Human Capital in China
2015

Principal Investigator

Haizheng Li

China Center for Human Capital and Labor Market Research

Central University of Finance and Economics

Beijing, China

December 2015

This project is funded by

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 (2008-)

Professor Emeritus of Economics, Ohio State University

Executive Editor of *China Economic Review*

Barbara Fraumeni   Special-term Professor and Senior Fellow, CHLR (2008-)

Professor of Public Policy, University of Southern Maine

Carsten A. Holz   Special-term Professor, CHLR (2013-)

Professor of Social Science

Hong Kong University of Science & Technology

Zhiqiang Liu   Special-term Professor, CHLR (2008-)

Associate Professor of Economics

State University of New York at Buffalo

Xiaojun Wang   Special-term Professor, CHLR (2008-)

Associate Professor of Economics

University of Hawaii at Manoa

Li Yu   Associate Professor, CHLR (2010-)

Kang-Hung Chang   Associate Professor, CHLR (2009-2015)

Sophie Xuefei Wang   Assistant Professor, CHLR (2012-)

Chun-Wing Tse   Assistant Professor, CHLR (2012-2015)

Fang Xia   Assistant Professor, CHLR (2013-)

Fanzheng Yang   Assistant Professor, CHLR (2013-)

Doctoral and postdoctoral students participated in this project：

Yue Sun   Doctoral Student, CHLR   (2013-)

Dazhi Guo   Doctoral Student, CHLR   (2012-)

Yuefang Qiu   Doctoral Student, CHLR   (2012-)

Tang Tang   Doctoral Student, CHLR   (2012-)

Bo Li   Doctoral Student, CHLR   (2011-2014)

Na Jia   Doctoral Student, CHLR (2010-2013)

Yunling Liang   Doctoral Student, CHLR (2009-2012)

Qinyi Liu   Doctoral Student, Hunan University   (2011-)

Xiaobei Zhang   Doctoral Student, Hunan University   (2010-2013)

Zhiyong Liu   Post-doctoral fellow, CHLR

                       Associate Professor, Hunan University of Commerce (2011-2013)

Administrative Members

Beiwen Sun	Executive Assistant to Director, CHLR (2011-)
Jing Xiao	Graduate Coordinator, CHLR (2010-)
Hao Deng	Former Graduate Coordinator / Former Executive Assistant to Director, CHLR (2008-2011)
Ruiju Wang	Former Executive Assistant to Director, CHLR (2008-2010)

2015 Team

Graduate Students, CHLR

2014 students   Bing Wang, Jiapeng Dong, Wang Li, Xiang Wang, Shuli Shen, Jingyi Zhang, Zhiying Bian, Miaomiao Mo, Ni Zeng

2014 Team

Graduate Students, CHLR

2013 students   Xing Chen, Qiang Gao, Yiwei Gao, Qianqian He, Xiaowei Hou, Feifei Huang, Tian Jin, Guanqun Li, Sijia Li, Mengyang Liu, Yangyi Liu, Wenhua Ma, Liyuan Ma, Yuzhe Ning, Yujiao Shi, Zehao Shi, Yanxia Sun, Xibo Wan, Jie Wei, Xinran Xing, Bing Yan, Yueshan Zhang, Cheng Zhao, Yangyang Zheng, Ye Zhou

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 Student, Georgia Institute of Technology：Chongyu Lu

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 Student, Georgia Institute of Technology: Yuxi Xiao

Assistant Professor, China Academy of Public Finance and Public Policy, CUFE:

Song Gao

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 programs. Nobel Laureates Kenneth J. Arrow and James Heckman, and Professor Dale W. Jorgenson of Harvard University and the founder of the income-based method for measuring human capital, serve on the Advisory Board.

The major research areas in the Center include but are not limited to human capital and skill measurement, human capital investment, human capital mobility, human capital and innovation, and health economics.

All faculty and research fellows of the CHLR hold a Ph.D. degree in economics from major universities in North America and some are tenured professors at U.S. universities. The CHLR Special-term Director, Dr. Haizheng Li, is Professor in the School of Economics, Georgia Institute of Technology. Currently the Center has 1 "Changjiang Fellowship" Scholar, 6 full-time faculty members, 7 special-term professors, 11 senior research fellows. Among the faculty members, 7 are professors, 1 is associate professor, and 5 are assistant professors.

The Center's graduate programs are internationally oriented. The curriculum and instruction are rigorously designed following research universities in North America. All courses are taught in English. By 2015, 1 post-doctoral student, 3 doctoral students and 57 master students have graduated. Currently, there are 40 students: 34 master students and 6 doctoral students.

The 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 at establishing China's first scientific and systematic human capital index, quantitatively describing 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 incorporate human capital into the National Income and Product Accounts (NIPA) system.

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/Books/Book Chapters published based on China Human Capital Report (in reverse chronological order):

- "Human Capital Estimates in China: New Panel Data 1985-2010", *China Economic Review*, Volume 30, pp.397-418, 2014.

- "Comparison among Beijing, Tianjin and Hebei in perspective of human capital" in: Beijing Human Resources Development Report 2013-2014, Beijing Human Recourses Bluebook Series, edited by Zhiwei Zhang, Social Science Literature Press, Beijing, China, in Chinese, 2014.

- "Regional Difference in perspective of the quality of labor force human capital", *Journal of Central University of Finance and Economics*, in Chinese, Volume 1(8), pp. 72-80, 2015.

- "China's Human Capital Measurement: Method, Results and Application", *Journal of Central University of Finance and Economics*, in Chinese, Volume 1(5), pp. 69-78, 2014.

- "Regional Distribution and Development of Human Capital in China", *Economic Research Journal*, in Chinese, Issue 7, pp. 49-62, 2013.

- "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: Economic Reform and Future Development Directions, Nankai University Press, pp.209-227, 2012.

- "Human Capital In Beijing-A Measurement Based on the Jorgenson-Fraumeni Income Approach" in: Beijing Human Resources 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: <u>The Changing Wealth of Nations</u>, Washington, DC: World Bank, Chapter 6, pp. 105-114, 2010.

- "Human Capital Measurement and Index Construction in China," *Economic Research 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:

- The 5th Changqing Commonweal Lecture, as a Keynote Speaker, "Human capital and pre-college education", Beijing, China, June 16, 2015.

- Shaanxi Normal University, International Symposium: Human Capital and Challenge of economic growth in China, as a Keynote Speaker, "Rural human capital in China and the economic growth in future", Xi'an, Shaanxi, June 6-7, 2015.

- The 6th International Symposium on Human Capital and Labor Markets and the Release of the China Human Capital Report, Host, "Human Capital in China 2014", Beijing, China, 2014.

- University of Chicago, Symposium on China's Economy and Governance, as a Speaker. Chicago, USA, August 27, 2014.

- The 26th Annual Meetings of the Chinese Economics Society of Australia, as a Keynote Speaker, "Regional Distribution and Growth of China's Human Capital 1985-2010: Urbanization, Education, and Aging," Monash University, Melbourne, Australia, July 6-9, 2014.

- The Chinese Economists Society (CES) President Forum, as a Keynote

Speaker, "Reform of China's Graduate Education" Guangzhou, China, June 13, 2014.

- Fudan University and The Chinese University of Hong Kong, Shanghai-Hong Kong Development Institute conference on "Human Capital Distribution and Trend in China: Where does Shanghai Stand?" Shanghai, China, May 28, 2014.

- The Third World KLEMS Conference: Growth and Stagnation in the World Economy, invited presentation, "Human Capital Estimates in China: New Panel Data 1985-2010," Tokyo, Japan, May 19-20, 2014.

- American Economic Association Annual Meeting, "Human Capital Estimates in China, New Panel Data 1985-2010", Philadelphia, USA, January 3-5, 2014.

- 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.

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

- The 31th International Association for Research in Income and Wealth （IARIW）, as a Speaker, "Estimation of China human capital.", Switzerland，

August 2010.

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

- The 31st IARIW General Conference of the International Association for Research in Income and Wealth, invited plenary session presentation, "Human Capital in China", St. Gallen, Switzerland, August 23-28, 2010.

- 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," (project No. 71273288).

- In 2012, the CHLR was invited to join the European Union project (2012-2015), "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, May, 2012.

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

2011.

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

- OECD Director of Statistics Directorate, Mr. Paul Schreyer, 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 on China's human capital."

- "China Human Capital Report 2009" and its summary was requested by the Ministry of Education as references, 2009.

- "China Human Capital Report 2009" and its summary was requested by the Organization Department as materials for policy making, 2009.

Acknowledgement

Revisions and Improvements in the 2015 Report

Main revisions and improvements based on the 2014 report include:

- Human capital calculation for all provinces, autonomous regions, municipalities and special administrative regions (excluding Macao) has been extended to 1985-2012.

- Updating the data set of enrollment categorized by region and gender to 1985-2012.

- A new data set, *China Family Panel Studies (CFPS2011)*, is added to the estimation of Mincer parameters; update new macro data for provinces. Adopt the method of quadratic fit instead of linear fit.

- Recalculate the growth rate based on real income in urban and rural regions instead of using the growth rate of labor productivity.

- Estimate both national and provincial physical capital stock for 1985-2012.

- Estimate cross-province living cost adjustment index (purchasing power parity index) for 1985-2012. And calculate the average age of labor force, average education level and the proportion of high-school education and above to enrich the report.

Brief Description

Abbreviations

- Provinces:

BJ=Beijing	TJ=Tianjin	HeB=Hebei
SX=Shanxi	NMG=Inner Mongolia	LN=Liaoning
JL=Jilin	HLJ=Heilongjiang	SH=Shanghai
JS=Jiangsu	ZJ=Zhejiang	AH=Anhui
FJ=Fujian	JX=Jiangxi	SD=Shandong
HeN=Henan	HuB=Hubei	HuN=Hunan
GD=Guangdong	GX=Guangxi	HaN=Hainan
CQ=Chongqing	SC=Sichuan	GZ=Guizhou
YN=Yunnan	XZ=Tibet	SaX=Shaanxi
GS=Gansu	QH=Qinghai	NX=Ningxia
XJ=Xinjiang	HK=Hong Kong	TW=Taiwan

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

Definition and Description

- Total human capital： age 0-55 for female， age 0-60 for male
- Labor force human capital：age >15，unretired labor force excluding students.
- Average growth rate: the mean growth rate for all years.
- Ratio of human capital to GDP: using current values.
- Ratio of labor force human capital to GDP: using current values.

Contents

Executive Summary

We adopt and modify the widely used Jorgenson-Fraumeni lifetime income approach (hereafter referred to as the J-F approach) to calculate China's human capital stock and estimate its distribution and trend.

Due to lack of data, the J-F approach cannot be directly applied to the measurement of human capital in China. Following widely accepted methods based on the theory of human capital, we combine micro survey data with macro data and modify J-F approach to fill in missing values in the Chinese data. Our approach allows us to systematically estimate China's human capital stocks at both the national and provincial levels. We use the results of these calculations to also build various human capital indexes.

In this report we present our calculations of China's human capital stocks of China at the national level from 1985 to 2012, including total human capital and human capital per capita for rural and urban residents, males and females, and analyze their distributions and trends. In addition, human capital stocks are estimated and analyzed for 33 provinces and municipalities: Beijing, Tianjin, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Shaanxi, Gansu, Shanxi, Qinghai, Inner Mongolia, Xinjiang, Tibet, Yunnan, Fujian, Hebei, Ningxia, Hong Kong and Taiwan.

We calculate a series of new provincial indexes for the year 2015, i.e., labor force average age, labor force average schooling years, and proportions of the labor force at different levels of education. We also compare various measures of the labor force among the Mainland, Hong

Kong and Taiwan. Our results comprise more precise and up to date measures of the composition of the labor force across provinces and regions than have been available to date.

Our report presents s China's human capital data as a panel available for intensive research. We also provide estimates at the national level and provincial level of China's physical capital stock for the same period. We also provide a living cost adjustment index (i.e., purchasing power parity index) useful for cross-province comparison of money values.

The entire data set of human capital, physical capital and related provincial data living cost adjustment index. And all the raw and processed data will be released to the public for research purposes at now change. Users can download the data at:

http://humancapital.cufe.edu.cn/plus/list.php?tid=61

The main findings in the 2015 report are summarized below. (All real values are based on 1985 prices and growth rates are based on real values unless otherwise specified.

1. China's human capital reached RMB 1057.3 trillion in 2012. Urban and rural human capital was RMB 839.9 and RMB 217.4 trillion, respectively, accounting for 79% and 21%, respectively of the total human capital.

2. Human capital per capita reached RMB 942,400 in 2012. Urban and rural human capital per capita were RMB 1,385,100 and RMB 421,800, respectively. Human capital per capita for males and females was RMB 1,144,100 and RMB 712,600, respectively.

3. Total human capital in 2012 was 5.76 times its level in 1985 (RMB 230.38 trillion compared to RMB 40 trillion). Total human capital grew

at a higher annual rate than human capital per capita (6.48% and 5.91% average, respectively).

4. During 1985-2012, rural human capital grew at an average annual rate of 2.91%, while urban human capital grew at 8.68% annually. Growth rates of both urban and rural areas accelerated since 1997, to annual rates of 10.89% and 4.65%, respectively, for 1997-2012. Total urban real human capital surpassed total rural human capital in 1990, and has remained higher since then.

5. Rural human capital per capita grew at an average annual rate of 4.21% over the period 1985-2012, while per capita urban human capital grew at an annual rate of 5.05% reflecting China's rising rural-urban economic gap.

6. At the national level, the ratio of human capital to physical capital decreased rapidly up to 1995 and then began to rise slowly, as human capital growth began to exceed the growth of physical capital.

7. At the national level, the ratio of China's GDP to human capital has grown over time, suggesting growing efficiency of human capital in production.

8. Human capital at the provincial level generally displays a trend similar to that of national human capital. However, since provinces differed in their population, education structure and market mechanism, and their human-capital dynamics in human capital also showed some differences.

9. Among the 31 provinces of Mainland China for which we have estimated, the top three provinces in terms of real human capital stock in 2012 were Guangdong, Shandong and Jiangsu; ranked by per capita human capital, the top three were Beijing, Shanghai and Tianjin.

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

11. During 1985-2012, the national labor force average age increased from 32 to 36 years. Rural labor force average age increased from 32 to 36 years, while the urban counterpart increased from 32 to 35 years.

12. During 1985-2012, the national average labor force schooling years increased from 5.96 to 9.91. Rural average labor force schooling years increased from 5.26 to 8.57, while that of urban counterpart increased from 8.14 to 10.98.

13. During 1985-2012，the proportion of workers with education at the level of high school or more increased from 13% to 34%; that of the rural labor force increased from 8% to 14%, while that of the urban labor force increased from 27% to 50% The national labor force population proportion of college graduates and above also increased substantially, from 1% to 14%, For the rural labor force, the proportion of workers with at least a college degree increased from 0.2% to 3%, while that of the urban population grew from 4% to 24%.

14. In Taiwan, during 1985-2012, the average annual growth rate of real human capital was 2.35%. The average annual growth rate of real human capital per capita was 2.02%.

15. In Hong Kong, during 1985-2012, the average annual growth rate of real human capital was 3.68%. The average annual growth rate of real human capital per capita was 2.84%.

16. During 1985-2012, in Hong Kong and Taiwan, average labor force age grew from 35 to 39 years and from 33 to 38 years, respectively.

17. During 1985-2012, for all of China, the real stock of physical capital grew from RMB 1.68 trillion to RMB 31.45 trillion, respectively, in 1985 prices, reflecting an average annual growth rate of 10.85%. The ratio of the nominal human capital stock to that of nominal net wealth stock of physical capital reduced from 23.8 in 1985 to 7.9 in 2012.

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. Detailed analyses of human capital in many advanced economies, including the United States, all show that human capital is a key source of economic growth.[2] The Stiglitz Commission report (Stiglitz, et. al. 2009). noted the importance of human capital as a "beyond Gross Domestic Product" measure of economic and social progress.

---

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

[2] In particular, we refer to studies that expand and refine measures of human capital in total wealth and relate these measures to economic growth. Such studies 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).

The Chinese economy has grown at a dramatic rate since the start of economic reforms, and human capital has played a significant role in the Chinese economic miracle (see, for example, Fleisher and Chen, 1997, and Démurger, 2001), with strong impacts on both productivity growth and reducing regional inequality. (Fleisher, Li and Zhao, 2009).

Despite its critical role in the Chinese economy, there has been almost no comprehensive measurement of the total human capital stock in China until now. Human capital measures for China are central to any understanding of the global importance of human capital for a number of reasons. Measures of human capital will facilitate a deeper understanding of the contribution of human capital to growth, development, and social well-being in empirical and theoretical research, not only in China, but in the world at large, in part because of dramatic changes in its magnitude and composition. First, China has undergone substantial demographic changes in the past 65 years that included first encouragement of large families, subsequent discouragement of population growth the one-child policy, dramatic improvements in health and longevity, and massive interregional migration, and urbanization. Second, there has been a massive elimination of illiteracy and, more recently, a rapid expansion of education at higher levels. It is difficult to find a natural experiment based on such substantial changes in the magnitude and composition of a critical source of economic growth anywhere in human history or across nations.

Until now, only imperfect representations of human capital, such as measures of formal education and workforce experience have been available for China. Developing comprehensive measures of human capital in China provides the necessary groundwork for China's joining the international OECD initiative to facilitate international comparison of human capital accumulation and growth across nations.

Additional benefits of developing human capital measures include the

provision of useful information for policy makers' assessment of how education, health, and family support policies of central and local governments affect the accumulation of human capital. In the area of schooling, for example, there has been a remarkable increase in the educational attainment of the Chinese population, which in 1985was largely concentrated in the "no schooling" and "primary school" categories (Figure 4.2.5). By 2010 the largest population group was found in the "junior middle" school category (Figure 4.2.7). Policy makers need a clear view of the current gap that remains in the overall education status between the rural and urban areas, especially for high school education and above. Our measures illustrate the significance of this gap and point to the long-term gains of bringing human-capital investment to the areas where it is still needed desperately.

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. Our work is part of this movement. 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 Labor 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.[3] The work of this

---

[3] J-F human capital accounts have been constructed for several other countries independent of the consortium efforts. These countries include Argentina (Coremberg,

consortium will facilitate cross-country comparisons.

Another approach to estimating the impact of human capital has been undertaken by the Lisbon Council, 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 realized the importance of monitoring human capital accumulation, while most developing and emerging countries, including China, are only beginning to embark on such projects.

Although systematic measures of the total human capital stock in China have not been completed, 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 (the cost side); others, such as Zhu and Xu (2007) and Wang and Xiang (2006), estimated human capital from the income side. Zhou (2005) and Yue (2008) used weighted averages of some human capital attributes to construct a measure. Most studies generally measure only parts of 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.

The limitations of past studies have precluded implementation of internationally recognized methods for human capital estimation based on China's data. The methodology used studies preceding the work reported here has been limited by data availability, feasibility of parameter estimation, and some technical treatment difficulties. It is for these and related reasons that we have no measures of changes of human capital in rural and urban areas

---

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.

and for males and females. .

We construct a comprehensive measure of human capital in China by applying the methods used in other countries after modifying them to fit China's particular situation. 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 adopt, where possible, the Jorgensen-Fraumeni (J-F) lifetime income based approach, which has been widely used in other countries.

Adapting and implementing the J-F approach to China's data to estimate the human capital series involves combining micro-level survey data to mitigate the lack of comprehensive earnings data in China. In particular, we apply the well-known Mincer equation to estimate earnings from available household surveys where comprehensive data are not available. By obtaining imputed earnings for the entire population, we are thus able to integrate the changes of returns to education and experience (on-the-job-training) that are reflected in incomes during the course of economic transition into our estimates of the human capital stock.

In separating the calculation of human capital for urban and rural areas, we capture changes caused by rapid urbanization and y the large scale rural-urban migration that has taken place since the beginning of economic reform. This framework is important for any transitional economy because of concomitant changes in economic structure and distribution of the population which in part reflect investments in migration—an important component of human capital often missed in ongoing research.

The rest of this report is arranged as follows. Chapter 2 discusses our methodology for human capital measurement. Chapter 3 describes the J-F method and its application and modifications for China. Chapter 4 reports China's population and education dynamics. Chapter 5 reports description

statistics of some indicators for the national and provincial labor population. The estimated national results of human capital are reported in Chapter 6. Chapter 7 presents   the cross-province comparison results, followed by the disaggregated human capital results for Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Hong Kong and Taiwan from Chapter 8 to Chapter 40.

Chapter 2   Methodology

In general, human capital can be produced by education, training, and child bearing and rearing, 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 expected lifetime. The first method - the perpetual inventory method--is used in the cost approach; while the second method is used in 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 approach as exemplified by The Lisbon Council's estimates (2006);

(4) The attribute approach as exemplified by Laroche and Merette (2000);

(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 Jorgenson-Fraumeni (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.[1] The lifetime income approach can reflect the importance of long-term investments, such as education and health, in human capital accumulation.

The 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 services, foster innovation and growth through managerial

---

[1] 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. 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.

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.[2]

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 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

---

[2] 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.

education sector's plant and equipment and students' expenditures on supplies. 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.[3] The Kendrick approach covers detailed aspects of human capital formation from the cost side and provides a very complete menu 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.[4] 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

---

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

[4] 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.

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 economic, demographic, and migratory trends.[5] 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.[6]

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.

---

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

[6] We have discussed with Dr. Ederer a possible collaboration to apply The Lisbon Council methodology to China in the future.

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

$$\ln\left(\frac{H}{L}\right) = \sum_e \sum_a \omega_{e,a} \ln\left(\rho_{e,a}\right) \tag{1}$$

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

where e and a denote years of formal schooling and age, respectively. $\rho_{\varepsilon,a}=L_{\varepsilon,a}/L$ is the proportion of working age individuals of age a with e years of schooling. $\omega_{\varepsilon,a}$ 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*, a gender index and $\varphi_{\varepsilon,a}$ 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 experimental 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.[7]

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

---

[7] This suggestion was confirmed as a reasonable modification by email communication with Dr. Reinhard Koman.

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 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).

2.6 Approach Conclusion

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 income based on the probabilities of survival, educational enrollment, and the employment. The expected future wages and income are estimated from the currently observed wages and income of cross-sectional individuals who are older than a given cohort at the time of the observation. Future income is augmented with a projected labor income growth rate and discounted to the present value with a constant interest rate. Estimation is conducted in a backward recursive fashion, from those aged 60, 59, 58, and so forth to those aged 0.[1] 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

To apply the J-F income-based approach, we need real world data -or their estimates for individual's annual market labor income per capita. Lifetime income is calculated by a backward recursion where the life cycle is divided into five stages. The equations used for calculating the lifetime expected income are as follows.

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

---

[1] 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.

$$mi_{y,s,a,e} = 0 \qquad (3)$$

Where the subscript y, s, a, and e denote year, sex, age and education attainments respectively, and mi stands for lifetime market labor income per capita.

The fourth stage is for work but no school (25-59 years old for males and 25-54 years old for females):

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

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 for 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 enrolled in education level $e+1$.

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

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

Let $L_{y,s,a,e}$ stands 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[2], 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. To apply the J-F income-based approach, we first need real world data or their estimates for 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 earning equation across gender and between the rural and urban population. To ensure our income estimates as accurate as possible, we estimate the parameters for the rural and urban population by gender and year using survey data in selected years and derive their imputed values for missing years over the period from 1985 to 2012.

The data used for estimating the parameters of the earning equation come from five 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 from 1987 to 1997. The second data set we used is the China Health and Nutrition Survey (CHNS) for the year of 1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009. The third data set we used is the

---

[2]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.

Chinese Household Income Project (CHIP) for the year of 1988, 1995, 1999, 2002, 2007. The fourth data set we used is the China Household Finance Survey (CHFS) for the year of 2010. The fifth data set we used is the Chinese Family Panel Studies (CFPS) for the year of 2009. CHIP (except 2009), CHNS, CHFS and CFPS cover both urban and rural population, but UHS covers only the urban population.

UHS is a representative sample of the urban population. The sample size varies from year to year, ranging from small number of respondents of 4,934 in 1986 to large number of respondents of 31,266 in 1992. Individual earnings are annual wage income, which include basic wages, bonuses, subsidies and other work-related income. Years of schooling are calculated using the information on the level of education completed: primary school equals 6 years of schooling, junior middle school equals 9 years of schooling, senior middle school equals 12 years of schooling, vocational school equals 11 years of schooling, and community college equals 15 years of schooling, and college and above equals 16 years of schooling. Suppose that schooling begins at age 6, work experience is estimated as 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. Table B.1.1 of Appendix B lists the descriptions of all the statistics.

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

Appendix B includes the descriptions of all the statistics.

CHNS is an international project that aims to learn more about the impacts of China's transitional economy and society 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. Table B.1.3 of Appendix B 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, financial wealth liabilities, credit constraints, income, consumption, social security, insurance coverage, intergenerational transfer payments, demographic characteristics, employment payment habits, and other relevant information. The rural sample of this database includes 22 provinces. The urban sample in this database also includes 22 provinces. The survey was conducted in 2011. Information of the statistics on household income starts from the year of 2010. The urban sample includes 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 is mainly from the net agricultural income. As the family income is calculated at the household unit, we need to allocate the income to individual household members to obtain personal income. Family net income of agricultural production is divided by the number of 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 as 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 reported information on

education and income status. AppendixB.3.4 gives the complete definitions of income, education, other variables and also the sample selection criteria of CHFS. Table B.1.4 of Appendix B lists the descriptive statistical indicators of CHFS.

CFPS is a nationwide longitudinal survey conducted by the Institute of Social Science Survey (ISSS) at Peking University. The survey focuses on economic, as well as non-economic well-being of Chinese children and adults. A wide range of domains are covered, including economic activities, education outcomes, family dynamics and relationships, migration, and health. In the 2010 survey, CFPS interviewed around 15,000 families with over 40,000 individuals. Information on household income starts from 2009. Urban income includes wage income and social security income. Rural income includes agriculture production income and social security income. We restrict the sample to males of 16-60 years old and females of 16-55 years old. AppendixB.1.5 gives the complete definitions of income, education, other variables and also the sample selection criteria of CFPS. Table B.1.5 of Appendix B lists the descriptive statistical indicators of CFPS.

We use Taiwan Family Income and Expenditure Survey covering both urban and rural population for the analysis of Taiwan. The survey is completed by the research center. 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 60 for female workers. Individual income includes main job income, minor job income, other income, and current transfers from enterprise.

The data sources for the analysis of Hong Kong are Hong Kong 1% Sample Population Census 1981, Hong Kong 1% Sample Population By-Census 1986, Hong Kong 5% Sample Population Census 1991, 2001 and 2011, and Hong Kong 5% Sample Population By-Census 1996 and 2006 collected by Hong Kong Census and Statistics Department. The main purpose

of the survey is to collect information on population, society and economic characteristics in Hong Kong. Work experience is estimated as age minus years of schooling minus 6. We restrict our sample to individuals who are currently employed and are between 15 and 65 years old for male workers and between 15 and 60 for female workers. Individual income includes main job income and minor job income.

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 represent years of work experience and experience squared respectively, and u denotes a random error. The coefficient α is the estimate of the average log earnings of individuals with zero years of schooling and work experience, β is the 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 the determination of earnings. 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 evidences that are 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 literature, we estimate equation (10) by ordinary least squares[3].

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

---

[3]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).

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

The intercept measures the base wage for the population without schooling or working experience. Figure 3.2.1 shows the intercept gap between urban and rural population during 1985-2012. The intercept in urban is higher than that in rural. Meanwhile, the intercept for males is higher than the intercept for females in urban areas, while there is no big difference between males and females in rural areas.
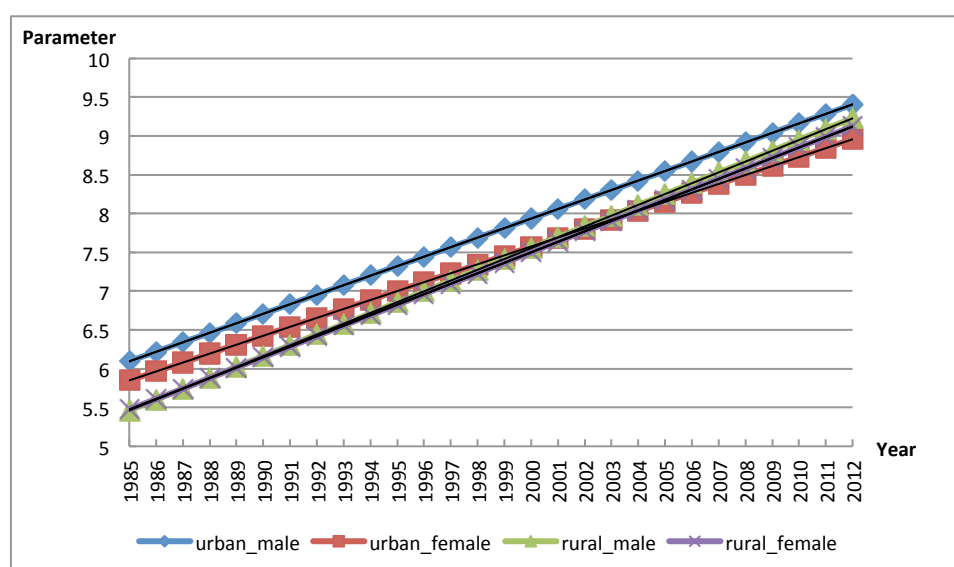
Figure 3.2.1   Mincer Intercepts by Gender and Location

Regression parameter of years of schooling and quadratic term of years of schooling measures return rate to education. Considering the current development of Chinese economy and education, we assume that return rate to education grows as nonlinear trend. Figure 3.2.2 shows the trend of the return to education for males and females in rural and urban areas. Returns to schooling are positive and firstly increasing and then decreasing over the sample years, and the decreasing trend is more obvious in urban areas than in rural areas. Besides, we found that return rate to education for male was

lower than that for female in urban areas, and return rate to education for male is higher than that to female in rural areas. When the Soviet-type wage grid was replaced by market wages (Fleisher, Sabirianova, Wang 2005), increasing return rate to education is a common phenomenon. But many studies recently show that return rate to education in urban follows a decreasing trend due to the increased enrollment. Wang, Fleisher, Li(2009) also find that female rates of return dominate male returns, and they argued that rising returns to education have been an ubiquitous phenomenon in transitional economies.
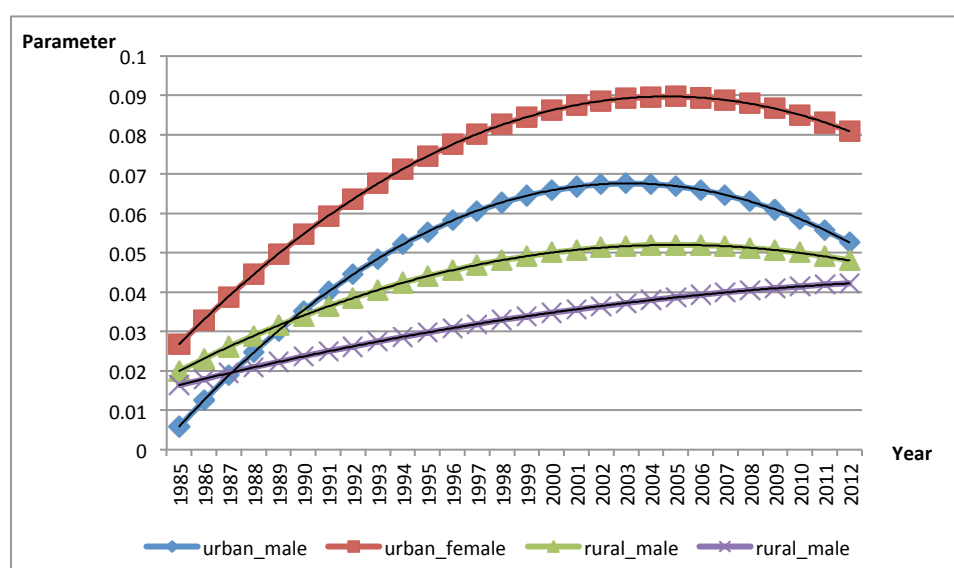
Figure 3.2.2 Rates of Return to Education by Gender and Location

We find that earnings increase with work experience but at a decreasing rate—a pattern found in most existing studies. Figures 3.2.3-3.2.6 show the trends of return rate to experience by gender and region. The curve shifts downward which means that return rate to experience is decreasing over time. In urban, return to experience for male is higher than that for female in the whole. In rural, return to experience for female is higher than that for

male in early years and the return to experience for female didn't change a lot between 2005 and 2012, while return to experience for male decreased a lot at that period.
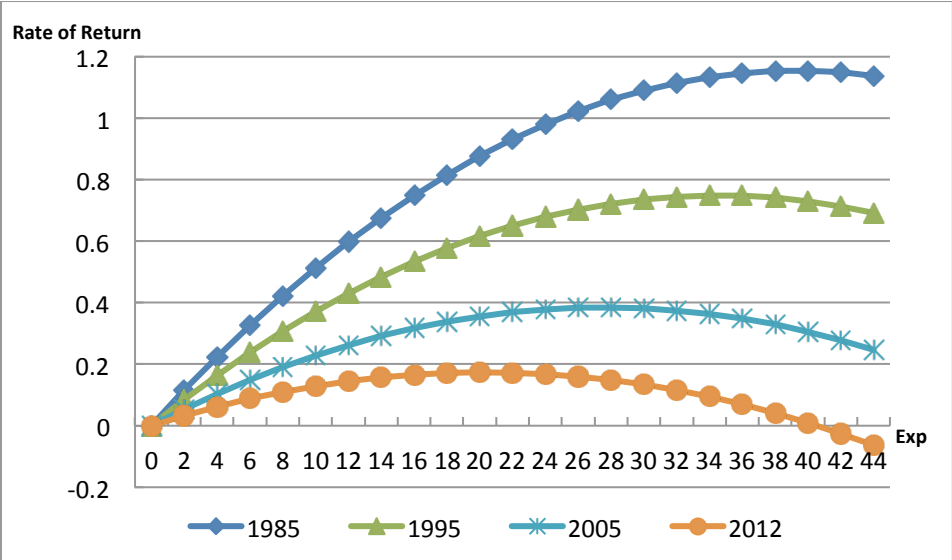
Figure 3.2.3   Return to Experience for Urban Males
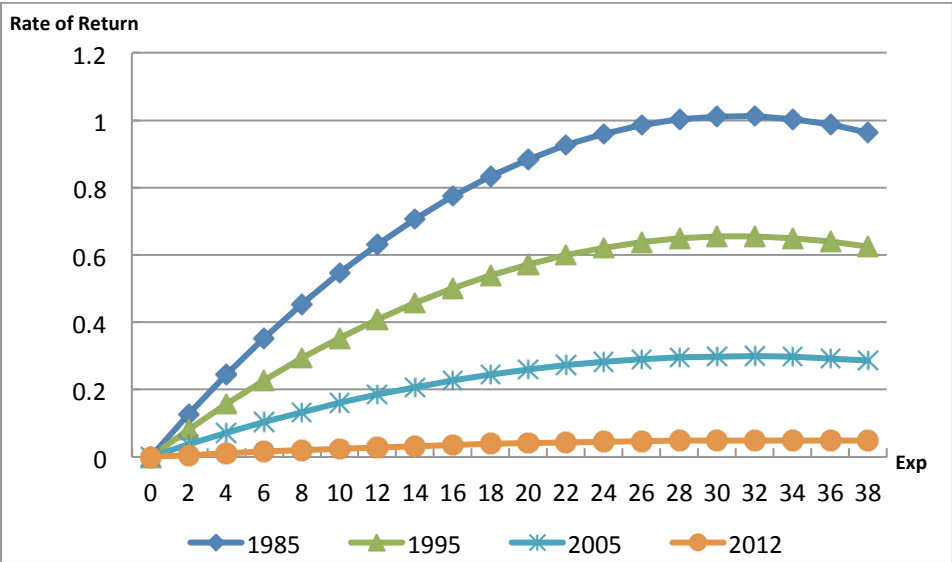
Figure 3.2.4   Return to Experience for Urban Females
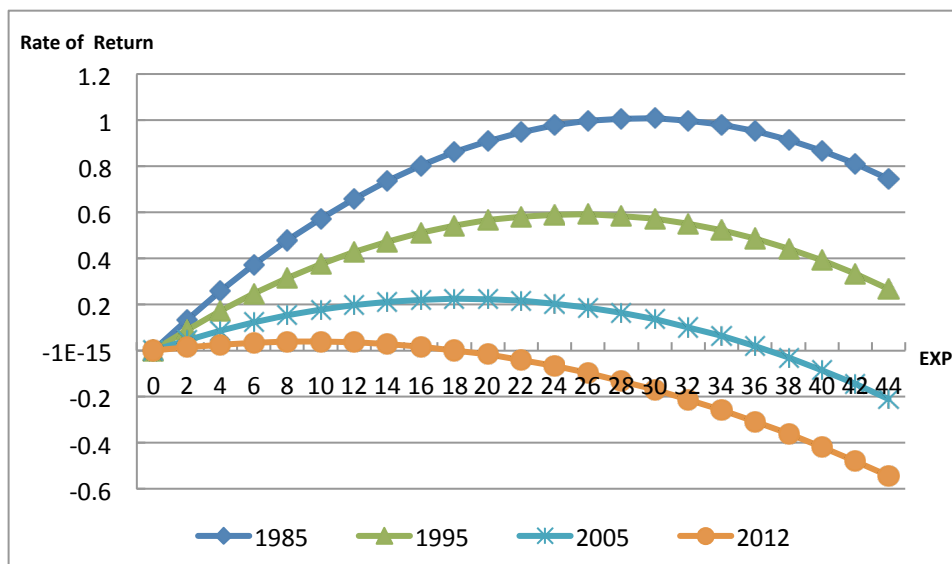
Figure 3.2.5   Return to Experience for Rural Males
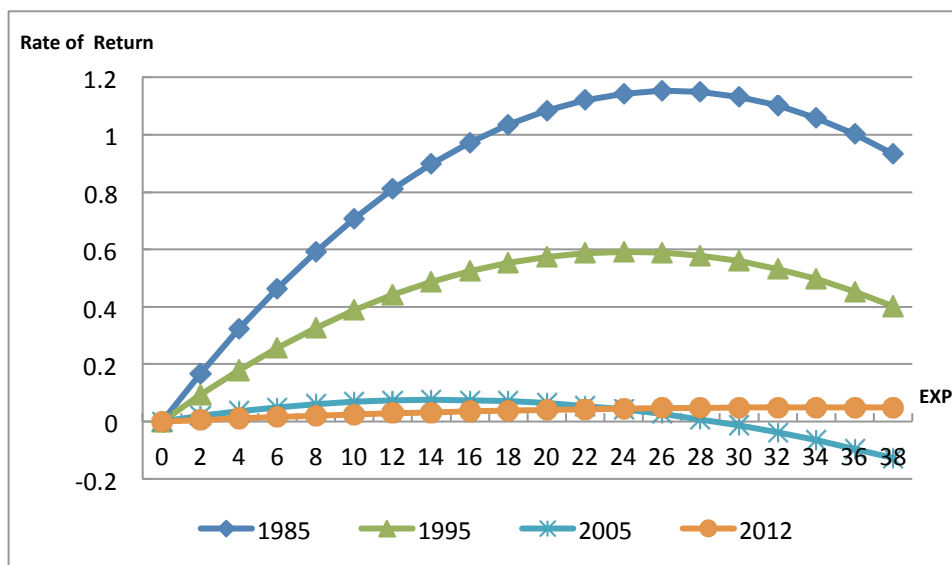
Figure 3.2.6   Return to Experience for Rural Females

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 adjustments. 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 Exp^2 represent years of work experience and experience squared respectively, and u denotes a random error. $Avwage$ represents the average employee nominal salary for the rural and urban population. It could reflect earning gap between different provinces. $Avgdp$ stands for nominal GDP per capita. $Ratio$ means the primary industry employment ratio of the total working population. The parameters of $Sch \cdot Avgdp$ and $Sch \cdot Ratio$ could reflect the job market situation of the educated population. We add $Avwage$ into the intercept term, an interaction term of $Avgdp$ and Sch, and an interaction term of the first industry employment ratio of the total working population and Sch 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 males have different returns to experience in urban and rural areas, but they share the same parameter for Exp and Exp^2

across all provinces; we use the same way in estimations for females.

As national Mincer parameter estimation, provincial data used for estimation also come from UHS, CHIP, CHNS，CHFS and CFPS. 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, CHFS and CFPS due to the relatively low quality of CHNS income measures. The estimates are weighted for obtaining a larger and representative sample making 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 from 1985 to 2012. 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*, *Exp^2* 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 with age, sex and educational attainments, 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 appendices.

3.3.1 Age distribution

We use data from the China Educational Statistical Yearbook: 2003-2012 to estimate the age distribution (1982-2012) 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 2012. Detailed information can be found in the appendices.

As for Hong Kong, we have data of total number of students in school by age, sex, and education from 1980 to 2012. First, we compute numbers of students of every grade in school. Then, we compute age distribution by using the number of students of first grade in school.

As for Taiwan, we have data of the number of first grade students in school by age, sex, and education from 2005 to 2012 and the total number of students in school by age, sex, and education from 1980 to 2004. First, we compute numbers of students of every grade in school. Then, we compute age distribution by using the number of students of first grade in school.

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. Dividing the number of deaths 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.

As for Hong Kong, the data sources of growth rate are Hong Kong Life Tables. 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. Dividing the number of deaths by the corresponding total population gives the death rate of those aged 65 and over.

As for Taiwan, the data sources of growth rate are Taiwan Life Tables. 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. Dividing the number of deaths by the corresponding total population gives the death rate of those aged 65 and over.

3.3.3 Enrollment rate

Following J-F as previously described, an individual may be categorized into 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, and 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 method 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 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 are 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) the 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 the 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 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 in 1987	"China Population Census 1987"
Population by age, sex and educational in 1987	"China Population Census 1987"
The employed by age, sex and educational in 1995	"China Population Census 1995"
Population by age, sex and educational in 1995	"China Population Census 1995"
The employed by age, sex and educational in 2000	"China Population Census 2000"
Population by age, sex and educational 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%.

As for Taiwan, employment rate $empr(y, s, a, e)$ includes data by age, sex and educational for individuals older than 15 from 1985 to 2012. The data we use are the employed by sex and education from 1985 to 2012 and the employed by age from 1985 to 2012. The formula used to calculate the employment rate is:

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

As for Hong Kong, employment rate $empr(y, s, a, e)$ includes data by age, sex and educational for individuals older than 15 from 1985 to 2011. The data sources of employment rate are Hong Kong Population Census 1991, 2001, 2011 and Hong Kong Population By-Census 1996, 2006.

The formula used to calculate the employment rate is:

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

For these missing years, the employment rate in year 1991 is used for the

employment rate from year 1985 to 1990. We calculate employment rate of 1992, 1993, 1994 and 1995 by linear fitting employment rate of year 1991 and 1996, etc.

3.3.5 Growth rate

To measure lifetime earnings for all individuals in the population, we need to project income for future years and discount the income back to the present. We use the following method to estimate the real income growth rates for urban and rural areas respectively.[4]

The data used to calculate rural growth rate are rural CPI and average pure income of rural residents. Calculation method: rural real income is equal to average pure income of rural residents divided by rural CPI. Rural growth rate in period T-1 is equal to the income gap between rural real income in period T and T-1 divided by rural real income in period T-1.

The data used to calculate urban growth rate are urban CPI and average wage of urban employees. Calculation method: urban real wage is equal to average wage of urban employees divided by urban CPI. Urban growth rate in period T-1 is equal to the income gap between urban real wage in period T and T-1 divided by urban real wage in period T-1.

The result shows that, for the 28-year period from 1985 to 2012, the growth rate is on average 5.86% and 8.50% annually in the rural and urban sectors, respectively. Those growth rates will be used in the J-F calculation.[5]

---

[4] 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.

[5] 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

We use the same method to calculate the provincial income growth rates for Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Jilin, Heilongjiang, Shanghai, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong, Henan, Hubei, Hunan, Guangdong, Guangxi, Hainan, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang; their growth rates for urban and rural areas are shown in Figure 3.3.1. We assume that the growth rate in each province grows at a fixed annual rate.

Table3.3.1 Provincial Growth Rate

Province	Urban	Province	Rural
Beijing	10.25%	Fujian	7.07%
Shanghai	9.90%	Zhejiang	7.06%
Tianjin	9.52%	Henan	6.82%
Anhui	9.43%	Jilin	6.71%
Inner Mongolia	9.30%	Jiangsu	6.65%
Shandong	8.75%	Shandong	6.61%
Hubei	8.66%	Hebei	6.58%
Jiangsu	8.62%	Heilongjiang	6.57%
Zhejiang	8.56%	Tianjin	6.39%
Chongqing	8.54%	Guangdong	6.22%
Fujian	8.51%	Jiangxi	6.20%
Sichuan	8.47%	Liaoning	6.05%
Henan	8.43%	Chongqing	5.92%
Jiangxi	8.38%	Sichuan	5.92%
Liaoning	8.35%	Anhui	5.80%
Hainan	8.34%	Inner Mongolia	5.74%
Hebei	8.34%	Guangxi	5.69%
Guizhou	8.33%	Shaanxi	5.39%
Shanxi	8.25%	Ningxia	5.39%
Ningxia	8.23%	Hubei	5.36%
Jilin	8.20%	Shanxi	5.16%

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.

