearly income of the employed using the Mincer equation, we obtain $yinc_{y,s,a,e} = whrs_{y,s,a,e} \times com_{y,s,a,e}$.

According to

$$mhrs_{y,s,a,e} = whrs_{y,s,a,e} \times empr_{y,s,a,e} \quad , \quad ymi_{y,s,a,e} = whrs_{y,s,a,e} \times empr_{y,s,a,e} \times com_{y,s,a,e}$$

to the annual market income is given by:

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[61] Jeffrey M. Wooldridge (2005), Introductory Econometrics: A Modern Approach, 3rd edition.

$$\text{ymi}_{y,s,a,e} = \text{yinc}_{y,s,a,e} \times \text{empr}_{y,s,a,e}.$$

2.2.1 Calculation of employment rate empr(y,s,a,e)

To calculate employment rate empr(y,s,a,e) by age, sex and education level for people older than 16, we use the average of the employment rates in 1995 and 2000. We assume the employment rate for college is the same as that of university.

The formula used to calculate the employment rate is:

empr(y,s,a,e)=[employed(y,s, a, e)]/pop(y,s, a, e)

The data sources of employment rate are listed in the table below:

Data	Sources
The employed by age,sex,and education Level in 1987	"China Population Census 1987"
Population by age,sex,and education level in 1987	"China Population Census 1987"
The employed by age, sex, and education level in 1995	"China Population Census 1995"
Population by age, sex, and education level in 1995	"China Population Census 1995"
The employed by age, sex, and education level in 2000	"China Population Census 2000"
Population by age, sex, and education level in 2000	"China Population Census 2000"

Note: The 1% sample population in 1995 is converted into the whole population by the actual sampling percentage of 1.04%.

The employed in "China Population Census 2000" for each province, autonomous region and municipality directly under the central government is aggregated to the whole population employed by the actual sampling percentage of 10%.

3．Calculation of enrollment rate

Enrollment rate is the share that a group with education level *e* to enroll in a higher education level *e*+1.

3.1 Calculation of enrollment by sex, age and education level

According to the age distribution of enrollment number for a certain education level and sex, the enrollment number of each year by sex, age and education level is given by:

$$NewEnroll (y,s,a,e) = NewEnroll (y,s,e)*\lambda(y,s,a,e)$$

$$\sum_{a} \lambda(y, s, a, e) = 1$$

Note that λ(y,s,a,e) refers to the age distribution of enrollment number for each education level and sex.

There is no college or university in rural area, so the enrollment number of college and university in rural areas is assumed to be 0.

3.2 In-school population of each education level and each grade

The in-school population of age *a*, sex *s*, education level *e*, grade *n*+1 in year *y* is the enrollment population of age a-n, sex s , education level e in year y-n:

$$pop\_inschool(y,s,a,e-n)= NewEnroll (y-n,s,a-n,e)$$

3.3 Enrollment rate of each education level and each grade

The probability of advancing to the next higher education level is

estimated by the average ratio of the sum of all students of any age in a year who are initially enrolled to the sum of all students of any age initially enrolled in the next higher education level *X* years later, where "*X*" is the number of years it takes to complete an education level.

3.3.1 Enrollment rate from no schooling to primary school

The formula from no schooling to primary school is:

$$senr(y,s,a,pri\text{-}ns) = Newenroll(y+1,s,\ pri)/pop(y,s,ns)$$

The upper bound of people out of school in year y and enrolling into primary school in year y+1 is determined by the upper bound of age distribution for enrollment of primary school in year y+1. For example, the age distribution for enrollment of primary school in year y+1 is from 6 to 12, the upper bound of people who have no schooling in year y and enroll into primary school in year y+1 is 11. The upper bound of people out of school in 2007 and enrolling into primary school in 2008 is the same for 2006.

3.3.2 Enrollment rate from primary school to junior middle school

The steps of calculating this enrollment rate by sex and age in year y are as follows:

(1) The enrollment rate of the first grade of primary school in year y by age and sex is the average enrollment rate that the group in this grade can enroll in the first grade of junior middle school six years later, and the formula is:

$$senr(y,s,a,jm\text{-}pri) = newEnroll\ (y+6,\ s,\ jm)/\ newEnroll\ (y,\ s,\ pri)$$

(2) The population of the second grade of primary school in year y by age and sex is the enrollment population of primary school in year y-1 by

age and sex. The probability of the group in this grade can enroll in junior middle school 5 years later is the average enrollment rate that the group in this grade can enroll in the first grade of junior middle school five years later, and the formula is:

senr(y,s,a,jm-pri-1) = newEnroll (y+5,s,jm)/ newEnroll (y-1,s,pri)

(3) The population of the third grade of primary school in year y by age and sex is the enrollment population of primary school in year y-2 by age and sex. The probability of the group in this grade can enroll in junior middle school 4 years later is the average enrollment rate that the group in this grade can enroll in the first grade of junior middle school four years later, and the formula is:

senr(y,s,a,jm-pri-2) = newEnroll (y+4,s,jm)/ newEnroll (y-2,s,pri)

(4) Similarly, we can calculate the probability of the group of each grade in primary school that enroll in junior middle school in year y.