Shaanxi	8.14%	Beijing	5.07%
Guangdong	8.11%	Hunan	4.90%
Heilongjiang	7.95%	Hainan	4.87%
Guangxi	7.95%	Gansu	4.66%
Hunan	7.71%	Yunnan2	4.55%
Tibet	7.65%	Guizhou	4.43%
Yunnan	7.62%	Xinjiang	4.37%
Xinjiang	7.58%	Qinghai	4.24%
Gansu	6.86%	Tibet	3.77%
Qinghai	6.07%		

As for Hong Kong, the data used to calculate growth rate is average wage index and we can adjust it to real wage index. Calculation method: growth rate in period T-1 is equal to the income gap between real wage index in period T and T-1 divided by real wage index in period T-1. The result shows that, growth rate on average is 3.21% annually in Hong Kong.

As for Taiwan, the data sources of growth rate are listed in the table below:

Data	Sources
Consumer Price Index (1960-2012, 2011=100)	Taiwan Directorate General of Budget, Accounting and Statistics
Regular salary (1980-2012)	Taiwan Directorate General of Budget, Accounting and Statistics

The formula used to calculate the growth rate is:

$$real\ regular\ salary\ = \frac{regular\ salary}{Consumer\ Price\ Index(rebase\ 1978 = 100)}$$

$$the \; growth \; rate \; of \; real \; regular \; salary \; at \; year \; T-1$$

$$= \frac{real \; regular \; salary \; at \; year \; T - real \; regular \; salary \; at \; year \; T-1}{real \; regular \; salary \; at \; year \; T-1}$$

The result shows that, the growth rate on average is 2.77% annually in Taiwan.

3.3.6 The discount rate

The discount rate that is used to value future income into present term 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 from 1996 to 2007, net of the average rate of inflation over the same period, 3.14%[6], the average benchmark lending rate over 5 years in China from 1996 to 2009, 5.51%[7], and the social discount rate based on the method from the World Bank, 8.14%.[8]

---

[6] The details could be found in the *China Human Capital Index Analysis Report* 2009 Version. However, the ideal discount rate should include market risk, and 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.

[7] 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 from 1993 to 1995, and started from 1996 to avoid negative discount rates.

[8] We calculated the average growth rate of individual consumption over the period

Discount rate reflects the time value of currency and is derived based on the return to long-term investments. The discount rate, 4.58%, used in Jorgenson and Yun (1990) and Jorgenson and Fraumeni (1992a), is based on the rate of return to 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.

---

from 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 of estimating human capital, according to fumula (8) and (9) in Chapter 3, we need annual population data by age, sex, and educational attainment. We construct the data sets according to the following procedure.

Data sets are available for years 1987, 1995, and 2005 from the 1% Population Sampling Survey and for 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 7-year data sets of population, we combine birth rate, mortality rate by age and sex and enrollment at different levels of education and regions to impute yearly population by age, sex and educational attainment for urban and rural areas. We define the levels of educational attainment as following: illiterate (no schooling), primary school (Grade 1-6), junior middle school (Grade 7-9), senior middle school (Grade 10-12), and college and above. Since year 2000, the availability of additional statistical information has made it possible to separate the population at the level of college and above into two categories: college, and the university and above.

Specifically, we use the following perpetual inventory formula to impute population by age, sex and educational attainment in the 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*. *δ(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 achieved this level of education in that given year, while outflow would include those who achieved the next level of education in that given year. *EX(e,a,s)* is a discrepancy term.[1] Moreover,

$$IF(y,e,a,s) = \lambda(y,e,a,s) \cdot ERS(y,e,s)$$

(14)

$$OF(y,e,a,s) = \lambda(y,e+1,a,s) \cdot ERS(y,e+1,s)$$

(15)

$$\sum_a \lambda(y,e,a,s) = 1$$

(16)

ERS is the matriculation at education level *e,* and *λ* is the age distribution at education level *e*. In order to obtain an 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), as well as 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 imputed 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 1.342 billion in 2012. The

---

[1] For example, the discrepancy can be caused by migration, but we do not have the data.

urban population increased by 497 million, while the rural population decreased by 172 million (Figure 4.2.1).
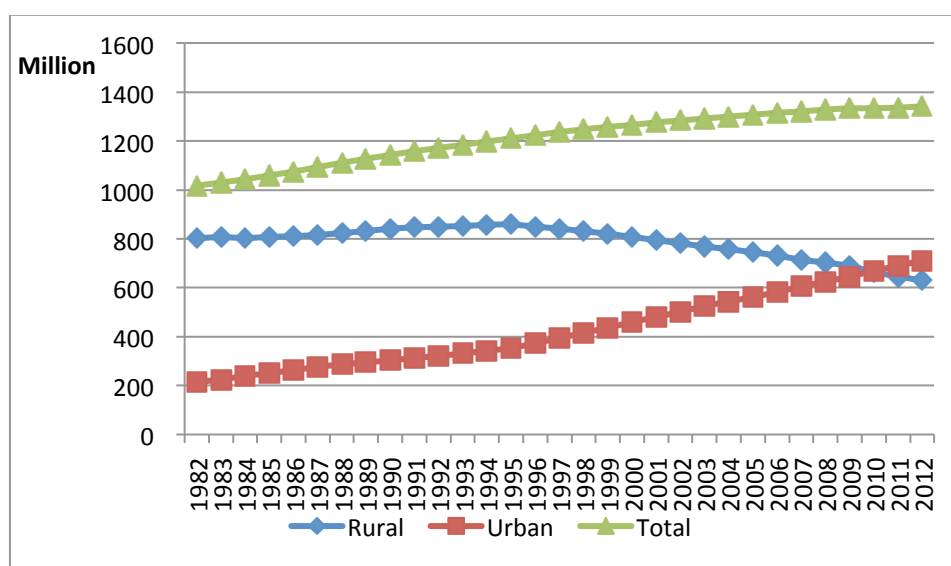
Figure 4.2.1 Population in China by Region 1982-2012

Figure 4.2.2-4.2.4 shows the trend of national, urban and rural population classified by educational attainment from 1982 to 2012. The illiterate population fell by half from 402 million in 1982 to 201 million in 2000, but it was relatively stable from 2000 to 2012. The number of primary school graduates increased from 359 million in 1982 to the peak of 464 million in 1995, then declined gradually to 354 million in 2012. This decline is expected as more primary school graduates continue to receive higher education, which is reflected by the rapid growth of junior middle school graduates.

The number of junior middle school students showed the largest growth among all education levels: the number increased from 181 million in 1982 to 515 million in 2012. This may be related to the implementation

of 9-Year Compulsory Schooling Law since 1994 (9-year schooling is equivalent to completing junior middle school). The number of senior middle school and that of college and above both started at very low numbers and grew significantly. Senior middle school graduates increased from 68 million in 1982 to 186 million in 2012, while college and above having increased from only 6 million in 1982 to 130 million in 2012. The numbers of these two education levels have kept a fast growth rate since mid-1980s, espacially after the expansion of university after 1999. Although the population of these two education levels still accounts for only a small part of the whole polulation, the increased population in these 13 years is much more than the population of these two education levels in 1980s and 1990s. Moreover, for the senior middle school and college and above levels, the growth in rural areas is much slower than that in the urban areas.
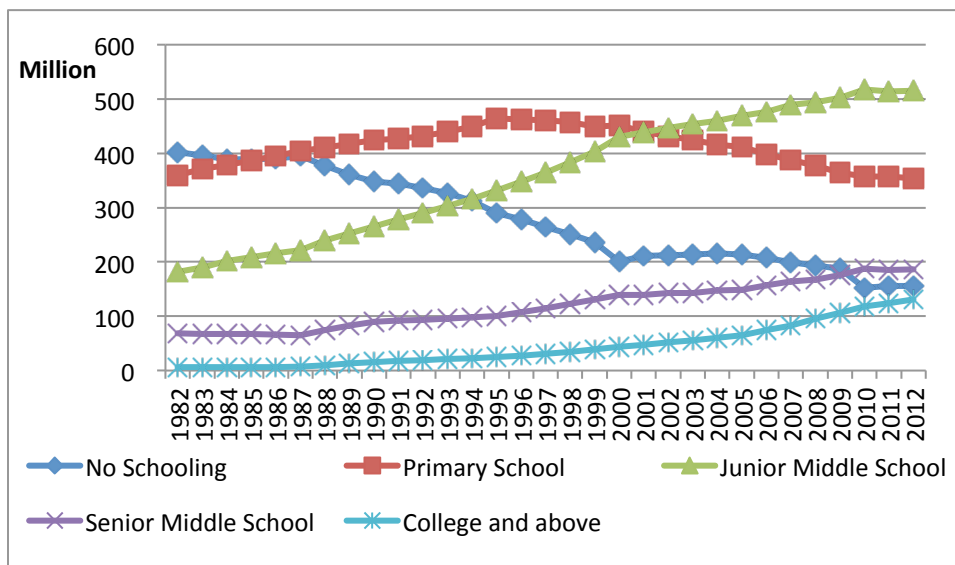
Figure 4.2.2 Population by Education Attainment in China 1982-2012
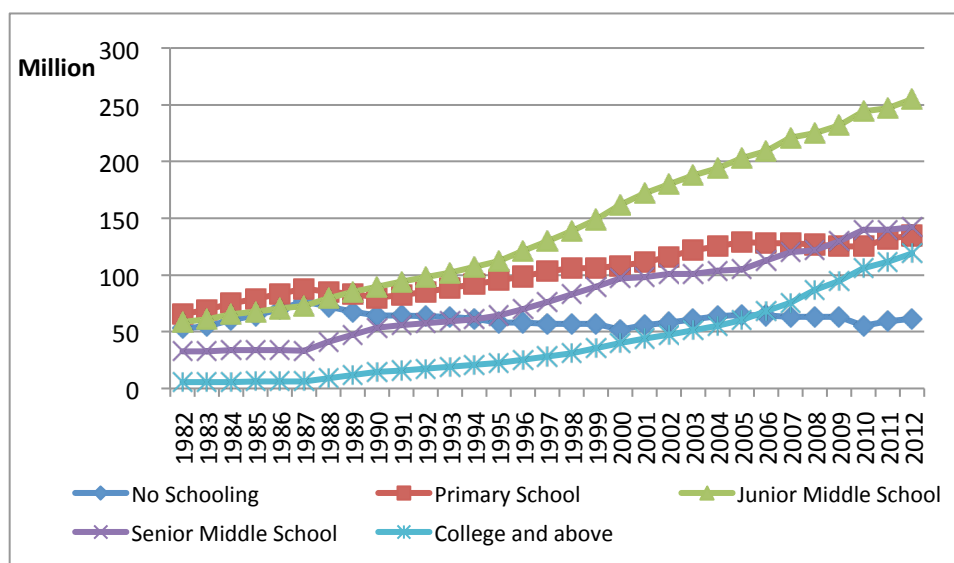
Figure 4.2.3 Urban Population by Educational Attainment 1982-2012
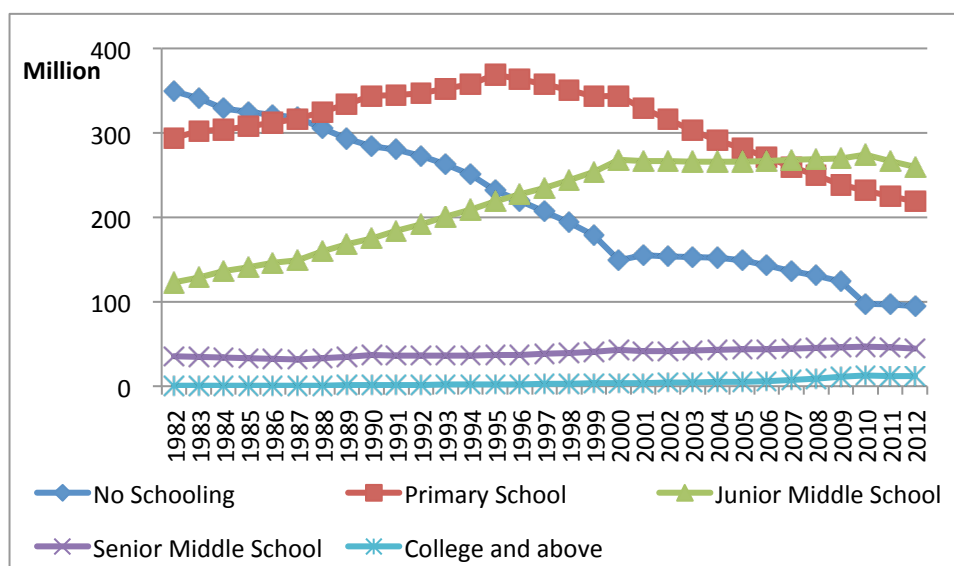
Figure 4.2.4 Rural Population by Educational Attainment 1982-2012

We now take a closer look at the changes in the distribution of educational attainment in the population at different time points. We do the comparision among the population of year 1985, 1995 and 2010 categorized by gender and region.

Figures 4.2.5 to 4.2.7 show the rightward shift of the educational attainment distribution in the population over time. In 1985, among the five education levels, the proportion of population being illiterate or just receiving primary education 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 left. By 2010, junior middle has become the dominant education level. The distribution is still skewed to the left, but it is much less so compared with the pattern 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, and the gender gap at high education levels also shrank considerably. Started with a very large difference in 1985 the female educational attainment distribution becomes similar to that of the male.
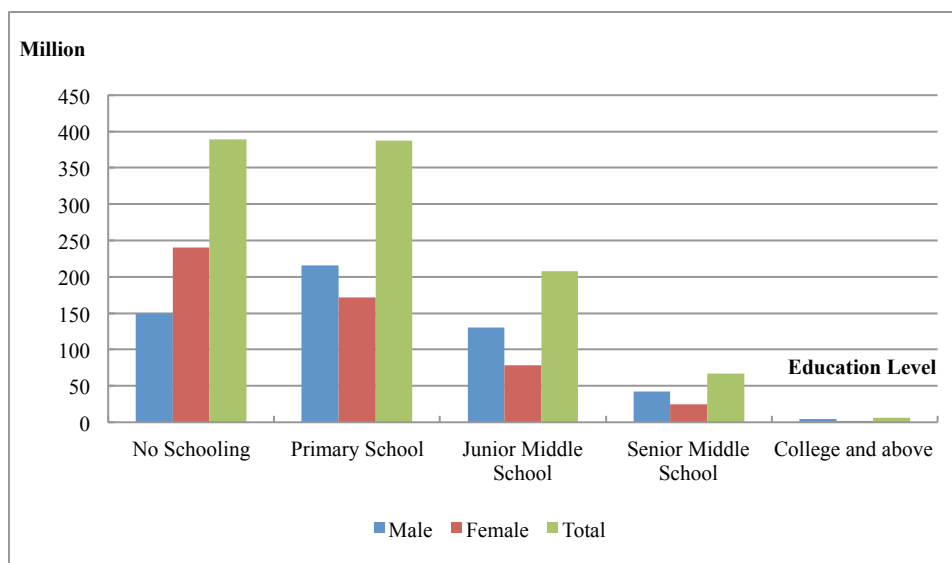
Figure 4.2.5 Population of Different Educational Levels by Gender, 1985
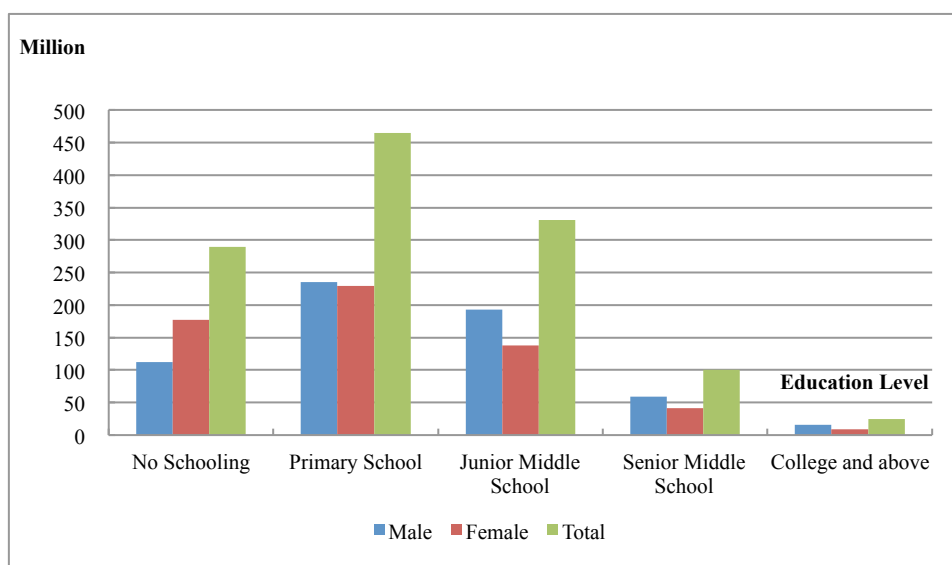
Figure 4.2.6 Population of Different Educational Levels by Gender, 1995
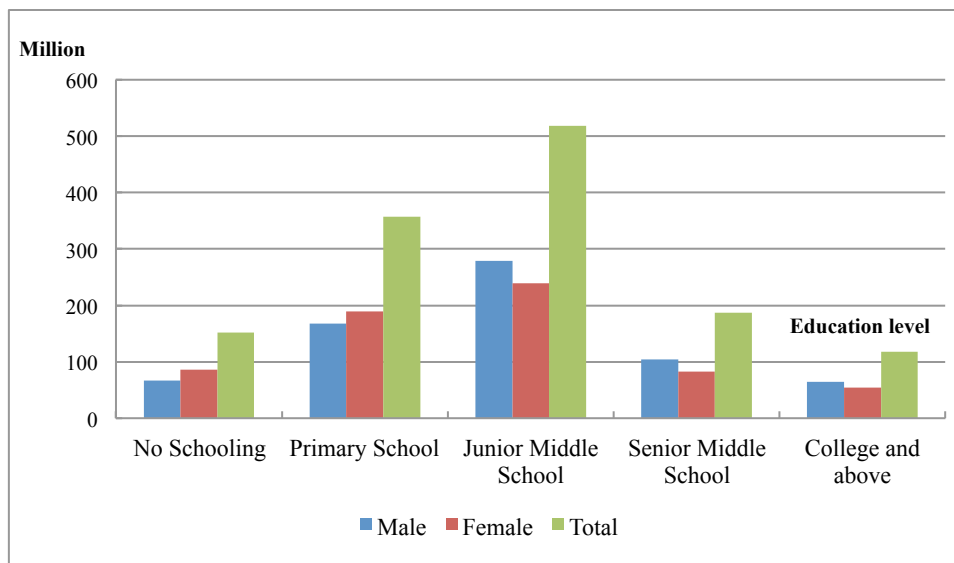
Figure 4.2.7 Population of Different Educational Levels by Gender, 2010

Chapter 5 Age and Education of Labor Force

We calculated provincial average age of labor population, average years of schooling and population proportions of high school educational attainment and above, in order to understand the degree of population aging, education status and higher education penetration of labor force more clearly at provincial level in China.

The cross-province comparison of these indicators, to some extent, can explain cross-province comparison of human capital. Moreover, the further analysis of the urban-rural comparison can help explain the human capital gap between urban and rural area within a province.

Meanwhile, according to the changes in these indicators over time, it can be clear to understand the growth of the human capital in China.

5.1 Definition of Labor Force and Education Level

Definition of Labor Force:

Male: the population in the range of 16-59 years old

Female: the population in the range of 16-54 years old

Definitions of educational attainment levels are shown in Table 5.1.1 and Table 5.1.2.

Table 5.1.1 Levels of Educational Attainment before 2000

Level	Illiterate	Primary School	Junior Middle	Senior Middle	College and Above
Years of Schooling	0	6	9	12	15

Table 5.1.2 Levels of Educational Attainment since 2000

Level	Illiterate	Primary School	Junior Middle	Senior Middle	College	University and Above
Years of Schooling	0	6	9	12	15	16

5.2 Average Age of National Labor Force

Figure 5.2.1 shows the upward trend in average age of labor force from 1982 to 2012 in Mainland China. The average age increases not only in rural area but also in urban area. The national average age increases from 32 years old in 1982 to 36 years old in 2012 and it is the same as rural average age, while the urban average age increases from 32 years old in 1982 to 35 in 2012. Since 1995, urban labor force average age is lower than rural because of the labor force immigration from rural area to urban area,
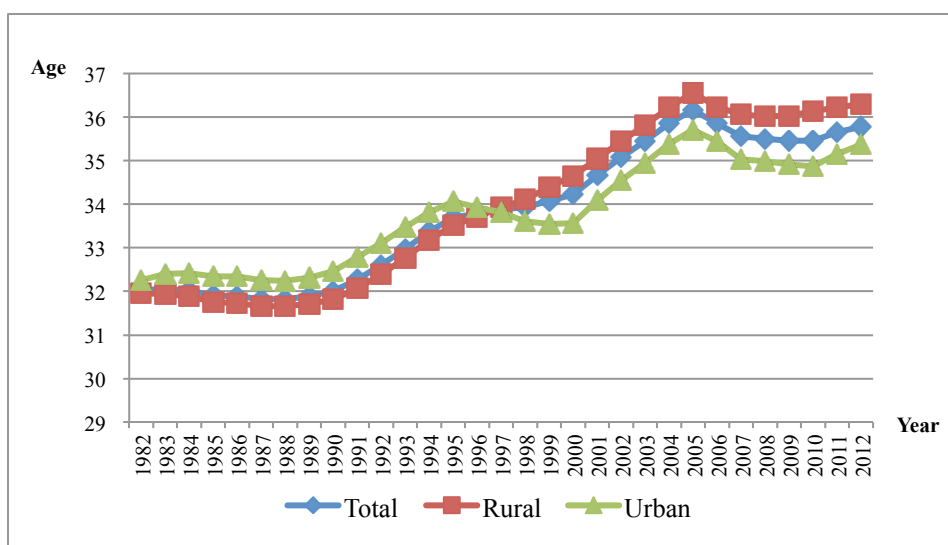
Figure 5.2.1 Average Age of National Labor Force

especially the young population immigration. Since 2005, the average age of labor force shows a slightly downward trend, because most of the new labor force entrants are young people and it decreases the average age of labor force. But the situation is opposite after 2008.

Table 5.2.1 Average Age of National Labor Force（1982-2012）

Unit：Year (of age)

Year	Average Age of Labor Force		
	Total	Urban	Rural
1982	32.03	32.25	31.96
1983	32.04	32.40	31.93
1984	32.02	32.42	31.89
1985	31.91	32.35	31.76
1986	31.89	32.34	31.73
1987	31.82	32.26	31.66
1988	31.82	32.24	31.66
1989	31.88	32.31	31.72
1990	32.00	32.47	31.82
1991	32.28	32.79	32.07
1992	32.60	33.12	32.39
1993	32.98	33.47	32.77
1994	33.38	33.82	33.19
1995	33.69	34.06	33.52
1996	33.79	33.94	33.72
1997	33.89	33.81	33.93
1998	33.93	33.61	34.10
1999	34.08	33.55	34.40
2000	34.22	33.57	34.65
2001	34.67	34.10	35.06
2002	35.08	34.55	35.45
2003	35.44	34.95	35.82
2004	35.86	35.39	36.23
2005	36.17	35.72	36.56
2006	35.86	35.44	36.24
2007	35.56	35.03	36.06

Year	Average Age of Labor Force		
	Total	**Urban**	**Rural**
2008	35.51	34.99	36.03
2009	35.46	34.92	36.04
2010	35.46	34.87	36.15
2011	35.65	35.16	36.23
2012	35.78	35.37	36.30

Figure 5.2.2 and Table 5.2.2 show the trends of labor force average age in Mainland, Hong Kong and Taiwan. The average age of labor force in Hong Kong increases from 35 in 1985 to 39 in 2012, while that of Taiwan increases from 33 in 1985 to 38 in 2012. The labor force average age of Taiwan is always between that of Hong Kong and Mainland China.
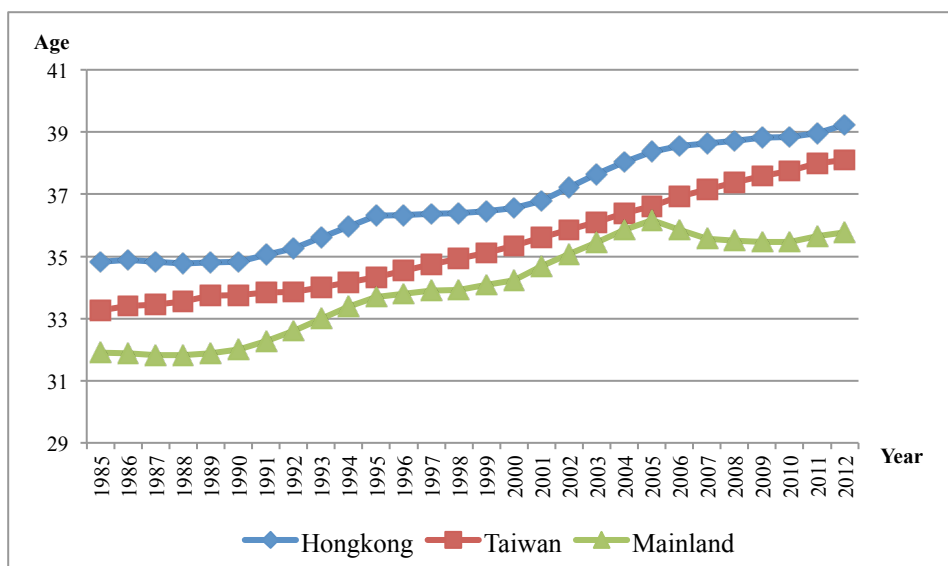
Figure 5.2.2 Average Age of Labor Force in Mainland, Hong Kong and Taiwan

Table 5.2.2 Average Age of Labor Force in Mainland, Hong Kong and Taiwan

Unit：Year (of age)

Year	Average Age of Labor Force		
	Hong Kong	**Taiwan**	**Mainland**
1985	34.83	33.26	31.91
1986	34.90	33.39	31.89
1987	34.82	33.45	31.82
1988	34.77	33.55	31.82
1989	34.81	33.73	31.88
1990	34.82	33.75	32.00
1991	35.05	33.84	32.28
1992	35.26	33.85	32.60
1993	35.61	34.00	32.98
1994	35.96	34.16	33.38
1995	36.30	34.32	33.69
1996	36.33	34.54	33.79
1997	36.37	34.74	33.89
1998	36.38	34.93	33.93
1999	36.45	35.12	34.08
2000	36.55	35.33	34.22
2001	36.77	35.61	34.67
2002	37.22	35.86	35.08
2003	37.65	36.10	35.44
2004	38.03	36.39	35.86
2005	38.38	36.61	36.17
2006	38.56	36.92	35.86
2007	38.64	37.15	35.56
2008	38.72	37.38	35.51
2009	38.81	37.57	35.46
2010	38.85	37.75	35.46
2011	38.96	37.99	35.65
2012	39.24	38.11	35.78

5.3 Average Years of Schooling of National Labor Force

Figure 5.3.1 shows the upward trend in average schooling years of national labor force from 1982 to 2012. The national average years of schooling increase from 5.96 years in 1982 to 9.91 in 2012, and the rural average years of schooling increase from 5.26 in 1982 to 8.57 in 2012 while the urban average years increase from 8.14 to 10.98 during the same period.
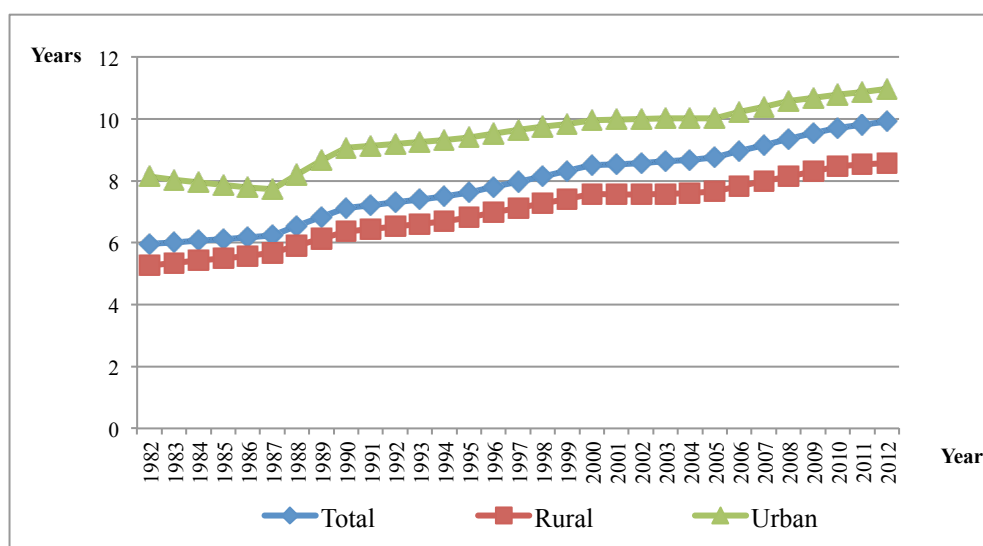
Figure 5.3.1   Average Years of Schooling of National Labor Force

Table 5.3.1 Average Years of Schooling of National Labor Force (1982-2012)

Unit: Year

Year	Average Years of Schooling		
	Total	**Urban**	**Rural**
1982	5.96	8.14	5.26
1983	6.00	8.04	5.35
1984	6.06	7.96	5.42
1985	6.11	7.88	5.50
1986	6.17	7.80	5.58
1987	6.23	7.73	5.68
1988	6.54	8.21	5.90

Year	Average Years of Schooling		
	Total	**Urban**	**Rural**
1989	6.84	8.65	6.12
1990	7.13	9.06	6.35
1991	7.22	9.13	6.44
1992	7.31	9.20	6.52
1993	7.40	9.26	6.60
1994	7.50	9.33	6.70
1995	7.62	9.40	6.82
1996	7.80	9.53	6.97
1997	7.97	9.64	7.12
1998	8.15	9.75	7.26
1999	8.33	9.84	7.41
2000	8.51	9.96	7.57
2001	8.54	9.98	7.57
2002	8.58	10.01	7.56
2003	8.63	10.02	7.57
2004	8.68	10.02	7.61
2005	8.76	10.03	7.67
2006	8.96	10.23	7.84
2007	9.16	10.40	8.00
2008	9.36	10.58	8.15
2009	9.54	10.69	8.31
2010	9.72	10.79	8.47
2011	9.81	10.88	8.52
2012	9.91	10.98	8.57
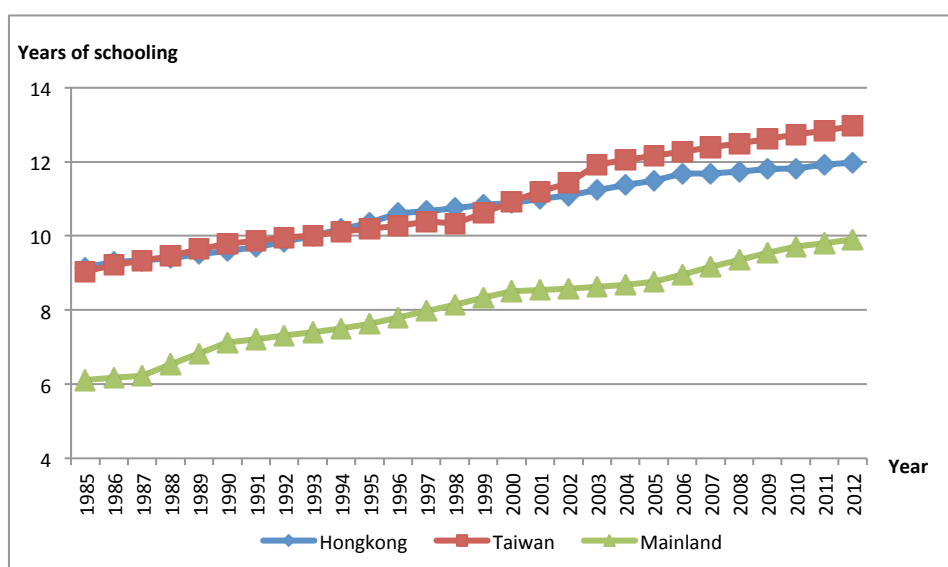
Figure 5.3.2 Average Years of Schooling of Labor Force in Mainland, Hong Kong and Taiwan

Figure 5.3.2 and Table 5.3.2 show the trends of average years of schooling of labor force in Mainland, Hong Kong and Taiwan. The labor force average years of schooling of Hong Kong increased from 9.15 in 1985 to 11.98 in 2012 while that of Taiwan increased from 9.04 in 1982 to 12.96 in 2012. The labor force years of schooling of Hong Kong and Taiwan are similar in 1985-2012, and both of them are significantly higher than Mainland counterpart.

Table 5.3.2 Average Years of Schooling of Labor Force in Mainland, Hong Kong and Taiwan

Unit: Year

Year	Average Years of Schooling		
	Hong Kong	**Taiwan**	**Mainland**
1985	9.15	9.04	6.11
1986	9.29	9.21	6.17
1987	9.33	9.33	6.23

Year	Average Years of Schooling		
	Hong Kong	Taiwan	Mainland
1988	9.41	9.46	6.54
1989	9.50	9.64	6.84
1990	9.60	9.79	7.13
1991	9.70	9.88	7.22
1992	9.83	9.96	7.31
1993	10.01	10.01	7.40
1994	10.19	10.10	7.50
1995	10.35	10.19	7.62
1996	10.62	10.27	7.80
1997	10.67	10.38	7.97
1998	10.74	10.33	8.15
1999	10.83	10.61	8.33
2000	10.88	10.92	8.51
2001	11.00	11.20	8.54
2002	11.10	11.43	8.58
2003	11.23	11.92	8.63
2004	11.37	12.04	8.68
2005	11.49	12.16	8.76
2006	11.69	12.28	8.96
2007	11.69	12.39	9.16
2008	11.74	12.50	9.36
2009	11.80	12.61	9.54
2010	11.82	12.73	9.72
2011	11.92	12.84	9.81
2012	11.98	12.96	9.91
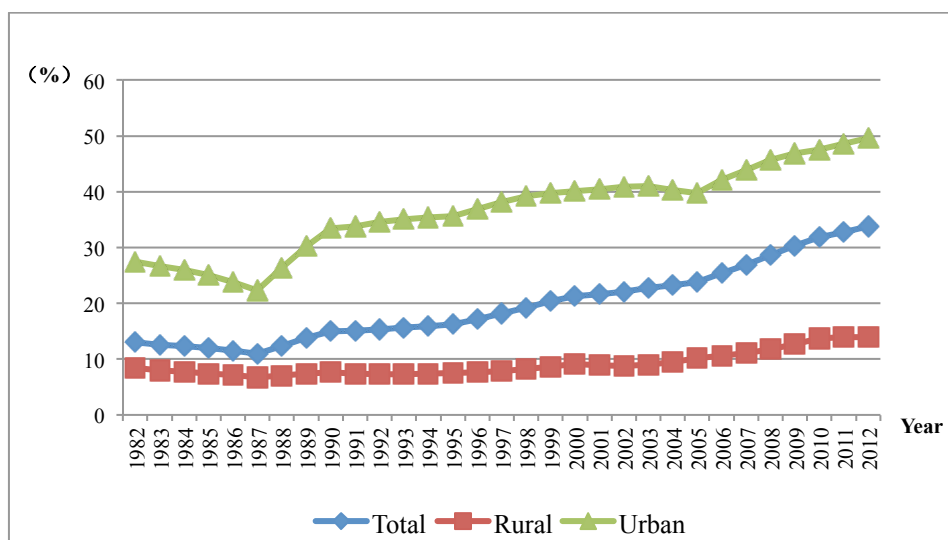
Figure 5.3.3 Proportions of High School and Above in Labor Force

Figure 5.3.3 shows the upward trend in the proportions of high school and above in labor force. The proportion significantly rises in general, but there was a slight fall from 1982 to 1987 for urban area because of the slight increase in urban labor force population and the stability in urban high school education population in labor force. National proportion of high school and above in labor force increases from 12.99% in 1982 to 33.81% in 2012, and rural proportion increases from 8.37% in 1982 to 13.94% in 2012 while urban proportion increases from 27.45% to 49.65%.

Table 5.3.3 National Proportions of High School and Above of National Labor Force (1982-2012)

Unit: %

Year	Proportions of High School and Above		
	Total	**Urban**	**Rural**
1982	12.99	27.45	8.37
1983	12.54	26.63	8.03
1984	12.35	25.97	7.74
1985	11.97	25.06	7.43

Year	Proportions of High School and Above		
	Total	Urban	Rural
1986	11.51	23.76	7.11
1987	10.94	22.30	6.73
1988	12.37	26.34	7.00
1989	13.82	30.23	7.35
1990	15.01	33.39	7.63
1991	15.07	33.82	7.42
1992	15.34	34.58	7.34
1993	15.63	35.06	7.32
1994	15.94	35.36	7.37
1995	16.26	35.66	7.46
1996	17.14	36.88	7.67
1997	18.12	38.14	7.91
1998	19.24	39.13	8.22
1999	20.35	39.71	8.62
2000	21.32	40.12	9.08
2001	21.62	40.38	8.88
2002	22.07	40.86	8.77
2003	22.72	40.97	8.96
2004	23.22	40.36	9.48
2005	23.81	39.76	10.19
2006	25.37	42.09	10.57
2007	26.92	43.90	11.04
2008	28.64	45.75	11.72
2009	30.29	46.80	12.65
2010	31.84	47.50	13.69
2011	32.79	48.53	13.91
2012	33.81	49.65	13.94
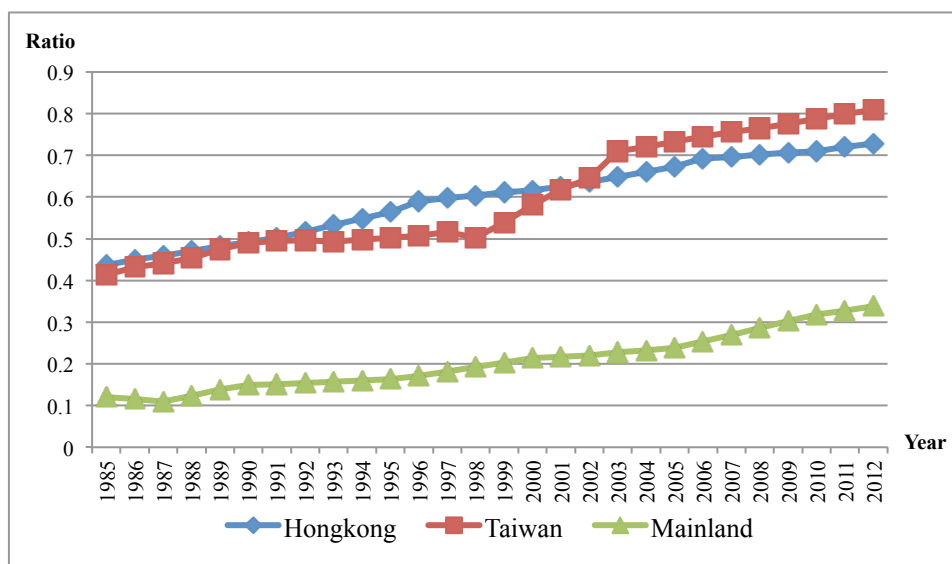
Figure 5.3.4 Proportions of High School Education and Above in Labor Force of Mainland, Hong Kong and Taiwan

Figure 5.3.4 and Table 5.3.4 show the trends in proportions of population with high school educational attainment and above in labor force of Mainland, Hong Kong and Taiwan. The proportion of Hong Kong increases from 43.57% in 1985 to 72.76% in 2012 while that of Taiwan increases from 41.34% in 1985 to 80.90% in 2012. The proportion of Hong Kong is greater than that of Taiwan before 2001, but smaller since 2001; meanwhile the proportions in these two areas are always much greater than that in Mainland China.

Table 5.3.4 Proportions of High School Education and Above in Labor Force of Mainland, Hong Kong and Taiwan

Unit: %

Year	Proportions of High School Education and Above		
	Hong Kong	**Taiwan**	**Mainland**
1985	43.57	41.34	11.97
1986	45.00	43.15	11.51

Year	Proportions of High School Education and Above		
	Hong Kong	Taiwan	Mainland
1987	45.94	44.03	10.94
1988	47.07	45.29	12.37
1989	48.23	47.41	13.82
1990	49.22	49.05	15.01
1991	50.31	49.43	15.07
1992	51.54	49.56	15.34
1993	53.24	49.30	15.63
1994	54.90	49.81	15.94
1995	56.40	50.29	16.26
1996	58.97	50.76	17.14
1997	59.67	51.62	18.12
1998	60.35	50.17	19.24
1999	61.12	53.86	20.35
2000	61.58	58.01	21.32
2001	62.46	61.68	21.62
2002	63.61	64.53	22.07
2003	64.82	70.87	22.72
2004	66.01	72.07	23.22
2005	67.23	73.31	23.81
2006	69.18	74.45	25.37
2007	69.54	75.55	26.92
2008	70.21	76.52	28.64
2009	70.71	77.61	30.29
2010	71.01	78.75	31.84
2011	71.98	79.83	32.79
2012	72.76	80.90	33.81
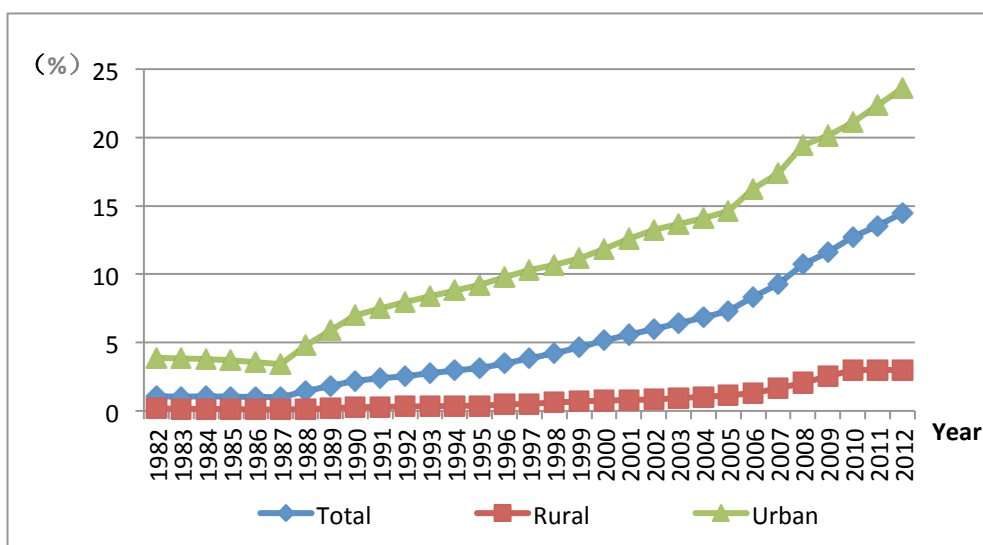
**Figure 5.3.5 National Proportions of College Education and Above
of National Labor Force**

Figure 5.3.5 shows the upward trend in the proportions of college and above in labor force. National proportion of college and above in labor force increased from 1.07% in 1982 to 14.45% in 2012, and rural proportion increased from 0.18% in 1982 to 2.98% in 2012 while urban proportion increased from 3.87% to 23.58%. The trend is consistent with the reality, which implies the improvement and expansion of higher education in China.

**Table 5.3.5 National Proportions of College and Above of National Labor Force
(1982-2012)**

Unit: %

Year	Proportions of College and Above		
	Total	Urban	Rural
1982	1.07	3.87	0.18
1983	1.05	3.84	0.16
1984	1.06	3.79	0.14
1985	1.04	3.68	0.12
1986	1.01	3.54	0.10

Year	Proportions of College and Above		
	Total	**Urban**	**Rural**
1987	0.99	3.42	0.09
1988	1.44	4.78	0.15
1989	1.82	5.91	0.21
1990	2.19	6.97	0.27
1991	2.38	7.50	0.29
1992	2.55	7.95	0.31
1993	2.75	8.39	0.34
1994	2.94	8.78	0.36
1995	3.14	9.20	0.39
1996	3.48	9.80	0.45
1997	3.83	10.32	0.52
1998	4.19	10.68	0.60
1999	4.64	11.16	0.68
2000	5.13	11.84	0.77
2001	5.56	12.59	0.79
2002	5.98	13.25	0.84
2003	6.40	13.66	0.92
2004	6.83	14.09	1.01
2005	7.32	14.60	1.11
2006	8.33	16.26	1.31
2007	9.25	17.37	1.66
2008	10.70	19.42	2.08
2009	11.63	20.14	2.54
2010	12.73	21.11	3.00
2011	13.53	22.31	2.99
2012	14.45	23.58	2.98

Figure 5.3.6 and Table 5.3.6 show the trends in proportions of population with college educational attainment and above in labor force of Mainland, Hong Kong and Taiwan. The proportion of Hong Kong increases from 10.09% in 1985 to 30.75% in 2012 while that of Taiwan increases from 12.77% in 1985 to 46.29% in 2012. The proportion of Hong Kong is

greater than that of Taiwan in general, and the proportions in these two areas are always much greater than that in Mainland China.
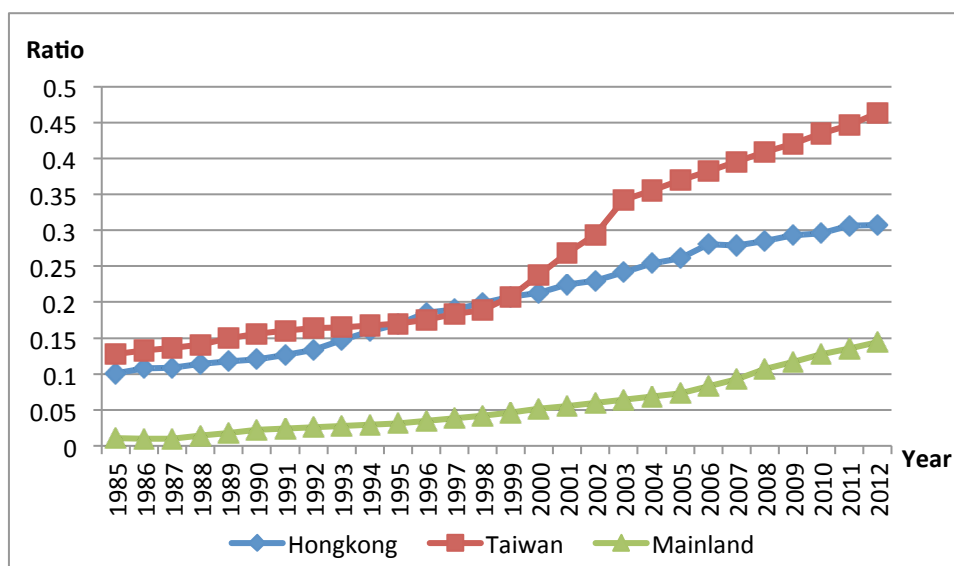
Figure 5.3.6 Proportions of College Education and Above in Labor Force of Mainland, Hong Kong and Taiwan

Table 5.3.6 Proportions of College Education and Above in Labor Force of Mainland, Hong Kong and Taiwan

Unit: %

Year	Proportions of College Education and Above		
	Hong Kong	**Taiwan**	**Mainland**
1985	10.09	12.77	1.04
1986	10.77	13.30	1.01
1987	10.90	13.66	0.99
1988	11.36	14.06	1.44
1989	11.75	14.98	1.82
1990	11.99	15.60	2.19
1991	12.62	16.03	2.38
1992	13.40	16.43	2.55
1993	14.70	16.47	2.75
1994	15.98	16.74	2.94
1995	16.95	17.03	3.14

Year	Proportions of College Education and Above		
	Hong Kong	Taiwan	Mainland
1996	18.57	17.51	3.48
1997	18.97	18.36	3.83
1998	19.83	18.90	4.19
1999	20.77	20.76	4.64
2000	21.28	23.75	5.13
2001	22.44	26.77	5.56
2002	22.94	29.36	5.98
2003	24.13	34.24	6.40
2004	25.34	35.54	6.83
2005	26.14	36.97	7.32
2006	28.08	38.22	8.33
2007	27.86	39.59	9.25
2008	28.49	40.85	10.70
2009	29.32	42.06	11.63
2010	29.54	43.50	12.73
2011	30.62	44.66	13.53
2012	30.75	46.29	14.45

5.4 Average Age of Labor Force at Provincial Level

Table 5.4.1 shows the comparison of average age of labor force in 2012 among all provinces in China in descending order. In general, the average age of labor force is distributed between 34 and 39 years old in 2012, and the three northeast provinces of China (Liaoning, Heilongjiang and Jilin) ranked the top while Tibet is at the bottom. Moreover, the average age of urban labor force is slightly lower than that of rural labor force within each province, except for Ningxia, Xinjiang, Qinghai and Tibet.

Table 5.4.1 Average Age of Labor Force at Provincial Level (2012)

Unit: Year (of age)

Rank	Province	Average Age		
		Sub-Total	Urban	Rural
1	Liaoning	37.70	37.37	38.30
2	Heilongjiang	37.35	37.31	37.39
3	Jilin	37.24	37.05	37.46
4	InnerMongolia	36.87	36.37	37.56
5	Shandong	36.57	35.55	37.67
6	Zhejiang	36.55	35.70	38.21
7	Jiangsu	36.29	35.68	37.42
8	Shanghai	36.27	36.27	-
9	Hunan	36.25	35.80	36.67
10	Chongqing	36.19	35.57	37.17
11	Anhui	35.88	35.51	36.20
12	Sichuan	35.86	35.03	36.59
13	Hubei	35.83	35.18	36.59
14	Mainland	35.78	35.37	36.30
15	Hebei	35.76	35.17	36.32
16	Tianjin	35.61	35.35	36.82
17	Shanxi	35.48	35.09	35.88
18	Jiangxi	35.39	35.12	35.63
19	Beijing	35.39	35.18	36.83
20	Fujian	35.29	34.64	36.35
21	Guizhou	35.28	35.03	35.43
22	Henan	35.24	34.64	35.68
23	Guangxi	35.20	34.64	35.66
24	Yunnan	35.15	34.94	35.27
25	Gansu	35.14	34.75	35.39
26	Shaanxi	35.14	34.27	35.99
27	Ningxia	34.89	35.15	34.62
28	Xinjiang	34.84	35.60	34.20
29	Hainan	34.58	34.27	34.90
30	Qinghai	34.55	34.57	34.54
31	Guangdong	33.84	33.67	34.23
32	Tibet	33.36	34.19	33.11

5.5 Education Indicators at Provincial Level

Table 5.5.1 shows the provincial rankings of average years of schooling of labor force in 2012. In general, the provinces with better economic development have longer average years of schooling accordingly, such as Beijing, Shanghai and Tianjin; in contrast, those underdeveloped provinces, such as Yunnan, Guizhou and Tibet, rank at the bottom. Average schooling years of urban labor force are longer than that of rural labor force in each province, and the urban-rural gap is greater in underdeveloped provinces. For example, the urban-rural differential in Tibet is 4.45 years while the gap in Beijing is only 2.42.

Table 5.5.1 Average Years of Schooling of Labor Force at Provincial Level (2012)

Unit: Year

Rank	Province	Average Years of Schooling		
		Sub-total	Urban	Rural
1	Beijing	12.23	12.54	10.12
2	Shanghai	11.34	11.34	-
3	Tianjin	10.99	11.43	9.03
4	Liaoning	10.33	11.28	8.64
5	Jiangsu	10.29	10.93	9.09
6	Hubei	10.23	11.34	8.92
7	Shaanxi	10.16	11.51	8.84
8	Shanxi	10.14	11.19	9.06
9	Jilin	10.12	11.45	8.52
10	Guangdong	10.11	10.63	8.89
11	Hunan	10.06	11.14	9.04
12	Shandong	9.99	11.10	8.79
13	InnerMongolia	9.94	10.93	8.56
14	Mainland	9.91	10.98	8.57
15	Chongqing	9.90	10.88	8.34
16	Heilongjiang	9.89	11.06	8.42

Rank	Province	Average Years of Schooling		
		Sub-total	Urban	Rural
17	Hebei	9.89	10.98	8.87
18	Hainan	9.86	10.91	8.75
19	Henan	9.83	11.08	8.91
20	Xinjiang	9.76	11.31	8.45
21	Zhejiang	9.76	10.33	8.64
22	Fujian	9.74	10.41	8.65
23	Jiangxi	9.60	10.76	8.59
24	Guangxi	9.52	10.80	8.48
25	Ningxia	9.50	10.92	8.00
26	Anhui	9.42	10.62	8.36
27	Sichuan	9.42	10.86	8.16
28	Gansu	9.09	11.21	7.74
29	Guizhou	8.57	10.32	7.51
30	Qinghai	8.54	10.50	6.64
31	Yunnan	8.46	10.16	7.45
32	Tibet	5.70	9.08	4.63

Table 5.5.2 shows the provincial rankings for proportion of high school education and above in total, rural and urban labor force in 2012. Beijing, Shanghai and Tianjin are top 3 in accordance with their rankings of average years of schooling. National proportion ranks the 14th, Meanwhile Yunnan and Tibet are at the bottom, the same as their rankings of average years of schooling.

Table 5.5.2 The Proportion of High School Education and Above of Labor Force at Provincial Level (2012)

Unit：%

Rank	Province	The proportion of high school education and above		
		Sub-total	Urban	Rural
1	Beijing	0.64	0.68	0.35
2	Shanghai	0.52	0.52	-

Rank	Province	The proportion of high school education and above		
		Sub-total	Urban	Rural
3	Tianjin	0.48	0.55	0.17
4	Jiangsu	0.38	0.48	0.20
5	Hubei	0.38	0.56	0.17
6	Shanxi	0.37	0.58	0.17
7	Guangdong	0.36	0.45	0.16
8	Jilin	0.36	0.57	0.11
9	Liaoning	0.36	0.50	0.10
10	Hunan	0.35	0.53	0.19
11	Chongqing	0.35	0.49	0.13
12	InnerMongolia	0.35	0.49	0.15
13	Shanxi	0.35	0.52	0.17
14	Mainland	0.34	0.50	0.14
15	Shandong	0.34	0.51	0.14
16	Zhejiang	0.33	0.40	0.17
17	Hainan	0.32	0.50	0.14
18	Xinjiang	0.32	0.56	0.12
19	Ningxia	0.32	0.50	0.14
20	Fujian	0.32	0.42	0.16
21	Heilongjiang	0.32	0.50	0.08
22	Henan	0.30	0.52	0.15
23	Hebei	0.30	0.48	0.13
24	Qinghai	0.30	0.51	0.09
25	Gansu	0.30	0.56	0.13
26	Sichuan	0.29	0.50	0.11
27	Jiangxi	0.29	0.47	0.14
28	Guangxi	0.27	0.48	0.11
29	Anhui	0.27	0.44	0.11
30	Guizhou	0.21	0.42	0.08
31	Yunnan	0.21	0.41	0.09
32	Tibet	0.14	0.40	0.06

Table 5.5.3 shows the provincial rankings for proportion of college education and above of labor force in 2012.The rankings are consistent with the rankings of proportion of high school education in general. But

considering the facts that quantity and quality of colleges in different provinces vary at lot and that most college students from other provinces are counted as part of the population in the provinces where they are studying, hence there are some inconsistencies between these two rankings for a few provinces. For example, Liaoning Province has lower rank in this ranking list than its rank in the proportion of high school education.

Table 5.5.3 The Proportion of College Education and Above of Labor Force at Provincial Level (2012)

Unit: %

Rank	Province	The proportion of college education and above		
		Sub-total	**Urban**	**Rural**
1	Beijing	0.40	0.44	0.11
2	Shanghai	0.29	0.29	-
3	Tianjin	0.24	0.29	0.04
4	Liaoning	0.18	0.26	0.03
5	Shanxi	0.17	0.30	0.04
6	Jiangxi	0.16	0.23	0.05
7	Hubei	0.16	0.27	0.04
8	Xinjiang	0.16	0.30	0.04
9	InnerMongolia	0.16	0.24	0.05
10	Jilin	0.15	0.26	0.02
11	Chongqing	0.15	0.23	0.02
12	Zhejiang	0.15	0.20	0.04
13	Ningxia	0.15	0.25	0.03
14	Mainland	0.14	0.24	0.03
15	Shandong	0.14	0.24	0.03
16	Shanxi	0.14	0.24	0.03
17	Fujian	0.13	0.19	0.04
18	Hunan	0.13	0.24	0.03
19	Heilongjiang	0.13	0.22	0.02
20	Guangdong	0.13	0.17	0.03
21	Hebei	0.13	0.24	0.02
22	Qinghai	0.13	0.23	0.02

Rank	Province	The proportion of college education and above		
		Sub-total	Urban	Rural
23	Hainan	0.12	0.21	0.03
24	Gansu	0.12	0.27	0.02
25	Jiangxi	0.12	0.22	0.03
26	Anhui	0.12	0.22	0.03
27	Sichuan	0.12	0.22	0.02
28	Henan	0.11	0.23	0.03
29	Guangxi	0.10	0.20	0.02
30	Guizhou	0.09	0.21	0.02
31	Yunnan	0.09	0.21	0.03
32	Tibet	0.08	0.24	0.03

.

Chapter 6   National human capital

6.1 Trends in human capital

It is more meaningful to discuss the trends of the real value of the human capital stock than the nominal value. We use CPI as deflator to calculate the real values. Other published deflators are not available for recent years while CPI is updated year by year. Moreover, as can be seen in preceding chapters, results based on CPI provide more conservative estimates than those based on capital deflators reported in the studies by Zhang(2004) and Holz(2006).

The discussions of human capital categorized by gender and by region are important in our report. Table 6.1.1 shows real human capital for the country as a whole based on 5-education categories, by gender, and by region. From 1985 to 2012, human capital increased 5.76 times from 40 trillion to 230.38 trillion Yuan, an average annual growth rate of 6.48%, lower than the growth rate of the economy.[1] Based on the 6-education categories, the human capital increased from 92.47 trillion Yuan in 2000 to 234.35 trillion Yuan in 2012, an average annual growth rate of 7.75%. This measure reflects the exit of the aging low-educated population from the labor market and the entrance of younger individuals with higher expected education and higher income.

Both urban real capital and rural real capital increased in 1985-2012. Rural real human capital increased from 22.66 trillion Yuan to 49.68 trillion Yuan; urban real human capital grew from 17.34 trillion to 180.7 trillion Yuan. The corresponding annual growth rates are 2.91% for rural areas and

---

[1] The average annual growth rate is the average of annual logarithmic growth rate, and the same as follows.

8.68% for urban areas. Until 1990, urban real human capital is smaller than rural real human capital, while after 1990 urban human capital exceeds that in rural areas.

Table 6.1.1 National Real Human Capital by Gender and Region[2]

Billions of 1985 Yuan

Year	National	Male	Female	Urban	Rural
1985	40000	24210	15799	17340	22660
1986	43620	26660	16968	19650	23970
1987	47170	29090	18072	21820	25350
1988	46020	28510	17499	21630	24390
1989	44890	27960	16929	21850	23040
1990	50900	31880	19021	26000	24900
1991	56010	35220	20780	28900	27110
1992	59910	37820	22100	31240	28670
1993	59640	37840	21780	31500	28140
1994	54350	34720	19634	29100	25250
1995	52460	33570	18899	28730	23730
1996	55250	35500	19745	31630	23620
1997	61280	39610	21672	36600	24680
1998	69920	45420	24499	43370	26550
1999	80590	52420	28170	52010	28580
2000	91310	59590	31730	60370	30940
2001	101030	65670	35350	68250	32780
2002	114460	74680	39780	79290	35170
2003	127050	82540	44510	90260	36790
2004	135440	87590	47860	97990	37450
2005	151140	96780	54340	111800	39340
2006	160190	104530	55700	118400	41790
2007	173960	113290	60700	131400	42560
2008	177200	115870	61330	134200	43000
2009	198010	129160	68890	151400	46610

[2] 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
2010	212380	138600	73760	163800	48580
2011	218200	142470	75780	169900	48300
2012	230380	149010	81290	180700	49680

Figure 6.1.1 shows the trend of urban and rural real human capital. Rural real human capital had little difference with urban real human capital before 1998, even higher than urban before 1990. However, since 1997, rural real human capital has shown a relatively lower growth rate compared to the accelerating growth rate of urban real human capital, and the gap between urban and rural also increased. There are several reasons for the more rapid growth of the urban than of the rural human-capital stock. Although the rural population which was 808 million was more than three times the size of the urban population which was 251 million in 1985 and thus had larger amount of human capital in the earlier years, by 2012, the population in rural China had fallen to 630 million, lower than the urban population of 712 million. This change was, to a large extent, a result of the rapid urbanization during the course of economic transition as well as the large scale rural-urban migration. These changes are magnified by the education gap between the urban and rural populations. Urban areas usually have a higher proportion of educated population than rural areas. As shown in the figure, the trend of national human capital most depends on the trend of urban human capital.
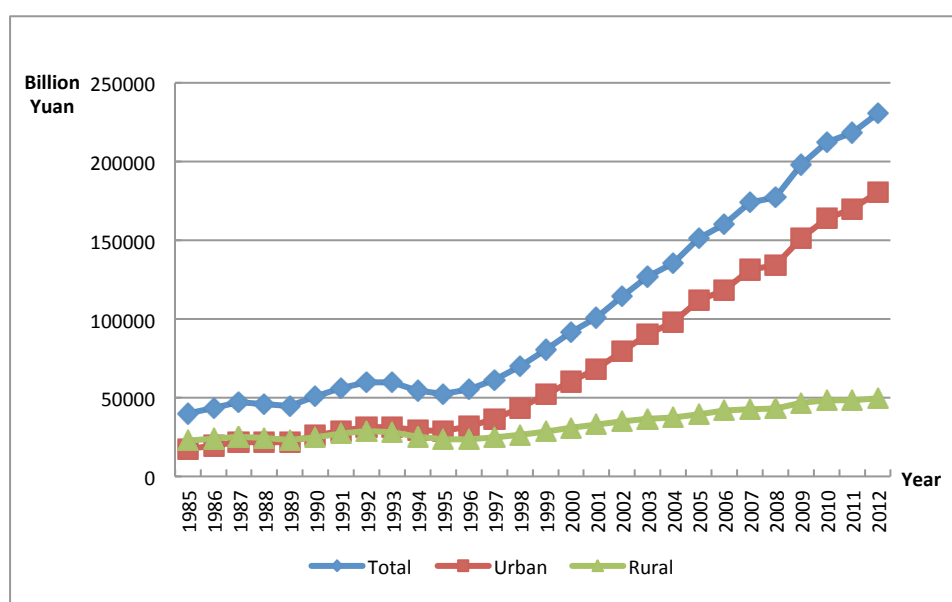
Figure 6.1.1 National Real Human Capital by Region,1985-2012

We report human capital indices (1985 = 100) by gender and region in table 6.1.2.

Table 6.1.2 National Real Human Capital Index (1985=100)

Year	National	Male	Female	Urban	Rural
1985	100	100	100	100	100
1986	109.05	110.12	107.40	113.32	105.78
1987	117.93	120.16	114.39	125.84	111.87
1988	115.05	117.76	110.76	124.74	107.63
1989	112.23	115.49	107.15	126.01	101.68
1990	127.25	131.68	120.39	149.94	109.89
1991	140.03	145.48	131.53	166.67	119.64
1992	149.78	156.22	139.88	180.16	126.52
1993	149.10	156.30	137.86	181.66	124.18
1994	135.88	143.41	124.27	167.82	111.43
1995	131.15	138.66	119.62	165.69	104.72
1996	138.13	146.63	124.98	182.41	104.24
1997	153.20	163.61	137.17	211.07	108.91

1998	174.80	187.61	155.07	250.12	117.17
1999	201.48	216.52	178.30	299.94	126.13
2000	228.28	246.14	200.84	348.15	136.54
2001	252.58	271.25	223.75	393.60	144.66
2002	286.15	308.47	251.79	457.27	155.21
2003	317.63	340.93	281.73	520.53	162.36
2004	338.60	361.79	302.93	565.11	165.27
2005	377.85	399.75	343.95	644.75	173.61
2006	400.48	431.76	352.55	682.81	184.42
2007	434.90	467.95	384.20	757.79	187.82
2008	443.00	478.60	388.19	773.93	189.76
2009	495.03	533.50	436.04	873.13	205.69
2010	530.95	572.49	466.86	944.64	214.39
2011	545.50	588.48	479.65	979.82	213.15
2012	575.95	615.49	514.53	1042.10	219.24

6.2 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. To further understand the underlying factors contributing to human-capital dynamics, we first calculate real human capital per capita, i.e., the ratio of real human capital to the non-retired population.

Table 6.2.1 shows the real human capital for the nation, and by gender and region based on 5-education group categories. The national real human capital per capita grew 3.93 times, from 41.63 thousand Yuan in 1985 to 205.35 thousand Yuan in 2012, with an average annual growth rate of 5.91%.

74

The fast growth rate was caused by the rapid growth of economy, the expansion of education and the improvement of market economy. Moreover, real human capital per capita for the urban population kept higher than that for the rural population in 1985-2012.

Table 6.2.1 National Real Human Capital Per Capita by Gender and Region

Thousands of 1985 Yuan

Year	National	Male	Female	Urban	Rural
1985	41.63	47.81	34.76	76.26	30.90
1986	44.83	52.05	36.83	82.62	32.60
1987	47.78	56.00	38.63	87.75	34.33
1988	45.94	53.99	36.94	83.92	32.75
1989	44.20	52.06	35.38	82.47	30.68
1990	49.31	58.22	39.26	95.44	32.78
1991	53.73	63.84	42.36	103.12	35.55
1992	56.96	68.09	44.53	108.66	37.52
1993	56.34	67.86	43.48	107.04	36.76
1994	50.99	61.89	38.88	96.76	32.98
1995	48.89	59.65	37.04	93.56	31.02
1996	51.01	62.35	38.44	96.58	31.25
1997	56.11	68.93	41.88	105.18	33.20
1998	63.58	78.43	47.05	117.90	36.33
1999	73.00	89.90	54.09	134.54	39.87
2000	81.67	100.74	60.26	148.33	43.49
2001	90.13	110.94	66.83	160.66	47.09
2002	102.09	126.64	74.84	179.46	51.74
2003	113.55	140.60	83.69	197.26	55.60
2004	121.51	150.26	90.01	208.65	58.06
2005	136.05	166.34	102.71	232.53	62.46
2006	143.89	178.68	105.44	237.18	68.15
2007	156.36	192.84	115.61	252.82	71.78
2008	159.52	196.90	117.40	251.43	74.42
2009	178.58	219.13	132.64	275.85	83.21
2010	189.17	231.56	140.73	285.29	88.39

| 2011 | 194.29 | 237.47 | 144.86 | 287.62 | 90.73 |
| 2012 | 205.35 | 249.31 | 155.07 | 297.95 | 96.37 |

Figure 6.2.1 shows the trend of urban and rural real human capital per capita. The urban real human capital per capita was considerably higher than rural human capital per capita with a widening gap. Based on Fleisher, Li and Zhao (2009), human capital is a significant contributing factor to economic growth, and the higher growth rate of per-capita human capital in urban areas is closely related to rural-urban and to regional growth in income gaps. It is worth noting that, although after 1997 rural human capital became less than the urban stock, the rural per capita stock has also been accelerating.
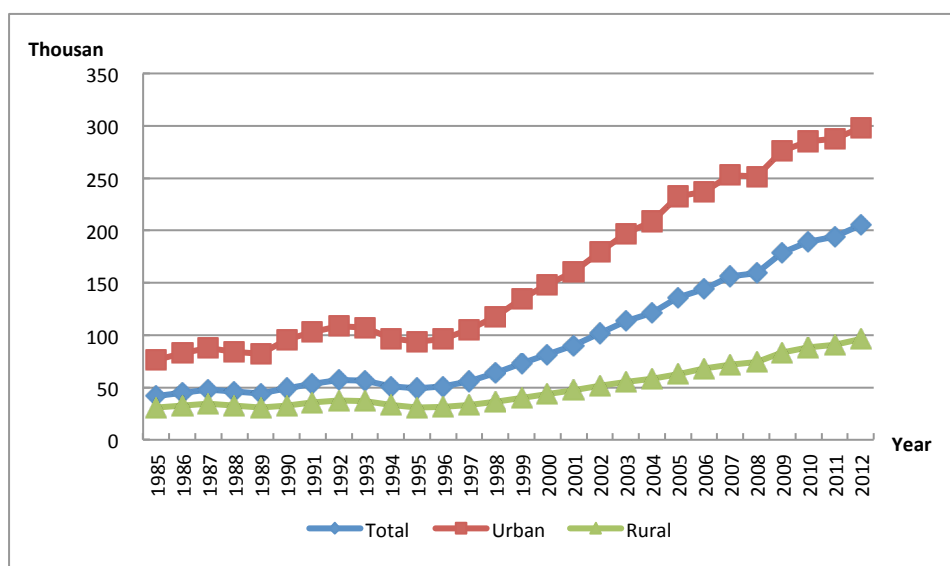
Figure 6.2.1 National Real Human Capital Per Capita by Region, 1985-2012
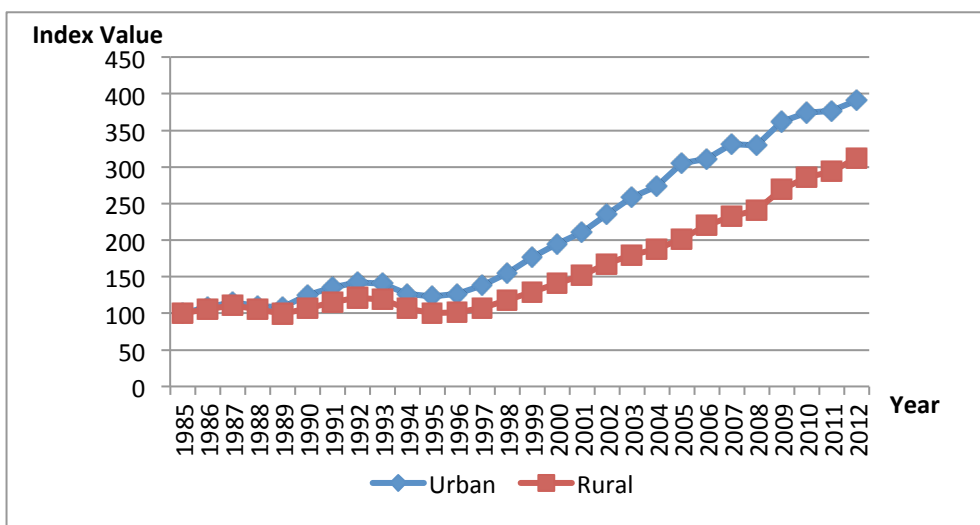
Figure 6.2.2 National Real Human Capital Per Capita Index by Region, 1985-2012

6.3 Labor force human capital

We also use the J-F method to estimate 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.

6.3.1 National labor force human capital

The national labor force human capital is reported in table 6.3.1. It applies the national income parameters, national population and the 4.58% discount rate discussed in preceding chapters. The first two columns show the nominal labor force human capital based on 5-education and 6-education categories. The third and the forth columns show the real values. The real values in this table are calculated by deflating the nominal values with the CPI using 1985 as the base year. The fifth column shows the nominal GDP and the ratio of labor force human capital to GDP is showed in the last column.

Table 6.3.1 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 5-education categories	By 6-education categories	By 5-education categories	By 6-education categories		
1985	16681		16681		904	18.45
1986	19604		18411		1031	19.01
1987	23160		20274		1210	19.14
1988	27700		20362		1510	18.34
1989	32600		20323		1709	19.08
1990	38120		23060		1877	20.31
1991	43600		25450		2190	19.91
1992	49150		26930		2707	18.16
1993	55200		26320		3552	15.54
1994	61640		23650		4846	12.72
1995	69100		22620		6113	11.30
1996	77850		23470		7157	10.88
1997	88130		25770		7943	11.10
1998	100780		29630		8488	11.87
1999	114590		34060		9019	12.71
2000	132510	129910	39100	38360	9978	13.28
2001	143340	141280	41940	41350	11027	13.00
2002	155170	153760	45750	45320	12100	12.82
2003	169050	168450	49230	49040	13657	12.38
2004	184180	184880	51590	51750	16071	11.46
2005	203260	203950	55840	56020	18590	10.93
2006	227770	228900	61670	61930	21766	10.46
2007	255890	257300	66070	66390	26802	9.55
2008	283010	284850	68970	69380	31675	8.93
2009	325470	327820	79750	80280	34563	9.42
2010	376900	380200	89260	90000	40890	9.22
2011	407500	411100	91490	92290	48412	8.42
2012	439600	443900	96150	97060	53412	8.23

The ratio of nominal labor force human capital to nominal GDP shows the efficiency of the use of human capital. The decline in the ratio over time can reflect growing productivity of human capital, but the decrease of the ratio may reflect that the future growth of the GDP will diminish over time. Figure 6.3.1 shows the trend for the ratio. The level of nominal labor force human capital is much higher than that of nominal GDP, but it shows a decreasing trend. The ratio remained between 8 and 12 in 1995-2012. It indicates that although national human capital level still remains much lower than physical capital, the efficiency of human capital has improved. However, the decreasing trend may also indicate possible constraints on the future GDP growth in China.
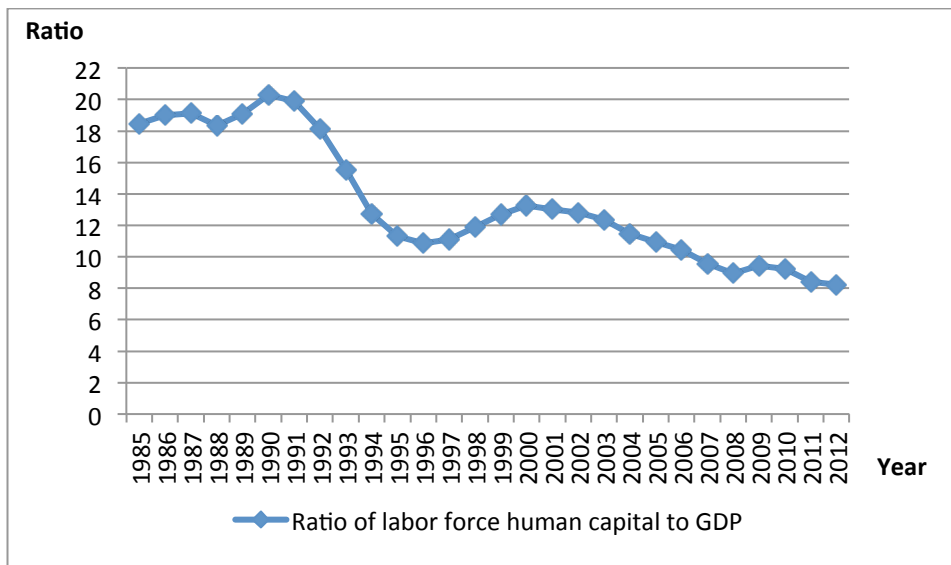
Figure 6.3.1 National Ratio of Labor Force Human Capital to GDP,1985-2012

Tables 6.3.2 and 6.3.3 show the labor force human capital by gender and region based on the 5-education categories, respectively. The first 3 columns are the nominal values and the last 3 columns are the real values.

Table 6.3.2 National Nominal and Real Labor Force Human Capital by Gender[3]

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	16681	10165	6516	16681	10165	6516
1986	19604	12053	7555	18411	11318	7097
1987	23160	14364	8804	20274	12561	7709
1988	27700	17291	10405	20362	12704	7663
1989	32600	20464	12140	20323	12747	7572
1991	43600	27630	15969	25450	16123	9328
1992	49150	31210	17931	26930	17087	9836
1993	55200	35210	19988	26320	16777	9544
1994	61640	39480	22150	23650	15140	8515
1995	69100	44380	24720	22620	14516	8101
1996	77850	50470	27380	23470	15204	8263
1997	88130	57570	30560	25770	16830	8947
1998	100780	66370	34410	29630	19508	10127
1999	114590	76030	38560	34060	22592	11471
2000	132510	88730	43760	39100	26180	12925
2001	143340	95780	47570	41940	28020	13927
2002	155170	103660	51560	45750	30540	15198
2003	169050	112530	56550	49230	32770	16460
2004	184180	122640	61580	51590	34350	17245
2005	203260	135080	68140	55840	37120	18720
2006	227770	152610	75190	61670	41320	20344
2007	255890	171810	84100	66070	44370	21701
2008	283010	190220	92850	68970	46360	22616
2009	325470	219350	106090	79750	53760	25980
2010	376900	254190	122680	89260	60220	29043
2011	407500	274070	133350	91490	61560	29923

[3] 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	Nominal labor force human capital (Billions of Yuan)			Real labor force human capital (Billions of 1985 Yuan)		
	National	Male	Female	National	Male	Female
2012	439600	295280	144290	96150	64600	31550

Table 6.3.3 shows the nominal and real labor force human capital for urban and rural regions respectively. The national nominal and real labor force human capital both were increasing during 1985-2012. Although the national real labor force human capital for urban and rural areas both exhibit positive trends, the urban real labor force human capital surpassed its rural counterpart for the first time in 1996. The regional gap increased from 0.37 trillion Yuan in 1996 to 42.19 trillion Yuan in 2012. In 2012, the national real labor force human capital was 2.56 times that that of the rural stock.

Table 6.3.3 National Nominal and Real Labor Force Human Capital by Region

Year	Nominal labor force human capital			Real labor force human capital (Billions of 1985 Yuan)		
	National	Urban	Rural	National	Urban	Rural
1985	16681	6750	9931	16681	6750	9931
1986	19604	8304	11300	18411	7761	10650
1987	23160	10210	12950	20274	8774	11500
1988	27700	12640	15060	20362	8992	11370
1989	32600	15280	17320	20323	9353	10970
1990	38120	18330	19790	23060	11070	11990
1991	43600	21230	22370	25450	12200	13250
1992	49150	24100	25050	26930	12760	14170
1993	55200	27340	27860	26320	12460	13860
1994	61640	31070	30570	23650	11330	12320
1995	69100	35360	33740	22620	11040	11580
1996	77850	41530	36320	23470	11920	11550
1997	88130	48980	39150	25770	13630	12140
1998	100780	58480	42300	29630	16380	13250

Year	Nominal labor force human capital			Real labor force human capital (Billions of 1985 Yuan)		
	National	Urban	Rural	National	Urban	Rural
1999	114590	69570	45020	34060	19740	14320
2000	132510	83660	48850	39100	23550	15550
2001	143340	91640	51700	41940	25610	16330
2002	155170	100000	55170	45750	28250	17500
2003	169050	109900	59150	49230	30760	18470
2004	184180	121500	62680	51590	32920	18670
2005	203260	136500	66760	55840	36380	19460
2006	227770	153000	74770	61670	40200	21470
2007	255890	173600	82290	66070	43650	22420
2008	283010	193100	89910	68970	45970	23000
2009	325470	228300	97170	79750	54810	24940
2010	376900	272000	104900	89260	63280	25980
2011	407500	296200	111300	91490	65430	26060
2012	439600	321500	118100	96150	69170	26980

Figure 6.3.3 shows the trends of real labor force human capital for urban and rural areas, respectively. Before 1996, the real labor force human capital for the rural regions was higher than that for urban areas. After 1996, the real labor force human capital for urban areas increased more rapidly than that for rural areas, resulting in an increasing rural-urban gap. The reasons, as discussed previously include urbanization, migration and the education gap between the urban and rural populations.
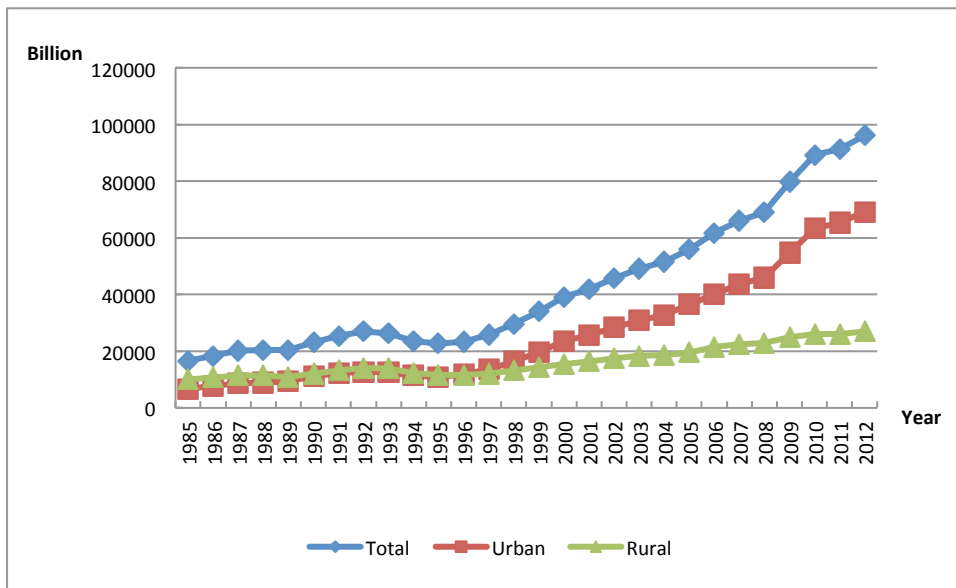
Figure 6.3.3 National Real Labor Force Human Capital by Region, 1985-2012

Figure 6.3.4 shows the national ratio of labor force human capital to total human capital by five education categories. The ratio reflects 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, rebounding somewhat in 1997. The decreasing trend may indicate that the proportion of young generation in total population is getting smaller, and the aging population phenomenon becomes dominant. This may reflect the constraints on future productivity growth in China.
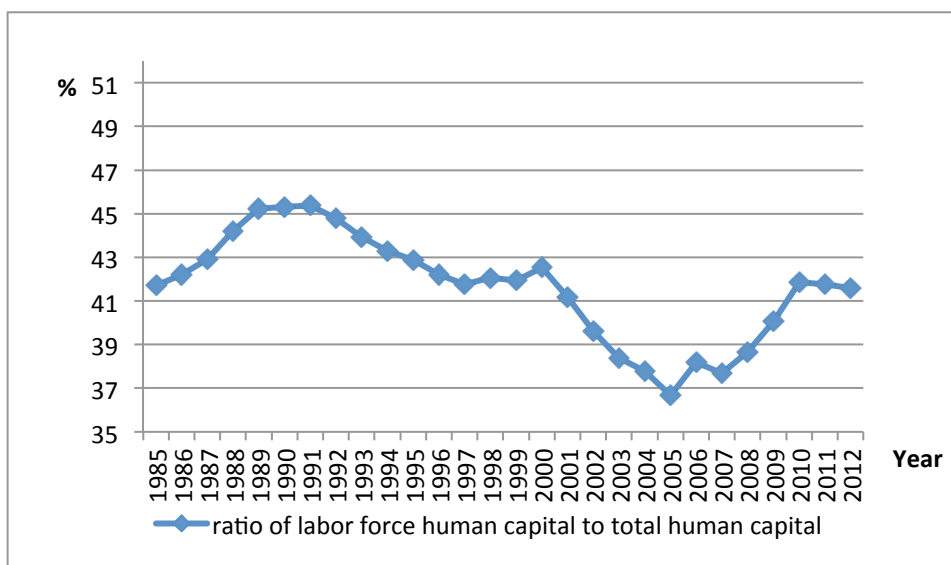
Figure 6.3.4 National Ratio of Labor Force Human Capital to Total Human Capital, 1985-2012

6.3.2 Average labor force human capital

To analyze the dynamic trends of the national labor force human capital more precisely, we calculate the average labor force human capital, in which the average labor force human capital is 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 6.3.4 shows that the average labor force human capital in nominal and real terms. The first two columns show the nominal terms based on 5-education and 6-education categories, while the last two columns show the real values. The real values in this table are calculated by deflating the nominal values with the CPI using 1985 as the base year. The results based on the two education categories are both increasing year by year.

Table 6.3.4 National Nominal and Real Average Labor Force Human Capital

Year	Nominal average labor force human capital （Thousands of Yuan）		Nominal average labor force human capital （Thousands of 1985 Yuan）	
	By 5-education Categories	By 6-education Categories	By 5-education Categories	By 6-education Categories
1985	29.53		29.53	
1986	33.93		31.87	
1987	39.00		34.14	
1988	44.89		33.00	
1989	51.19		31.91	
1990	58.42		35.34	
1991	65.25		38.09	
1992	72.14		39.53	
1993	80.24		38.26	
1994	88.82		34.08	
1995	98.01		32.09	
1996	109.65		33.06	
1997	122.57		35.84	
1998	137.68		40.48	
1999	154.02		45.78	
2000	172.76	170.71	50.98	50.41
2001	187.62	186.39	54.90	54.55
2002	202.84	202.58	59.80	59.71
2003	220.40	220.77	64.19	64.27
2004	240.13	242.31	67.26	67.82
2005	263.29	265.56	72.33	72.94
2006	294.66	298.05	79.78	80.64
2007	331.03	335.03	85.47	86.45
2008	366.59	371.38	89.34	90.46
2009	417.80	424.09	102.37	103.86
2010	472.31	478.84	111.85	113.35

2011	512.58	519.72	115.08	116.68
2012	552.96	561.90	120.94	122.86

Tables 6.3.5 and 6.3.6 report the average labor force human capital by gender and by region separately. The first three columns show the nominal average labor force human capital, while the last three columns of Table 6.3.5 show the real terms. From 1985-2012, the nominal and real average labor force human capital exhibit increasing trends.

Table 6.3.5 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	29.53	34.02	24.50	29.53	34.02	24.50
1986	33.93	39.58	27.65	31.87	37.17	25.98
1987	39.00	45.99	31.26	34.14	40.22	27.38
1988	44.89	53.14	35.67	33.00	39.04	26.27
1989	51.19	60.67	40.53	31.91	37.79	25.28
1990	58.42	69.42	45.88	35.34	42.00	27.76
1991	65.25	78.05	50.82	38.09	45.55	29.69
1992	72.14	86.94	55.63	39.53	47.60	30.52
1993	80.24	97.53	61.14	38.26	46.47	29.20
1994	88.82	108.76	66.92	34.08	41.71	25.73
1995	98.01	120.93	73.14	32.09	39.55	23.97
1996	109.65	136.04	80.77	33.06	40.98	24.37
1997	122.57	152.71	89.36	35.84	44.64	26.16
1998	137.68	172.84	98.88	40.48	50.80	29.10
1999	154.02	193.95	109.55	45.78	57.63	32.59
2000	172.76	219.09	120.88	50.98	64.64	35.70
2001	187.62	238.26	131.41	54.90	69.70	38.47
2002	202.84	259.15	141.26	59.80	76.35	41.64

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
2003	220.40	281.33	154.09	64.19	81.93	44.85
2004	240.13	307.37	167.34	67.26	86.09	46.86
2005	263.29	337.70	183.17	72.33	92.80	50.32
2006	294.66	378.68	203.22	79.78	102.53	54.98
2007	331.03	423.18	229.16	85.47	109.29	59.13
2008	366.59	466.23	255.08	89.34	113.63	62.13
2009	417.80	529.83	290.66	102.37	129.86	71.18
2010	472.31	596.69	329.78	111.85	141.36	78.07
2011	512.58	644.87	360.41	115.08	144.85	80.87
2012	552.96	693.15	391.03	120.94	151.64	85.50

Table 6.3.6 reports the real average labor force human capital by region. The growth for urban region is much higher than that for rural and the urban-rural gap widens significantly. The average labor force human capital for urban areas was always higher than that for rural areas during 1985-2012.

Table 6.3.6 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	29.53	47.28	23.53	29.53	47.28	23.53
1986	33.93	55.10	26.45	31.87	51.50	24.93
1987	39.00	64.28	29.79	34.14	55.22	26.44
1988	44.89	74.70	33.58	33.00	53.16	25.36
1989	51.19	86.46	37.62	31.91	52.91	23.82
1990	58.42	100.43	42.10	35.34	60.67	25.50
1991	65.25	112.33	46.63	38.09	64.56	27.62
1992	72.14	124.43	51.36	39.53	65.86	29.05

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
1993	80.24	138.53	56.65	38.26	63.15	28.18
1994	88.82	153.70	62.08	34.08	56.05	25.03
1995	98.01	169.72	68.07	32.09	52.99	23.35
1996	109.65	189.08	74.00	33.06	54.26	23.53
1997	122.57	210.99	80.51	35.84	58.73	24.98
1998	137.68	236.41	87.44	40.48	66.20	27.40
1999	154.02	262.43	94.13	45.78	74.46	29.94
2000	172.76	291.93	101.57	50.98	82.17	32.35
2001	187.62	311.19	110.13	54.90	86.98	34.79
2002	202.84	330.57	119.26	59.80	93.33	37.83
2003	220.40	354.17	129.45	64.19	99.10	40.41
2004	240.13	381.03	139.88	67.26	103.21	41.67
2005	263.29	411.80	151.68	72.33	109.79	44.21
2006	294.66	452.08	172.38	79.78	118.75	49.50
2007	331.03	498.37	193.66	85.47	125.27	52.77
2008	366.59	543.55	215.41	89.34	129.38	55.11
2009	417.80	610.92	239.47	102.37	146.67	61.46
2010	472.31	677.63	263.73	111.85	157.64	65.33
2011	512.58	722.84	288.58	115.08	159.69	67.58
2012	552.96	766.43	314.58	120.94	164.87	71.87

6.4 International comparison

The Jorgenson-Fraumeni lifetime earnings approach has been used to estimate human capital for many countries, 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 (Jorgenson and Fraumeni, 1989, 1992a, 1992b and Christian, 2009). A summary of human capital estimates for 18 countries in 2006 is reported in

table 6.4.1.[4] The working age population is defined as males aged 16-59 and females age 16-54 in China, population aged 15-59 in India and population aged 15-64 in other countries. Figure 6.4.1 shows the ratio of human capital to GDP for the 16 countries in 2006.