3.3.3 Enrollment rate from junior middle school to senior middle school

The steps of calculating this enrollment rate by sex and age in year *y* are as follows:

(1) The enrollment rate of the first grade of junior middle school in year y by age is the average enrollment rate that the group in this grade can enroll in the first grade of senior middle school three years later, and the formula is:

senr(y,s,a,sm-jm) = newEnroll (y+3,s,sm)/ newEnroll (y,s,jm)

(2) The population of the second grade of junior middle school in year y by age and sex is the enrollment population of junior school in year y-1 by age and sex. The probability of the group in this grade can enroll in senior middle school two years later is the average enrollment rate that the group in this grade can enroll in the first grade of senior middle school two years

later, and the formula is:

senr(y,s,a,sm-jm-1) = newEnroll (y+2,s,sm)/ newEnroll (y-1,s,jm)

(3) Similarly, we can calculate the probability of the group of each grade in junior middle school that enroll in senior middle school in year y.

3.3.4 Enrollment rate from senior middle school to college or university

The steps of calculating the enrollment rate from senior middle school to college by sex and age in year *y* are as follows:

(1) The enrollment rate of the first grade of senior middle school in year *y* by age is the average enrollment rate that the group in this grade can enroll in the first grade of college three years later, and the formula is:

senr(y,s,a,col-sm) = newEnroll (y+3,s,col)/ newEnroll (y,s,sm)

(2) The population of the second grade of senior middle school in year y by age and sex is the enrollment population of senior school in year y-1 by age and sex. The probability of the group in this grade can enroll in college two years later is the average enrollment rate that individuals in this grade can enroll in the first grade of college two years later, and the formula is:

senr(y,s,a,col-sm-1) = newEnroll (y+2,s,col)/ newEnroll (y-1,s,sm)

(3) Similarly, we can calculate the probability of the group of each grade in senior middle school that can enroll in college in year *y*.

The steps of calculating the enrollment rate from senior middle school to university by sex and age in year *y* are as follows:

(1) The enrollment rate of the first grade of senior middle school in year y by age is the average enrollment rate that the group in this grade can enroll in the first grade of university three years later, and the formula is:

senr(y,s,a,col-uni) =newEnroll (y+3,s,uni)/ newEnroll (y,s,sm)

(2) The population of the second grade of senior middle school in year y by age and sex is the enrollment population of senior school in year y-1 by

age and sex. The probability of the group in this grade can enroll in university two years later is the average enrollment rate that the group in this grade can enroll in the first grade of university two years later, and the formula is:

senr(y,s,a,uni -sm-1) = newEnroll (y+2,s,uni)/ newEnroll (y-1,s,sm)

(3)Similarly, we can calculate the probability of the group of each grade in senior middle school that can enroll in university in year *y*.

Two points worth noting are as follows:

1) By using different years' enrollment population in the calculation of enrollment rate, an adjustment has already been made for survival rate. Therefore, the survival rate is not included in the formula. We also assume that no one drops out, skips a grade, repeats a grade, or takes leaves for a year or more within a certain education category.

2) We could only calculate the primary school enrollment rate till 2003 for lack of data We use the same enrollment rates in 2003 for years after 2003. Likewise, for junior middle school and high school enrollment rates, we fix the enrollment rates for 2007 and 2008 at the 2006 levels.

4．Growth rate of real wage

We use the average labor productivity growth rate to approximate the real wage growth rate of urban and rural areas. Specifically, we use the labor productivity of the primary sector for the rural population and the labor productivity of the secondary and tertiary sectors for the urban population. The growth rates of real wage are 6.14% for the urban population and 4.33% for the rural population.

5．Discount rate

The discount rate we use is 4.58%, This discount rate was used in Jorgenson and Yun (1990) and Jorgenson and Fraumeni (1992a). It is based on the rate of return on long-term investments in the private sector of the U.S. economy. This is also the rate adopted by the OECD consortium (OECD 2010).

6．Calculation of human capital

6.1 In-school population's human capital

The number of years discounted until they realize the higher level of human capital depends on the number of years it takes to complete the starting grade level and the current grade of enrollment within the starting grade level.

6.1.1 Human capital of population in primary school by age and sex

(1) If an individual in the first grade of primary school can advance to the next higher education level, he could get human capital equal to someone who is currently six years older and whose educational attainment is junior middle school. We discount that income by 6 years to reflect the fact that it takes 6 years for him to reach junior middle school: $senr(y,s,a,jm\text{-}pri)*mi(y,s,a+6,jm)*R^6$.

(2) If an individual in the second grade of primary school can advance to the next higher education level, his human capital calculated as: $senr(y,s,a,jm\text{-}pri\text{-}1)*mi(y,s,a+5,jm)*R^5$, discounted by 5 years as it takes him 5 years to reach junior middle school.

(3) Similarly, we can calculate the human capital of the group in each grade of primary school.

6.1.2 Human capital of the group in junior middle school and above by age and sex

Take junior middle school as an example.

(1) If an individual in the first grade of junior middle school can advance to the next higher education level, he could get human capital equal to someone who is currently three years older and whose educational attainment is senior middle school.- We discount that income by 3 years as it takes 3 years for him to reach senior middle school: senr(y,s,a,sm-jm)*mi(y,s,a+3,sm)*R^3

(2) If an individual in the second grade of junior middle school can advance to the next higher education level, his human capital is calculated as senr(y,s,a,sm-jm-1)*mi(y,s,a+2,sm)*R^2, discounted by 5 years as it takes 2 years for hime to reach senior middle school.