China's human capital is quite large, second only to that of the United States. In 2006, the human capital in China was around 51.5 times of that in New Zealand, 35.2 times of that in Norway, 9.8 times of that in Australia, 5.2 times of that in Canada, and 1.4 times of that in Japan. However, China's human capital per capita is still very small. In 2006, human capital per working age population in China is less than 15% of that for Canada, Japan, Norway, South Korea, the United Kingdom, and the United States.

Table 6.4.1 International Comparison of Human Capital Estimates

Currency unit: US Dollars

Countries	Human capital per working age population (10 thousands)	Human capital (Billions)	Human capital to GDP ratio
India	9.42	55.61	3.20
Rumania	12.65	1.90	7.91
Netherlands	45.70	5.04	8.30
Italy	37.45	14.59	8.38
Israel	38.20	1.61	9.24
Norway	53.71	1.65	9.29
China	7.06	58.16	9.35
Canada	49.78	11.29	9.39
France	45.94	18.38	9.41
US	64.10	128.24	9.62
Denmark	45.75	1.63	9.87
Japan	48.97	41.00	10.08
New Zealand	40.69	1.13	10.39
UK	55.78	21.48	10.40
Australia	45.74	5.94	10.43

---

[4] The estimates for Australia are for 2001 and for Denmark 2002.

Spain	45.62	13.83	10.59
Poland	22.25	5.99	10.68
South Korea	48.99	17.01	14.28

Note: The PPPs for private consumption, which are applied to human capital in national currencies, are from the World Bank, International Comparison Program database, accessed December 2013. The website link is http://data.worldbank.org/indicator/PA.NUS.PRVT.PP.   The PPPs for GDP applied to GDP in national currencies are from the World Bank, International Comparison Program database, accessed January 2014. The website link is http://data.worldbank.org/indicator/PA.NUS.PPP.

.
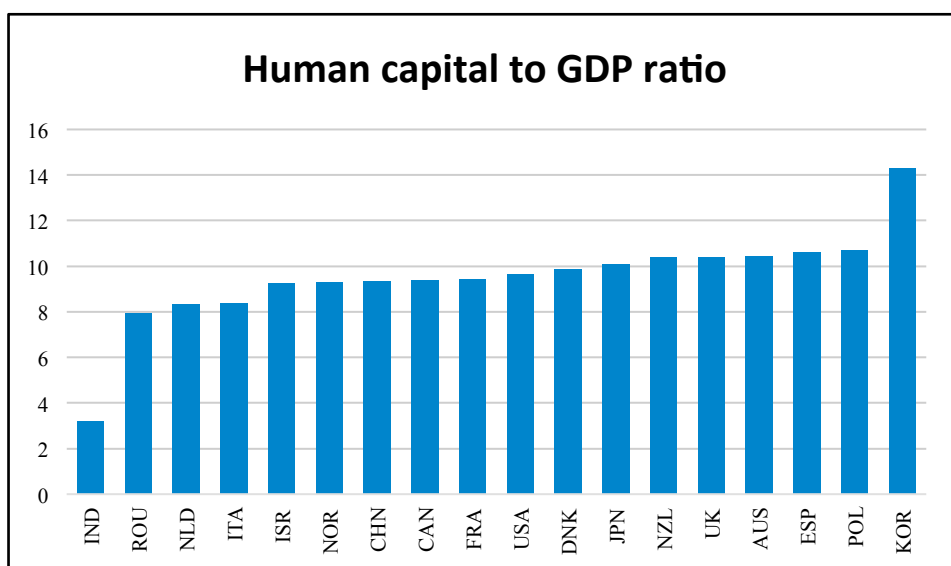
Figure 6.4.1 International Comparison of Human capital to GDP Ratio in 2006

6.5 Human capital, GDP, and physical capital

Human capital estimates are based on the Mincer equation parameter estimates and the population imputation data, with 4.58% as the discount rate using J-F method, as described in preceding chapters. 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.[5] With this more detailed information on educational attainment, we create a separate human capital series starting from 2000.

As shown in Figure 6.5.1 and Figure 6.5.2, China's human capital stock is much larger than its physical capital stock, about 7 to 26 times the amount of physical capital. This is not surprising, given that in most other countries human capital accounts for over 60% of national wealth.[6] The ratio of the human capital to the physical capital as measured by Holz, the ratio keeps decreasing, but the rate of decrease slows down after 1996. Whether the more rapid growth of the physical capital stock than of the human capital indicates "overinvestment" in physical capital is beyond the scope of our study.[7]

---

[5] 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.

[6] World Bank (1997). The World Bank wealth estimates include physical capital, natural resources, and other forms of intangible capital besides human capital.

[7] Hechman（2005）and Liu（2007）also find that China invested too much on physical capital relative to human capital during the economy reform period.
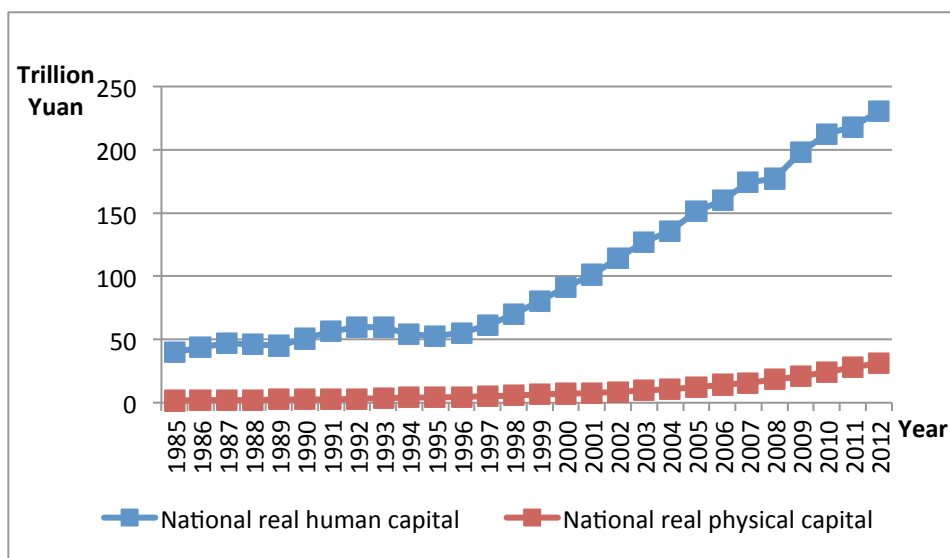
Figure 6.5.1 Human Capital and Physical Capital , 1985-2012
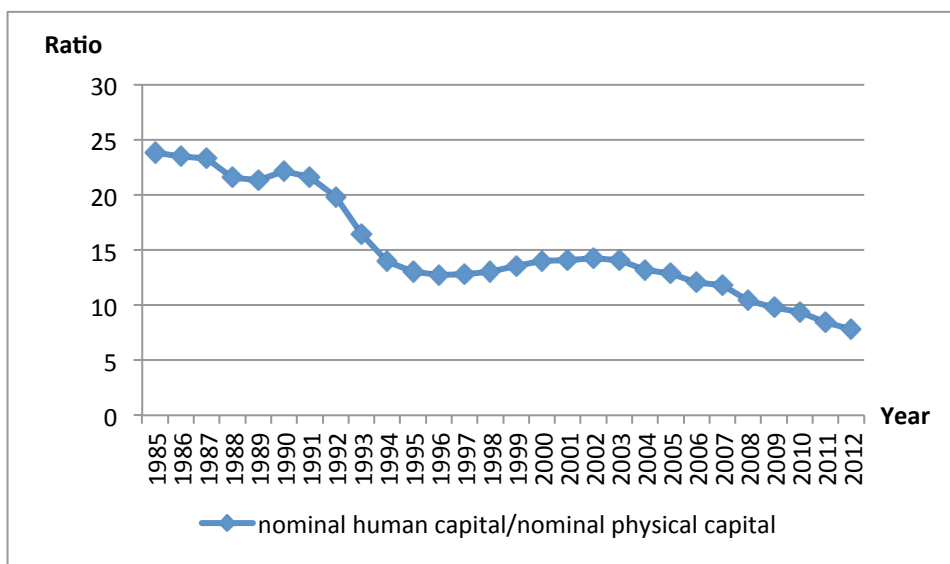
Figure 6.5.2 Human Capital and Physical Capital Ratio, 1985-2012

Chapter 7   Cross-province Comparison

By comparing the stocks of human capital across provinces and over time, we gain some understanding of the cross-section paths of economic progress and hope to gain further understanding of their causes. Our comparison is based on calculation of total provincial human capital and provincial labor force capital constructed using J-F method (see Appendix results C). We also construct two additional indicators: the provincial real human capital per capita and provincial real labor force human capital per capita. The definitions of these real stocks are as follows:

Real human capital per capita=real human capital/ population

Real labor force human capital per capita= real labor force human capital / labor force population

Where the real human capital stocks are the nominal stocks deflated by a cost of living index.

7.1 Cross-province human capital comparison

Graphical representation of current year (2012) provincial human capital stocks is shown in figure 7.1.1. Current year human capital is the nominal human capital adjusted by living cost and expressed in current-year prices for each province. The provinces are shown in descending order of their 2012 human capital indicators that are based on underlying schooling divided into five education categories. Shandong is the highest ranking province in terms of total real human capital, followed by Guangdong, and Tibet ranks the lowest. 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 Shandong, Guangdong, Jiangsu, and Henan rank relatively higher. (2) Provinces at the top rank of human capital per capita (figure 7.1.3), such as Zhejiang, Beijing and Shanghai, also rank high in terms of total stock but their total human wealth is magnified by differences in their education levels and age structure.
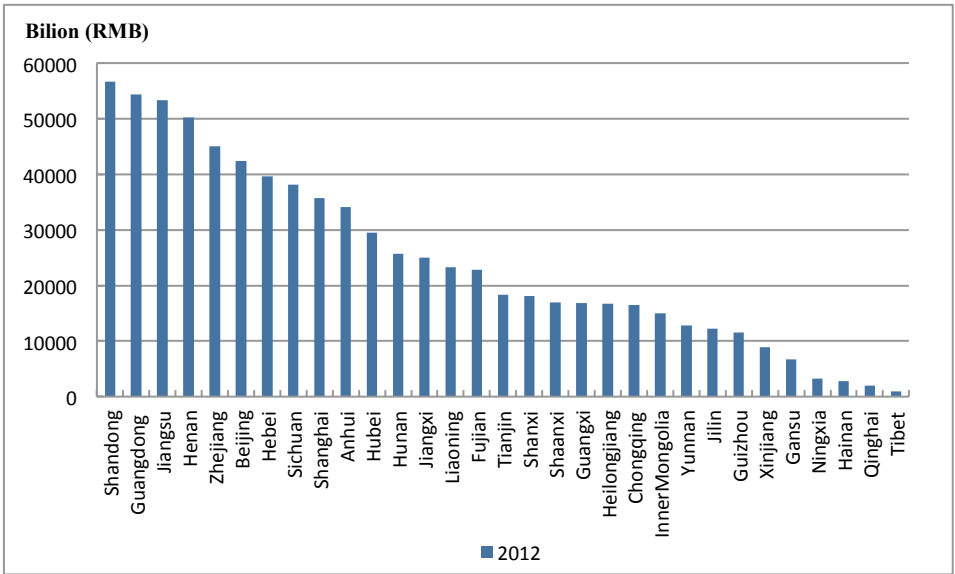
Figure 7.1.1 Provincial Current Year Human Capital in 2012

Figure 7.1.2 presents the provincial comparison of real human capital in 1985 prices. Real human capital is created by deflating nominal human capital by a living cost index based on Brandt and Holz (2006).[1,2]We use their living cost index and update it over time using provincial CPI's to construct a deflator that is comparable across provinces and over time. The ranking of real human capital is similar to the nominal ranking: Guangdong has the

---

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

[2] 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.

largest real human capital, followed by Shandong, and Tibet ranks the lowest.
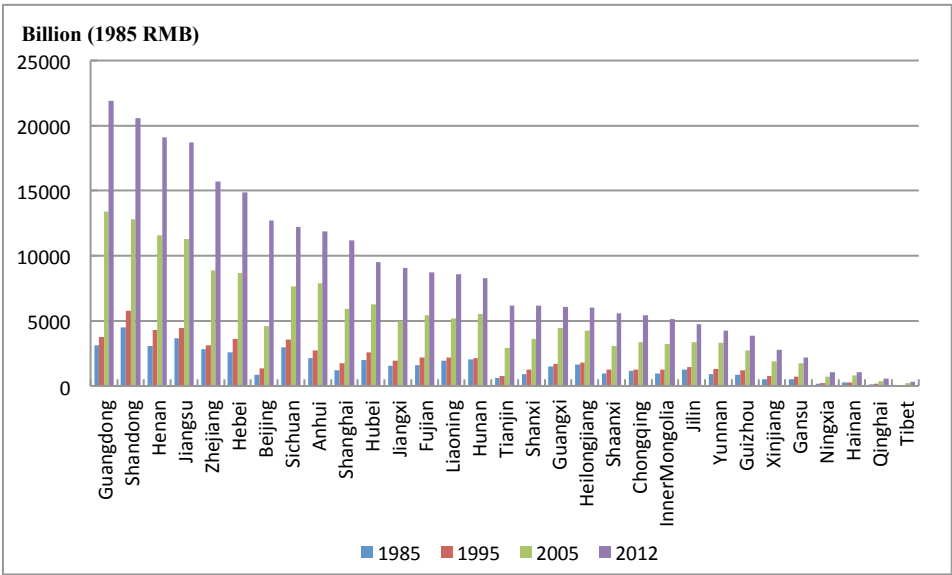
Figure 7.1.2 Provincial Real Human Capital

Figure 7.1.3 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 total provincial real human capital, with Beijing, Shanghai and Tianjin ranking as the top three and Gansu at the bottom. The
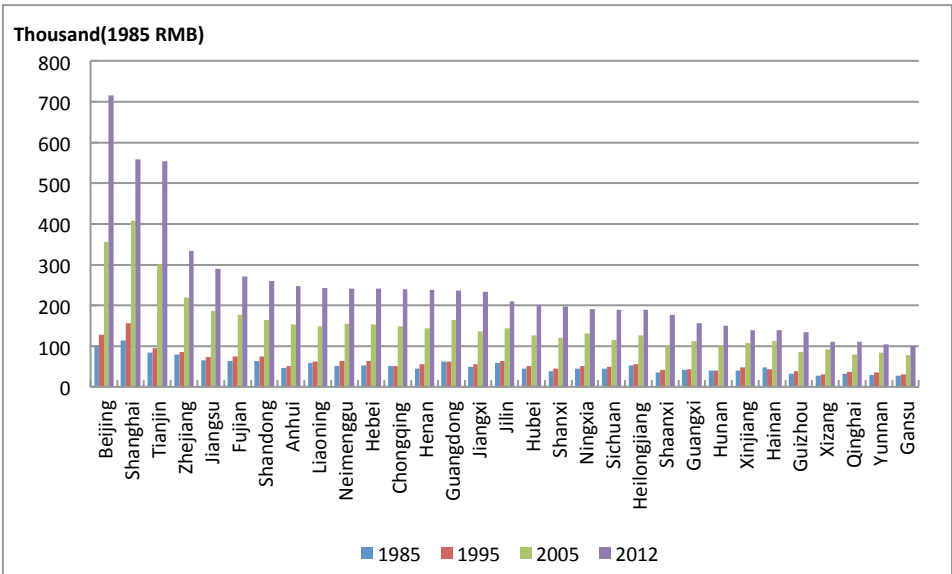
Figure 7.1.3 Provincial Real Human Capital Per Capita

per-capita human capital ranking presents a good picture of the inequality of the development stage of the provinces. Not only is the ranking influenced by education level and population structure, but perhaps more important at this stage of China's economic development, regional inequality in potential earnings has led to a clustering of educated workers in the provinces where their earnings potential is highest.

7.2 Cross-province labor force human capital comparison

Provincial real labor force human capital is displayed in figure 7.2.1. Overall, Guangdong has the largest real labor force human capital, followed by Jiangsu and Shandong; Tibet has the least. The provincial rankings by real labor force human capital ranking can differ from their ranking based on total human capital because of the different sizes of the provincial labor forces relative to their populations.
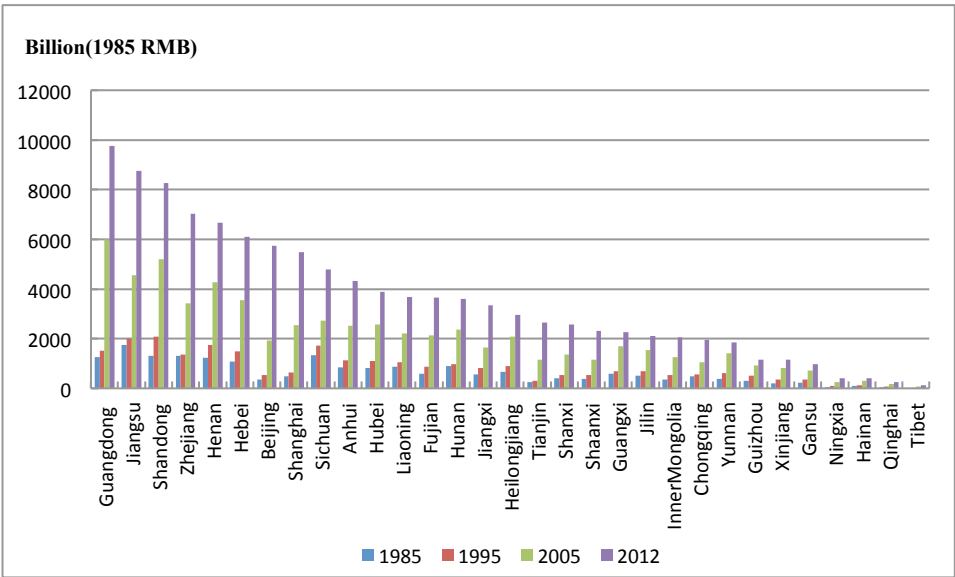
Figure 7.2.1 Provincial Real Labor Force Human Capital

Figure 7.2.2 shows the provincial comparison for real labor force human capital per member of the labor force. Average labor force human capital rankings are almost the same as those for real human capital per capita: Beijing remains at the top, Shanghai and Tianjin follow, and Gansu stays in the last place.
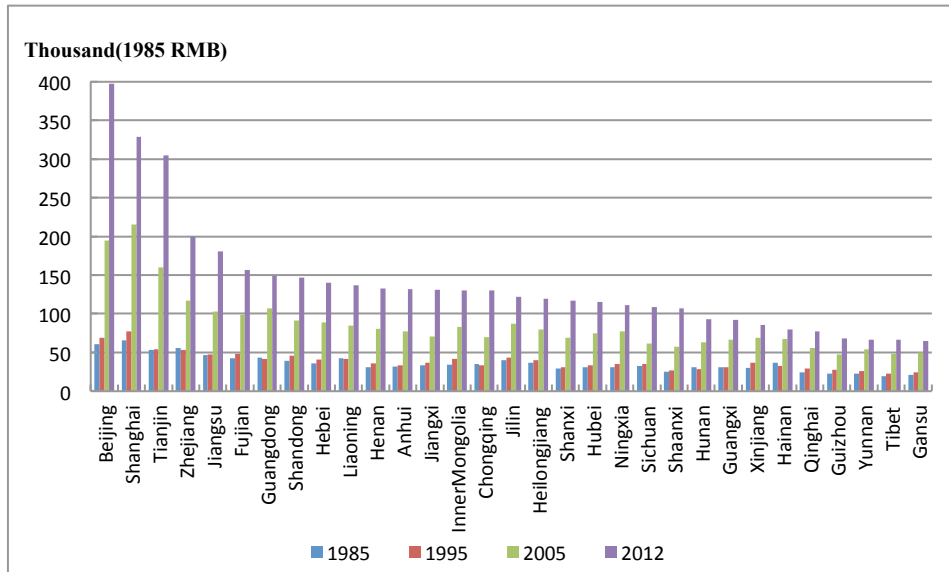
Figure 7.2.2 Provincial Real Average Labor Force Human Capital

7.3 Comparison of the human-capital measures across provinces.

Figure 7.3.1 presents 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, future development of the province might require inflows of working-age population from other

provinces. The labor forces of more developed provinces tend to be more educated, tending raise their ratios of labor-force to total human capital In 2012 Shanghai ranks highest, followed by Heilongjiang and Jiangsu.
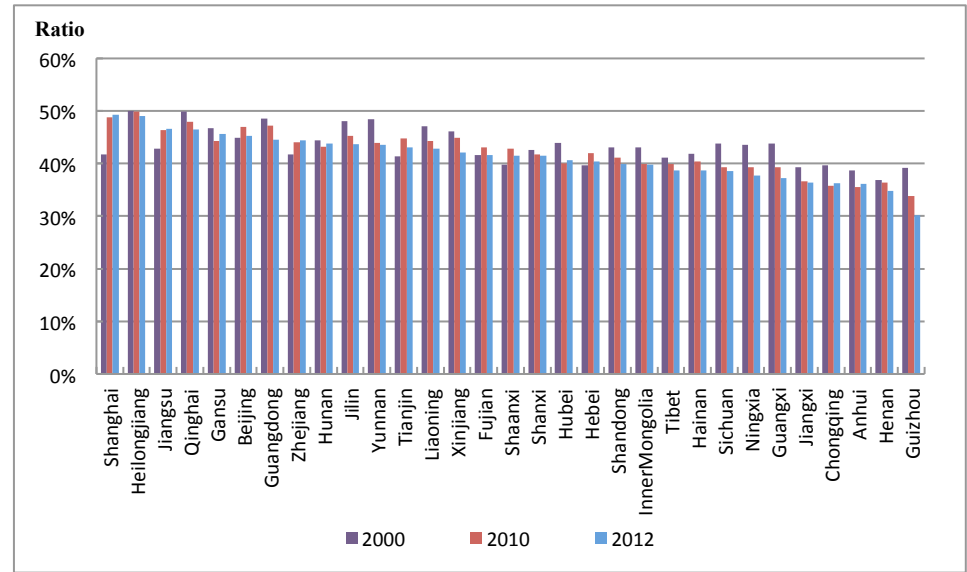
Figure 7.3.1 Ratio of Nominal Labor Force Human Capital to Total Nominal Human Capital

Figure 7.3.2 shows ratios of provincial nominal GDP to nominal labor force human capital. Inner Mongolia ranks at the top in 2012, followed by Liaoning Qinghai and Shandong; Beijing and Shanghai rank the last. These ratios reflect their persistent dispersion, and the continuing geographical disequilibrium in the allocation of labor and human capital in the Chinese economy.
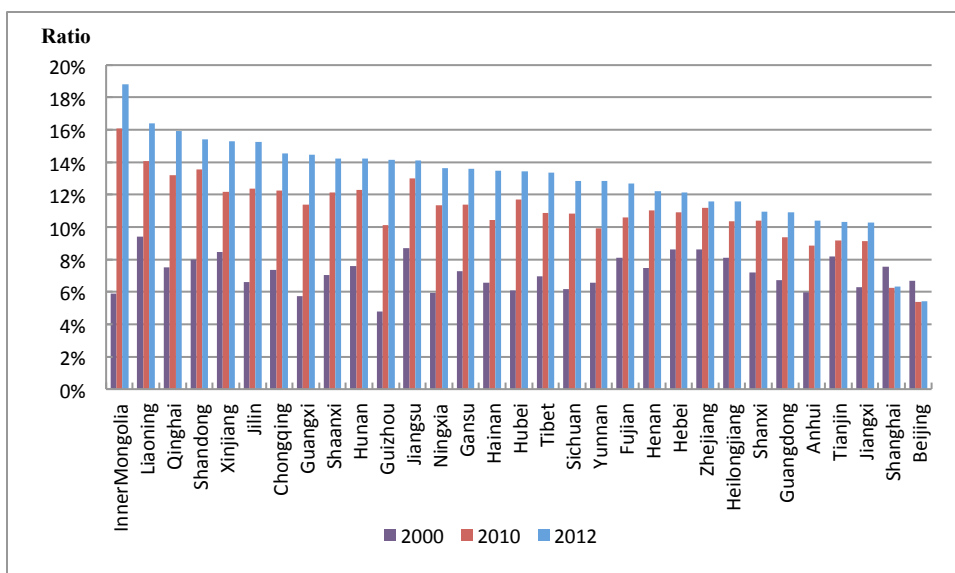
Figure 7.3.2 Ratio of Nominal GDP to Nominal Labor Force Human Capital

Chapter 8   Human Capital for Beijing

8.1 Total human capital

Table BJ-1.1 presents the results of nominal and real total human capital and real physical capital for Beijing. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	850		850		43
1986	1038		972		51
1987	1252		1079		62
1988	1474		1056		75
1989	1763		1077		85
1990	2133		1237		99
1991	2491		1290		112
1992	2979		1404		131
1993	3564		1412		147
1994	4147		1315		169
1995	4967		1343		204
1996	5707		1382		235
1997	6623		1524		266
1998	7803		1754		302
1999	8984		2007		338

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	10612	12669	2292	2734	379
2001	12025	14140	2517	2961	426
2002	14081	16567	3001	3530	485
2003	16388	19573	3487	4163	561
2004	18980	22924	3998	4829	648
2005	21960	26063	4556	5409	743
2006	26535	31997	5458	6579	845
2007	32323	39255	6492	7883	960
2008	38860	47572	7426	9091	1067
2009	46731	57632	9065	11176	1178
2010	56089	69820	10629	13227	1327
2011	64251	80481	11531	14439	1469
2012	72867	91663	12658	15915	1638

8.2 Human capital per capita

To obtain 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. Table BJ-2.1 presents human capital per capita for Beijing by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 40.63 times from 98,750 Yuan to 4,110,730 Yuan. Real human capital per capita increases 6.23 times from 98,750 Yuan to 714,080 Yuan.

Figure BJ-2.1 illustrates the trends of human capital per capita by

gender for Beijing.[1] The real human capital per capita of male is similar to that of female for Beijing. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
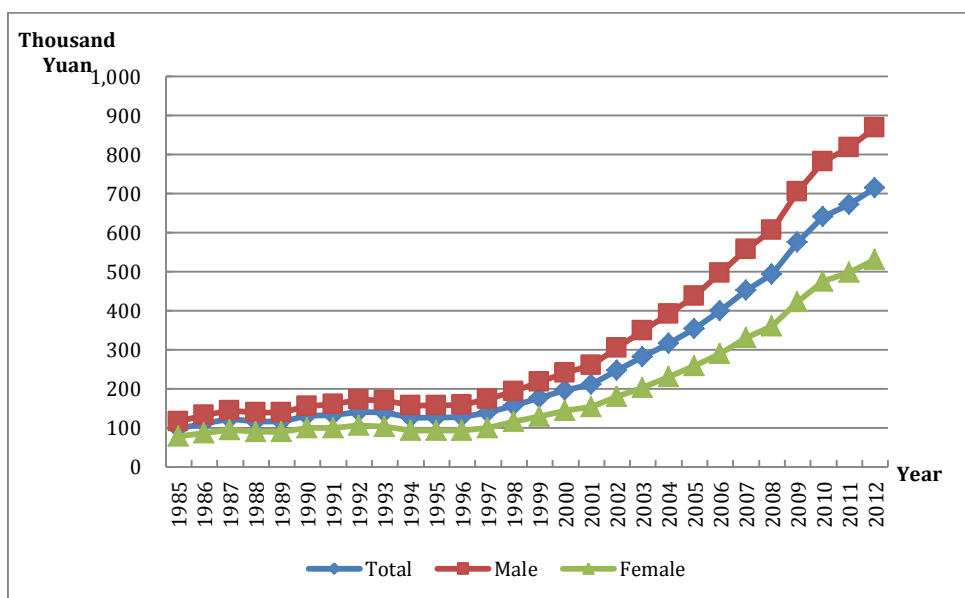
Figure BJ-2.1 Human Capital Per Capita by Gender for Beijing，1985-2012

Table BJ-2.1 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	98.75	126.30	41.77	98.75	126.30	41.77
1986	119.28	150.79	48.37	111.69	141.19	45.29
1987	141.45	177.22	55.94	121.93	152.80	48.23
1988	162.89	202.73	63.73	116.67	145.17	45.64
1989	191.25	236.87	71.93	116.83	144.73	43.95

---

[1] All the discussion below is based on 5-education category.

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1990	224.77	277.54	80.64	130.33	160.89	46.74
1991	255.69	314.90	90.27	132.44	163.14	46.77
1992	298.71	368.18	100.79	140.79	173.56	47.51
1993	349.91	431.65	112.68	138.58	170.99	44.64
1994	398.74	491.61	124.67	126.44	155.91	39.54
1995	468.11	577.69	138.92	126.52	156.19	37.56
1996	527.85	649.95	151.47	127.84	157.47	36.70
1997	603.09	741.10	166.44	138.77	170.51	38.29
1998	698.91	858.23	181.88	157.05	192.83	40.87
1999	790.99	968.78	197.93	176.70	216.37	44.21
2000	912.57	1117.19	216.98	197.05	241.08	46.82
2001	1010.38	1219.64	235.12	211.53	255.28	49.21
2002	1158.02	1381.91	256.74	246.83	294.54	54.72
2003	1321.10	1559.64	280.33	281.09	331.76	59.63
2004	1501.57	1753.76	308.51	316.31	369.36	64.98
2005	1705.68	1975.99	334.64	353.90	410.01	69.44
2006	1947.30	2243.21	369.57	400.50	461.31	76.00
2007	2253.08	2582.20	410.82	452.55	518.58	82.50
2008	2579.70	2942.54	455.09	492.98	562.27	86.96
2009	2966.10	3369.79	504.67	575.40	653.71	97.90
2010	3381.73	3833.19	551.92	640.82	726.18	104.56
2011	3744.49	4232.03	584.47	671.99	759.22	104.85
2012	4110.73	4633.91	618.26	714.08	804.76	107.37

Figure BJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is

significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
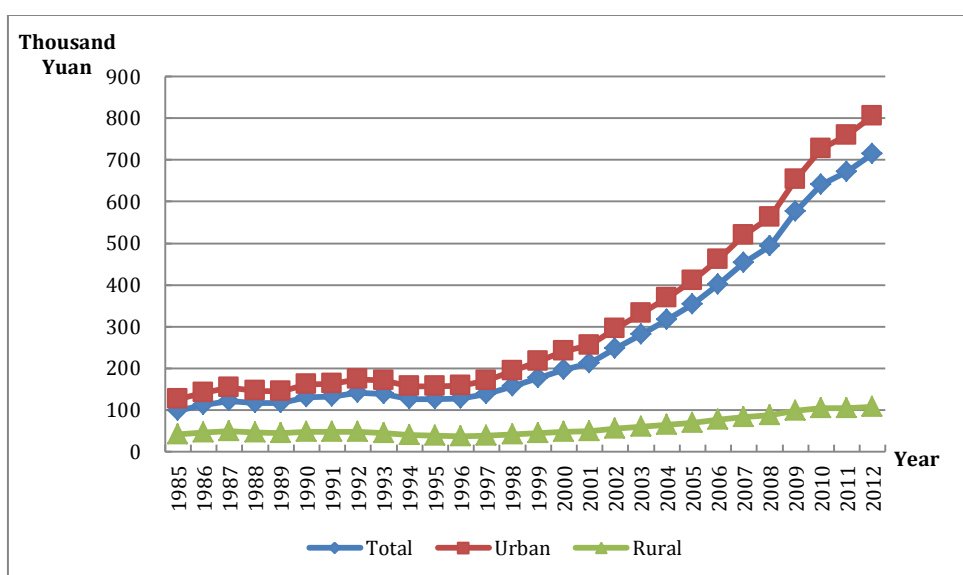
Figure BJ-2.2 Real Human Capital Per Capita by Region for Beijing，1985-2012

8.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

8.3.1 Total labor force human capital

The total labor force human capital for Beijing is reported in Table BJ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Beijing show differential increases. Nominal labor force human capital increases 96.89 times, from 336 billion Yuan to 32,905 billion Yuan. Real labor force human capital increases almost 16.00 times, from 336 billion Yuan to 5,714 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	336		336	
1986	402		377	
1987	485		418	
1988	592		424	
1989	726		444	
1990	904		524	
1991	1051		545	
1992	1212		571	
1993	1414		560	
1994	1652		524	
1995	1915		518	
1996	2236		542	
1997	2689		619	
1998	3291		740	
1999	3908		873	
2000	4743	4543	1023	980
2001	5340	5206	1117	1090
2002	6104	6060	1301	1292
2003	6985	7083	1485	1507
2004	7991	8296	1683	1747
2005	9270	9646	1923	2001
2006	11479	11974	2362	2462
2007	14018	14683	2816	2949
2008	17393	18268	3323	3491
2009	21419	22594	4155	4382
2010	26235	27760	4970	5260

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	29557	31371	5303	5628
2012	32905	34966	5714	6073

8.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables BJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Beijing show differential increases. Nominal average labor force human capital increases more than 37.61 times, from 58,950 Yuan to 2,275,910 Yuan. Real average labor force human capital increases more than 5.70 times, from 58,950 Yuan to 395,210 Yuan.

Table BJ-3.2 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	58.95	69.41	33.59	58.95	69.41	33.59
1986	70.16	81.98	39.06	65.69	76.76	36.57
1987	84.00	98.03	45.42	72.41	84.52	39.16
1988	98.04	113.91	51.57	70.20	81.57	36.93
1989	114.76	133.00	58.26	70.11	81.26	35.59
1990	134.90	156.10	66.00	78.21	90.49	38.26
1991	154.48	179.20	74.01	80.02	92.83	38.34

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
1992	173.48	201.70	82.40	81.77	95.08	38.84
1993	196.51	229.31	91.75	77.85	90.84	36.34
1994	222.74	260.93	101.53	70.65	82.75	32.20
1995	251.26	295.47	112.18	67.94	79.89	30.33
1996	288.57	340.27	123.52	69.93	82.44	29.92
1997	336.81	397.70	136.88	77.49	91.50	31.49
1998	394.37	466.05	151.87	88.62	104.71	34.12
1999	450.88	532.57	166.82	100.70	118.95	37.26
2000	525.23	621.29	182.49	113.33	134.07	39.38
2001	586.62	690.13	199.77	122.75	144.45	41.81
2002	655.56	765.72	218.80	139.77	163.21	46.64
2003	733.04	850.23	239.96	155.88	180.86	51.04
2004	821.83	946.95	261.64	173.08	199.44	55.10
2005	930.21	1066.04	284.86	193.01	221.20	59.11
2006	1089.54	1246.49	323.87	224.20	256.34	66.60
2007	1253.93	1428.69	364.69	251.91	286.92	73.24
2008	1458.85	1653.68	408.18	278.71	315.99	78.00
2009	1693.35	1913.36	455.19	328.46	371.18	88.30
2010	1937.35	2182.88	502.55	366.98	413.54	95.21
2011	2107.20	2368.32	534.46	378.09	424.87	95.88
2012	2275.91	2552.27	563.89	395.21	443.25	97.93

Chapter 9   Human Capital for Tianjin

9.1 Total human capital

Table TJ-1.1 presents the results of nominal and real total human capital and real physical capital for Tianjin. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	597		597		32
1986	694		650		37
1987	817		716		42
1988	954		716		47
1989	1103		721		52
1990	1284		815		55
1991	1457		839		62
1992	1664		860		78
1993	1901		836		96
1994	2166		768		116
1995	2486		765		138
1996	2818		795		162
1997	3218		881		188
1998	3771		1037		218
1999	4349		1209		245

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	5036	5572	1407	1556	275
2001	5921	6569	1634	1812	311
2002	6964	7734	1930	2142	406
2003	8260	9372	2265	2571	472
2004	9732	11171	2609	2994	548
2005	11320	12809	2991	3384	640
2006	13042	15043	3394	3916	754
2007	14880	17339	3717	4330	911
2008	16661	19610	3949	4647	1137
2009	18934	22438	4532	5370	1415
2010	22610	27274	5228	6307	1741
2011	25570	30999	5638	6834	2075
2012	29236	35639	6275	7650	406

9.2 Human capital per capita

To obtain 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. Table TJ-2.1 presents human capital per capita for Tianjin by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 30.19 times from 84,100 Yuan to 2,623,030 Yuan. Real human capital per capita increases 5.69 times from 84,100 Yuan to 563,000 Yuan.

Figure TJ-2.1 illustrates the trends of human capital per capita by gender for Tianjin. The real human capital per capita of male is similar to

that of female for Tianjin. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
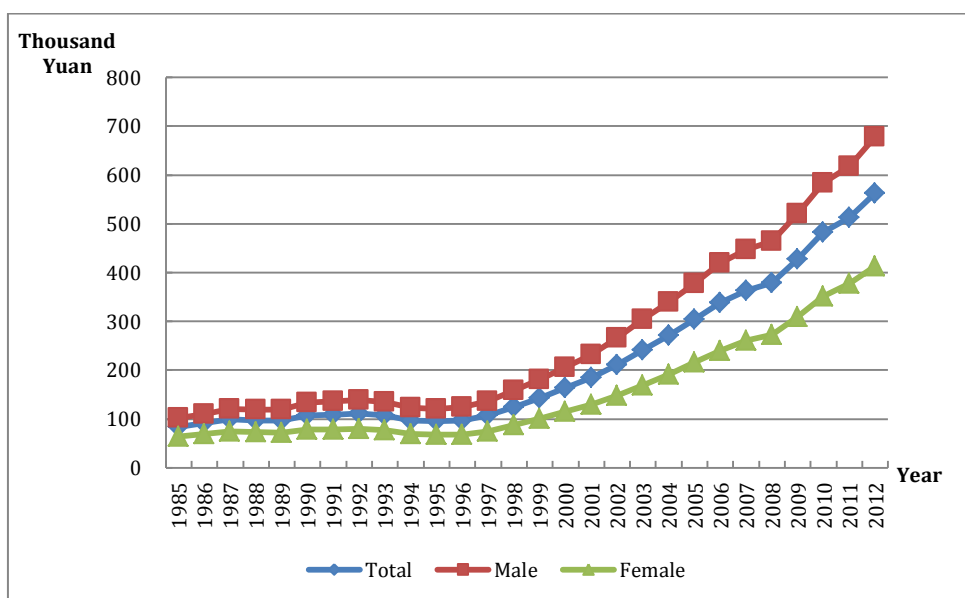
Figure TJ-2.1 Human Capital Per Capita by Gender for Tianjin，1985-2012

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

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	84.10	100.02	47.72	84.10	100.02	47.72
1986	97.15	115.63	54.39	90.98	108.27	50.93
1987	112.72	134.78	61.86	98.84	118.17	54.23
1988	129.71	153.94	70.94	97.28	115.45	53.21
1989	147.62	173.74	80.91	96.52	113.60	52.90
1990	169.34	197.95	92.61	107.51	125.66	58.79
1991	189.61	221.25	103.57	109.22	127.45	59.66
1992	214.21	249.64	116.41	110.75	129.09	60.19

110

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	242.72	282.75	130.59	106.72	124.33	57.42
1994	274.24	319.64	145.33	97.27	113.35	51.54
1995	308.93	362.47	161.03	95.02	111.48	49.53
1996	345.22	404.62	177.59	97.42	114.16	50.11
1997	390.10	457.41	194.79	106.77	125.18	53.31
1998	451.75	532.57	210.95	124.23	146.48	58.02
1999	514.63	608.13	228.67	143.11	169.13	63.59
2000	584.58	690.84	252.85	163.27	192.90	70.60
2001	667.39	789.98	275.25	184.13	217.97	75.94
2002	763.74	903.80	304.25	211.61	250.37	84.28
2003	881.84	1045.34	331.38	241.82	286.71	90.89
2004	1012.41	1200.01	364.54	271.41	321.74	97.74
2005	1150.78	1365.00	399.31	304.04	360.57	105.48
2006	1300.13	1537.93	442.17	338.38	400.24	115.07
2007	1455.02	1716.53	490.84	363.49	428.72	122.59
2008	1599.11	1880.26	540.96	379.01	445.55	128.19
2009	1788.05	2097.07	600.40	427.94	501.94	143.71
2010	2084.80	2450.66	652.09	482.07	566.74	150.80
2011	2326.45	2736.33	704.28	512.96	603.24	155.26
2012	2623.03	3084.05	765.01	563.00	662.03	164.22

Figure TJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
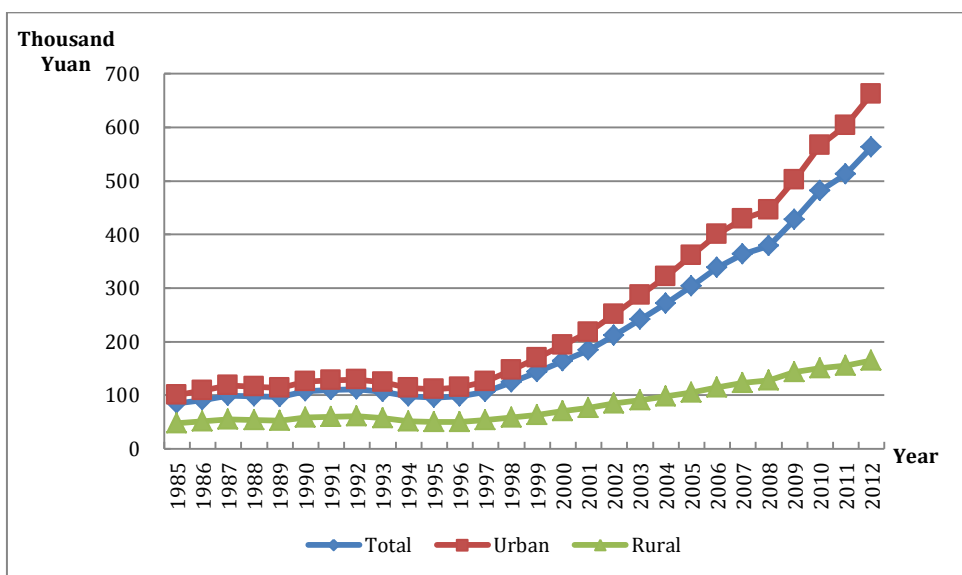
Figure TJ-2.2 Real Human Capital Per Capita by Region for Tianjin，1985-2012

9.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

9.3.1 Total labor force human capital

The total labor force human capital for Tianjin is reported in Table TJ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Tianjin show differential increases. Nominal labor force human capital increases 48.01 times, from 255 billion Yuan to 12,519 billion Yuan. Real labor force human capital increases almost 9.52 times, from 255 billion Yuan to 2,687 billion Yuan.

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

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	255		255	
1986	299		280	
1987	353		310	
1988	409		307	
1989	473		309	
1990	541		343	
1991	609		351	
1992	690		357	
1993	777		342	
1994	877		311	
1995	992		305	
1996	1120		316	
1997	1300		356	
1998	1531		421	
1999	1773		493	
2000	2076	2010	580	561
2001	2401	2350	662	648
2002	2780	2751	770	762
2003	3211	3215	881	882
2004	3727	3789	999	1016
2005	4424	4499	1169	1188
2006	5304	5402	1380	1406
2007	6224	6353	1555	1587
2008	7331	7497	1738	1776
2009	8558	8768	2048	2099
2010	10075	10354	2330	2395

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	11316	11675	2496	2573
2012	12519	12934	2687	2777

9.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables TJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Tianjin show differential increases. Nominal average labor force human capital increases more than 25.82 times, from 53,540 Yuan to 1,435,840 Yuan. Real average labor force human capital increases more than 4.76 times, from 53,540 Yuan to 308,190 Yuan.

Table TJ-3.2 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	53.54	60.57	33.79	53.54	60.57	33.79
1986	61.95	70.24	38.98	58.01	65.77	36.50
1987	71.95	82.04	44.88	63.07	71.93	39.34
1988	81.67	92.57	50.96	61.25	69.42	38.22
1989	92.65	104.40	57.52	60.57	68.26	37.61
1990	104.86	117.37	65.15	66.57	74.50	41.36
1991	117.79	131.63	72.92	67.85	75.83	42.01

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
1992	130.25	145.28	81.27	67.35	75.12	42.02
1993	144.07	160.52	90.58	63.35	70.58	39.83
1994	159.94	178.18	100.31	56.71	63.18	35.57
1995	176.65	197.62	111.31	54.33	60.78	34.23
1996	197.18	220.31	122.18	55.64	62.16	34.47
1997	223.49	250.40	134.72	61.15	68.53	36.87
1998	255.28	286.74	148.58	70.24	78.87	40.87
1999	287.29	323.11	162.16	79.89	89.86	45.10
2000	325.03	366.69	176.62	90.76	102.39	49.32
2001	367.52	415.99	196.31	101.42	114.78	54.17
2002	415.63	472.14	219.11	115.13	130.79	60.70
2003	468.03	533.28	245.01	128.35	146.27	67.20
2004	529.85	605.35	272.69	142.06	162.30	73.11
2005	608.91	698.20	302.12	160.87	184.43	79.81
2006	705.66	810.56	337.11	183.64	210.94	87.73
2007	804.35	924.54	372.22	200.90	230.91	92.97
2008	916.92	1054.10	410.32	217.33	249.78	97.23
2009	1042.06	1198.09	453.52	249.36	286.77	108.55
2010	1180.94	1354.63	497.55	273.10	313.27	115.06
2011	1306.52	1498.33	544.64	288.13	330.32	120.07
2012	1435.84	1646.91	594.23	308.19	353.53	127.56

Chapter 10   Human Capital for Hebei

10.1 Total human capital

Table HeB-1.1 presents the results of nominal and real total human capital and real physical capital for Hebei. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Hebei.

Table HeB-1.1 Real physical capital, Nominal and Real Human Capital for Hebei

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	2081		2081		76
1986	2399		2273		84
1987	2829		2489		92
1988	3287		2451		101
1989	3767		2341		110
1990	4392		2721		119
1991	5019		3006		130
1992	5704		3232		147
1993	6552		3271		163
1994	7463		3048		183
1995	8449		2985		208
1996	9429		3101		241
1997	10412		3302		278
1998	11606		3731		320
1999	13060		4267		366

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	14976	15087	4884	4914	408
2001	16925	17102	5458	5507	452
2002	18733	18940	6075	6134	496
2003	20933	21205	6617	6695	554
2004	22962	23306	6952	7045	630
2005	24810	25089	7388	7461	733
2006	28550	28906	8329	8422	851
2007	32690	33140	9087	9198	990
2008	36170	36630	9451	9562	1177
2009	40700	41270	10693	10833	1368
2010	45260	45880	11531	11678	1579
2011	49790	50470	11989	12141	1849
2012	55170	55930	12934	13098	2127

10.2 Human capital per capita

To obtain 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. Table HeB-2.1 presents human capital per capita for Hebei by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 20.45 times from 41,540 Yuan to 891,000 Yuan. Real human capital per capita increases 4.03 times from 41,540 Yuan to 208,890 Yuan.

Figure HeB-2.1 illustrates the trends of human capital per capita by gender for Hebei. The real human capital per capita of male is similar to that

of female for Hebei. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
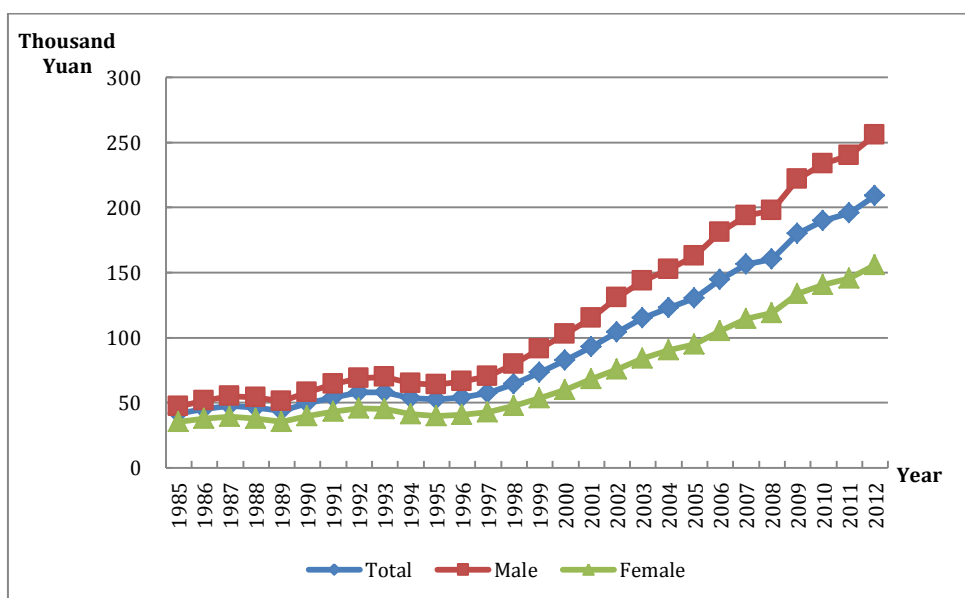
Figure HeB-2.1 Human Capital Per Capita by Gender for Hebei，1985-2012

Table HeB-2.1 Nominal and Real Human Capital Per Capita by Region for Hebei

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	41.54	74.08	35.55	41.54	74.08	35.55
1986	47.50	86.05	39.96	45.00	81.18	37.92
1987	54.11	98.69	44.74	47.61	86.05	39.52
1988	61.96	114.38	50.36	46.21	84.30	37.77
1989	70.21	129.98	56.34	43.63	82.66	34.57
1990	80.03	149.58	63.14	49.58	93.99	38.79
1991	90.62	171.06	70.21	54.28	100.83	42.45
1992	102.23	194.31	77.64	57.92	105.57	45.18

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	116.39	225.22	86.23	58.10	105.94	44.84
1994	131.64	256.52	95.50	53.76	96.61	41.39
1995	148.30	290.68	105.31	52.39	94.29	39.75
1996	164.74	324.34	114.37	54.18	97.78	40.42
1997	180.90	353.99	124.08	57.37	102.91	42.42
1998	200.55	394.89	134.30	64.47	116.31	46.80
1999	224.37	444.76	146.60	73.31	132.73	52.34
2000	252.65	507.03	159.10	82.39	150.55	57.32
2001	287.81	575.39	172.74	92.81	170.17	61.86
2002	322.07	628.41	188.26	104.45	188.49	67.76
2003	363.81	700.46	205.40	115.00	205.38	72.48
2004	405.43	758.72	225.78	122.75	214.53	76.02
2005	437.12	789.22	250.35	130.17	220.07	82.48
2006	496.30	870.60	277.49	144.79	238.70	89.89
2007	562.01	956.73	307.36	156.22	251.41	94.76
2008	614.25	1007.73	339.65	160.50	251.72	96.86
2009	686.12	1091.90	380.19	180.26	275.99	108.06
2010	745.59	1152.82	421.07	189.96	283.39	115.51
2011	812.32	1226.58	457.42	195.60	286.35	117.83
2012	891.00	1318.82	499.29	208.89	299.89	125.53

Figure HeB-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
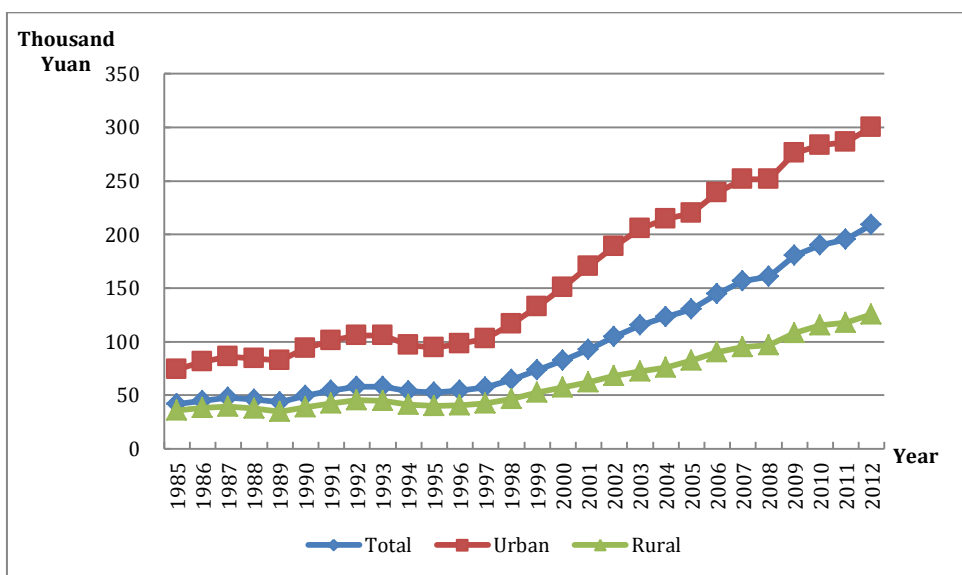
Figure HeB-2.2 Real Human Capital Per Capita by Region for Hebei，1985-2012

10.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

10.3.1 Total labor force human capital

The total labor force human capital for Hebei is reported in Table HeB-3.1 From 1985 to 2012, the nominal and real labor force human capital for Hebei show differential increases. Nominal labor force human capital increases 24.39 times, from 863 billion Yuan to 21,910 billion Yuan. Real labor force human capital increases almost 5.01 times, from 863 billion Yuan to 5,188 billion Yuan.

Table HeB-3.1 Nominal and Real Labor Force Human Capital for Hebei

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	863		863	
1986	1008		955	
1987	1216		1071	
1988	1419		1059	
1989	1632		1013	
1990	1895		1173	
1991	2133		1279	
1992	2401		1365	
1993	2706		1359	
1994	3035		1253	
1995	3374		1208	
1996	3689		1233	
1997	4080		1316	
1998	4537		1487	
1999	4988		1666	
2000	5840	5749	1945	1915
2001	6361	6288	2103	2080
2002	7015	6959	2336	2318
2003	7750	7718	2524	2513
2004	8505	8511	2649	2650
2005	9568	9564	2920	2916
2006	10818	10820	3241	3238
2007	12261	12268	3498	3497
2008	13909	13923	3709	3709
2009	16040	16058	4279	4281
2010	18669	18709	4810	4817

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	20419	20481	4964	4978
2012	21910	21993	5188	5203

10.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables HEB-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Hebei show differential increases. Nominal average labor force human capital increases more than 16.59 times, from 28,590 Yuan to 502,910 Yuan. Real average labor force human capital increases more than 3.16 times, from 28,590 Yuan to 119,080 Yuan.

Table HeB-3.2 Nominal and Real Average Labor Force Human Capital by Region for Hebei

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	28.59	43.32	26.02	28.59	43.32	26.02
1986	32.66	50.42	29.33	30.95	47.57	27.82
1987	37.45	58.82	33.12	32.97	51.28	29.26
1988	42.62	67.69	37.14	31.80	49.89	27.85
1989	48.21	77.32	41.37	29.91	49.17	25.39
1990	54.74	89.23	45.93	33.89	56.07	28.21
1991	60.98	99.32	50.91	36.55	58.54	30.78

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
1992	67.91	110.66	56.22	38.60	60.12	32.71
1993	75.46	124.08	62.10	37.90	58.37	32.30
1994	83.63	138.30	68.28	34.51	52.09	29.59
1995	92.27	152.48	75.07	33.02	49.46	28.34
1996	100.22	165.39	81.25	33.49	49.86	28.72
1997	109.61	181.16	88.33	35.35	52.67	30.20
1998	119.90	197.67	96.12	39.29	58.22	33.49
1999	129.94	214.04	103.56	43.40	63.87	36.97
2000	148.27	257.25	112.19	49.37	76.39	40.42
2001	162.79	275.36	123.22	53.81	81.44	44.13
2002	179.25	296.30	135.37	59.70	88.88	48.72
2003	196.40	315.83	149.36	63.96	92.60	52.70
2004	216.52	338.92	164.37	67.44	95.83	55.34
2005	239.46	368.41	180.93	73.08	102.73	59.61
2006	268.33	400.64	203.77	80.39	109.85	66.01
2007	300.99	440.67	226.98	85.87	115.80	69.98
2008	335.66	482.80	251.16	89.51	120.60	71.63
2009	381.34	540.66	278.60	101.73	136.66	79.19
2010	429.23	603.34	305.30	110.59	148.31	83.75
2011	468.53	647.08	331.38	113.90	151.06	85.37
2012	502.91	681.87	357.63	119.08	155.05	89.91

Chapter 11   Human Capital for Shanxi

11.1 Total human capital

Table SX-1.1 presents the results of nominal and real total human capital and real physical capital for Shanxi. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Shanxi.

Table SX-1.1 Real physical capital, Nominal and Real Human Capital for Shanxi

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	765		765		43
1986	884		837		49
1987	1020		897		54
1988	1213		881		58
1989	1432		873		61
1990	1691		1009		64
1991	1946		1107		68
1992	2251		1194		72
1993	2601		1201		77
1994	2979		1097		83
1995	3393		1068		87
1996	3846		1121		93
1997	4296		1213		99
1998	4784		1369		110
1999	5338		1530		121

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	6095	6152	1677	1691	132
2001	7072	7140	1945	1962	145
2002	8256	8342	2305	2328	161
2003	9893	10054	2703	2745	183
2004	11252	11450	2951	3002	212
2005	12455	12647	3194	3243	249
2006	14485	14775	3640	3711	294
2007	15833	16120	3806	3873	348
2008	17050	17286	3824	3876	408
2009	19183	19520	4325	4399	488
2010	21616	22000	4728	4811	582
2011	24352	24783	5064	5153	693
2012	27231	27722	5524	5624	798

11.2 Human capital per capita

To obtain 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. Table SX-2.1 presents human capital per capita for Shanxi by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 25.89 times from 32,550 Yuan to 875,450 Yuan. Real human capital per capita increases 4.46 times from 32,550 Yuan to 177,590 Yuan.

Figure SX-2.1 illustrates the trends of human capital per capita by gender for Shanxi. The real human capital per capita of male is similar to

that of female for Shanxi. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
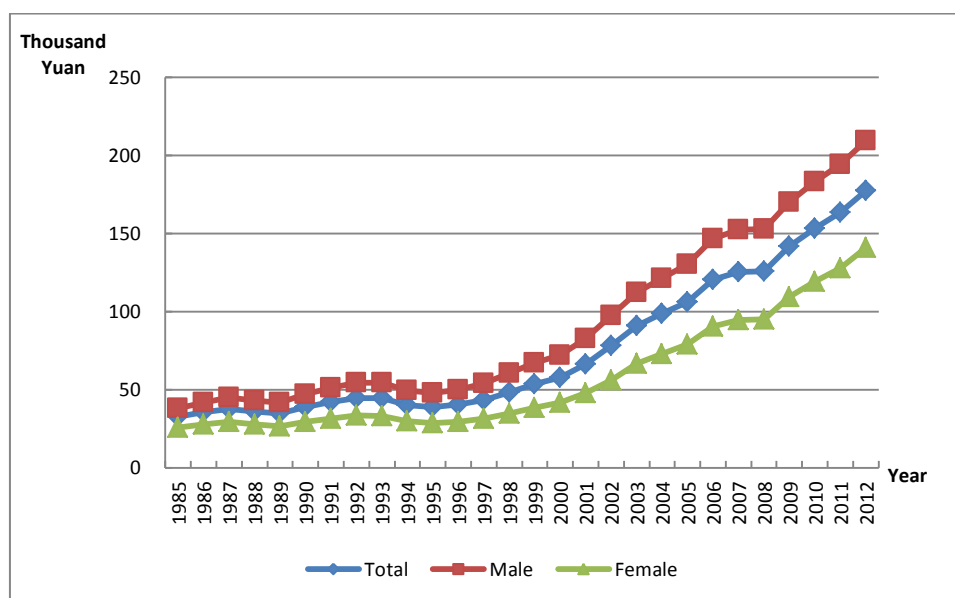
Figure SX-2.1 Human Capital Per Capita by Gender for Shanxi，1985-2012

Table SX-2.1 Nominal and Real Human Capital Per Capita by Region for Shanxi

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	32.55	68.86	20.78	32.55	68.86	20.78
1986	37.48	78.34	23.47	35.47	73.63	22.40
1987	42.92	88.27	26.44	37.74	76.46	23.67
1988	49.46	100.78	29.87	35.92	71.50	22.33
1989	56.78	114.75	33.56	34.60	70.00	20.42
1990	65.01	130.56	37.78	38.80	78.47	22.32
1991	73.82	147.43	42.22	42.01	83.43	24.24
1992	84.36	168.25	47.21	44.75	87.27	25.91

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	96.54	191.69	52.94	44.59	85.64	25.78
1994	109.45	216.24	58.97	40.31	76.74	23.09
1995	123.47	242.69	65.55	38.87	73.80	21.90
1996	138.73	272.60	71.75	40.42	76.54	22.34
1997	153.58	299.13	78.61	43.38	81.46	23.76
1998	169.41	328.04	85.54	48.47	90.51	26.25
1999	187.38	360.70	93.32	53.72	99.13	29.07
2000	209.94	406.16	102.26	57.75	106.61	30.93
2001	241.49	458.82	114.02	66.41	121.04	34.35
2002	279.67	522.47	127.36	78.08	140.93	38.64
2003	332.93	619.16	141.41	90.97	164.38	41.85
2004	376.26	683.88	157.53	98.68	175.25	44.23
2005	414.68	735.83	173.49	106.33	185.42	46.98
2006	479.56	841.10	193.18	120.51	208.19	51.03
2007	522.31	889.68	215.28	125.56	211.34	53.80
2008	561.06	928.11	237.24	125.83	206.05	55.05
2009	629.68	1026.06	262.64	141.97	229.99	60.40
2010	701.01	1128.26	291.25	153.33	245.29	65.16
2011	785.90	1248.97	317.61	163.43	258.35	67.41
2012	875.45	1371.06	347.88	177.59	276.84	71.95

Figure SX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
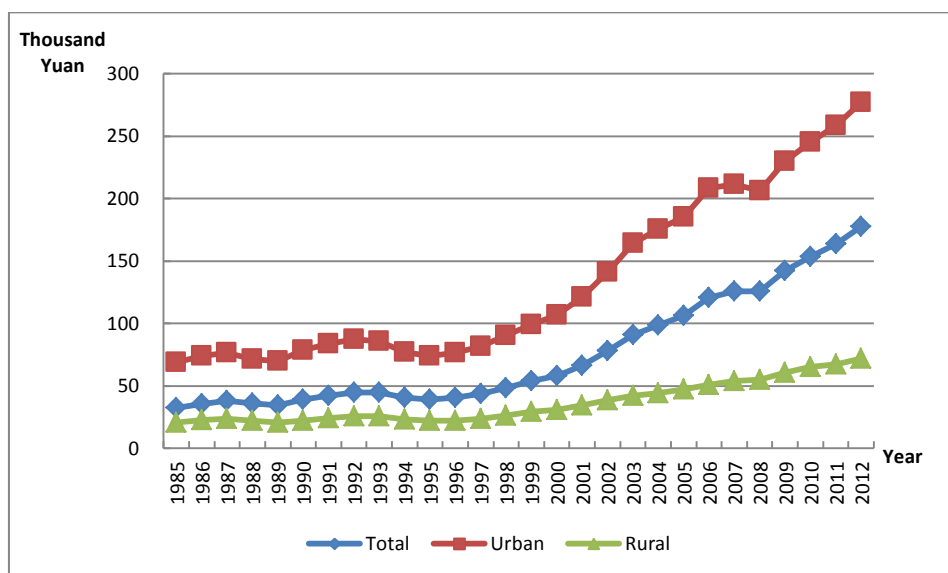
Figure SX-2.2 Real Human Capital Per Capita by Region for Shanxi，1985-2012

11.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

11.3.1 Total labor force human capital

The total labor force human capital for Shanxi is reported in Table SX-3.1 From 1985 to 2012, the nominal and real labor force human capital for Shanxi show differential increases. Nominal labor force human capital increases 31.62 times, from 339 billion Yuan to 11,052 billion Yuan. Real labor force human capital increases almost 5.63 times, from 339 billion Yuan to 2,248 billion Yuan.

Table SX-3.1 Nominal and Real Labor Force Human Capital for Shanxi

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	339		339	
1986	401		380	
1987	484		426	
1988	574		417	
1989	671		409	
1990	792		473	
1991	908		517	
1992	1026		545	
1993	1158		537	
1994	1302		482	
1995	1469		465	
1996	1634		479	
1997	1818		517	
1998	2033		585	
1999	2266		654	
2000	2561	2519	711	699
2001	2826	2789	785	775
2002	3156	3125	891	882
2003	3535	3520	979	975
2004	3980	3992	1055	1058
2005	4566	4585	1181	1185
2006	5182	5202	1312	1317
2007	5805	5831	1403	1409
2008	6614	6650	1490	1497
2009	7586	7632	1714	1725
2010	8857	8914	1943	1955

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	9977	10052	2080	2096
2012	11052	11142	2248	2266

11.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables SX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Shanxi show differential increases. Nominal average labor force human capital increases more than 19.54 times, from 24,530 Yuan to 503,880 Yuan. Real average labor force human capital increases more than 3.18 times, from 24,530 Yuan to 102,470 Yuan.

Table SX-3.2 Nominal and Real Average Labor Force Human Capital by Region for Shanxi

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	24.53	45.91	16.62	24.53	45.91	16.62
1986	28.50	53.25	18.71	26.98	50.04	17.85
1987	33.30	61.71	21.09	29.28	53.45	18.88
1988	37.72	68.85	23.99	27.39	48.85	17.94
1989	42.53	76.75	27.12	25.92	46.82	16.50
1990	48.22	86.57	30.61	28.77	52.03	18.08
1991	54.40	96.89	34.40	30.97	54.83	19.75

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**
1992	60.49	107.25	38.43	32.16	55.63	21.09
1993	67.57	119.33	42.86	31.35	53.31	20.87
1994	75.31	132.54	47.47	27.89	47.04	18.59
1995	84.05	147.59	52.42	26.60	44.88	17.51
1996	92.36	161.73	57.00	27.09	45.41	17.74
1997	101.61	177.39	61.92	28.89	48.31	18.72
1998	111.83	194.07	67.31	32.20	53.55	20.65
1999	122.14	210.51	72.74	35.27	57.85	22.66
2000	133.82	230.43	79.08	37.14	60.48	23.92
2001	148.11	251.49	88.04	41.16	66.34	26.52
2002	164.61	276.77	98.06	46.46	74.66	29.75
2003	182.61	301.92	109.55	50.56	80.16	32.42
2004	203.56	330.70	121.69	53.98	84.75	34.17
2005	229.72	370.16	134.81	59.40	93.27	36.50
2006	257.16	407.95	150.83	65.12	100.98	39.84
2007	285.86	444.55	167.14	69.08	105.60	41.77
2008	320.26	489.31	185.47	72.13	108.63	43.04
2009	359.81	541.74	207.64	81.30	121.43	47.75
2010	404.64	602.12	232.16	88.76	130.90	51.94
2011	455.70	678.71	257.89	95.01	140.39	54.74
2012	503.88	744.77	284.23	102.47	150.38	58.79

Chapter 12 Human Capital for Inner Mongolia

12.1 Total human capital

Table NMG-1.1 presents the results of nominal and real total human capital and real physical capital for Inner Mongolia. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Inner Mongolia.

Table NMG-1.1 Real physical capital, Nominal and Real Human Capital for Inner Mongolia

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	817		817		25
1986	956		910		28
1987	1118		989		31
1988	1308		996		35
1989	1514		992		38
1990	1752		1122		41
1991	1995		1219		46
1992	2260		1290		53
1993	2560		1281		63
1994	2891		1173		72
1995	3259		1125		81
1996	3729		1194		89

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1997	4244		1297		97
1998	4771		1467		107
1999	5360		1645		118
2000	6127	6201	1853	1874	130
2001	7010	7101	2103	2129	143
2002	7895	8001	2323	2354	166
2003	8880	9025	2561	2603	207
2004	9956	10156	2793	2849	269
2005	10734	10924	2945	2996	357
2006	12489	12754	3377	3448	461
2007	13854	14113	3587	3653	590
2008	15594	15934	3824	3909	746
2009	16988	17352	4179	4267	951
2010	18583	18963	4433	4525	1190
2011	20250	20647	4578	4669	1457
2012	21662	22072	4746	4835	1760

12.2 Human capital per capita

To obtain 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. Table NMG-2.1 presents human capital per capita for Inner Mongolia by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 22.28 times from 43,710 Yuan to 1,017,420 Yuan. Real human capital per capita increases 4.10 times from 43,710 Yuan to 222,910

Yuan.

Figure NMG-2.1 illustrates the trends of human capital per capita by gender for Inner Mongolia. The real human capital per capita of male is similar to that of female for Inner Mongolia. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
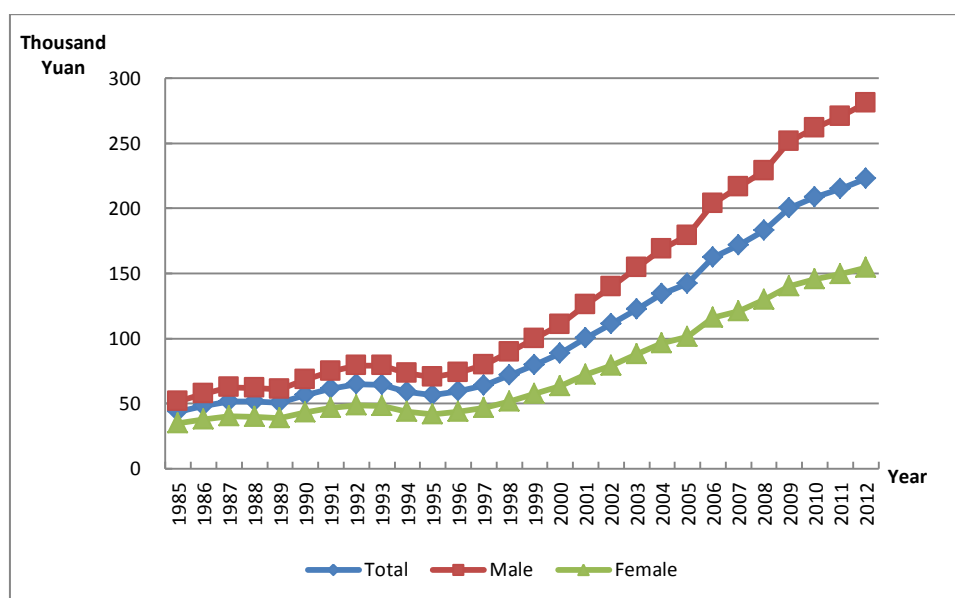
Figure NMG-2.1 Human Capital Per Capita by Gender for Inner Mongolia，1985-2012

Table NMG-2.1 Nominal and Real Human Capital Per Capita by Region for Inner Mongolia

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	43.71	75.84	28.55	43.71	75.84	28.55
1986	50.65	89.13	31.69	48.20	84.48	30.33
1987	58.43	104.13	35.09	51.72	90.97	31.68

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1988	67.54	120.84	39.19	51.41	90.23	30.76
1989	77.27	138.52	43.41	50.65	90.18	28.81
1990	88.33	158.31	48.22	56.57	101.23	30.94
1991	100.47	181.60	53.63	61.39	109.56	33.58
1992	113.76	207.61	59.15	64.92	115.22	35.65
1993	128.89	236.77	65.65	64.50	114.56	35.17
1994	145.73	269.67	72.43	59.11	104.98	31.98
1995	164.14	306.15	79.72	56.66	101.77	29.84
1996	185.72	345.51	86.11	59.46	106.84	29.92
1997	209.01	386.75	92.88	63.89	114.34	30.94
1998	232.83	427.76	99.79	71.60	127.35	33.51
1999	259.52	472.84	107.06	79.65	140.35	36.28
2000	292.21	530.57	114.92	88.36	155.47	38.48
2001	334.36	598.93	124.86	100.30	174.45	41.61
2002	377.16	664.40	135.20	110.95	191.98	42.74
2003	425.17	737.14	146.32	122.61	209.86	44.69
2004	478.37	815.87	158.93	134.18	226.60	46.72
2005	517.88	862.93	172.69	142.10	234.97	49.14
2006	599.94	988.87	188.74	162.21	265.81	52.66
2007	663.25	1070.82	208.16	171.71	275.98	55.21
2008	745.99	1185.23	228.57	182.91	289.81	57.03
2009	813.06	1267.24	252.34	199.99	310.80	63.08
2010	873.58	1337.44	278.28	208.40	318.46	67.22
2011	951.01	1431.52	302.31	215.00	323.09	69.08
2012	1017.42	1502.95	329.42	222.91	328.37	73.44

Figure NMG-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area

remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
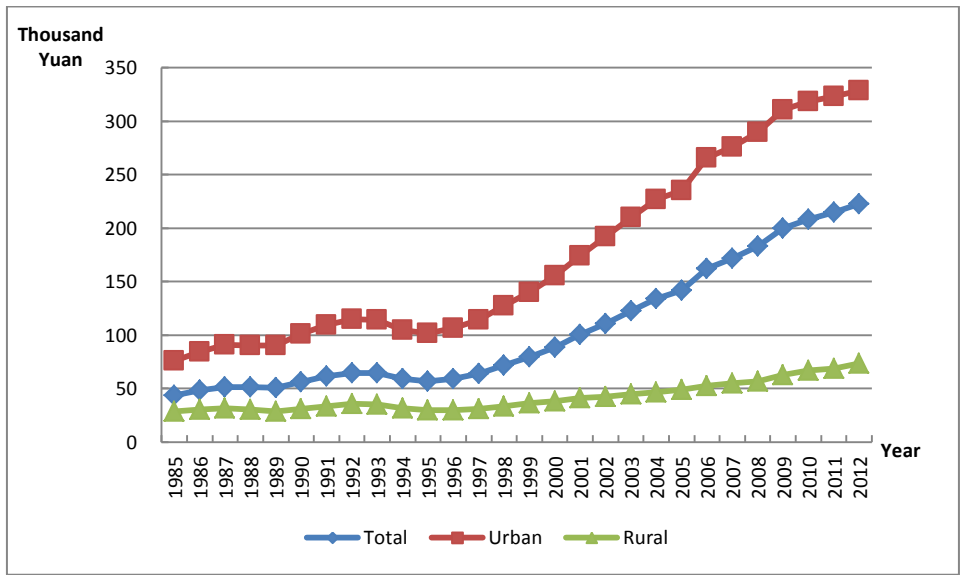
Figure NMG-2.2 Real Human Capital Per Capita by Region for Inner Mongolia，1985-2012

12.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

12.3.1 Total labor force human capital

The total labor force human capital for Inner Mongolia is reported in Table NMG-3.1 From 1985 to 2012, the nominal and real labor force human capital for Inner Mongolia show differential increases. Nominal labor force

human capital increases 25.98 times, from 313 billion Yuan to 8,441 billion Yuan. Real labor force human capital increases almost 4.92 times, from 313 billion Yuan to 1,853 billion Yuan.

Table NMG-3.1 Nominal and Real Labor Force Human Capital for Inner Mongolia

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	313		313	
1986	371		354	
1987	448		397	
1988	532		406	
1989	629		413	
1990	745		477	
1991	851		521	
1992	960		551	
1993	1085		546	
1994	1215		497	
1995	1364		474	
1996	1545		499	
1997	1758		542	
1998	2007		623	
1999	2281		707	
2000	2603	2573	795	786
2001	2846	2821	863	856
2002	3106	3088	921	916
2003	3402	3397	988	987
2004	3728	3751	1051	1058
2005	4126	4157	1137	1145

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2006	4582	4617	1244	1253
2007	5071	5107	1317	1326
2008	5617	5661	1381	1391
2009	6319	6368	1557	1569
2010	7264	7323	1736	1749
2011	7921	7994	1793	1809
2012	8441	8519	1853	1870

12.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables NMG-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Inner Mongolia show differential increases. Nominal average labor force human capital increases more than 17.20 times, from 29,480 Yuan to 536,410 Yuan. Real average labor force human capital increases more than 3.00 times, from 29,480 Yuan to 117,770 Yuan.

Table NMG-3.2 Nominal and Real Average Labor Force Human Capital by Region for Inner Mongolia

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	29.48	43.72	22.02	29.48	43.72	22.02

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
1986	34.12	52.00	24.50	32.48	49.29	23.44
1987	39.79	62.24	27.33	35.27	54.37	24.67
1988	45.66	71.93	30.67	34.83	53.71	24.08
1989	52.24	82.90	34.19	34.28	53.96	22.69
1990	60.10	96.02	38.09	38.49	61.40	24.45
1991	67.69	109.22	42.23	41.44	65.89	26.44
1992	75.27	122.51	46.55	43.15	67.99	28.05
1993	84.07	137.89	51.34	42.33	66.72	27.50
1994	93.71	154.77	56.26	38.30	60.25	24.85
1995	104.03	172.84	61.73	36.18	57.46	23.10
1996	115.60	192.18	66.80	37.30	59.43	23.21
1997	128.40	213.94	72.32	39.60	63.25	24.09
1998	143.08	238.55	78.21	44.37	71.02	26.26
1999	158.84	263.91	83.86	49.20	78.34	28.42
2000	175.45	290.71	90.06	53.57	85.18	30.16
2001	192.29	315.26	97.76	58.33	91.83	32.58
2002	208.82	338.72	105.81	61.95	97.88	33.45
2003	227.02	364.05	114.55	65.94	103.64	34.99
2004	247.49	391.35	123.35	69.80	108.69	36.26
2005	271.46	422.62	132.96	74.78	115.08	37.84
2006	300.05	461.89	149.23	81.45	124.16	41.64
2007	331.55	503.81	166.09	86.07	129.84	44.05
2008	364.99	545.89	183.90	89.72	133.48	45.88
2009	407.95	602.02	203.72	100.55	147.65	50.93
2010	454.80	662.36	224.49	108.67	157.72	54.22
2011	500.42	723.52	244.77	113.25	163.30	55.93
2012	536.41	762.96	265.92	117.77	166.70	59.28

Chapter 13   Human Capital for Liaoning

13.1 Total human capital

Table LN-1.1 presents the results of nominal and real total human capital and real physical capital for Liaoning. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1716		1716		81
1986	1969		1853		90
1987	2273		1974		101
1988	2643		1940		113
1989	3042		1887		123
1990	3485		2090		133
1991	3892		2213		144
1992	4325		2319		156
1993	4861		2271		176
1994	5430		2041		193
1995	6032		1953		206
1996	6725		2015		218
1997	7445		2155		230
1998	8342		2419		243
1999	9425		2759		257

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	10597	11083	3095	3225	275
2001	11657	12223	3397	3549	296
2002	12888	13323	3789	3906	319
2003	14226	14847	4096	4260	353
2004	15735	16553	4359	4571	405
2005	17333	17821	4719	4847	485
2006	19254	19782	5177	5312	580
2007	21412	22197	5473	5664	686
2008	23593	24521	5760	5977	819
2009	26235	27467	6394	6684	953
2010	29970	31492	7080	7430	1121
2011	32742	34407	7350	7715	1313
2012	35923	37834	7835	8241	1518

13.2 Human capital per capita

To obtain 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. Table LN-2.1 presents human capital per capita for Liaoning by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 18.51 times from 52,150 Yuan to 1,017,520 Yuan. Real human capital per capita increases 3.26 times from 52,150 Yuan to 221,930 Yuan.

Figure LN-2.1 illustrates the trends of human capital per capita by gender for Liaoning. The real human capital per capita of male is similar to

that of female for Liaoning. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
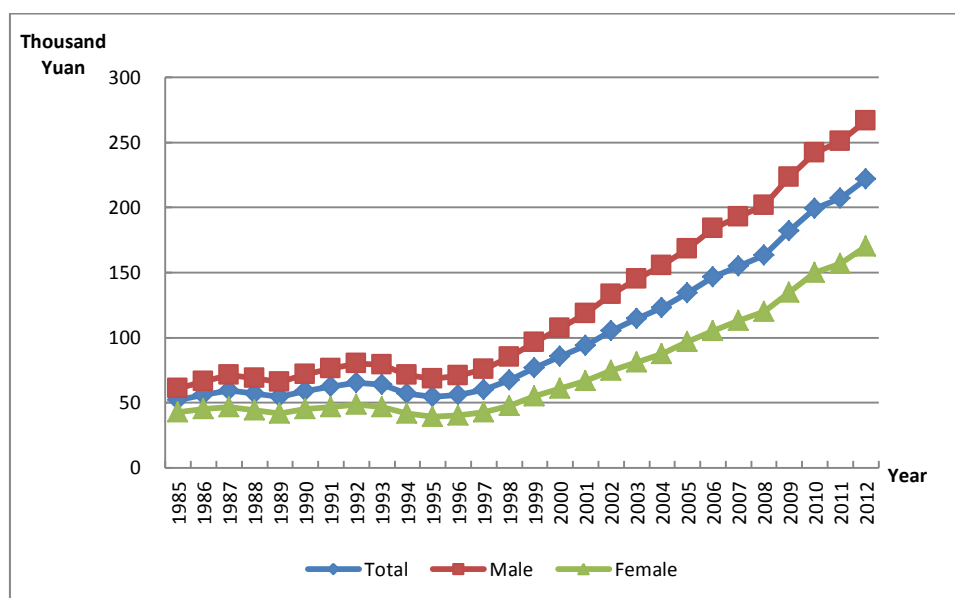
Figure LN-2.1 Human Capital Per Capita by Gender for Liaoning，1985-2012

Table LN-2.1 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	52.15	70.35	36.47	52.15	70.35	36.47
1986	59.72	80.41	41.08	56.20	75.15	39.12
1987	68.36	92.13	46.12	59.37	78.42	41.60
1988	77.78	104.53	51.76	57.09	74.39	40.28
1989	87.78	117.75	57.50	54.46	71.50	37.26
1990	98.67	131.79	64.05	59.18	77.62	39.86
1991	109.66	146.76	70.86	62.36	81.54	42.32
1992	121.48	163.01	78.11	65.13	83.79	45.61

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	136.24	183.86	86.53	63.65	80.98	45.56
1994	151.95	206.07	95.44	57.10	71.98	41.56
1995	168.43	229.02	105.33	54.52	68.90	39.54
1996	187.33	256.02	113.89	56.12	71.19	40.03
1997	207.27	284.09	123.00	60.00	76.10	42.35
1998	232.22	320.83	132.06	67.33	86.11	46.06
1999	262.43	366.12	141.84	76.81	99.56	50.33
2000	292.21	408.02	153.64	85.34	110.96	54.68
2001	322.41	446.31	167.79	93.95	121.49	59.60
2002	358.34	493.25	182.48	105.35	135.76	65.67
2003	398.03	545.19	197.94	114.60	148.28	68.69
2004	444.34	605.21	215.37	123.09	160.12	70.31
2005	492.52	667.89	233.63	134.09	175.30	73.34
2006	545.56	736.98	256.79	146.69	191.33	79.34
2007	607.04	818.31	280.87	155.16	203.10	81.10
2008	668.91	899.34	304.76	163.31	213.80	83.42
2009	746.20	1002.15	332.84	181.87	238.25	90.83
2010	843.55	1137.85	358.47	199.28	263.14	94.06
2011	923.43	1244.70	381.88	207.29	273.92	94.97
2012	1017.52	1372.57	406.96	221.93	293.55	98.74

Figure LN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
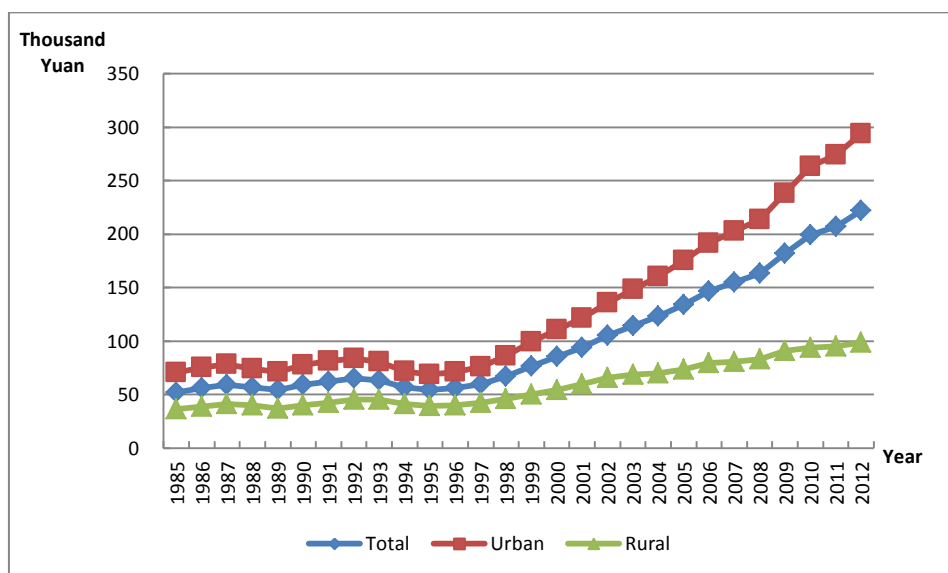
Figure LN-2.2 Real Human Capital Per Capita by Region for Liaoning，1985-2012

13.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

13.3.1 Total labor force human capital

The total labor force human capital for Liaoning is reported in Table LN-3.1 From 1985 to 2012, the nominal and real labor force human capital for Liaoning show differential increases. Nominal labor force human capital increases 18 times, from 781 billion Yuan to 15,146 billion Yuan. Real labor force human capital increases almost 3.27 times, from 781 billion Yuan to 3,332 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	781		781	
1986	906		852	
1987	1058		919	
1988	1248		916	
1989	1458		905	
1990	1693		1015	
1991	1872		1065	
1992	2091		1122	
1993	2323		1089	
1994	2567		970	
1995	2853		930	
1996	3182		960	
1997	3561		1039	
1998	4022		1176	
1999	4433		1310	
2000	4958	4846	1460	1429
2001	5327	5255	1565	1545
2002	5781	5734	1717	1703
2003	6236	6225	1816	1812
2004	6640	6680	1861	1870
2005	7224	7275	1988	1999
2006	8141	8201	2209	2223
2007	9006	9088	2322	2341
2008	9917	10022	2441	2465
2009	11208	11346	2753	2784
2010	13134	13331	3123	3168

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	14148	14390	3200	3253
2012	15146	15427	3332	3391

13.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables LN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Liaoning show differential increases. Nominal average labor force human capital increases more than 13.94 times, from 37,550 Yuan to 560,950 Yuan. Real average labor force human capital increases more than 2.29 times, from 37,550 Yuan to 123,390 Yuan.

Table LN-3.2 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	37.55	47.32	27.65	37.55	47.32	27.65
1986	43.14	54.55	31.15	40.58	50.98	29.67
1987	49.60	63.14	35.10	43.07	53.75	31.66
1988	56.07	71.23	39.35	41.14	50.69	30.62
1989	62.99	80.00	43.86	39.09	48.58	28.42
1990	71.01	90.13	48.95	42.58	53.09	30.46
1991	78.74	100.16	54.17	44.80	55.65	32.35

146

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
1992	86.18	109.64	59.59	46.24	56.35	34.79
1993	94.31	120.15	65.57	44.22	52.92	34.52
1994	103.07	131.34	71.89	38.95	45.87	31.31
1995	113.23	144.53	79.19	36.90	43.48	29.73
1996	124.94	160.06	85.69	37.71	44.50	30.12
1997	137.97	177.83	92.62	40.27	47.64	31.89
1998	153.18	198.49	99.81	44.80	53.28	34.82
1999	167.63	217.99	106.16	49.54	59.28	37.67
2000	184.43	241.13	112.58	54.32	65.57	40.07
2001	202.14	263.00	121.92	59.39	71.59	43.31
2002	218.34	281.77	132.08	64.83	77.55	47.53
2003	234.68	300.51	143.49	68.33	81.73	49.80
2004	251.92	320.58	154.54	70.60	84.82	50.45
2005	274.93	349.13	166.27	75.64	91.64	52.19
2006	312.19	397.50	185.07	84.71	103.20	57.18
2007	342.93	435.11	203.58	88.40	107.99	58.79
2008	375.07	474.81	221.95	92.31	112.88	60.75
2009	419.99	532.96	243.01	103.18	126.70	66.31
2010	479.77	611.94	265.34	114.07	141.52	69.62
2011	521.02	666.43	287.69	117.83	146.66	71.55
2012	560.95	717.58	310.51	123.39	153.47	75.34

Chapter 14   Human Capital for Jilin

14.1 Total human capital

Table JL-1.1 presents the results of nominal and real total human capital and real physical capital for Jilin. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1091		1091		32
1986	1258		1191		36
1987	1440		1275		41
1988	1639		1213		45
1989	1842		1156		48
1990	2081		1236		51
1991	2350		1313		56
1992	2650		1382		61
1993	2993		1399		69
1994	3373		1304		77
1995	3797		1272		85
1996	4212		1316		94
1997	4593		1381		100
1998	5011		1516		108
1999	5551		1706		117

| Year | Nominal Human Capital (Billions of Yuan) | | Real Human Capital (Billions of 1985 Yuan) | | Real physical capital (Billions of 1985 Yuan) |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	6178	6280	1919	1949	129
2001	6930	7305	2124	2232	141
2002	7713	8080	2371	2477	156
2003	8534	9131	2588	2760	175
2004	9559	10281	2781	2983	201
2005	10444	11004	2991	3145	239
2006	11528	12177	3254	3429	302
2007	12558	13370	3378	3590	392
2008	13450	14447	3441	3687	517
2009	14517	15601	3711	3978	647
2010	15803	17028	3900	4191	809
2011	16979	18281	4012	4307	959
2012	18304	19717	4216	4529	1117

14.2 Human capital per capita

To obtain 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. Table JL-2.1 presents human capital per capita for Jilin by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 14.92 times from 50,680 Yuan to 806,690 Yuan. Real human capital per capita increases 2.67 times from 50,680 Yuan to 185,810 Yuan.