(3) Similarly, we can calculate the human capital of the group in each grade of junior middle school.

For the years that we do not separate enrollments for university and college (there are five categories for education level, and the last level is college and above), we get the human capital of the group in the first grade of senior middle school as senr(y,s,a,col-sm)*mi(y,s,a+3,col)*R^3. For grade 2 and 3 students, the human capital are given by:

$$senr(y,s,a,col-sm-1)*mi(y,s,a+2,col)*R^2$$

and

$$senr(y,s,a,col-sm-1)*mi(y,s,a+2,col)*R$$

respectively.

For the years that separate university and college enrollments are available

(there are six categories for education level, and the last level is university and above), we should use the human capital equation are:

senr(y,s,a,col-sm)*mi(y,s,a+3,col)*R^3+senr(y,s,a,uni-sm)*mi(y,s,a+3,uni)*R^3
as for a senior middle school students, they can go to college or university after their graduation.

For grade 2 students, the human capital is calculated as
senr(y,s,a,col-sm-1)*mi(y,s, a+2,col)*R^2+senr(y,s,a,uni-sm-1)*mi(y,s,a+2,uni)*R^2.
Similarly, we can calculate the human capital of the group in each grade of senior middle school.

Note that by using the average ratio of the sum of all students of any age in a year who are initially enrolled to the sum of all students of any age initially enrolled in the next higher education level 'X' years later, an adjustment has already been made for age-specific survival rates. Accordingly, survival rate does not appear in the formula.

6.2 Out-of-school population's human capital

6.2.1 Calculation of out-of-school population

In-school population of age a, sex s, education level e in year y, pop_inschool(y,s,a,e), is the sum of population of each grade:

$$pop\_inschool(y,s,a,e) = \sum_{n=0}^{y(e)} pop\_inschool(y,s,a,e-n)$$

where y(e) is the number of years to achieve education level e. The formula for calculating out-of-school population of age a, sex s, education level e in year y is:

pop_nischool(y,s,a,e) = pop(y, s, a,e) - pop_inschool(y,s,a,e)

Note that following adjustment is made for negative values in out-of-school population

(1) Reset negative out-of-school population for certain gender, age, education level to 0. The negative out-of-school population mainly appears in primary school for students aged 5-10.

(2) Add the weighted negative out-of-school population for certain gender, age, education level to the in-school population by grades, where the weights are the proportion of population in each grade for by gender, age, and education level.

6.2.2 Out-of-school population's human capital

The out-of-school population consists of people who are working. For people below the age of 60, the formula for human capital is:

$$mi(y,s,a,e) = ymi(y,s,a,e) + sr(y+1,s)*mi((y,s,a+1,e)*R$$

For those who are over 60, human capital is zero, i.e. ymi = 0.

7. Human capital stock in China: 1985-2010

The income estimated by the Mincer equation is the real yearly income (using 1985 as the based). We use CPI and real income to obtain the nominal yearly income.

Tables C.1－C.4 report the real human capital in China with 1985 as the baseline year. Table C.5-C.8 show the labor force human capital. We create a new human capital series starting from 2000, as the reported education categories separates college from university or above.

Tables and figures of appendix C

Table C.1 Real Human Capital by Region and Gender, 1985-2010

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	7,371	4,356	10,140	6,737
1986	8,046	4,734	10,740	7,074
1987	8,647	5,034	11,390	7,437
1988	8,367	4,867	10,990	7,149
1989	8,267	4,803	10,400	6,755
1990	9,565	5,543	11,280	7,295
1991	10,380	6,029	12,310	7,933
1992	10,960	6,376	13,080	8,387
1993	10,840	6,296	12,910	8,209
1994	9,913	5,706	11,670	7,351
1995	9,646	5,595	11,050	6,925
1996	10,540	6,083	11,100	6,870
1997	12,150	6,964	11,720	7,160
1998	14,440	8,200	12,770	7,675
1999	17,290	9,839	13,950	8,236
2000	20,300	11,500	15,380	8,872
2001	23,270	13,310	16,380	9,491
2002	27,560	15,610	17,770	10,240
2003	31,840	18,330	18,830	10,780
2004	35,440	20,620	19,380	11,100
2005	40,950	24,620	20,820	11,640
2006	46,560	26,350	22,500	12,430
2007	53,620	30,400	23,350	12,750
2008	59,630	33,840	24,050	13,050
2009	70,350	39,500	26,680	14,190
2010	80,590	44,820	28,550	15,020

Note: The results are based on five education categories.

Table C.2 Real Human Capital by Region and Gender, 2000-2010

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	20,600	11,710	15,250	8,798
2001	23,640	13,570	16,250	9,413
2002	28,050	15,920	17,620	10,150
2003	32,450	18,750	18,660	10,680
2004	36,200	21,130	19,190	10,990
2005	42,010	25,370	20,590	11,510
2006	47,490	26,980	22,270	12,290
2007	54,800	31,190	23,090	12,600
2008	61,040	34,790	23,780	12,900
2009	72,100	40,670	26,350	14,010
2010	82,680	46,210	28,210	14,840

Note: The results are based on six education categories.