Figure JL-2.1 illustrates the trends of human capital per capita by gender for Jilin. The real human capital per capita of male is similar to that

of female for Jilin. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
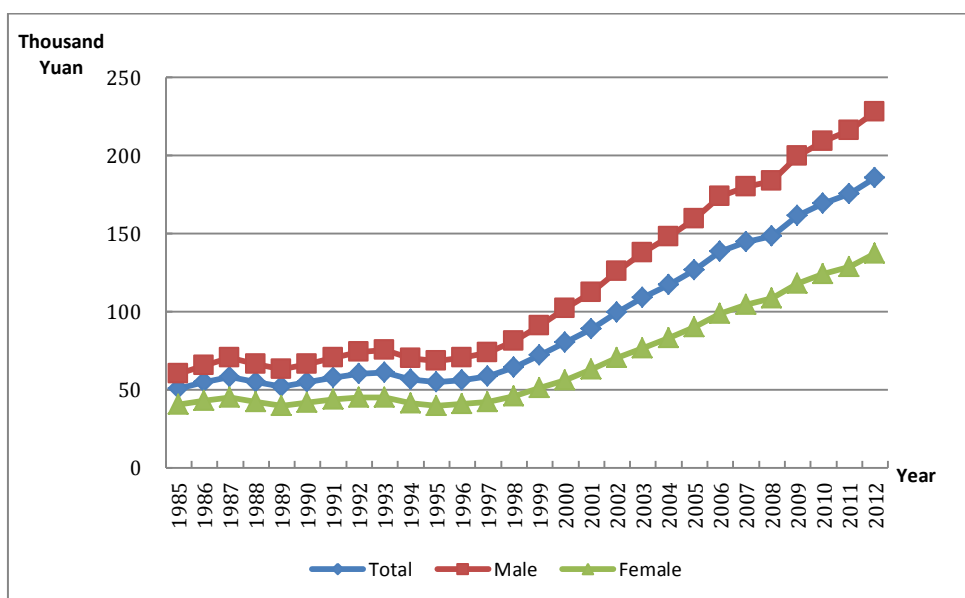
Figure JL-2.1 Human Capital Per Capita by Gender for Jilin，1985-2012

Table JL-2.1 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	50.68	68.94	38.17	50.68	68.94	38.17
1986	57.99	80.94	42.04	54.91	76.36	40.00
1987	65.78	93.89	45.92	58.28	82.01	41.49
1988	74.03	105.31	51.67	54.79	75.65	39.87
1989	82.56	116.92	57.67	51.82	71.85	37.30
1990	92.17	129.24	65.30	54.75	76.44	39.04
1991	103.33	145.37	71.92	57.73	80.27	40.87
1992	115.71	163.22	79.07	60.32	82.46	43.24

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	130.16	183.56	87.55	60.83	81.93	44.01
1994	146.14	206.10	96.81	56.50	74.66	41.56
1995	163.35	230.19	107.14	54.71	72.45	39.79
1996	180.10	255.09	115.05	56.25	74.55	40.38
1997	195.28	276.15	122.98	58.72	77.82	41.62
1998	212.12	300.28	131.00	64.17	85.22	44.79
1999	234.02	333.38	140.00	71.94	96.64	48.54
2000	258.47	369.51	150.96	80.30	108.97	52.55
2001	290.31	418.17	164.46	88.99	121.50	56.97
2002	323.72	468.06	178.92	99.51	137.09	61.79
2003	358.97	519.87	194.59	108.84	150.61	66.21
2004	403.41	587.59	211.99	117.38	164.31	68.63
2005	442.88	644.16	230.67	126.84	177.65	73.29
2006	491.42	713.95	252.85	138.69	194.56	78.75
2007	538.46	779.02	276.63	144.84	203.34	81.21
2008	580.66	834.20	300.71	148.55	207.18	83.83
2009	632.28	901.50	331.69	161.63	224.12	91.83
2010	686.55	979.79	358.51	169.43	235.57	95.35
2011	742.52	1054.98	386.50	175.45	241.13	100.58
2012	806.69	1143.13	416.35	185.81	254.88	105.79

Figure JL-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
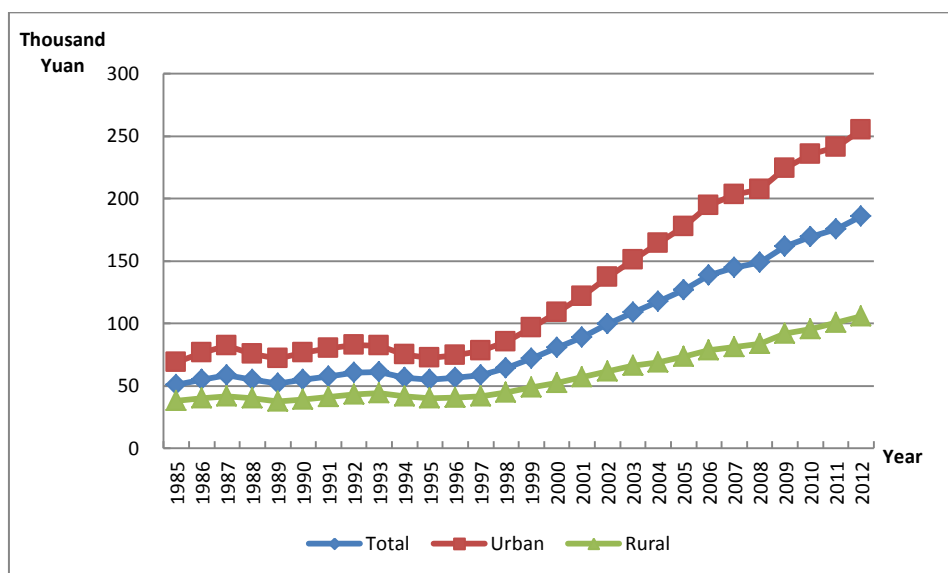
Figure JL-2.2 Real Human Capital Per Capita by Region for Jilin，1985-2012

14.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

14.3.1 Total labor force human capital

The total labor force human capital for Jilin is reported in Table JL-3.1 From 1985 to 2012, the nominal and real labor force human capital for Jilin show differential increases. Nominal labor force human capital increases 16.76 times, from 441 billion Yuan to 7,832 billion Yuan. Real labor force human capital increases almost 3.15 times, from 441 billion Yuan to 1,838 billion Yuan.

152

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	441		441	
1986	524		497	
1987	619		550	
1988	716		533	
1989	818		515	
1990	947		563	
1991	1077		602	
1992	1215		635	
1993	1374		645	
1994	1551		603	
1995	1754		591	
1996	1956		615	
1997	2161		654	
1998	2402		732	
1999	2644		819	
2000	2948	2889	922	904
2001	3240	3189	1002	987
2002	3540	3504	1100	1089
2003	3907	3895	1200	1196
2004	4226	4246	1247	1252
2005	4636	4660	1347	1353
2006	5053	5081	1447	1454
2007	5428	5457	1480	1487
2008	5876	5909	1523	1530
2009	6380	6414	1649	1657
2010	7010	7057	1747	1757

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	7394	7457	1771	1784
2012	7832	7908	1830	1846

14.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables JL-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Jilin show differential increases. Nominal average labor force human capital increases more than 12.13 times, from 34,460 Yuan to 452,520 Yuan. Real average labor force human capital increases more than 2.07 times, from 34,460 Yuan to 105,720 Yuan.

Table JL-3.2 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	34.46	43.64	28.27	34.46	43.64	28.27
1986	39.52	51.56	31.79	37.44	48.64	30.25
1987	45.01	60.67	35.65	39.98	53.00	32.21
1988	50.66	68.08	39.78	37.70	48.91	30.69
1989	56.84	76.05	44.19	35.79	46.73	28.58
1990	64.87	86.15	49.25	38.55	50.95	29.44
1991	72.20	96.11	54.10	40.37	53.07	30.74

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**
1992	79.81	106.29	59.36	41.72	53.70	32.46
1993	89.06	118.80	65.44	41.80	53.02	32.89
1994	99.29	132.85	71.77	38.61	48.13	30.81
1995	110.43	148.26	78.54	37.18	46.67	29.16
1996	120.49	161.80	84.72	37.87	47.29	29.73
1997	130.91	175.93	91.27	39.64	49.58	30.89
1998	142.44	191.57	98.05	43.41	54.37	33.52
1999	154.54	208.38	104.52	47.88	60.41	36.24
2000	169.14	229.50	111.50	52.92	67.68	38.82
2001	184.98	250.05	122.24	57.22	72.65	42.34
2002	200.89	270.25	134.21	62.43	79.15	46.35
2003	219.33	294.01	147.86	67.36	85.18	50.31
2004	237.78	317.68	162.27	70.18	88.84	52.53
2005	260.75	348.99	177.69	75.75	96.24	56.45
2006	284.54	378.87	195.92	81.48	103.25	61.02
2007	307.10	405.75	213.33	83.72	105.91	62.63
2008	332.52	437.03	231.42	86.17	108.54	64.52
2009	362.10	473.92	252.08	93.58	117.82	69.79
2010	394.46	515.51	272.59	98.30	123.94	72.49
2011	422.44	549.51	293.77	101.17	125.60	76.45
2012	452.52	587.35	314.74	105.72	130.96	79.97

Chapter 15   Human Capital for Heilongjiang

15.1 Total human capital

Table HLJ-1.1 presents the results of nominal and real total human capital and real physical capital for Heilongjiang. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1396		1396		56
1986	1587		1488		63
1987	1810		1567		70
1988	2106		1550		77
1989	2412		1549		81
1990	2779		1683		86
1991	3116		1764		90
1992	3490		1824		96
1993	3921		1787		103
1994	4379		1638		111
1995	4868		1568		121
1996	5351		1610		132
1997	5860		1690		144

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1998	6449		1849		158
1999	7087		2096		172
2000	7819	7888	2353	2373	186
2001	8797	8905	2626	2655	202
2002	9891	10038	2965	3006	220
2003	11133	11326	3301	3354	240
2004	12332	12585	3512	3579	264
2005	13285	13501	3737	3795	292
2006	14817	15182	4084	4180	328
2007	15908	16185	4160	4228	375
2008	17264	17628	4274	4361	433
2009	18644	18973	4607	4685	502
2010	20337	20707	4832	4918	585
2011	22387	22804	5027	5119	676
2012	24493	24966	5329	5428	782

15.2 Human capital per capita

To obtain 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. Table HLJ-2.1 presents human capital per capita for Heilongjiang by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 16.16 times from 44,620 Yuan to 765,850 Yuan. Real human capital per capita increases 2.37 times from 44,620 Yuan to 166,630 Yuan.

Figure HLJ-2.1 illustrates the trends of human capital per capita by

gender for Heilongjiang. The real human capital per capita of male is similar to that of female for Heilongjiang. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
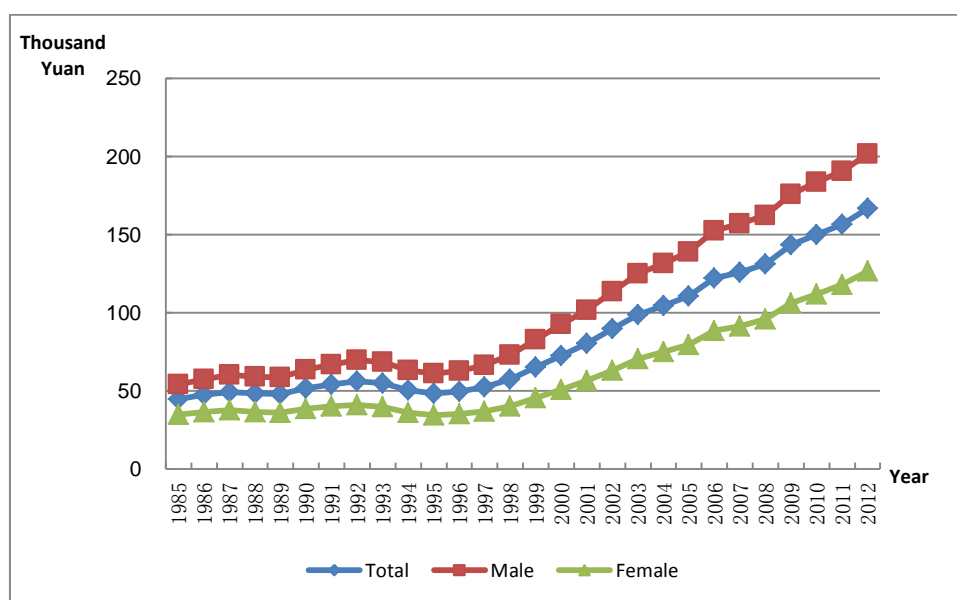
Figure HLJ-2.1 Human Capital Per Capita by Gender for Heilongjiang，

1985-2012

Table HLJ-2.1 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	44.62	56.55	35.51	44.62	56.55	35.51
1986	50.49	64.13	39.71	47.34	60.50	36.94
1987	56.95	72.56	44.40	49.29	62.40	38.75
1988	65.68	84.79	49.65	48.34	61.48	37.32
1989	74.70	96.90	55.36	47.95	61.31	36.31

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1990	85.27	110.94	61.95	51.65	66.48	38.23
1991	95.56	124.81	68.70	54.09	69.11	40.26
1992	107.00	140.20	76.07	55.92	70.77	42.09
1993	120.36	158.45	84.41	54.86	69.43	41.07
1994	134.64	178.25	92.94	50.36	64.02	37.28
1995	149.95	199.35	102.20	48.31	61.78	35.28
1996	165.28	221.42	110.16	49.74	63.77	35.95
1997	181.32	244.14	118.85	52.30	67.29	37.36
1998	199.91	270.92	128.32	57.32	74.00	40.46
1999	220.12	300.42	138.00	65.11	84.60	45.19
2000	241.02	330.53	148.92	72.54	94.30	50.17
2001	268.28	367.18	162.97	80.09	103.93	54.68
2002	298.84	408.49	178.02	89.59	116.44	60.03
2003	333.58	456.47	193.79	98.91	129.08	64.57
2004	367.56	499.99	212.18	104.68	136.61	67.21
2005	393.71	528.68	231.17	110.75	143.30	71.58
2006	443.60	601.13	253.57	122.27	160.05	76.67
2007	481.71	650.60	277.04	125.97	164.35	79.48
2008	529.19	716.57	301.73	131.01	172.39	80.74
2009	579.77	785.61	329.98	143.26	189.38	87.26
2010	631.48	856.77	357.48	150.04	199.36	90.11
2011	697.47	950.34	383.66	156.62	209.60	90.91
2012	765.85	1045.79	412.26	166.63	223.32	94.95

Figure HLJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is

159

significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
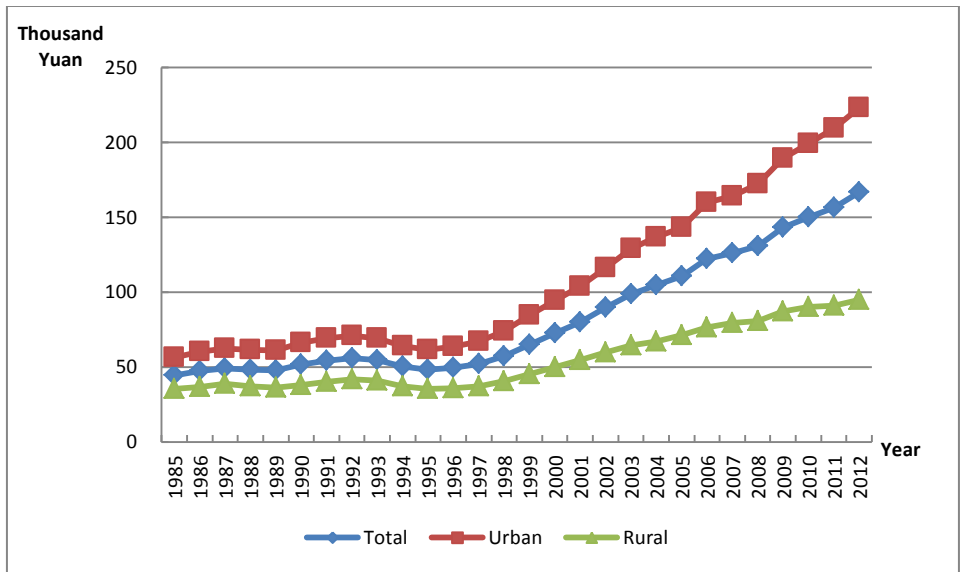
Figure HLJ-2.2 Real Human Capital Per Capita by Region for Heilongjiang，1985-2012

15.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

15.3.1 Total labor force human capital

The total labor force human capital for Heilongjiang is reported in Table HLJ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Heilongjiang show differential increases. Nominal labor force human capital increases 19.65 times, from 573 billion Yuan to 11,834 billion Yuan. Real labor force human capital increases almost 3.52 times, from 573

billion Yuan to 2,588 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	573		573	
1986	678		636	
1987	815		705	
1988	962		708	
1989	1127		723	
1990	1306		791	
1991	1497		847	
1992	1692		885	
1993	1910		871	
1994	2138		801	
1995	2397		774	
1996	2644		798	
1997	2903		840	
1998	3214		924	
1999	3516		1044	
2000	3883	3852	1174	1193
2001	4293	4207	1289	1290
2002	4754	4645	1436	1434
2003	5263	5134	1574	1554
2004	5749	5590	1651	1616
2005	6345	6103	1798	1729
2006	6881	6588	1913	1836
2007	7423	7104	1960	1871
2008	8062	7727	2012	1934
2009	8857	8505	2204	2129

| Year | Nominal Labor Force Human Capital (Billions of Yuan) | | Real Labor Force Human Capital (Billions of 1985 Yuan) | |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2010	10016	9665	2392	2330
2011	10942	10603	2470	2422
2012	11834	11498	2588	2548

15.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables HLJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Heilongjiang show differential increases. Nominal average labor force human capital increases more than 14.09 times, from 31,440 Yuan to 474,310 Yuan. Real average labor force human capital increases more than 2.30 times, from 31,440 Yuan to 103,740 Yuan.

Table HLJ-3.2 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	31.44	37.93	25.81	31.44	37.93	25.81
1986	36.18	44.15	29.01	33.92	41.65	26.99
1987	41.79	51.53	32.61	36.15	44.32	28.46
1988	47.73	59.18	36.84	35.11	42.91	27.69
1989	54.38	67.85	41.33	34.89	42.93	27.11
1990	62.14	78.13	46.39	37.65	46.81	28.62

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	69.81	88.17	51.67	39.49	48.83	30.27
1992	77.57	98.30	57.12	40.56	49.62	31.60
1993	86.42	109.79	63.24	39.40	48.11	30.77
1994	95.84	122.21	69.67	35.89	43.90	27.95
1995	106.40	136.24	76.69	34.33	42.22	26.48
1996	116.26	149.61	82.99	35.08	43.09	27.08
1997	126.99	164.20	89.44	36.73	45.25	28.12
1998	138.80	180.03	96.49	39.92	49.18	30.42
1999	150.20	195.18	103.30	44.62	54.96	33.82
2000	163.01	213.06	110.84	49.30	60.79	37.34
2001	177.40	229.55	121.15	53.27	64.97	40.65
2002	192.16	246.22	132.29	58.04	70.18	44.61
2003	208.61	265.18	144.57	62.40	74.99	48.17
2004	225.64	284.51	157.34	64.80	77.73	49.84
2005	244.47	305.86	171.51	69.27	82.90	53.10
2006	267.65	333.58	190.38	74.42	88.82	57.57
2007	291.70	363.09	209.49	77.01	91.72	60.10
2008	319.51	398.96	228.51	79.75	95.98	61.15
2009	353.89	444.75	250.21	88.04	107.21	66.16
2010	395.35	502.02	271.98	94.42	116.81	68.56
2011	435.93	558.69	294.34	98.41	123.22	69.75
2012	474.31	610.42	317.08	103.74	130.35	73.03

Chapter 16   Human Capital for Shanghai

16.1 Total human capital

Table SH-1.1 presents the results of nominal and real total human capital and real physical capital for Shanghai. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1275		1275		59
1986	1539		1447		68
1987	1873		1630		79
1988	2258		1636		91
1989	2696		1685		100
1990	3224		1896		110
1991	3777		2011		119
1992	4390		2124		132
1993	5059		2037		150
1994	5783		1879		177
1995	6805		1863		212
1996	7854		1969		254
1997	9200		2243		293
1998	10780		2629		330
1999	12720		3056		366

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	15180	15800	3557	3704	403
2001	16770	17460	3931	4093	444
2002	18800	19570	4384	4564	489
2003	21880	23090	5097	5379	540
2004	25070	26870	5714	6125	601
2005	27890	29510	6294	6660	669
2006	32880	38710	7333	8633	751
2007	38950	43400	8417	9380	850
2008	44450	49550	9080	10120	943
2009	50340	56360	10320	11560	1046
2010	56230	62910	11180	12510	1142
2011	59960	66680	11340	12610	1230
2012	64580	71770	11880	13200	1314

16.2 Human capital per capita

To obtain 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. Table SH-2.1 presents human capital per capita for Shanghai by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 25.50 times from 121,910 Yuan to 3,230,220 Yuan. Real human capital per capita increases 3.87 times from 121,910 Yuan to 594,230 Yuan.

Figure SH-2.1 illustrates the trends of human capital per capita by gender for Shanghai. The real human capital per capita of male is similar to

that of female for Shanghai. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
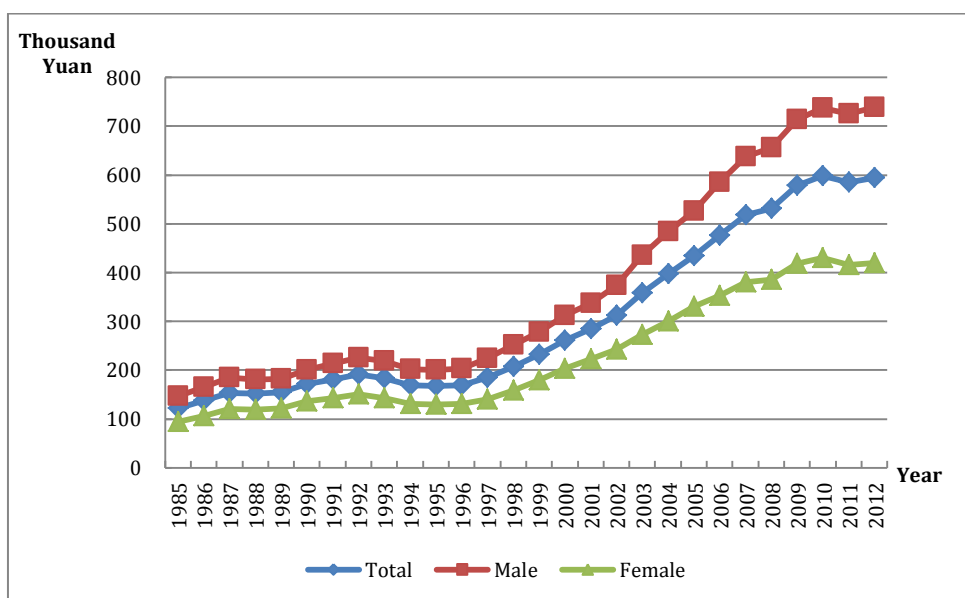
Figure SH-2.1 Human Capital Per Capita by Gender for Shanghai，1985-2012

16.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

16.3.1 Total labor force human capital

The total labor force human capital for Shanghai is reported in Table SH-3.1 From 1985 to 2012, the nominal and real labor force human capital

for Shanghai show differential increases. Nominal labor force human capital increases 59.66 times, from 524 billion Yuan to 31,810 billion Yuan. Real labor force human capital increases almost 10.16 times, from 524 billion Yuan to 5,851 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	524		524	
1986	631		594	
1987	756		657	
1988	909		659	
1989	1089		681	
1990	1292		760	
1991	1477		786	
1992	1675		811	
1993	1908		768	
1994	2160		702	
1995	2440		668	
1996	2948		739	
1997	3619		883	
1998	4466		1089	
1999	5333		1281	
2000	6332	6135	1484	1438
2001	7210	7078	1690	1659
2002	8205	8164	1913	1904
2003	9410	9504	2192	2214
2004	10590	10870	2413	2479
2005	11990	12340	2707	2785

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2006	14690	15180	3276	3385
2007	17730	18370	3832	3970
2008	21080	21870	4305	4468
2009	24180	25130	4959	5154
2010	27440	28560	5457	5680
2011	29780	31010	5631	5864
2012	31810	33110	5851	6090

16.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital to the labor force population. From 1985 to 2012, the nominal and real average labor force human capital for Shanghai show differential increases. Nominal average labor force human capital increases more than 26.04times, from 70,380 Yuan to 1,903,280 Yuan. Real average labor force human capital increases more than 3.97 times, from 70,380 Yuan to 350,080 Yuan.

Chapter 17   Human Capital for Jiangsu

17.1 Total human capital

Table JS-1.1 presents the results of nominal and real total human capital and real physical capital for Jiangsu. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	3013		3013		83
1986	3451		3216		102
1987	4026		3455		123
1988	4648		3275		147
1989	5355		3207		166
1990	6433		3736		187
1991	7461		4159		213
1992	8676		4539		257
1993	9892		4379		316
1994	10898		3909		369
1995	12128		3756		425
1996	14027		3957		486
1997	16093		4430		552
1998	18203		5001		629
1999	20906		5773		711

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	23196	23479	6393	6465	804
2001	26313	26777	7168	7282	904
2002	28917	29422	7931	8061	1013
2003	32634	33314	8828	8999	1176
2004	36541	37360	9475	9675	1370
2005	39922	40672	10118	10298	1612
2006	45503	46535	11329	11576	1879
2007	50210	51247	11980	12217	2179
2008	55870	57090	12651	12911	2515
2009	62000	63330	14091	14376	2922
2010	69270	70770	15166	15483	3413
2011	75810	77420	15753	16078	3987
2012	83170	84870	16842	17173	4547

17.2 Human capital per capita

To obtain 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. Table JS-2.1 presents human capital per capita for Jiangsu by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 22.93 times from 53,850 Yuan to 1,288,620 Yuan. Real human capital per capita increases 3.85 times from 53,850 Yuan to 260,950 Yuan.

Figure JS-2.1 illustrates the trends of human capital per capita by gender for Jiangsu. The real human capital per capita of male is similar to

that of female for Jiangsu. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
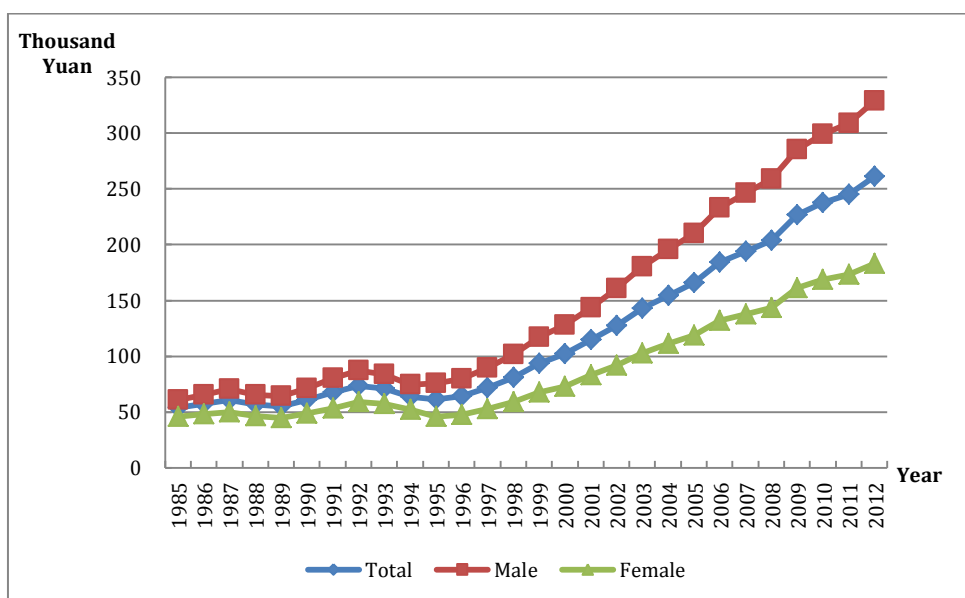
Figure JS-2.1 Human Capital Per Capita by Gender for Jiangsu，1985-2012

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

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	53.85	74.57	47.93	53.85	74.57	47.93
1986	61.41	88.01	53.81	57.22	82.71	49.96
1987	70.90	109.52	60.05	60.85	93.15	51.77
1988	80.48	128.13	67.18	56.71	88.89	47.71
1989	91.64	150.50	75.28	54.88	90.01	45.12
1990	104.53	178.25	84.77	60.71	103.10	49.32
1991	121.16	214.97	93.55	67.54	115.45	53.42

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	140.70	260.46	102.84	73.61	128.57	56.25
1993	160.53	297.43	114.28	71.06	123.68	53.28
1994	177.02	320.25	125.91	63.50	106.29	48.24
1995	197.50	347.91	140.68	61.16	99.37	46.74
1996	227.43	395.93	152.50	64.16	102.06	47.31
1997	260.77	444.68	165.57	71.78	113.15	50.36
1998	294.96	486.99	180.06	81.04	123.92	55.32
1999	338.56	551.21	193.97	93.49	142.26	60.32
2000	369.88	573.21	216.96	101.94	147.93	67.40
2001	420.67	641.88	233.91	114.60	165.49	71.59
2002	464.88	685.25	255.43	127.50	179.54	78.02
2003	527.81	763.08	278.94	142.78	198.15	84.19
2004	595.93	842.89	303.82	154.52	211.07	87.67
2005	653.28	898.64	330.99	165.57	220.61	93.27
2006	739.17	1011.00	365.34	184.03	244.29	101.23
2007	813.11	1096.82	401.14	194.01	254.59	106.06
2008	900.49	1203.72	440.69	203.90	265.59	110.34
2009	997.39	1317.61	487.06	226.68	291.89	122.56
2010	1085.25	1429.12	525.06	237.60	305.59	126.68
2011	1179.78	1539.27	568.10	245.15	313.24	129.38
2012	1288.62	1668.17	615.12	260.95	330.99	136.54

Figure JS-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
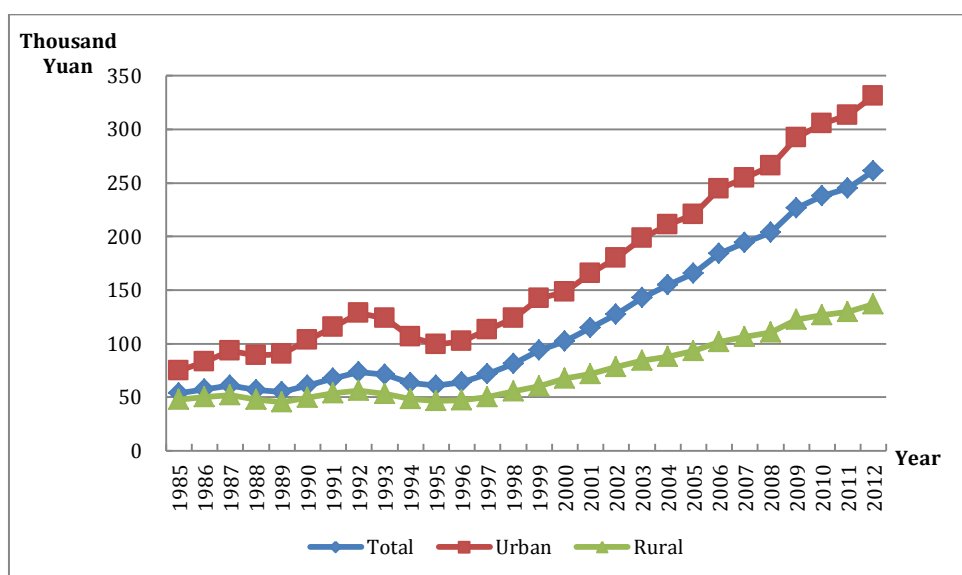
Figure JS-2.2 Real Human Capital Per Capita by Region for Jiangsu，1985-2012

17.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

17.3.1 Total labor force human capital

The total labor force human capital for Jiangsu is reported in Table JS-3.1 From 1985 to 2012, the nominal and real labor force human capital for Jiangsu show differential increases. Nominal labor force human capital increases 25.73 times, from 1435 billion Yuan to 38,367 billion Yuan. Real labor force human capital increases almost 4.45 times, from 1,435 billion Yuan to 7,817 billion Yuan.

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

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	1435		1435	
1986	1685		1570	
1987	1932		1658	
1988	2282		1610	
1989	2590		1551	
1990	3051		1772	
1991	3342		1874	
1992	3744		1983	
1993	4202		1886	
1994	4725		1720	
1995	5338		1672	
1996	5965		1711	
1997	6696		1875	
1998	7574		2117	
1999	8564		2404	
2000	9838	9591	2742	2676
2001	10778	10564	2967	2909
2002	11800	11646	3262	3219
2003	13076	13017	3560	3543
2004	14255	14326	3717	3734
2005	15849	15946	4035	4057
2006	17890	18019	4488	4518
2007	20146	20306	4848	4885
2008	23137	23345	5283	5325
2009	26809	27076	6138	6195
2010	31831	32195	7012	7087

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	35168	35632	7353	7445
2012	38367	38878	7817	7914

17.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables JS-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Jiangsu show differential increases. Nominal average labor force human capital increases more than 19.41 times, from 38,610 Yuan to 788,040 Yuan. Real average labor force human capital increases more than 3.16 times, from 38,610 Yuan to 160,056 Yuan.

Table JS-3.2 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	38.61	49.12	35.54	38.61	49.12	35.54
1986	44.09	57.53	40.17	41.08	54.07	37.30
1987	50.26	69.55	45.36	43.15	59.15	39.11
1988	57.02	78.06	51.24	40.23	54.16	36.39
1989	64.27	89.88	57.37	38.48	53.75	34.38
1990	72.40	104.57	64.08	42.04	60.48	37.28
1991	80.75	119.21	70.65	45.27	64.02	40.34

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
1992	90.02	135.16	77.54	47.67	66.71	42.41
1993	100.88	153.80	85.29	45.27	63.96	39.77
1994	112.57	173.76	93.09	40.97	57.67	35.66
1995	125.99	195.29	101.48	39.47	55.78	33.72
1996	141.03	216.59	110.05	40.44	55.83	34.14
1997	157.56	237.65	119.51	44.13	60.47	36.35
1998	176.60	260.95	129.52	49.36	66.40	39.79
1999	197.06	286.85	139.07	55.32	74.03	43.25
2000	220.29	317.42	149.51	61.40	81.92	46.45
2001	243.24	341.38	160.88	66.96	88.01	49.24
2002	266.97	366.15	172.18	73.80	95.93	52.59
2003	295.84	399.87	183.86	80.54	103.83	55.49
2004	324.70	431.57	195.68	84.67	108.07	56.47
2005	359.30	469.60	210.98	91.47	115.29	59.45
2006	401.31	515.96	246.29	100.67	124.67	68.24
2007	449.01	570.16	282.39	108.05	132.34	74.66
2008	507.15	640.59	317.03	115.80	141.34	79.38
2009	579.02	726.72	356.36	132.57	160.99	89.67
2010	656.75	824.06	395.99	144.68	176.21	95.54
2011	724.48	908.24	433.14	151.48	184.83	98.64
2012	788.04	983.61	469.89	160.56	195.16	104.30

Chapter 18   Human Capital for Zhejiang

18.1 Total human capital

Table ZJ-1.1 presents the results of nominal and real total human capital and real physical capital for Zhejiang. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1985	2345		2345		12
1986	2655		2500		14
1987	3025		2641		17
1988	3478		2506		19
1989	3949		2397		22
1990	4519		2685		26
1991	5213		2997		30
1992	5913		3183		35
1993	6773		3055		65
1994	7655		2759		99
1995	8503		2625		140
1996	9947		2803		183
1997	11555		3123		227
1998	13374		3581		273
1999	15307		4097		321

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	17403	17633	4589	4642	377
2001	19755	20028	5196	5259	441
2002	22071	22366	5844	5916	521
2003	25490	25943	6645	6754	634
2004	28696	29295	7224	7364	767
2005	31261	31861	7757	7895	909
2006	37123	38083	9075	9296	1064
2007	40731	41595	9565	9755	1230
2008	45791	46776	10234	10441	1392
2009	51193	52286	11593	11826	1573
2010	57020	58250	12418	12673	1784
2011	62360	63650	12878	13120	2016
2012	68220	69620	13770	14025	2239

18.2 Human capital per capita

To obtain 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. Table ZJ-2.1 presents human capital per capita for Zhejiang by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 21.10 times from 65,680 Yuan to 1,451,580 Yuan. Real human capital per capita increases 3.46 times from 65,680 Yuan to 293,000 Yuan.

Figure ZJ-2.1 illustrates the trends of human capital per capita by gender for Zhejiang. The real human capital per capita of male is similar to

that of female for Zhejiang. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
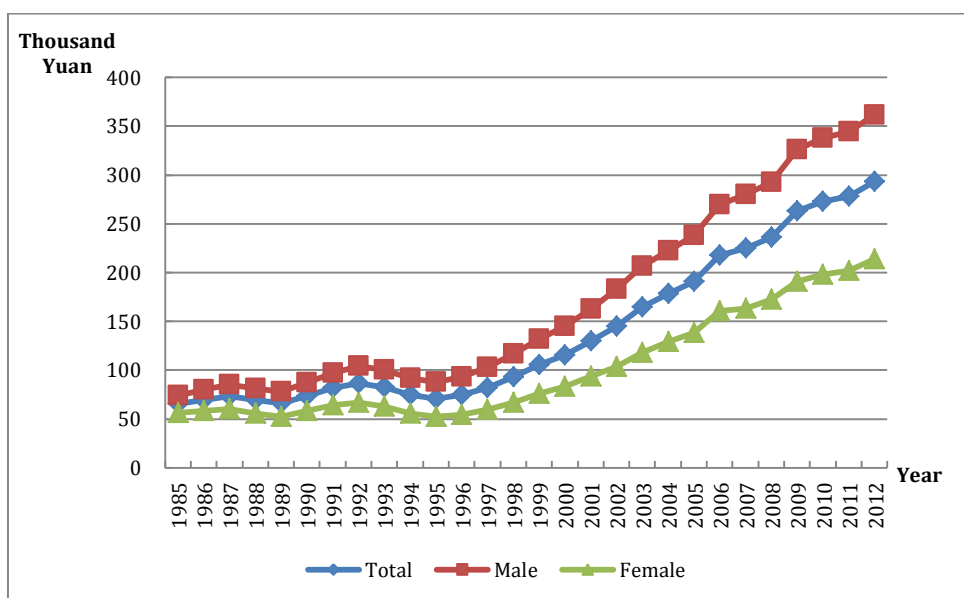
Figure ZJ-2.1 Human Capital Per Capita by Gender for Zhejiang，1985-2012

Table ZJ-2.1 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	65.68	74.12	62.49	65.68	74.12	62.49
1986	73.98	85.83	69.36	69.68	80.75	65.37
1987	83.89	99.66	77.54	73.24	84.54	68.69
1988	95.95	116.96	87.17	69.14	80.40	64.45
1989	108.64	135.64	96.95	65.94	79.83	59.94
1990	123.61	159.32	107.50	73.44	91.84	65.16
1991	141.94	195.72	117.30	81.60	106.84	70.05

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	160.36	227.47	129.18	86.32	113.71	73.61
1993	183.27	267.84	143.51	82.67	110.29	69.65
1994	207.11	309.44	158.51	74.65	102.18	61.60
1995	230.16	346.68	174.60	71.06	97.84	58.29
1996	264.84	400.89	187.54	74.63	103.04	58.51
1997	303.95	456.15	202.28	82.15	112.63	61.82
1998	347.67	514.06	218.92	93.09	126.30	67.37
1999	394.05	570.76	236.73	105.47	140.93	73.96
2000	438.64	619.93	258.22	115.66	151.71	79.80
2001	493.61	695.41	278.52	129.83	170.86	86.07
2002	548.29	763.86	302.49	145.18	189.96	94.14
2003	630.44	874.06	335.27	164.35	216.28	101.40
2004	707.76	971.77	368.38	178.17	233.91	106.51
2005	768.54	1032.16	410.48	190.70	244.77	117.28
2006	891.61	1201.32	444.88	217.96	281.79	125.85
2007	957.93	1265.85	486.72	224.95	285.78	131.88
2008	1056.09	1380.12	532.30	236.03	297.31	136.97
2009	1160.95	1498.90	587.33	262.90	327.15	153.90
2010	1252.26	1596.42	641.30	272.72	335.03	162.05
2011	1348.05	1699.03	688.84	278.39	338.62	164.83
2012	1451.58	1815.43	742.37	293.00	354.03	173.64

Figure ZJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

180
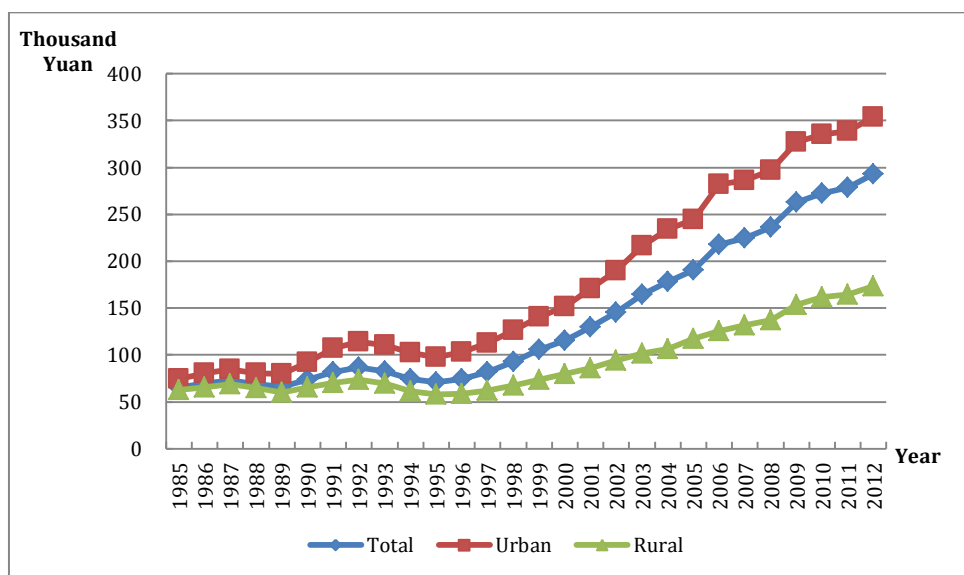
Figure ZJ-2.2 Real Human Capital Per Capita by Region for Zhejiang，1985-2012

18.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

18.3.1 Total labor force human capital

The total labor force human capital for Zhejiang is reported in Table ZJ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Zhejiang show differential increases. Nominal labor force human capital increases 26.58 times, from 1,084 billion Yuan to 29,904 billion Yuan. Real labor force human capital increases almost 4.63 times, from 1,084 billion Yuan to 6,106 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	1084		1084	
1986	1254		1181	
1987	1449		1266	
1988	1667		1204	
1989	1901		1156	
1990	2171		1293	
1991	2412		1396	
1992	2647		1444	
1993	2904		1337	
1994	3173		1171	
1995	3508		1109	
1996	3960		1151	
1997	4534		1268	
1998	5291		1465	
1999	6128		1691	
2000	7124	7019	1925	1898
2001	7758	7666	2095	2071
2002	8459	8395	2301	2284
2003	9348	9319	2500	2491
2004	10362	10390	2668	2673
2005	11584	11624	2933	2940
2006	13474	13538	3368	3380
2007	15520	15612	3718	3737
2008	18077	18209	4112	4138
2009	21101	21296	4855	4893
2010	24787	25053	5471	5523

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	27393	27719	5726	5789
2012	29904	30278	6106	6174

18.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables ZJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Zhejiang show differential increases. Nominal average labor force human capital increases more than 17.53 times, from 45,950 Yuan to 851,720 Yuan. Real average labor force human capital increases more than 2.78 times, from 45,950 Yuan to 173,910 Yuan.

Table ZJ-3.2 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	45.95	47.83	45.22	45.95	47.83	45.22
1986	52.11	55.15	50.90	49.09	51.88	47.97
1987	59.23	63.58	57.46	51.78	53.94	50.90
1988	67.41	74.05	64.61	48.70	50.90	47.77
1989	76.32	85.85	72.14	46.40	50.53	44.60
1990	86.41	99.75	80.29	51.45	57.50	48.67
1991	95.68	111.47	88.68	55.38	60.85	52.95

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
1992	105.37	123.82	97.61	57.48	61.89	55.62
1993	116.31	137.76	107.64	53.54	56.72	52.25
1994	127.35	151.63	117.76	46.98	50.07	45.76
1995	139.62	167.52	128.48	44.15	47.28	42.89
1996	156.09	192.09	139.42	45.36	49.37	43.50
1997	175.98	221.05	151.40	49.20	54.58	46.27
1998	199.78	254.14	164.68	55.30	62.44	50.68
1999	225.30	287.95	177.03	62.18	71.10	55.31
2000	252.37	322.02	189.67	68.18	78.80	58.61
2001	274.60	347.87	205.45	74.15	85.47	63.49
2002	298.38	374.59	222.74	81.18	93.15	69.32
2003	327.05	406.63	243.61	87.47	100.62	73.68
2004	359.66	443.89	265.05	92.61	106.85	76.64
2005	396.24	484.25	289.04	100.32	114.84	82.58
2006	447.13	543.60	323.87	111.77	127.51	91.62
2007	501.92	608.74	358.70	120.24	137.43	97.19
2008	567.24	688.10	395.44	129.03	148.23	101.76
2009	643.33	781.74	435.98	148.02	170.62	114.24
2010	720.00	872.66	474.67	158.92	183.14	119.94
2011	791.56	956.31	513.07	165.46	190.59	122.77
2012	851.72	1023.92	550.66	173.91	199.68	128.80

Chapter 19   Human Capital for Anhui

19.1 Total human capital

Table AH-1.1 presents the results of nominal and real total human capital and real physical capital for Anhui. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1631		1631		37
1986	1877		1767		44
1987	2160		1866		50
1988	2528		1819		56
1989	2955		1809		61
1990	3456		2061		66
1991	3969		2241		68
1992	4521		2355		71
1993	5176		2345		76
1994	5884		2101		83
1995	6724		2092		91
1996	7547		2133		99
1997	8654		2408		108
1998	9756		2706		118
1999	11003		3115		126

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
2000	12765	12924	3581	3623	136
2001	14723	14920	4103	4157	147
2002	16880	17112	4745	4808	160
2003	19513	19830	5381	5465	175
2004	22187	22555	5850	5944	198
2005	24618	24952	6409	6493	224
2006	27516	27960	7071	7182	255
2007	30006	30436	7321	7424	294
2008	32748	33234	7531	7639	341
2009	36059	36638	8372	8503	391
2010	40034	40685	9015	9159	458
2011	43704	44395	9326	9470	537
2012	46880	47570	9782	9924	623

19.2 Human capital per capita

To obtain 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. Table AH-2.1 presents human capital per capita for Anhui by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 26.93 times from 34,670 Yuan to 968,360 Yuan. Real human capital per capita increases 4.83 times from 34,670 Yuan to 202,060 Yuan.

Figure AH-2.1 illustrates the trends of human capital per capita by gender for Anhui. The real human capital per capita of male is similar to that

of female for Anhui. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
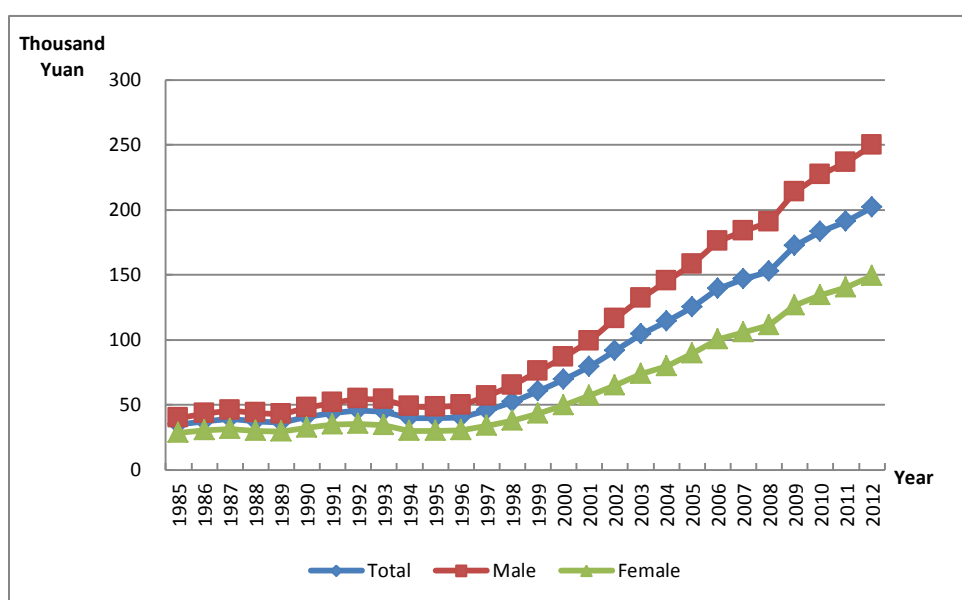
Figure AH-2.1 Human Capital Per Capita by Gender for Anhui，1985-2012

Table AH-2.1 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	34.67	87.72	25.02	34.67	87.72	25.02
1986	39.63	100.89	28.03	37.30	95.36	26.32
1987	45.22	115.38	31.49	39.07	99.23	27.30
1988	51.82	132.51	35.45	37.29	93.88	25.81
1989	59.33	152.53	39.83	36.33	93.40	24.41
1990	68.11	175.67	44.75	40.63	104.84	26.68
1991	77.39	201.84	49.99	43.70	112.16	28.62

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	87.47	229.13	55.67	45.56	117.02	29.51
1993	98.95	261.54	62.36	44.83	116.76	28.65
1994	111.81	298.42	69.09	39.92	104.57	25.13
1995	127.04	342.07	77.08	39.53	103.42	24.66
1996	143.12	372.98	84.21	40.45	102.43	24.56
1997	164.95	422.88	92.03	45.90	113.96	26.65
1998	187.85	468.64	100.35	52.10	125.92	29.09
1999	213.73	518.53	109.19	60.51	142.75	32.30
2000	246.61	590.48	120.24	69.18	161.10	35.39
2001	284.01	643.49	132.73	79.15	175.57	38.57
2002	326.20	702.27	146.17	91.70	193.34	43.03
2003	377.93	780.68	161.13	104.22	211.13	46.64
2004	432.34	852.56	178.43	113.99	221.07	49.29
2005	480.71	899.62	199.38	125.15	230.96	54.05
2006	543.08	1002.81	223.17	139.56	253.89	59.96
2007	600.50	1088.77	247.69	146.51	261.79	63.25
2008	664.71	1188.04	273.45	152.86	269.48	65.63
2009	743.32	1311.21	303.87	172.58	300.78	73.35
2010	813.07	1417.64	335.90	183.09	315.73	78.42
2011	894.38	1540.26	367.07	190.85	325.46	80.92
2012	968.36	1640.86	403.04	202.06	339.25	86.77

Figure AH-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

188

Figure AH-2.2 Real Human Capital Per Capita by Region for Anhui，1985-2012

19.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

19.3.1 Total labor force human capital

The total labor force human capital for Anhui is reported in Table AH-3.1 From 1985 to 2012, the nominal and real labor force human capital for Anhui show differential increases. Nominal labor force human capital increases 25.51 times, from 625 billion Yuan to 16,566 billion Yuan. Real labor force human capital increases almost 4.55 times, from 625 billion Yuan to 3,470 billion Yuan.

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) | |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	625		625	
1986	743		699	
1987	882		762	
1988	1071		772	
1989	1284		787	
1990	1518		905	
1991	1737		982	
1992	1965		1026	
1993	2211		1004	
1994	2477		887	
1995	2767		865	
1996	3077		874	
1997	3430		961	
1998	3832		1070	
1999	4277		1218	
2000	4857	4755	1371	1342
2001	5271	5190	1477	1454
2002	5730	5675	1621	1605
2003	6251	6224	1735	1727
2004	6858	6868	1818	1820
2005	7703	7714	2012	2015
2006	8529	8547	2203	2207
2007	9366	9385	2301	2304
2008	10457	10479	2420	2424
2009	11926	11964	2784	2792
2010	13941	14006	3153	3167

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	15315	15415	3282	3301
2012	16566	16653	3470	3490

19.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables AH-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Anhui show differential increases. Nominal average labor force human capital increases more than 20.55 times, from 23,450 Yuan to 505,220Yuan. Real average labor force human capital increases more than 3.51 times, from 23,450Yuan to 105,830Yuan.

Table AH-3.2 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	23.45	48.25	18.63	23.45	48.25	18.63
1986	27.07	56.55	21.06	25.47	53.45	19.78
1987	31.32	66.16	23.85	27.07	56.90	20.67
1988	36.09	76.80	27.08	26.00	54.41	19.71
1989	41.43	89.04	30.57	25.38	54.52	18.73
1990	47.80	103.30	34.41	28.50	61.65	20.51
1991	53.36	115.28	38.34	30.17	64.06	21.95

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
1992	59.18	127.13	42.52	30.89	64.93	22.55
1993	65.49	141.26	47.30	29.72	63.06	21.73
1994	72.74	156.63	52.38	26.06	54.89	19.05
1995	80.77	173.03	58.02	25.25	52.31	18.56
1996	90.17	190.42	63.30	25.61	52.29	18.46
1997	100.83	209.66	68.86	28.25	56.50	19.94
1998	113.39	232.64	74.60	31.66	62.51	21.63
1999	127.20	256.73	80.20	36.23	70.68	23.72
2000	142.94	286.66	86.50	40.34	78.21	25.46
2001	157.60	302.17	93.66	44.15	82.44	27.21
2002	172.39	317.51	101.12	48.76	87.41	29.77
2003	189.11	335.78	109.37	52.49	90.81	31.66
2004	209.87	359.81	117.51	55.64	93.30	32.46
2005	236.53	391.75	127.13	61.79	100.57	34.46
2006	263.18	426.65	148.17	67.98	108.02	39.81
2007	288.90	461.13	169.92	70.98	110.87	43.39
2008	322.20	507.47	191.30	74.57	115.11	45.92
2009	367.03	575.81	214.22	85.69	132.09	51.71
2010	415.47	650.72	236.15	93.97	144.92	55.13
2011	463.93	726.27	263.05	99.42	153.46	57.99
2012	505.22	781.94	291.16	105.83	161.67	62.68

Chapter 20   Human Capital for Fujian

20.1 Total human capital

Table FJ-1.1 presents the results of nominal and real total human capital and real physical capital for Fujian. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Fujian.

Table FJ-1.1 Real physical capital, Nominal and Real Human Capital for Fujian

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1400		1400		26
1986	1615		1526		30
1987	1867		1621		33
1988	2164		1487		36
1989	2485		1437		39
1990	2873		1674		41
1991	3351		1888		44
1992	3934		2090		49
1993	4661		2134		56
1994	5426		1974		66
1995	6270		1968		78
1996	7159		2107		91
1997	8064		2319		106
1998	8956		2572		123
1999	10019		2898		140

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	11307	11418	3184	3211	157
2001	13151	13357	3727	3779	174
2002	14592	14841	4146	4209	192
2003	16143	16460	4537	4619	215
2004	17787	18149	4798	4889	246
2005	19186	19513	5060	5141	285
2006	21307	21686	5562	5654	333
2007	24178	24690	5982	6101	395
2008	26655	27228	6301	6429	475
2009	29702	30368	7136	7287	563
2010	32845	33566	7649	7806	658
2011	35048	35790	7755	7908	768
2012	37998	38788	8196	8356	884

20.2 Human capital per capita

To obtain 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. Table FJ-2.1 presents human capital per capita for Fujian by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 20.22 times from 55,630 Yuan to 1,180,530 Yuan. Real human capital per capita increases 3.58 times from 55,630Yuan to 254,640 Yuan.

Figure FJ-2.1 illustrates the trends of human capital per capita by gender for Fujian. The real human capital per capita of male is similar to

that of female for Fujian. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.

Figure FJ-2.1 Human Capital Per Capita by Gender for Fujian，1985-2012

Table FJ-2.1 Nominal and Real Human Capital Per Capita by Region for Fujian

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	55.63	80.61	49.33	55.63	80.61	49.33
1986	63.09	94.20	55.16	59.63	88.12	52.34
1987	72.27	108.81	61.68	62.73	92.03	54.24
1988	81.49	128.28	69.02	56.02	85.43	48.17
1989	92.26	148.44	77.27	53.34	83.21	45.35
1990	105.14	173.47	86.81	61.27	97.15	51.68
1991	121.25	200.31	96.90	68.31	107.25	56.33

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	140.56	235.22	107.38	74.68	116.61	59.96
1993	164.45	279.83	118.94	75.30	118.77	58.16
1994	189.09	318.35	132.23	68.79	108.01	51.52
1995	215.88	358.55	146.46	67.76	104.51	49.88
1996	243.66	400.06	160.22	71.71	109.08	51.77
1997	271.65	437.93	174.90	78.12	116.49	55.79
1998	298.88	471.96	189.56	85.83	125.55	60.77
1999	331.57	517.07	205.10	95.91	139.36	66.28
2000	370.77	567.20	226.77	104.41	148.13	72.35
2001	429.45	664.91	243.95	121.71	176.65	78.37
2002	475.20	725.61	263.44	135.02	194.33	84.81
2003	525.26	789.53	286.05	147.63	209.98	91.17
2004	579.52	857.97	310.56	156.32	219.83	94.91
2005	626.20	900.96	342.57	165.15	226.54	101.84
2006	692.08	976.68	377.29	180.66	242.91	111.82
2007	783.24	1092.04	415.94	193.79	258.42	116.96
2008	861.33	1176.52	460.42	203.61	266.42	123.78
2009	958.24	1292.21	505.02	230.22	297.68	138.68
2010	1029.69	1367.01	555.86	239.80	305.44	147.62
2011	1092.43	1427.49	600.69	241.72	303.19	151.49
2012	1180.53	1517.92	651.48	254.64	314.76	160.38

Figure FJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
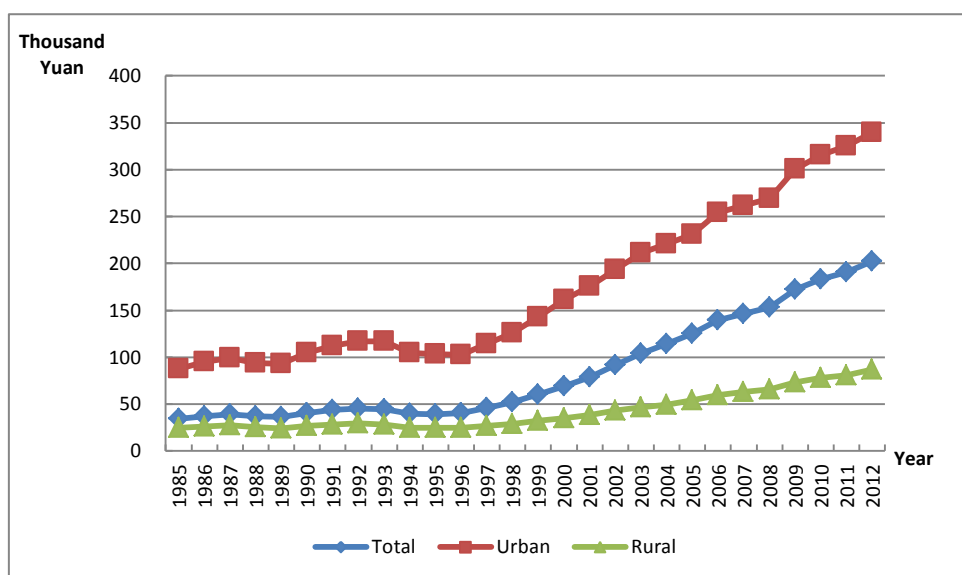
196

Figure FJ-2.2 Real Human Capital Per Capita by Region for Fujian，1985-2012

20.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

20.3.1 Total labor force human capital

The total labor force human capital for Fujian is reported in Table FJ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Fujian show differential increases. Nominal labor force human capital increases 29.18 times, from 514 billion Yuan to 15,520 billion Yuan. Real labor force human capital increases almost 5.59 times, from 514 billion Yuan to 3,391 billion Yuan.

Table FJ-3.1 Nominal and Real Labor Force Human Capital for Fujian

| Year | Nominal Labor Force Human Capital (Billions of Yuan) | | Real Labor Force Human Capital (Billions of 1985 Yuan) | |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	514		514	
1986	610		576	
1987	722		627	
1988	850		585	
1989	999		578	
1990	1173		685	
1991	1379		779	
1992	1592		851	
1993	1838		852	
1994	2105		776	
1995	2411		769	
1996	2719		814	
1997	3086		902	
1998	3559		1037	
1999	4070		1192	
2000	4633	4575	1320	1304
2001	5090	5042	1465	1451
2002	5598	5563	1615	1605
2003	6188	6172	1764	1759
2004	6749	6769	1843	1848
2005	7370	7394	1963	1968
2006	8332	8367	2204	2211
2007	9318	9371	2342	2353
2008	10432	10493	2502	2515
2009	11971	12048	2915	2930
2010	13931	14027	3281	3302

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	14752	14866	3303	3326
2012	15520	15642	3391	3414

20.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables FJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Fujian show differential increases. Nominal average labor force human capital increases more than 17.2 times, from 36,610 Yuan to 666,430 Yuan. Real average labor force human capital increases more than 2.98 times, from 36,610Yuan to145,610Yuan.

Table FJ-3.2 Nominal and Real Average Labor Force Human Capital by Region for Fujian

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	36.61	47.72	33.55	36.61	47.72	33.55
1986	42.06	56.60	38.01	39.74	52.94	36.07
1987	48.72	66.80	42.97	42.29	56.50	37.79
1988	54.77	76.63	48.56	37.68	51.03	33.89
1989	62.18	88.35	54.79	35.98	49.53	32.16
1990	70.98	103.03	61.82	41.44	57.70	36.80
1991	81.41	118.67	69.33	45.99	63.54	40.30

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
1992	92.36	135.06	77.59	49.40	66.96	43.33
1993	104.98	153.91	86.94	48.66	65.33	42.51
1994	118.81	174.77	96.72	43.80	59.30	37.68
1995	134.43	198.90	106.85	42.85	57.97	36.39
1996	149.59	222.33	115.57	44.76	60.62	37.34
1997	166.89	247.39	125.24	48.77	65.81	39.95
1998	186.05	272.77	136.33	54.22	72.56	43.70
1999	205.68	296.19	147.33	60.24	79.83	47.61
2000	227.04	321.04	159.84	64.69	83.84	50.99
2001	246.26	343.02	172.44	70.87	91.13	55.40
2002	266.32	366.56	184.61	76.84	98.17	59.43
2003	290.94	398.29	197.22	82.93	105.93	62.86
2004	315.89	429.90	209.27	86.27	110.15	63.95
2005	342.73	462.05	222.63	91.26	116.18	66.18
2006	382.98	503.46	257.55	101.29	125.22	76.33
2007	424.80	546.88	291.88	106.76	129.41	82.08
2008	471.82	597.91	324.04	113.15	135.40	87.11
2009	534.80	672.45	359.44	130.21	154.91	98.70
2010	594.13	741.00	397.63	139.93	165.57	105.60
2011	631.66	776.26	433.83	141.43	164.87	109.41
2012	666.43	803.50	468.11	145.61	166.62	115.24

Chapter 21   Human Capital for Jiangxi

21.1 Total human capital

Table JX-1.1 presents the results of nominal and real total human capital and real physical capital for Jiangxi. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1254		1254		35
1986	1420		1329		40
1987	1614		1424		43
1988	1891		1376		45
1989	2140		1311		49
1990	2472		1480		52
1991	2842		1659		55
1992	3278		1819		61
1993	3778		1837		70
1994	4296		1644		79
1995	4852		1585		88
1996	5345		1609		98
1997	5876		1725		110
1998	6506		1888		122
1999	7301		2146		135

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	8279	8347	2415	2433	149
2001	9875	10008	2871	2906	165
2002	11284	11438	3264	3305	189
2003	13004	13220	3716	3771	222
2004	14220	14447	3930	3986	263
2005	15358	15533	4172	4214	310
2006	17316	17539	4642	4696	369
2007	19539	19783	4986	5045	439
2008	21772	22041	5237	5295	522
2009	24573	24898	5948	6019	609
2010	28690	29104	6730	6819	708
2011	31666	32136	7045	7141	817
2012	35330	35870	7634	7742	921

21.2 Human capital per capita

To obtain 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. Table JX-2.1 presents human capital per capita for Jiangxi by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 22.1 times from 39,420 Yuan to 910,660 Yuan. Real human capital per capita increases 3.99 times from 39,420 Yuan to 196,770 Yuan.

Figure JX-2.1 illustrates the trends of human capital per capita by gender for Jiangxi. The real human capital per capita of male is similar to

that of female for Jiangxi. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
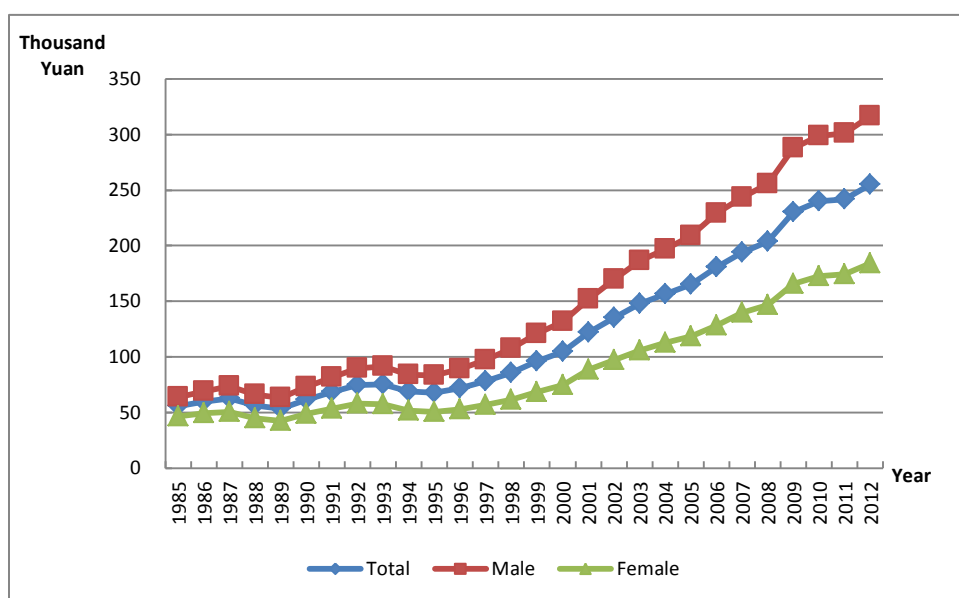

Figure JX-2.1 Human Capital Per Capita by Gender for Jiangxi，1985-2012

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

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	39.42	69.45	32.09	39.42	69.45	32.09
1986	44.18	78.07	35.89	41.33	73.65	33.41
1987	49.69	88.62	40.13	43.82	77.49	35.55
1988	57.01	104.73	45.06	41.49	74.02	33.35
1989	63.32	114.76	50.31	38.79	69.21	31.11
1990	71.75	133.40	56.05	42.95	79.26	33.71
1991	81.96	154.37	62.53	47.85	87.86	37.13

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	93.91	181.43	69.22	52.12	96.05	39.71
1993	107.78	211.35	76.99	52.40	96.63	39.26
1994	121.99	240.64	85.04	46.69	86.70	34.23
1995	137.07	270.14	93.90	44.78	83.25	32.30
1996	150.91	294.03	102.29	45.44	83.83	32.40
1997	165.34	316.69	111.88	48.53	87.66	34.71
1998	182.55	347.27	122.13	52.98	95.17	37.51
1999	204.56	388.50	134.57	60.13	107.44	42.13
2000	228.61	442.23	146.35	66.69	119.78	46.24
2001	270.42	529.72	158.60	78.62	143.76	50.51
2002	307.04	583.75	174.57	88.81	158.11	55.66
2003	352.53	656.38	192.14	100.74	176.20	60.89
2004	384.60	678.06	215.48	106.29	176.20	65.98
2005	414.30	691.76	241.12	112.54	177.11	72.24
2006	464.26	763.65	267.16	124.46	193.77	78.78
2007	522.72	840.17	301.99	133.39	204.20	84.17
2008	581.28	912.19	339.31	139.82	209.35	88.97
2009	654.41	1005.66	385.13	158.40	232.20	101.80
2010	743.21	1140.19	431.25	174.34	255.79	110.33
2011	817.58	1242.75	465.98	181.89	265.26	112.90
2012	910.66	1376.70	505.86	196.77	286.28	119.03

Figure JX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
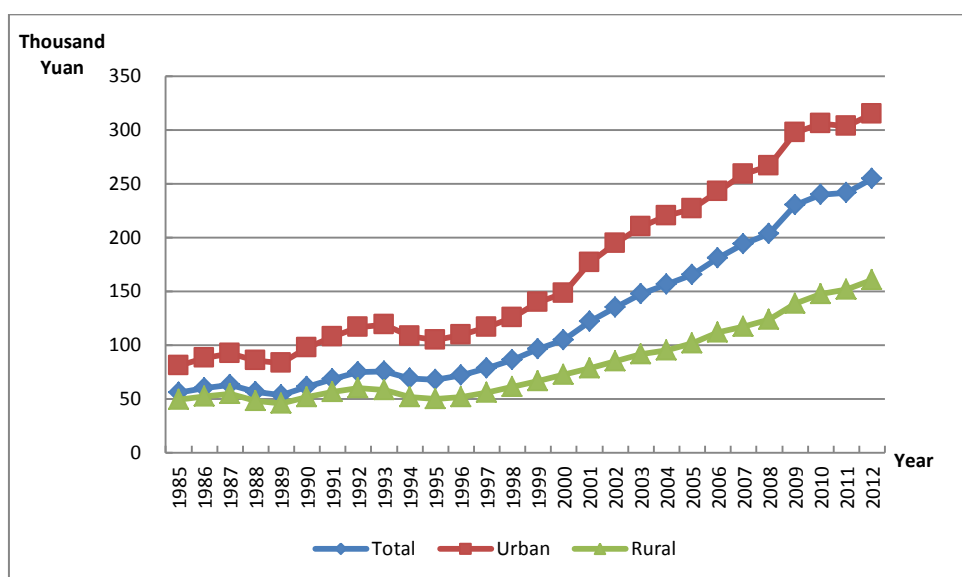
204

Figure JX-2.2 Real Human Capital Per Capita by Region for Jiangxi，1985-2012

21.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

21.3.1 Total labor force human capital

The total labor force human capital for Jiangxi is reported in Table JX-3.1 From 1985 to 2012, the nominal and real labor force human capital for Jiangxi show differential increases. Nominal labor force human capital increases 27.52 times, from 445 billion Yuan to 12,574 billion Yuan. Real labor force human capital increases almost 5.2 times, from 445 billion Yuan to 2,760 billion Yuan.

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

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	445		445	
1986	516		482	
1987	596		526	
1988	700		510	
1989	836		513	
1990	1023		612	
1991	1178		689	
1992	1344		750	
1993	1530		752	
1994	1733		672	
1995	1951		647	
1996	2143		655	
1997	2340		698	
1998	2577		760	
1999	2827		846	
2000	3186	3136	948	933
2001	3454	3420	1030	1021
2002	3755	3729	1117	1109
2003	4083	4067	1201	1196
2004	4400	4395	1245	1243
2005	4889	4886	1350	1349
2006	5727	5723	1562	1560
2007	6558	6555	1702	1701
2008	7475	7476	1828	1827
2009	8618	8624	2118	2118
2010	10352	10379	2460	2465

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	11374	11418	2566	2575
2012	12574	12626	2760	2770

21.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables JX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Jiangxi show differential increases. Nominal average labor force human capital increases more than 17.19 times, from 27,000 Yuan to 491,140 Yuan. Real average labor force human capital increases more than 2.99 times, from 27,000 Yuan to 107,800 Yuan.

Table JX-3.2 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	27.00	41.82	22.89	27.00	41.82	22.89
1986	30.50	47.72	25.74	28.53	45.02	23.97
1987	34.53	54.52	28.94	30.45	47.67	25.64
1988	39.05	62.19	32.83	28.46	43.96	24.30
1989	44.33	70.90	37.23	27.18	42.76	23.02
1990	51.06	81.68	42.12	30.57	48.53	25.34
1991	57.37	91.67	47.38	33.55	52.17	28.13

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**
1992	63.83	101.94	53.06	35.62	53.97	30.44
1993	71.22	113.95	59.53	35.03	52.10	30.36
1994	79.22	127.36	66.19	30.74	45.88	26.64
1995	88.05	142.60	73.33	29.21	43.95	25.22
1996	95.99	156.58	79.39	29.33	44.64	25.15
1997	104.56	171.50	85.73	31.18	47.47	26.60
1998	114.06	187.06	92.70	33.63	51.26	28.47
1999	123.93	202.42	99.78	37.06	55.98	31.24
2000	136.98	221.44	108.16	40.75	59.98	34.18
2001	149.21	237.30	116.78	44.51	64.40	37.20
2002	161.66	251.58	125.39	48.07	68.14	39.98
2003	175.34	266.60	134.55	51.57	71.57	42.64
2004	190.05	282.69	143.14	53.79	73.46	43.83
2005	209.40	307.52	152.72	57.83	78.73	45.76
2006	243.47	348.85	179.73	66.38	88.52	53.00
2007	275.26	381.97	208.04	71.46	92.83	57.99
2008	309.87	418.71	237.23	75.77	96.10	62.20
2009	353.58	472.35	269.22	86.90	109.06	71.16
2010	407.57	549.08	301.47	96.85	123.18	77.13
2011	447.19	598.10	332.38	100.89	127.66	80.53
2012	491.14	655.33	365.74	107.80	136.27	86.06

Chapter 22   Human Capital for Shandong

22.1 Total human capital

Table SD-1.1 presents the results of nominal and real total human capital and real physical capital for Shandong. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Shandong.

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

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	3692		3692		101
1986	4195		4016		115
1987	4800		4252		132
1988	5439		4068		148
1989	6191		3935		162
1990	7150		4394		176
1991	8363		4890		193
1992	9799		5371		214
1993	11502		5584		239
1994	13213		5176		262
1995	14880		4957		286
1996	16312		4939		315
1997	17895		5257		349
1998	19519		5755		388
1999	21117		6255		433

| Year | Nominal Human Capital (Billions of Yuan) | | Real Human Capital (Billions of 1985 Yuan) | | Real physical capital (Billions of 1985 Yuan) |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	24360	24628	7138	7206	488
2001	26876	27146	7738	7807	547
2002	30468	30824	8811	8906	619
2003	34915	35501	9953	10110	710
2004	38413	39103	10575	10753	830
2005	41770	42490	11323	11508	985
2006	49560	50700	13268	13553	1169
2007	54910	56040	14103	14379	1371
2008	59640	60650	14582	14826	1595
2009	64320	65650	15736	16048	1855
2010	71550	73110	17016	17370	2155
2011	76330	77810	17286	17606	2483
2012	82960	84510	18406	18724	2817

22.2 Human capital per capita

To obtain 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. Table SD-2.1 presents human capital per capita for Shandong by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 19.03 times from 52,190 Yuan to 1,045,500 Yuan. Real human capital per capita increases 3.44 times from 52,190 Yuan to 231,960Yuan.

Figure SD-2.1 illustrates the trends of human capital per capita by gender for Shandong. The real human capital per capita of male is similar to

that of female for Shandong. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
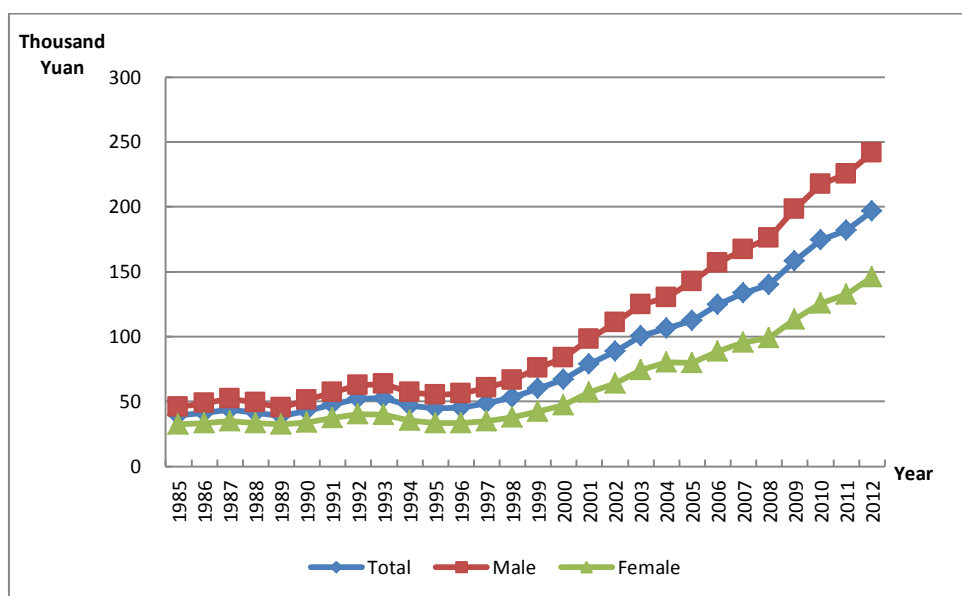

Figure SD-2.1 Human Capital Per Capita by Gender for Shandong，1985-2012

Table SD-2.1 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	52.19	80.89	43.86	52.19	80.89	43.86
1986	58.69	93.34	48.08	56.19	88.90	46.19
1987	66.87	107.59	53.52	59.24	93.92	47.87
1988	73.94	118.66	58.58	55.30	85.89	44.78
1989	83.21	134.68	64.62	52.89	84.26	41.54
1990	94.87	154.09	72.29	58.30	93.96	44.69
1991	109.85	182.63	80.45	64.23	104.86	47.82
1992	127.61	216.13	89.51	69.95	114.27	50.87

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	148.72	255.09	100.26	72.20	117.68	51.47
1994	169.86	291.72	111.18	66.54	107.32	46.90
1995	190.83	327.41	121.77	63.57	103.13	43.57
1996	208.91	354.58	131.32	63.25	101.07	43.11
1997	228.84	385.74	141.12	67.23	106.54	45.24
1998	249.15	416.55	150.98	73.46	115.40	48.89
1999	269.48	446.85	161.24	79.82	123.80	52.95
2000	311.05	531.38	171.77	91.15	145.47	56.80
2001	341.48	566.46	188.60	98.32	153.38	60.91
2002	387.27	634.99	204.55	111.99	174.20	66.13
2003	445.09	728.40	219.92	126.88	198.44	70.04
2004	493.03	790.80	237.53	135.73	209.57	72.32
2005	536.94	840.35	259.96	145.55	220.28	77.30
2006	633.07	997.67	288.59	169.48	258.93	84.96
2007	700.55	1089.64	320.98	179.93	272.45	89.74
2008	761.61	1162.34	358.32	186.21	277.58	94.34
2009	824.52	1241.63	397.64	201.72	296.68	104.61
2010	905.42	1352.84	438.02	215.33	314.15	111.98
2011	965.16	1421.04	473.68	218.58	315.17	114.35
2012	1045.50	1529.73	516.08	231.96	332.30	122.15

Figure SD-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
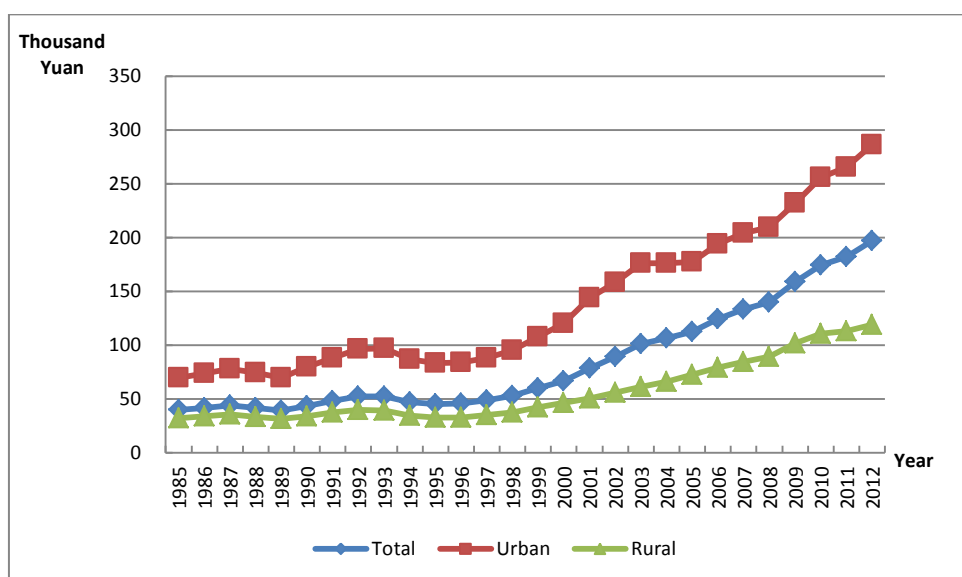
Figure SD-2.2 Real Human Capital Per Capita by Region for Shandong，1985-2012

22.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

22.3.1 Total labor force human capital

The total labor force human capital for Shandong is reported in Table SD-3.1 From 1985 to 2012, the nominal and real labor force human capital for Shandong show differential increases. Nominal labor force human capital increases 29.27 times, from 1,072 billion Yuan to 32,440 billion Yuan. Real labor force human capital increases almost 5.76 times, from 1,072 billion Yuan to 7,248billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	1072		1072	
1986	1317		1261	
1987	1622		1436	
1988	2054		1533	
1989	2539		1613	
1990	3064		1882	
1991	3438		2010	
1992	3800		2087	
1993	4208		2053	
1994	4672		1843	
1995	5272		1768	
1996	5888		1792	
1997	6710		1977	
1998	7638		2255	
1999	8698		2573	
2000	10448	10286	3071	3025
2001	11160	11041	3226	3192
2002	12032	11952	3509	3485
2003	13318	13282	3847	3835
2004	14765	14801	4115	4123
2005	16552	16584	4536	4542
2006	18006	18070	4897	4910
2007	20898	20983	5436	5454
2008	23153	23252	5716	5739
2009	25545	25690	6304	6335
2010	28920	29108	6927	6971

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	30829	31051	7028	7075
2012	32440	32660	7248	7296

22.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables SD-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Shandong show differential increases. Nominal average labor force human capital increases more than 16.77 times, from 32,260 Yuan to 573,140 Yuan. Real average labor force human capital increases more than 2.97 times, from 32,260 Yuan to 128,060 Yuan.

Table SD-3.2 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	32.26	44.91	27.99	32.26	44.91	27.99
1986	37.60	54.10	31.68	36.00	51.52	30.44
1987	44.11	65.53	35.88	39.06	57.21	32.09
1988	50.67	76.07	40.23	37.83	55.06	30.75
1989	57.94	87.77	45.03	36.80	54.91	28.95
1990	65.49	100.01	50.22	40.23	60.98	31.05
1991	73.66	113.82	55.76	43.07	65.35	33.15

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
1992	82.40	129.66	61.67	45.25	68.55	35.05
1993	92.68	148.16	68.15	45.22	68.35	34.98
1994	103.60	167.32	74.59	40.88	61.56	31.47
1995	116.73	189.36	81.83	39.14	59.64	29.28
1996	129.68	210.80	87.58	39.46	60.09	28.75
1997	145.18	235.30	93.98	42.77	64.99	30.12
1998	161.27	258.91	100.89	47.61	71.73	32.67
1999	177.28	281.20	107.73	52.44	77.90	35.38
2000	193.84	306.71	116.11	56.98	83.96	38.40
2001	209.77	325.15	126.64	60.64	88.04	40.90
2002	225.32	341.64	138.55	65.71	93.73	44.79
2003	243.47	362.83	153.07	70.33	98.85	48.75
2004	266.04	389.20	167.07	74.14	103.14	50.87
2005	291.41	419.21	182.40	79.86	109.89	54.24
2006	321.54	460.91	208.08	87.45	119.62	61.26
2007	371.19	536.58	232.45	96.55	134.16	64.99
2008	411.98	589.08	255.98	101.71	140.68	67.39
2009	452.12	637.09	282.21	111.58	152.23	74.24
2010	497.76	688.83	309.33	119.23	159.96	79.08
2011	539.91	745.90	336.20	123.08	165.43	81.16
2012	573.14	788.48	364.33	128.06	171.28	86.23

Chapter 23   Human Capital for Henan

23.1 Total human capital

Table HeN-1.1 presents the results of nominal and real total human capital and real physical capital for Henan. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	2500		2500		80
1986	2860		2724		90
1987	3350		3006		99
1988	4110		3087		112
1989	4675		2939		122
1990	5417		3380		132
1991	6098		3743		143
1992	6844		4020		156
1993	7749		4121		170
1994	8725		3717		188
1995	9655		3531		212
1996	11367		3741		241
1997	13116		4156		273
1998	14939		4838		309
1999	16892		5625		345

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	18771	18918	6284	6330	385
2001	21546	21761	7149	7216	427
2002	23850	24060	7891	7956	475
2003	27270	27620	8862	8967	535
2004	30500	30900	9397	9508	612
2005	33440	33810	10077	10180	719
2006	38740	39320	11503	11663	867
2007	43020	43540	12111	12245	1062
2008	47390	47790	12455	12553	1297
2009	52750	53340	13940	14088	1586
2010	58310	58910	14537	14684	1937
2011	64750	65390	15617	15762	2325
2012	71030	71680	16704	16844	2747

23.2 Human capital per capita

To obtain 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. Table HeN-2.1 presents human capital per capita for Henan by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 23.47 times from 36,330 Yuan to 889,060 Yuan. Real human capital per capita increases 4.75 times from 36,330 Yuan to 209,080 Yuan.