Table C.3 Per Capita Real Human Capital by Region and Gender, 1985-2010

Unit: Thousand Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	61.01	40.87	26.33	19.34
1986	63.85	42.31	27.82	20.26
1987	65.85	42.91	29.37	21.21
1988	61.07	40.33	28.06	20.24
1989	58.35	38.96	26.28	19.01
1990	65.22	44.07	28.15	20.32
1991	69.31	46.23	30.63	21.99
1992	71.61	47.45	32.48	23.19
1993	69.64	45.45	32.05	22.63

1994	62.55	40.10	28.99	20.25
1995	60.01	38.25	27.51	19.06
1996	61.40	39.03	27.89	19.19
1997	66.76	41.97	29.90	20.37
1998	74.94	46.83	33.09	22.26
1999	85.14	53.62	36.76	24.42
2000	94.56	59.78	40.75	26.56
2001	104.27	66.00	44.46	28.96
2002	119.06	74.20	49.53	31.89
2003	133.51	83.66	54.06	34.39
2004	145.04	91.54	57.30	36.15
2005	163.71	106.78	62.76	39.02
2006	178.29	110.61	69.50	42.94
2007	196.28	123.21	74.27	45.77
2008	211.94	134.08	78.25	48.24
2009	242.01	152.94	89.25	54.32
2010	264.09	166.64	97.06	58.81

Note: The results are based on five education categories.

Table C.4 Per Capita Real Human Capital by Region and Gender, 2000-2010

Unit: Thousand Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	95.97	60.89	40.75	26.56
2001	105.89	67.31	44.46	28.96
2002	121.11	75.69	49.53	31.89
2003	136.02	85.59	54.06	34.40
2004	148.13	93.81	57.31	36.15
2005	167.95	110.04	62.77	39.03
2006	181.84	113.25	69.51	42.95

Year	Urban Male	Urban Female	Rural Male	Rural Female
2007	200.60	126.44	74.29	45.78
2008	216.97	137.84	78.29	48.26
2009	248.02	157.45	89.32	54.35
2010	270.94	171.80	97.15	58.85

Note: The results are based on six education categories.

Table C.5 Real Labor Force Human Capital by Region and Gender, 1985-2010

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	3,466	2,001	5,010	3,184
1986	3,835	2,207	5,370	3,392
1987	4,186	2,396	5,792	3,635
1988	4,195	2,390	5,737	3,590
1989	4,267	2,423	5,537	3,463
1990	4,960	2,772	6,070	3,784
1991	5,349	3,020	6,721	4,189
1992	5,504	3,129	7,214	4,489
1993	5,316	3,020	7,102	4,390
1994	4,789	2,716	6,359	3,912
1995	4,631	2,632	6,013	3,686
1996	5,002	2,784	6,069	3,655
1997	5,728	3,138	6,457	3,822
1998	6,894	3,711	7,143	4,142
1999	8,362	4,427	7,837	4,454
2000	10,090	5,207	8,651	4,812
2001	11,180	5,819	9,173	5,107
2002	12,620	6,578	9,940	5,519
2003	14,020	7,398	10,600	5,887

2004	15,410	8,108	10,860	6,022
2005	17,480	9,223	11,460	6,363
2006	20,130	10,350	12,870	6,964
2007	22,670	11,560	13,680	7,295
2008	24,970	12,650	14,320	7,544
2009	31,110	15,560	15,910	8,226
2010	37700	18730	17,010	8,668

Note: The results are based on five education categories.

Table C.6 Real Labor Force Human Capital by Region and Gender, 2000-2010

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	9,878	5,092	8,580	4,772
2001	11,020 ,	5,724	9,100	5,065
2002	12,520	6,511	9,860	5,474
2003	14,020	7,387	10,510	5,836
2004	15,550	8,190	10,760	5,964
2005	17,660	9,326	11,340	6,295
2006	20,360	10,490	12,740	6,891
2007	22,960	11,730	13,530	7,215
2008	25,320	12,870	14,170	7,463
2009	31,600	15,870	15,720	8,127
2010	38,360	19,160	16,810	8,567

Note: The results are based on six education categories.

Table C.7 Per Capita Real Labor Force Human Capital by Region and Gender, 1985-2010

<div align="right">Unit: Thousand Yuan</div>

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	45.75	29.86	22.51	15.96
1986	48.25	30.98	23.86	16.77
1987	50.22	31.72	25.33	17.64
1988	46.90	29.99	24.27	16.92
1989	45.26	29.37	22.77	15.94
1990	50.45	32.93	24.41	17.09
1991	53.05	34.26	26.54	18.50
1992	53.75	34.27	28.09	19.45
1993	51.40	32.16	27.49	18.82
1994	45.53	28.00	24.64	16.69
1995	43.03	26.13	23.20	15.59
1996	43.91	26.33	23.58	15.65
1997	47.47	28.15	25.27	16.57
1998	53.51	31.31	28.03	18.10
1999	60.37	34.97	30.98	19.77
2000	67.08	38.26	33.90	21.32
2001	72.76	41.31	36.99	23.06
2002	80.33	45.19	40.84	25.18
2003	87.50	49.28	44.27	27.08
2004	93.68	52.49	46.40	28.14
2005	102.41	57.41	50.01	30.17
2006	114.52	63.61	56.66	33.71
2007	124.40	69.56	61.10	36.29
2008	133.32	75.24	64.77	38.43
2009	156.87	88.72	73.69	43.32
2010	175.96	100.04	80.06	46.81

Note: The results are based on five education categories.

Table C.8 Per Capita Real Labor Force Human Capital by Region and Gender,

2000-2010

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	66.45	37.77	33.91	21.32
2001	72.39	40.95	37.00	23.06
2002	80.26	45.01	40.85	25.18
2003	87.82	49.38	44.28	27.08
2004	94.55	53.02	46.42	28.15
2005	103.43	58.05	50.03	30.17
2006	115.82	64.44	56.69	33.72
2007	125.97	70.61	61.15	36.31
2008	135.19	76.56	64.84	38.46
2009	159.33	90.50	73.79	43.37
2010	179.03	102.32	80.20	46.87

Note: The results are based on six education categories.

Appendix D　　Calculation of physical capital

1. Results using Holz's method

We use Holz' method to calculate the real physical capital of every province during 1985 to 2010, the base year is 1985.

Holz's real investment estimating equation is:

$$ROFA_t = ROFA_0 + \sum_{i=1}^{t} \frac{investment_i}{P_i} - \frac{scrap\_rate_i * OFA_{i-1}}{P_{i-k}}$$

1、ROFA: the real original value of fixed assets

2、Investment: measured as efficient investment, which is defined as the product of the transfer rate and gross fixed capital formation.　Data on transfer rates gross fixed capital investment after 1996 is from China Statistical Yearbooks, data before 1996 is from "Comprehensive Statistical Data and Materials on 60 Years of New China", which is adjusted by yearbooks.

3、Transfer rate: from official statistics as noted above following Holz.

4、P: data after 1991 is from China Statistical Yearbooks(national investment price data), data before 1991 is from Holz(2006), k refers to the number of years earlier in which all decommissioned assets in year i were purchased.

5、Scrap_rate:　The scrap rate, following Holz (2006), is a combination of an investment- and depreciation-based scrap rate.

6、Depreciation rate: 5% & 9.6%, where the 9.6% is the reset rate calculated by Zhang, Wu, and Zhang(2004), which is used as an alternative depreciation rate.

7、OFA: original fixed assets.

8、Real physical capital using Holtz's (2006) methodology with a depreciation rate of 9.6% is shown in Table D.1.

2.   Result using Zhang, Wu, and Zhang's method

We also use Zhang, Wu, and Zhang's method to calculate the real physical capital of every province during 1985 to 2010; the base year is also 1985.

Zhang, Wu, and Zhang's real investment estimating equation is:

$$K_{it} = K_{i,t-1} * (1 - \delta_t) + I_{it}$$

1、Investment: gross fixed capital formation, defined like Holz. Delta is depreciation rate.

2、K is the real term of fixed assets of each year.

3、Real physical capital using Zhang, Wu, and Zhang's (year) methodology with a depreciation rate of 9.6% is shown in Table D.2.

3. National fixed assets

The data before 2004 is from "The Data of Gross Domestic Product of China" and data after 2004 is accumulated by adding each province and adjusted by "The Data of Gross Domestic Product of China".

Tables and figures of appendix D

Table D.1 Real Physical Capital (Holz methodology), 1985-2010

Unit: 100 millions of 1985 Yuan

Year	Beijing	Tianjin	Hebei	Shanxi
1985	366	269	506	351
1986	455	334	610	430
1987	565	400	726	512
1988	693	468	884	593
1989	807	542	1,034	678
1990	959	621	1,174	778
1991	1,110	731	1,354	892
1992	1,306	866	1,590	1,013
1993	1,586	1,031	1,944	1,176
1994	2,028	1,260	2,401	1,360
1995	2,626	1,556	3,035	1,553
1996	3,289	1,871	3,744	1,775
1997	4,055	2,317	4,902	2,099
1998	4,904	2,778	6,127	2,503
1999	5,816	3,240	7,499	2,949
2000	6,810	3,735	8,934	3,420
2001	7,891	4,260	10,312	3,889
2002	9,126	4,847	11,718	4,433
2003	10,406	5,531	13,235	5,081
2004	12,035	6,444	15,412	6,011
2005	14,055	7,553	18,097	7,235
2006	16,266	8,896	21,323	8,749
2007	18,792	10,604	25,259	10,626
2008	20,998	13,031	30,658	12,937
2009	23,627	16,354	36,616	16,101
2010	26,822	20,578	43,393	19,973

Year	Inner Mongolia	Liaoning	Jilin	Heilongjiang
1985	186	666	268	574
1986	223	804	319	676
1987	264	968	379	787
1988	318	1,164	449	911
1989	373	1,357	512	1,038
1990	429	1,562	588	1,173
1991	506	1,794	674	1,319
1992	612	2,092	781	1,495
1993	755	2,550	950	1,712
1994	916	3,106	1,146	1,977
1995	1,096	3,671	1,376	2,310
1996	1,294	4,312	1,638	2,715
1997	1,532	5,035	1,925	3,261
1998	1,779	5,782	2,238	3,883
1999	2,057	6,578	2,623	4,508
2000	2,362	7,487	3,076	5,164
2001	2,685	8,410	3,536	5,842
2002	3,153	9,420	4,065	6,564
2003	3,898	10,619	4,644	7,265
2004	5,115	12,551	5,386	8,186
2005	6,935	14,922	6,515	9,275
2006	9,190	17,984	8,381	10,652
2007	12,106	21,880	11,063	12,455
2008	15,835	28,522	14,830	14,765
2009	20,785	34,189	18,975	17,977
2010	26,675	41,205	23,959	21,386

Year	Shanghai	Jiangsu	Zhejiang	Anhui
1985	428	642	362	310
1986	549	838	460	389
1987	696	1,088	575	474
1988	886	1,373	712	572
1989	1,058	1,627	847	655
1990	1,246	1,919	991	748
1991	1,443	2,256	1,165	844
1992	1,700	2,772	1,412	987
1993	2,140	3,540	1,849	1,185
1994	2,895	4,409	2,484	1,427
1995	4,020	5,553	3,376	1,765
1996	5,053	6,858	4,403	2,229
1997	6,442	8,627	5,722	2,831
1998	7,746	10,552	7,075	3,428
1999	9,067	12,671	8,549	4,047
2000	10,442	14,939	10,208	4,714
2001	11,793	17,206	11,979	5,372
2002	13,264	19,767	14,115	6,088
2003	14,741	23,010	16,798	6,865
2004	16,731	27,500	20,420	8,057
2005	19,021	33,145	24,452	9,467
2006	21,625	39,555	28,942	11,167
2007	24,704	46,910	34,119	13,296
2008	27,955	56,081	39,978	16,044
2009	31,850	66,951	46,275	19,093
2010	35,560	80,052	53,722	22,942

Year	Fujian	Jiangxi	Shandong	Henan
1985	212	197	767	495
1986	269	238	956	617
1987	339	282	1,200	747
1988	422	339	1,495	909
1989	511	395	1,748	1,064
1990	616	449	2,034	1,240
1991	739	516	2,386	1,444
1992	920	602	2,837	1,680
1993	1,191	719	3,454	1,987
1994	1,583	868	4,205	2,412
1995	2,097	1,052	5,136	2,982
1996	2,632	1,294	6,227	3,628
1997	3,394	1,664	7,799	4,597
1998	4,236	2,044	9,507	5,629
1999	5,123	2,456	11,500	6,723
2000	6,036	2,896	13,855	7,927
2001	6,897	3,357	16,243	9,114
2002	7,807	3,970	19,026	10,407
2003	8,808	4,759	22,147	11,830
2004	10,193	5,856	26,703	13,912
2005	11,861	7,102	32,412	16,830
2006	13,954	8,574	39,122	20,752
2007	16,733	10,295	46,626	26,035
2008	20,338	12,336	55,605	32,892
2009	24,442	14,955	66,922	41,408
2010	29,066	17,964	80,090	51,615

Year	Hubei	Hunan	Guangdong	Guangxi
1985	417	358	697	190
1986	504	435	870	233
1987	609	523	1,062	281
1988	727	625	1,328	337
1989	819	712	1,602	392
1990	931	809	1,912	446
1991	1,053	924	2,275	512
1992	1,218	1,085	2,944	611
1993	1,462	1,289	4,038	794
1994	1,841	1,553	5,445	1,043
1995	2,393	1,897	7,018	1,326
1996	2,973	2,290	8,538	1,640
1997	3,828	2,846	10,266	2,012
1998	4,735	3,461	12,165	2,427
1999	5,723	4,176	14,358	2,894
2000	6,780	4,965	16,629	3,376
2001	7,845	5,786	18,894	3,856
2002	8,923	6,675	21,340	4,391
2003	9,980	7,609	24,173	4,957
2004	11,413	8,842	27,883	5,775
2005	13,158	10,482	32,551	6,862
2006	15,385	12,477	37,845	8,281
2007	18,145	15,007	44,030	10,114
2008	21,542	18,571	51,093	12,419
2009	25,739	22,891	59,841	16,090
2010	30,949	28,452	70,317	21,279

Year	Hainan	Chongqing+Sichuan	Guizhou	Yunnan
1985	29	677	134	143
1986	42	793	164	182
1987	54	929	198	223
1988	69	1,079	233	272
1989	93	1,232	268	324
1990	122	1,408	311	384
1991	158	1,614	356	457
1992	221	1,890	413	555
1993	349	2,271	483	719
1994	494	2,745	576	923
1995	626	3,349	695	1,174
1996	769	4,122	830	1,469
1997	888	5,177	1,045	1,896
1998	1,008	6,424	1,294	2,405
1999	1,141	7,762	1,595	2,949
2000	1,276	9,207	1,933	3,455
2001	1,404	10,767	2,328	3,943
2002	1,537	12,556	2,770	4,466
2003	1,678	14,573	3,229	5,058
2004	1,860	17,217	3,787	5,915
2005	2,076	20,439	4,413	7,038
2006	2,330	24,353	5,135	8,420
2007	2,627	29,212	5,986	10,094
2008	3,092	35,806	7,046	11,715
2009	3,656	42,859	8,335	13,929
2010	4,407	51,270	9,916	17,312

Year	Tibet	Shaanxi	Gansu	Qinghai
1985	10	226	129	62
1986	14	278	156	76
1987	17	342	187	93
1988	21	415	224	112
1989	25	492	257	128
1990	30	578	296	146
1991	37	675	339	163
1992	44	777	388	183
1993	54	929	453	211
1994	65	1,114	537	238
1995	86	1,334	645	273
1996	108	1,597	746	314
1997	128	1,951	910	392
1998	150	2,367	1,082	477
1999	177	2,854	1,293	575
2000	204	3,440	1,539	690
2001	231	4,033	1,779	827
2002	277	4,693	2,084	989
2003	339	5,524	2,394	1,163
2004	453	6,584	2,799	1,365
2005	584	7,894	3,362	1,595
2006	737	9,618	4,021	1,852
2007	915	11,648	4,800	2,151
2008	1,116	14,644	5,926	2,515
2009	1,361	18,060	7,058	3,019
2010	1,729	22,514	8,435	3,700

Year	Ningxia	Xinjiang	National
1985	50	152	14,010
1986	64	193	16,478
1987	79	235	19,361
1988	93	289	22,849
1989	106	352	26,273
1990	124	430	30,134
1991	146	532	34,687
1992	173	662	40,683
1993	207	835	49,395
1994	245	1,030	60,551
1995	291	1,265	74,554
1996	341	1,544	92,446
1997	408	1,896	112,138
1998	486	2,290	132,562
1999	583	2,696	154,900
2000	701	3,165	179,057
2001	834	3,638	203,557
2002	985	4,189	231,164
2003	1,178	4,820	261,876
2004	1,424	5,600	302,634
2005	1,711	6,536	350,599
2006	2,040	7,690	408,671
2007	2,437	8,939	479,444
2008	2,993	10,309	569,143
2009	3,770	11,815	675,745
2010	4,743	13,821	804,641

Table D.2 Real Physical Capital (Zhang methodology), 1985-2010
Unit: 100 millions of 1985 Yuan

Year	Beijing	Tianjin	Hebei	Shanxi
1985	302	224	411	290
1986	367	271	482	345
1987	448	315	560	400
1988	541	359	674	450
1989	613	405	774	500
1990	719	453	856	563
1991	816	530	973	635
1992	952	627	1,138	710
1993	1,164	747	1,410	823
1994	1,523	923	1,767	950
1995	2,014	1,155	2,277	1,077
1996	2,535	1,389	2,827	1,226
1997	3,124	1,739	3,790	1,469
1998	3,758	2,082	4,754	1,776
1999	4,416	2,404	5,802	2,106
2000	5,115	2,741	6,847	2,440
2001	5,861	3,088	7,773	2,754
2002	6,720	3,480	8,676	3,125
2003	7,577	3,948	9,646	3,581
2004	8,739	4,620	11,228	4,294
2005	10,229	5,451	13,231	5,261
2006	11,828	6,470	15,663	6,460
2007	13,659	7,797	18,673	7,954
2008	15,074	9,770	22,979	9,796
2009	16,851	12,524	27,600	12,387
2010	19,115	16,021	32,791	15,537

Year	Inner Mongolia	Liaoning	Jilin	Heilongjiang
1985	152	534	217	463
1986	178	629	251	528
1987	204	744	291	597
1988	242	882	338	675
1989	279	1,008	375	751
1990	314	1,137	423	830
1991	368	1,285	479	916
1992	448	1,491	551	1,026
1993	558	1,843	681	1,171
1994	679	2,268	829	1,355
1995	811	2,675	1,001	1,596
1996	953	3,130	1,194	1,892
1997	1,126	3,641	1,400	2,312
1998	1,297	4,144	1,618	2,780
1999	1,489	4,667	1,896	3,223
2000	1,697	5,275	2,226	3,669
2001	1,912	5,863	2,543	4,114
2002	2,259	6,510	2,911	4,580
2003	2,864	7,313	3,310	5,001
2004	3,904	8,808	3,851	5,623
2005	5,480	10,656	4,748	6,383
2006	7,392	13,089	6,331	7,392
2007	9,847	16,215	8,631	8,774
2008	12,966	21,907	11,876	10,586
2009	17,120	26,279	15,302	13,201
2010	21,971	31,767	19,368	15,865

Year	Shanghai	Jiangsu	Zhejiang	Anhui
1985	359	533	297	254
1986	450	687	371	313
1987	562	882	457	373
1988	707	1,097	558	442
1989	825	1,267	650	492
1990	950	1,463	745	547
1991	1,077	1,690	864	603
1992	1,254	2,082	1,047	702
1993	1,604	2,699	1,409	850
1994	2,244	3,373	1,942	1,032
1995	3,209	4,277	2,695	1,299
1996	4,012	5,280	3,529	1,672
1997	5,118	6,681	4,598	2,159
1998	6,066	8,146	5,630	2,608
1999	6,971	9,711	6,717	3,050
2000	7,879	11,329	7,922	3,515
2001	8,714	12,851	9,166	3,944
2002	9,627	14,585	10,705	4,408
2003	10,502	16,909	12,704	4,910
2004	11,852	20,351	15,526	5,803
2005	13,435	24,748	18,592	6,862
2006	15,250	29,656	21,942	8,153
2007	17,449	35,233	25,794	9,802
2008	19,710	42,321	30,122	11,976
2009	22,505	50,718	34,661	14,331
2010	24,981	60,897	40,126	17,359

Year	Fujian	Jiangxi	Shandong	Henan
1985	175	160	633	408
1986	218	188	771	497
1987	271	217	954	588
1988	333	257	1,175	704
1989	397	294	1,336	805
1990	471	326	1,521	920
1991	559	369	1,761	1,056
1992	699	428	2,082	1,215
1993	919	515	2,549	1,435
1994	1,244	627	3,119	1,758
1995	1,669	768	3,830	2,206
1996	2,085	956	4,655	2,698
1997	2,700	1,261	5,906	3,482
1998	3,354	1,555	7,210	4,276
1999	4,010	1,862	8,717	5,081
2000	4,653	2,178	10,492	5,947
2001	5,206	2,497	12,191	6,745
2002	5,779	2,949	14,187	7,607
2003	6,414	3,551	16,409	8,552
2004	7,404	4,426	19,943	10,109
2005	8,623	5,398	24,423	12,414
2006	10,201	6,539	29,643	15,588
2007	12,378	7,864	35,360	19,936
2008	15,258	9,436	42,235	25,600
2009	18,474	11,498	51,074	32,591
2010	22,035	13,838	61,284	40,873

Year	Hubei	Hunan	Guangdong	Guangxi
1985	341	291	574	153
1986	400	346	700	184
1987	474	406	836	217
1988	554	477	1,037	256
1989	604	527	1,231	292
1990	672	584	1,448	324
1991	744	656	1,703	366
1992	855	771	2,248	438
1993	1,039	919	3,178	591
1994	1,344	1,119	4,353	797
1995	1,803	1,385	5,611	1,023
1996	2,256	1,682	6,730	1,266
1997	2,955	2,123	7,985	1,549
1998	3,659	2,594	9,332	1,857
1999	4,398	3,135	10,892	2,198
2000	5,160	3,716	12,438	2,534
2001	5,886	4,294	13,890	2,849
2002	6,584	4,908	15,450	3,201
2003	7,226	5,533	17,319	3,567
2004	8,215	6,425	19,971	4,166
2005	9,464	7,676	23,437	5,001
2006	11,130	9,210	27,339	6,121
2007	13,238	11,193	31,923	7,591
2008	15,866	14,098	37,141	9,447
2009	19,150	17,592	43,772	12,563
2010	23,270	22,129	51,786	17,014

Year	Hainan	Chongqing+Sichuan	Guizhou	Yunnan
1985	26	540	110	121
1986	37	613	131	150
1987	46	701	155	179
1988	58	797	177	214
1989	77	889	199	250
1990	100	999	227	291
1991	128	1,133	255	342
1992	182	1,327	294	415
1993	296	1,614	343	548
1994	419	1,975	411	713
1995	520	2,441	502	913
1996	625	3,046	603	1,143
1997	700	3,891	776	1,490
1998	771	4,874	973	1,896
1999	852	5,883	1,208	2,310
2000	931	6,937	1,467	2,660
2001	999	8,042	1,765	2,972
2002	1,069	9,314	2,092	3,303
2003	1,145	10,743	2,418	3,687
2004	1,259	12,719	2,824	4,315
2005	1,402	15,163	3,277	5,177
2006	1,575	18,160	3,800	6,247
2007	1,784	21,934	4,425	7,549
2008	2,151	27,232	5,227	8,724
2009	2,596	32,686	6,213	10,433
2010	3,204	39,205	7,441	13,219

Year	Tibet	Shaanxi	Gansu	Qinghai
1985	9	186	105	52
1986	12	223	123	62
1987	15	270	144	74
1988	17	321	170	87
1989	20	374	190	97
1990	23	432	215	107
1991	28	497	242	116
1992	34	562	274	128
1993	41	674	319	147
1994	49	811	381	164
1995	66	975	462	188
1996	84	1,170	532	216
1997	98	1,444	660	280
1998	113	1,762	788	346
1999	133	2,131	946	421
2000	151	2,576	1,130	508
2001	168	3,001	1,297	613
2002	203	3,469	1,520	735
2003	252	4,080	1,734	862
2004	351	4,887	2,033	1,011
2005	459	5,897	2,473	1,179
2006	584	7,263	2,982	1,365
2007	726	8,856	3,584	1,583
2008	883	11,324	4,499	1,854
2009	1,074	14,069	5,367	2,252
2010	1,379	17,696	6,434	2,804

Year	Ningxia	Xinjiang	National
1985	41	129	8,574
1986	52	160	10,401
1987	63	188	12,510
1988	71	228	15,074
1989	79	274	17,392
1990	91	330	19,993
1991	106	408	23,118
1992	125	507	27,483
1993	150	644	34,273
1994	178	792	43,043
1995	211	970	54,062
1996	248	1,181	68,228
1997	297	1,451	83,246
1998	355	1,745	98,029
1999	429	2,033	113,826
2000	519	2,367	130,512
2001	617	2,686	146,597
2002	730	3,064	164,948
2003	876	3,503	185,451
2004	1,068	4,068	214,953
2005	1,288	4,756	250,057
2006	1,539	5,627	293,372
2007	1,843	6,543	347,034
2008	2,290	7,533	416,702
2009	2,932	8,608	499,439
2010	3,733	10,130	600,038

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