Figure HeN-2.1 illustrates the trends of human capital per capita by gender for Henan. The real human capital per capita of male is similar to

that of female for Henan. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
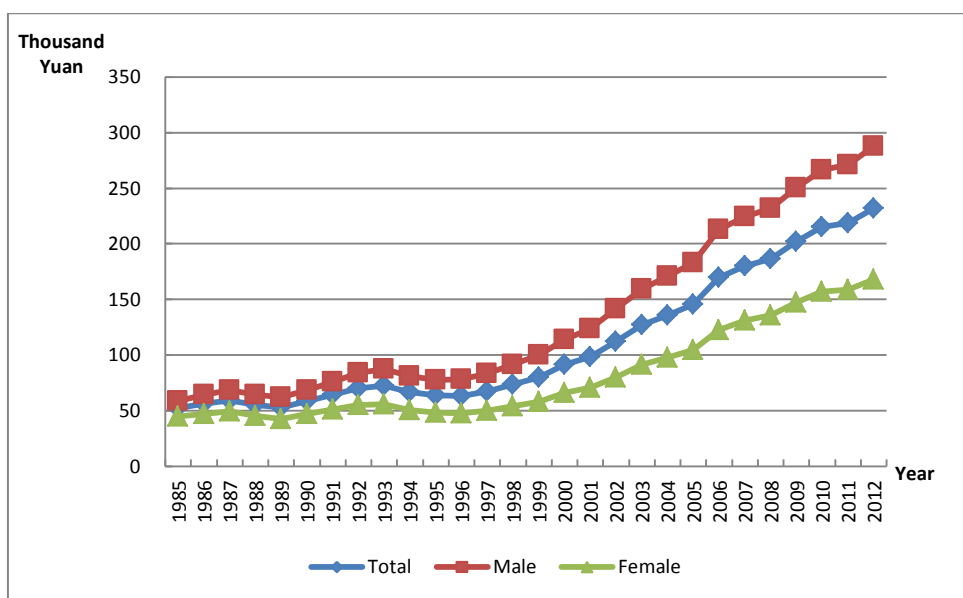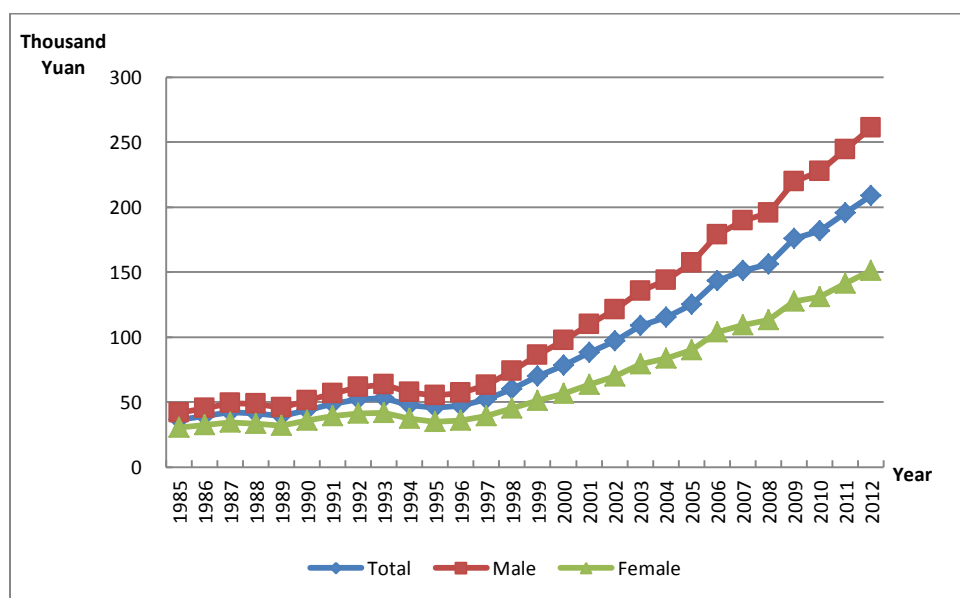

Figure HeN-2.1 Human Capital Per Capita by Gender for Henan，1985-2012

Table HeN-2.1 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	36.33	63.75	31.20	36.33	63.75	31.20
1986	41.16	75.21	34.87	39.20	70.42	33.43
1987	47.10	88.56	39.04	42.26	76.92	35.55
1988	55.15	100.81	44.13	41.42	72.07	34.02
1989	62.17	119.76	49.61	39.09	74.51	31.35
1990	70.26	149.52	55.83	43.84	92.56	34.97
1991	78.97	174.46	61.69	48.47	102.76	38.64

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	88.48	200.27	68.37	51.97	109.53	41.61
1993	99.95	230.88	76.63	53.15	114.17	42.29
1994	112.37	267.42	85.13	47.87	103.80	38.04
1995	124.45	301.64	94.16	45.51	100.16	36.18
1996	142.94	345.38	102.64	47.04	104.73	35.56
1997	163.71	392.25	111.88	51.87	116.16	37.30
1998	185.64	433.71	121.66	60.12	131.19	41.78
1999	209.26	476.78	132.12	69.68	149.29	46.72
2000	233.22	509.87	143.40	78.08	161.10	51.12
2001	264.78	570.17	159.75	87.85	178.90	56.55
2002	293.01	603.29	176.74	96.94	189.67	62.19
2003	334.76	674.16	196.39	108.79	208.41	68.16
2004	374.52	722.39	220.82	115.39	211.88	72.71
2005	415.27	771.44	245.64	125.14	221.61	79.22
2006	482.20	879.07	280.47	143.18	249.54	89.11
2007	537.26	943.09	316.56	151.25	253.96	95.43
2008	594.70	1009.00	354.77	156.30	255.12	99.11
2009	665.71	1091.54	404.28	175.92	279.28	112.50
2010	728.65	1155.53	453.33	181.66	285.93	114.39
2011	809.72	1264.82	497.44	195.30	296.98	125.52
2012	889.06	1354.99	550.95	209.08	310.07	135.77

Figure HeN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
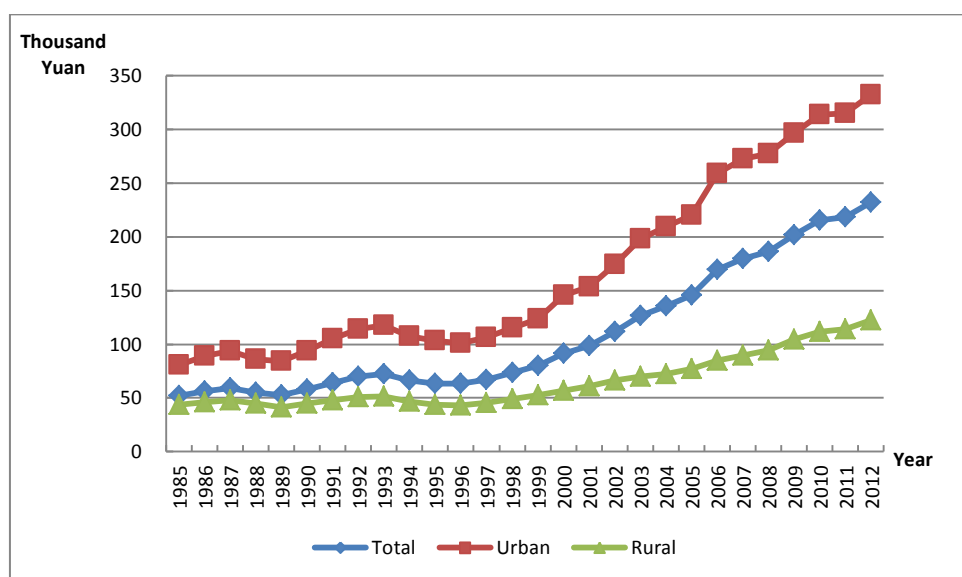
220
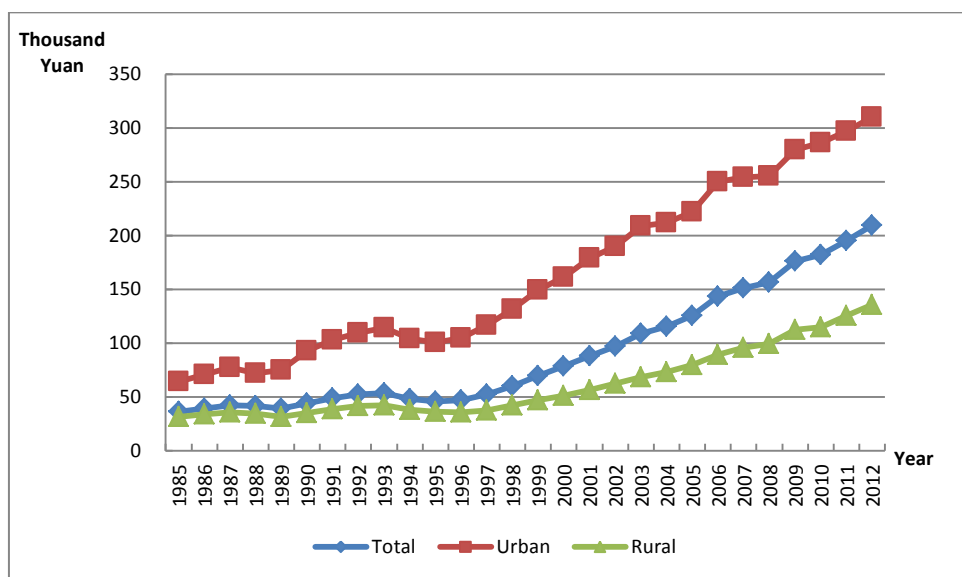
Figure HeN-2.2 Real Human Capital Per Capita by Region for Henan，1985-2012

23.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

23.3.1 Total labor force human capital

The total labor force human capital for Henan is reported in Table HeN-3.1 From 1985 to 2012, the nominal and real labor force human capital for Henan show differential increases. Nominal labor force human capital increases 23.38 times, from 994 billion Yuan to 24,220 billion Yuan. Real labor force human capital increases almost 4.77 times, from 994 billion Yuan to 5,732 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	994		994	
1986	1145		1091	
1987	1356		1218	
1988	1741		1308	
1989	2005		1261	
1990	2301		1436	
1991	2580		1587	
1992	2850		1684	
1993	3136		1679	
1994	3433		1476	
1995	3801		1405	
1996	4360		1452	
1997	4922		1580	
1998	5493		1805	
1999	6050		2043	
2000	6771	6700	2294	2271
2001	7479	7424	2515	2497
2002	8278	8232	2769	2753
2003	9387	9358	3086	3075
2004	10511	10515	3273	3272
2005	11944	11939	3635	3632
2006	13276	13282	3988	3988
2007	14583	14581	4158	4155
2008	16124	16126	4284	4282
2009	18077	18081	4814	4813
2010	20928	20948	5224	5227

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	22730	22758	5513	5517
2012	24220	24240	5732	5735

23.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables HeN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Henan show differential increases. Nominal average labor force human capital increases more than 18.02 times, from 25,290 Yuan to 480,940 Yuan. Real average labor force human capital increases more than 3.5 times, from 25,290 Yuan to 113,820 Yuan.

Table HeN-3.2 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	25.29	40.76	22.03	25.29	40.76	22.03
1986	28.60	47.39	24.80	27.24	44.37	23.78
1987	32.72	55.11	27.98	29.39	47.87	25.47
1988	38.67	65.00	31.73	29.06	46.47	24.46
1989	43.42	76.40	35.66	27.29	47.53	22.54
1990	48.17	90.34	40.01	30.06	55.93	25.06
1991	53.38	101.59	44.35	32.85	59.84	27.78

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
1992	58.63	112.83	48.85	34.63	61.71	29.73
1993	64.69	126.14	53.96	34.63	62.38	29.78
1994	71.10	140.52	59.34	30.57	54.54	26.51
1995	78.00	156.62	65.54	28.83	52.01	25.18
1996	87.44	174.06	71.67	29.13	52.78	24.83
1997	97.14	192.53	77.87	31.17	57.01	25.96
1998	107.83	211.04	84.33	35.43	63.83	28.96
1999	117.97	225.54	90.36	39.84	70.62	31.96
2000	132.19	253.36	96.56	44.79	80.05	34.42
2001	144.48	269.68	105.48	48.59	84.62	37.34
2002	159.79	290.54	115.01	53.45	91.35	40.47
2003	178.65	314.21	127.16	58.73	97.14	44.13
2004	198.84	336.65	141.11	61.92	98.74	46.46
2005	223.86	364.54	158.84	68.13	104.72	51.23
2006	252.28	396.10	182.99	75.78	112.44	58.14
2007	280.35	427.52	207.08	79.94	115.12	62.42
2008	312.65	465.25	232.01	83.07	117.64	64.82
2009	354.22	518.77	259.93	94.33	132.73	72.33
2010	402.75	583.75	288.89	100.53	144.45	72.90
2011	443.96	637.93	320.36	107.68	149.78	80.84
2012	480.94	677.14	353.58	113.82	154.95	87.13

Chapter 24   Human Capital for Hubei

24.1 Total human capital

Table HuB-1.1 presents the results of nominal and real total human capital and real physical capital for Hubei. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Hubei.

Table HuB-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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1622		1622		56
1986	1900		1814		62
1987	2226		1975		69
1988	2623		1957		75
1989	3060		1966		80
1990	3593		2243		85
1991	4137		2457		91
1992	4749		2575		99
1993	5468		2503		111
1994	6278		2281		127
1995	7141		2159		148
1996	7998		2208		175
1997	9108		2438		202
1998	10288		2797		232
1999	11673		3247		263

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	13401	13604	3744	3798	295
2001	14884	15130	4142	4209	331
2002	16234	16490	4533	4600	367
2003	18388	18741	5015	5106	406
2004	20085	20470	5222	5317	454
2005	21444	21797	5419	5506	510
2006	23885	24332	5942	6050	584
2007	25785	26287	6119	6234	673
2008	28292	28900	6334	6467	777
2009	31516	32385	7090	7283	901
2010	34967	35972	7648	7864	1055
2011	38402	39465	7946	8164	1248
2012	41536	42658	8357	8579	1447

24.2 Human capital per capita

To obtain 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. Table HuB-2.1 presents human capital per capita for Hubei by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 23.34 times from 35,940 Yuan to 875,010 Yuan. Real human capital per capita increases 3.9 times from 35,940 Yuan to 176,050 Yuan.

Figure HuB-2.1 illustrates the trends of human capital per capita by gender for Hubei. The real human capital per capita of male is similar to that

of female for Hubei. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
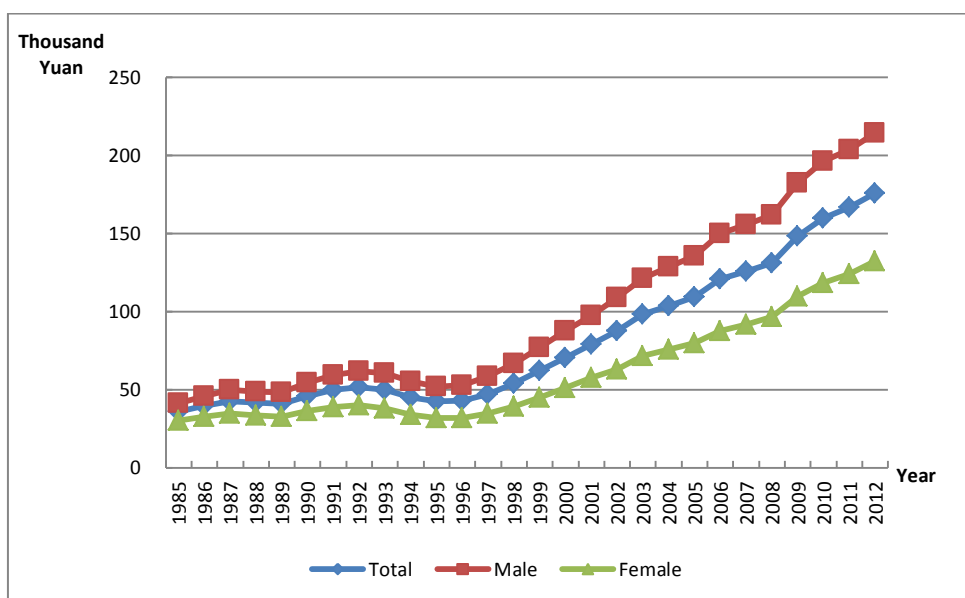
Figure HuB-2.1 Human Capital Per Capita by Gender for Hubei，1985-2012

Table HuB-2.1 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	35.94	73.80	25.46	35.94	73.80	25.46
1986	41.60	84.52	28.61	39.72	80.19	27.46
1987	48.12	96.79	32.12	42.70	84.48	28.97
1988	55.71	110.74	36.12	41.56	80.22	27.80
1989	63.84	124.98	40.60	41.01	79.34	26.44
1990	73.59	142.50	45.62	45.94	88.43	28.70
1991	83.84	160.82	50.75	49.80	93.97	30.82

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	95.42	181.27	56.28	51.74	95.86	31.62
1993	109.12	205.11	62.75	49.95	91.30	29.97
1994	124.49	231.69	69.98	45.23	81.21	26.94
1995	140.55	257.80	77.93	42.49	75.23	25.02
1996	155.79	282.96	84.40	43.01	74.93	25.11
1997	176.68	318.41	92.05	47.28	82.18	26.43
1998	198.24	354.98	99.73	53.89	93.59	28.93
1999	223.55	397.80	107.97	62.18	107.90	31.86
2000	252.71	448.18	117.94	70.60	121.56	35.44
2001	283.41	498.75	129.51	78.87	134.74	38.99
2002	313.67	542.06	143.18	87.59	147.62	42.77
2003	360.00	620.56	157.72	98.18	164.72	46.51
2004	399.51	676.56	174.41	103.87	171.85	48.61
2005	433.34	720.29	191.19	109.51	178.15	51.58
2006	486.02	800.13	210.46	120.91	195.16	55.72
2007	529.58	855.49	231.53	125.67	199.30	58.33
2008	585.99	935.35	253.55	131.19	206.54	59.47
2009	659.70	1041.32	281.23	148.41	231.57	65.97
2010	730.95	1137.42	314.73	159.87	246.05	71.61
2011	805.41	1235.78	347.01	166.65	253.39	74.27
2012	875.01	1319.69	382.25	176.05	263.22	79.43

Figure HuB-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

228
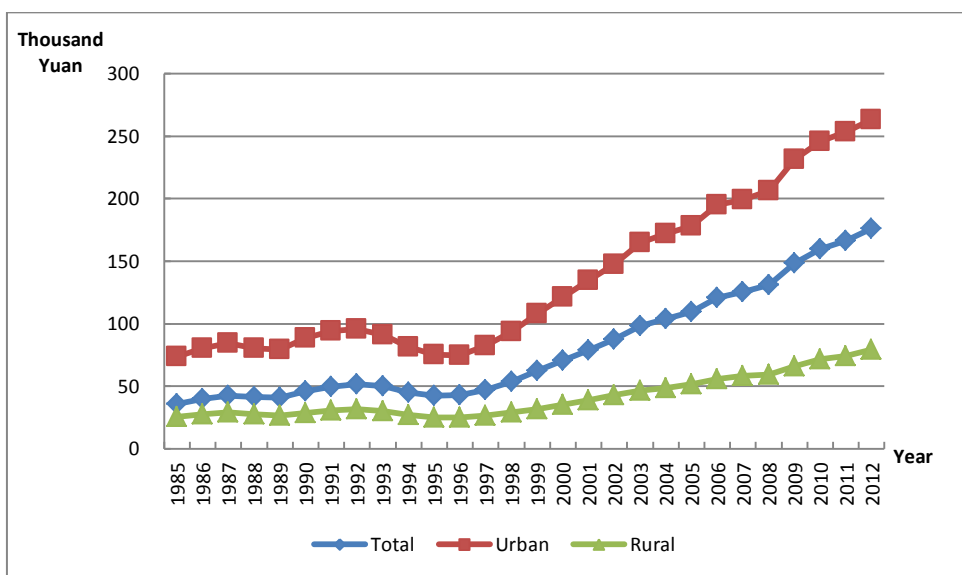
Figure HuB-2.2 Real Human Capital Per Capita by Region for Hubei，1985-2012

24.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

24.3.1 Total labor force human capital

The total labor force human capital for Hubei is reported in Table HuB-3.1 From 1985 to 2012, the nominal and real labor force human capital for Hubei show differential increases. Nominal labor force human capital increases 24.53 times, from 648 billion Yuan to 16,548 billion Yuan. Real labor force human capital increases almost 4.15 times, from 648 billion Yuan to 3,340 billion Yuan.

Table HuB-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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	648		648	
1986	778		743	
1987	934		831	
1988	1133		848	
1989	1357		873	
1990	1616		1009	
1991	1858		1105	
1992	2110		1146	
1993	2394		1100	
1994	2693		982	
1995	3036		921	
1996	3374		936	
1997	3834		1032	
1998	4409		1205	
1999	5019		1403	
2000	5808	5668	1632	1594
2001	6264	6138	1757	1722
2002	6729	6632	1892	1866
2003	7295	7248	2009	1997
2004	7812	7841	2050	2058
2005	8502	8540	2167	2177
2006	9312	9358	2337	2348
2007	10062	10112	2408	2419
2008	10931	10989	2464	2477
2009	12133	12204	2746	2761
2010	13650	13746	3001	3021

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	15270	15410	3172	3200
2012	16548	16713	3340	3372

24.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables HuB-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Hubei show differential increases. Nominal average labor force human capital increases more than 18.86 times, from 24,660 Yuan to 489,710 Yuan. Real average labor force human capital increases more than 3 times, from 24,660 Yuan to 98,840 Yuan.

Table HuB-3.2 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	24.66	40.65	20.49	24.66	40.65	20.49
1986	28.85	48.62	22.91	27.56	46.13	21.99
1987	33.73	57.48	25.59	29.99	50.17	23.09
1988	39.30	66.62	28.92	29.42	48.26	22.26
1989	45.48	76.90	32.50	29.25	48.82	21.16
1990	52.65	88.84	36.41	32.88	55.13	22.91
1991	59.32	99.57	40.33	35.30	58.18	24.49

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
1992	66.39	110.42	44.38	36.08	58.39	24.93
1993	74.65	123.11	48.94	34.28	54.80	23.38
1994	83.30	136.09	53.56	30.38	47.70	20.61
1995	92.82	149.65	58.57	28.16	43.67	18.80
1996	102.28	164.27	64.11	28.38	43.50	19.07
1997	114.03	181.96	70.40	30.68	46.97	20.22
1998	127.61	203.34	76.99	34.86	53.61	22.33
1999	141.98	225.26	83.37	39.68	61.10	24.60
2000	158.47	251.42	90.64	44.54	68.20	27.24
2001	173.47	273.71	100.03	48.64	73.94	30.12
2002	189.02	295.50	110.43	53.14	80.48	32.99
2003	206.62	320.44	122.59	56.91	85.06	36.15
2004	225.22	344.70	135.31	59.11	87.56	37.71
2005	247.30	375.80	148.28	63.04	92.95	40.01
2006	270.68	405.77	164.33	67.93	98.97	43.51
2007	294.39	432.43	180.25	70.46	100.74	45.41
2008	320.42	462.40	198.11	72.21	102.11	46.47
2009	356.14	507.01	219.37	80.59	112.75	51.46
2010	394.02	556.20	241.12	86.64	120.32	54.86
2011	445.89	632.10	263.54	92.62	129.61	56.41
2012	489.71	688.27	286.59	98.84	137.28	59.55

Chapter 25　Human Capital for Hunan

25.1 Total human capital

Table HuN-1.1 presents the results of nominal and real total human capital and real physical capital for Hunan. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1553		1553		39
1986	1780		1690		43
1987	2049		1773		49
1988	2378		1640		54
1989	2738		1594		57
1990	3200		1855		58
1991	3644		2024		61
1992	4099		2063		66
1993	4626		1990		72
1994	5232		1794		77
1995	5862		1690		84
1996	6642		1775		92
1997	7478		1943		100
1998	8376		2165		109
1999	9473		2436		120

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
2000	10739	10852	2723	2750	132
2001	12196	12323	3119	3150	145
2002	13871	14033	3560	3601	161
2003	15666	15853	3926	3973	178
2004	17598	17833	4216	4271	200
2005	19072	19308	4466	4520	228
2006	21238	21537	4900	4969	263
2007	23077	23393	5039	5106	310
2008	25186	25549	5176	5250	370
2009	27738	28133	5718	5802	436
2010	30760	31218	6149	6242	522
2011	33658	34162	6378	6474	617
2012	36133	36619	6710	6802	720

25.2 Human capital per capita

To obtain 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. Table HuN-2.1 presents human capital per capita for Hunan by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 20.47 times from 30,630 Yuan to 657,790 Yuan. Real human capital per capita increases 2.99 times from 30,630 Yuan to 122,150 Yuan.

Figure HuN-2.1 illustrates the trends of human capital per capita by gender for Hunan. The real human capital per capita of male is similar to

that of female for Hunan. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
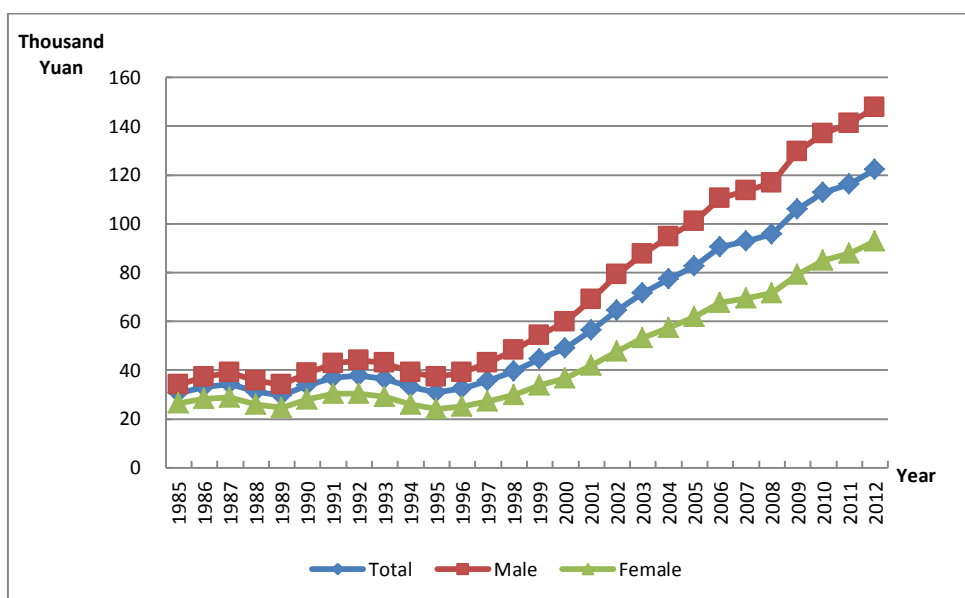
Figure HuN-2.1 Human Capital Per Capita by Gender for Hunan，1985-2012

Table HuN-2.1 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	30.63	64.53	24.32	30.63	64.53	24.32
1986	34.81	75.07	27.13	33.04	71.22	25.77
1987	39.58	86.75	30.33	34.26	73.95	26.48
1988	45.11	99.68	33.99	31.11	67.60	23.66
1989	51.01	113.26	37.92	29.70	65.48	22.16
1990	58.47	131.64	42.27	33.90	75.65	24.65
1991	66.48	149.78	46.83	36.92	81.90	26.31

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	74.81	166.78	51.70	37.66	80.35	26.92
1993	84.59	186.90	57.39	36.40	76.69	25.68
1994	95.90	211.98	63.34	32.89	69.70	22.56
1995	107.60	234.07	70.38	31.02	65.17	20.98
1996	121.47	265.80	76.21	32.46	69.03	21.00
1997	136.99	298.68	82.95	35.58	75.31	22.30
1998	153.19	334.53	89.69	39.60	83.94	24.08
1999	173.71	381.08	96.79	44.67	96.00	25.63
2000	193.79	420.41	105.83	49.14	104.55	27.64
2001	220.50	463.19	116.46	56.39	116.47	30.63
2002	251.49	512.18	128.16	64.54	129.30	33.91
2003	285.45	562.63	140.98	71.54	140.08	35.83
2004	322.50	614.89	155.77	77.26	147.06	37.45
2005	353.02	648.61	170.81	82.66	151.93	39.95
2006	391.92	703.69	188.73	90.42	162.24	43.62
2007	425.79	741.20	208.53	92.97	162.44	45.08
2008	465.84	787.73	230.46	95.73	163.17	46.39
2009	514.56	847.16	257.57	106.07	176.01	52.06
2010	563.97	912.65	285.83	112.74	183.92	55.98
2011	613.80	974.64	311.54	116.31	186.17	57.78
2012	657.79	1017.59	341.20	122.15	190.19	62.28

Figure HuN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

236
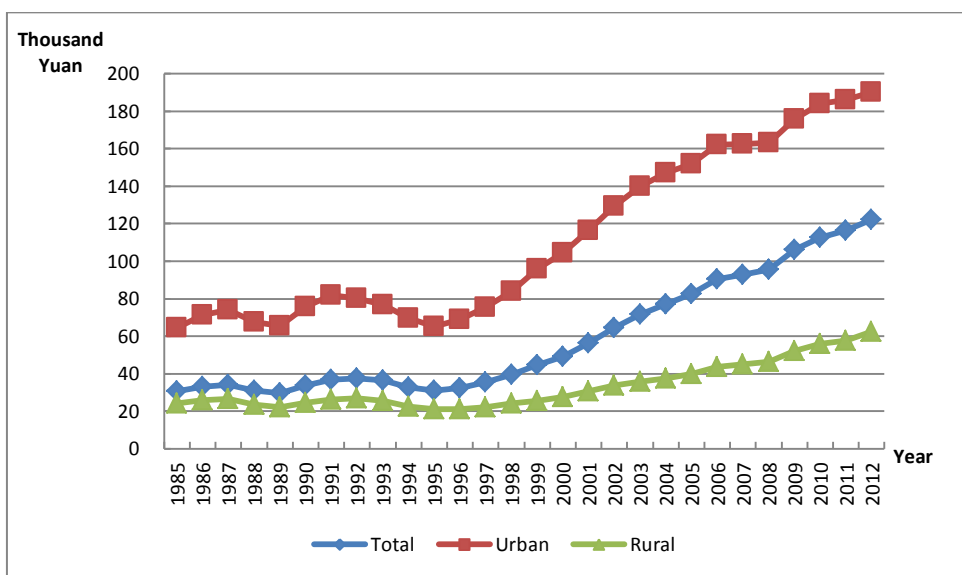
Figure HuN-2.2 Real Human Capital Per Capita by Region for Hunan，1985-2012

25.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

25.3.1 Total labor force human capital

The total labor force human capital for Hunan is reported in Table HuN-3.1 From 1985 to 2012, the nominal and real labor force human capital for Hunan show differential increases. Nominal labor force human capital increases 21.82 times, from 682 billion Yuan to 15,571 billion Yuan. Real labor force human capital increases almost 3.23 times, from 682 billion Yuan to 2,885 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	682		682	
1986	790		750	
1987	914		793	
1988	1088		751	
1989	1292		752	
1990	1535		891	
1991	1728		962	
1992	1936		980	
1993	2171		939	
1994	2396		826	
1995	2636		764	
1996	2902		780	
1997	3235		846	
1998	3660		954	
1999	4107		1063	
2000	4678	4581	1193	1169
2001	5217	5130	1342	1319
2002	5808	5739	1500	1482
2003	6524	6481	1640	1629
2004	7242	7242	1736	1736
2005	8020	8035	1877	1881
2006	8950	8962	2065	2069
2007	9769	9782	2129	2131
2008	10698	10711	2190	2193
2009	11765	11781	2418	2422
2010	13044	13077	2600	2607

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	14320	14383	2705	2717
2012	15571	15637	2885	2898

25.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables HuN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Hunan show differential increases. Nominal average labor force human capital increases more than 16.28 times, from 23,280 Yuan to 402,320 Yuan. Real average labor force human capital increases more than 2.2 times, from 23,280 Yuan to 74,540 Yuan.

Table HuN-3.2 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	23.28	39.77	20.41	23.28	39.77	20.41
1986	26.21	45.86	22.76	24.88	43.51	21.62
1987	29.54	52.44	25.41	25.62	44.70	22.18
1988	33.94	61.65	28.52	23.45	41.81	19.85
1989	38.80	72.02	31.83	22.60	41.64	18.60
1990	44.48	83.67	35.52	25.81	48.08	20.72
1991	49.76	93.44	39.24	27.68	51.09	22.05

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**
1992	55.37	103.74	43.11	28.02	49.98	22.45
1993	61.80	115.44	47.37	26.74	47.37	21.20
1994	68.30	126.78	51.63	23.56	41.69	18.39
1995	75.08	138.11	56.30	21.75	38.45	16.78
1996	82.65	152.56	61.35	22.21	39.62	16.90
1997	91.63	169.89	66.98	23.95	42.84	18.00
1998	101.29	189.81	73.17	26.40	47.62	19.65
1999	111.90	209.36	79.11	28.95	52.74	20.95
2000	123.52	231.01	85.48	31.51	57.45	22.32
2001	138.20	252.96	94.28	35.54	63.60	24.80
2002	153.65	274.99	104.00	39.68	69.42	27.52
2003	171.97	300.09	115.33	43.23	74.71	29.31
2004	191.54	325.30	127.62	45.92	77.80	30.69
2005	212.35	353.49	140.14	49.70	82.80	32.78
2006	233.43	377.95	155.75	53.87	87.14	36.00
2007	254.77	400.59	171.08	55.52	87.79	36.99
2008	279.13	424.66	187.31	57.14	87.97	37.71
2009	307.43	455.26	205.93	63.19	94.59	41.62
2010	337.14	488.15	225.25	67.19	98.37	44.12
2011	370.81	532.73	245.81	70.05	101.76	45.59
2012	402.32	567.96	267.54	74.54	106.15	48.84

Chapter 26 Human Capital for Guangdong

26.1 Total human capital

Table GD-1.1 presents the results of nominal and real total human capital and real physical capital for Guangdong. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	3281		3281		80
1986	3774		3592		90
1987	4299		3691		100
1988	5053		3348		113
1989	6039		3272		122
1990	7180		3988		135
1991	8179		4488		150
1992	9311		4763		175
1993	10716		4510		219
1994	12265		4242		273
1995	13876		4205		333
1996	16472		4655		392
1997	19922		5516		448
1998	23589		6637		515
1999	27835		7960		593

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	32561	32909	9146	9242	670
2001	36064	36481	10190	10303	753
2002	41395	41938	11848	12000	852
2003	47518	48316	13493	13714	978
2004	53783	54723	14849	15098	1124
2005	59140	60030	15973	16209	1304
2006	68380	69640	18132	18459	1503
2007	75080	76310	19200	19516	1732
2008	85360	86930	20673	21047	1975
2009	94210	95820	23364	23752	2265
2010	104300	106080	25086	25500	2613
2011	111670	113580	25482	25918	3007
2012	118990	121010	26410	26850	3427

26.2 Human capital per capita

To obtain 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. Table GD-2.1 presents human capital per capita for Guangdong by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 18.97 times from 64,380 Yuan to 1,285,870 Yuan. Real human capital per capita increases 3.43 times from 64,380 Yuan to 285,400 Yuan.

Figure GD-2.1 illustrates the trends of human capital per capita by gender for Guangdong. The real human capital per capita of male is similar

242

to that of female for Guangdong. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
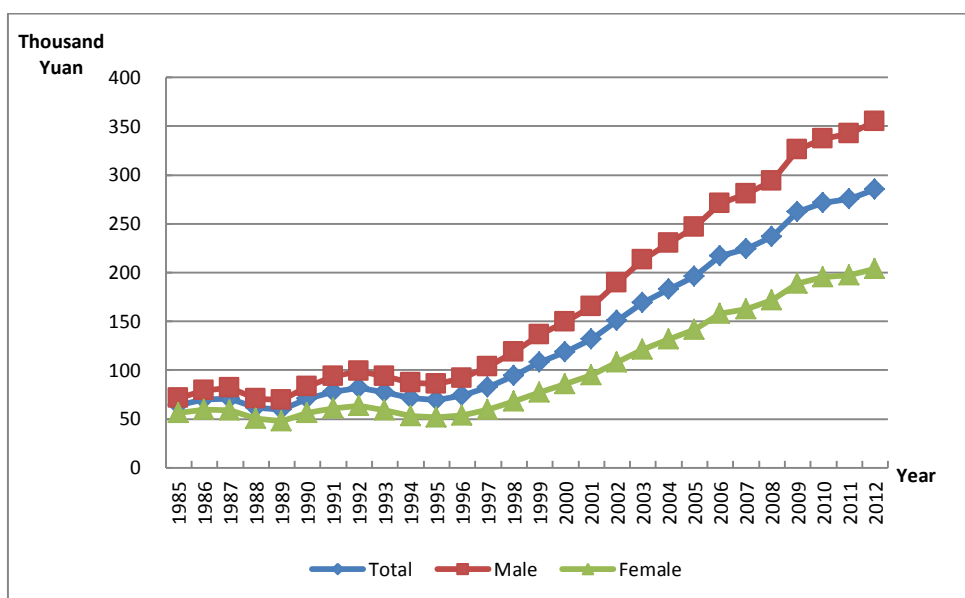
Figure GD-2.1 Human Capital Per Capita by Gender for Guangdong，1985-2012

Table GD-2.1 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	64.38	92.01	55.93	64.38	92.01	55.93
1986	73.53	106.77	62.42	69.99	101.98	59.28
1987	82.58	122.05	68.63	70.90	103.34	59.42
1988	93.00	140.00	73.43	61.62	91.54	49.16
1989	109.72	159.98	84.37	59.45	85.81	46.15
1990	127.20	181.50	95.68	70.65	99.95	53.63
1991	142.43	206.14	104.45	78.15	110.97	58.60

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	160.07	233.10	115.35	81.88	115.76	61.11
1993	183.89	271.14	128.35	77.39	110.37	56.38
1994	205.74	305.14	142.30	71.16	102.65	51.03
1995	230.04	343.63	156.54	69.71	102.21	48.68
1996	260.81	380.37	167.12	73.71	105.54	48.80
1997	298.07	425.86	183.23	82.53	115.73	52.72
1998	336.33	470.39	198.05	94.63	130.04	58.08
1999	378.91	520.43	213.77	108.36	146.22	64.17
2000	423.20	570.94	231.22	118.87	156.95	69.41
2001	466.27	620.46	250.55	131.75	171.94	75.51
2002	526.31	699.90	271.97	150.64	196.71	83.13
2003	595.01	791.51	293.12	168.96	220.91	89.24
2004	663.40	879.27	317.55	183.16	239.19	93.23
2005	726.08	946.23	346.77	196.11	252.35	99.13
2006	818.02	1064.92	377.53	216.91	278.98	106.22
2007	878.26	1128.92	411.21	224.60	285.20	111.79
2008	976.30	1250.76	443.99	236.45	299.51	114.08
2009	1056.80	1339.56	484.25	262.08	328.66	127.23
2010	1128.08	1425.12	519.20	271.32	339.14	132.18
2011	1206.38	1522.94	550.78	275.28	344.18	132.78
2012	1285.87	1618.06	586.16	285.40	355.73	137.32

Figure GD-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

244
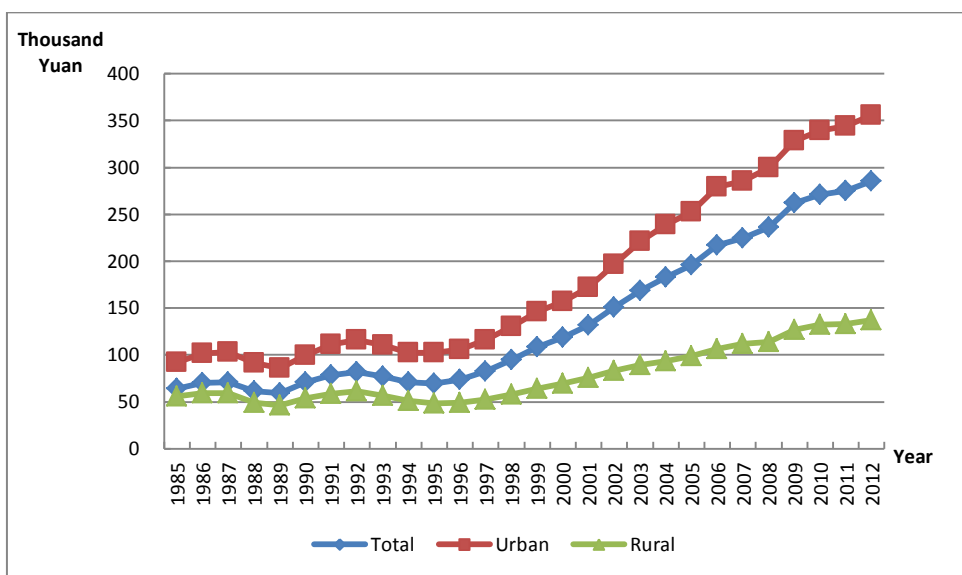
Figure GD-2.2 Real Human Capital Per Capita by Region for Guangdong，1985-2012

26.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

26.3.1 Total labor force human capital

The total labor force human capital for Guangdong is reported in Table GD-3.1 From 1985 to 2012, the nominal and real labor force human capital for Guangdong show differential increases. Nominal labor force human capital increases 38.63 times, from 1,322 billion Yuan to 52,369 billion Yuan. Real labor force human capital increases almost 7.82 times, from 1,322 billion Yuan to 11,650 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	1322		1322	
1986	1544		1469	
1987	1800		1545	
1988	2203		1459	
1989	2612		1414	
1990	3203		1778	
1991	3567		1954	
1992	4033		2058	
1993	4460		1873	
1994	4988		1721	
1995	5600		1695	
1996	7168		2025	
1997	8947		2473	
1998	11139		3127	
1999	13476		3843	
2000	15985	15915	4475	4455
2001	17314	17244	4878	4856
2002	19209	19166	5483	5472
2003	21703	21718	6155	6159
2004	24141	24263	6657	6688
2005	26625	26761	7185	7220
2006	29685	29862	7870	7915
2007	33627	33850	8599	8655
2008	37928	38215	9190	9258
2009	42751	43086	10607	10690
2010	49136	49572	11824	11925

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	50500	50963	11542	11647
2012	52369	52843	11650	11753

26.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables GD-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Guangdong show differential increases. Nominal average labor force human capital increases more than 16.49 times, from 45,840 Yuan to 801,980 Yuan. Real average labor force human capital increases more than 2.89 times, from 45,840 Yuan to 178,410 Yuan.

Table GD-3.2 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	45.84	60.20	40.64	45.84	60.20	40.64
1986	52.32	69.85	45.36	49.80	66.71	43.08
1987	59.75	81.25	50.84	51.27	68.80	44.01
1988	67.10	95.19	53.72	44.44	62.24	35.97
1989	79.53	110.65	60.33	43.04	59.35	33.00
1990	93.73	127.86	69.72	52.01	70.41	39.08
1991	103.94	143.83	75.36	56.95	77.43	42.28

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
1992	115.07	159.85	82.17	58.72	79.38	43.53
1993	127.66	177.83	89.51	53.61	72.39	39.32
1994	140.71	197.45	97.26	48.55	66.42	34.88
1995	155.76	219.71	106.53	47.13	65.35	33.13
1996	179.75	254.45	114.39	50.78	70.60	33.40
1997	211.01	292.87	126.69	58.33	79.59	36.45
1998	245.43	331.24	138.88	68.89	91.57	40.73
1999	277.58	364.74	150.69	79.17	102.47	45.23
2000	307.60	395.10	163.09	86.12	108.61	48.96
2001	337.30	428.86	175.61	95.03	118.85	52.93
2002	365.58	463.04	188.19	104.35	130.14	57.52
2003	399.15	504.23	202.53	113.20	140.73	61.66
2004	434.07	548.10	217.66	119.70	149.10	63.90
2005	477.33	596.68	235.15	128.81	159.13	67.22
2006	527.50	656.95	262.05	139.85	172.11	73.73
2007	576.11	712.52	289.76	147.32	180.00	78.77
2008	625.90	769.01	318.09	151.66	184.15	81.73
2009	682.46	832.72	349.64	169.33	204.31	91.86
2010	743.20	905.77	381.78	178.84	215.55	97.19
2011	771.60	938.38	414.22	176.35	212.07	99.86
2012	801.98	969.22	446.83	178.41	213.08	104.68

Chapter 27   Human Capital for Guangxi

27.1 Total human capital

Table GX-1.1 presents the results of nominal and real total human capital and real physical capital for Guangxi. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	1176		1176		35
1986	1355		1276		38
1987	1555		1367		41
1988	1819		1333		42
1989	2088		1252		44
1990	2405		1409		44
1991	2754		1568		46
1992	3146		1691		48
1993	3618		1610		54
1994	4113		1451		60
1995	4708		1403		66
1996	5348		1494		73
1997	6012		1667		79
1998	6715		1920		87
1999	7409		2169		95

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	8332	8386	2444	2460	104
2001	9181	9232	2677	2691	114
2002	10356	10417	3047	3064	125
2003	11783	11882	3429	3458	139
2004	13087	13220	3649	3687	158
2005	14000	14128	3808	3842	184
2006	15585	15749	4180	4222	216
2007	16958	17100	4291	4326	258
2008	18377	18531	4311	4345	314
2009	20022	20203	4803	4844	398
2010	21681	21855	5047	5088	518
2011	23071	23251	5070	5108	657
2012	24590	24741	5235	5268	797

27.2 Human capital per capita

To obtain 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. Table GX-2.1 presents human capital per capita for Guangxi by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 17.84 times from 33,590 Yuan to 632,690 Yuan. Real human capital per capita increases 3.01 times from 33,590 Yuan to 134,690 Yuan.

Figure GX-2.1 illustrates the trends of human capital per capita by gender for Guangxi. The real human capital per capita of male is similar to

that of female for Guangxi. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
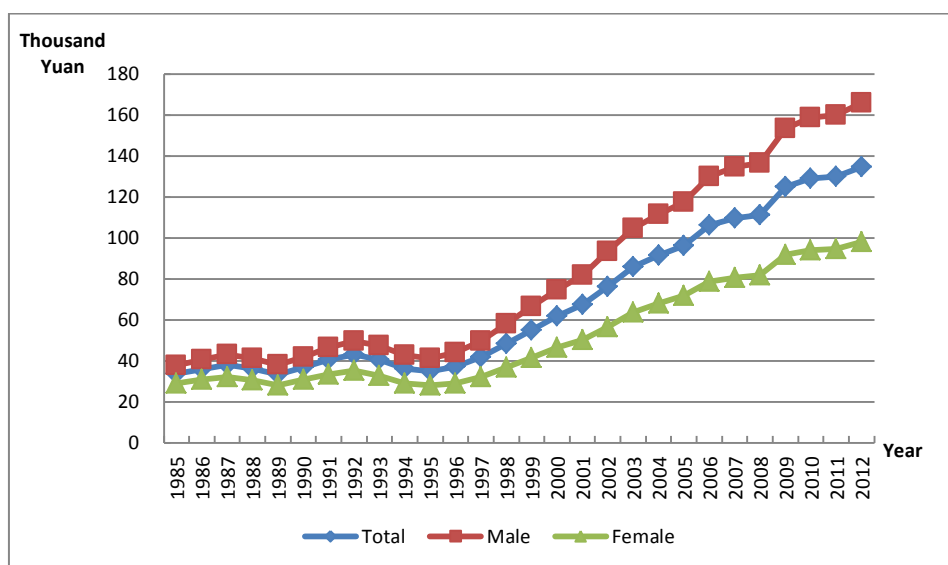
Figure GX-2.1 Human Capital Per Capita by Gender for Guangxi，1985-2012

Table GX-2.1 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	33.59	69.22	28.23	33.59	69.22	28.23
1986	38.15	81.82	31.37	35.93	77.04	29.53
1987	43.15	96.75	34.86	37.93	82.67	31.03
1988	49.39	111.68	39.08	36.20	77.40	29.38
1989	55.70	126.83	43.53	33.38	73.43	26.54
1990	62.66	143.46	48.53	36.70	84.49	28.34
1991	70.97	163.18	53.77	40.40	93.58	30.49
1992	80.07	185.38	59.48	43.03	99.36	31.99

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	91.25	211.49	66.36	40.59	91.93	29.97
1994	102.81	238.92	73.22	36.26	82.82	26.14
1995	117.31	268.13	82.93	34.96	78.77	24.96
1996	132.45	299.30	89.71	37.01	83.34	25.15
1997	150.08	334.51	96.58	41.62	92.49	26.85
1998	168.81	368.66	103.68	48.28	104.98	29.78
1999	187.71	399.77	110.56	54.95	117.12	32.34
2000	210.45	439.28	119.40	61.73	128.70	35.10
2001	230.68	468.08	129.44	67.26	135.37	38.21
2002	259.16	520.66	140.22	76.25	152.25	41.68
2003	294.48	587.57	152.31	85.70	170.29	44.69
2004	327.48	642.32	165.90	91.31	178.82	46.41
2005	353.70	683.78	181.45	96.21	184.82	49.96
2006	395.88	746.98	199.47	106.18	198.70	54.42
2007	433.50	791.37	219.62	109.69	199.34	56.10
2008	473.89	839.33	241.31	111.17	196.49	56.82
2009	520.77	898.01	267.21	124.93	214.74	64.53
2010	553.86	928.86	295.01	128.93	215.86	68.90
2011	591.42	960.25	321.21	129.97	211.12	70.50
2012	632.69	997.28	350.27	134.69	212.46	74.43

Figure GX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
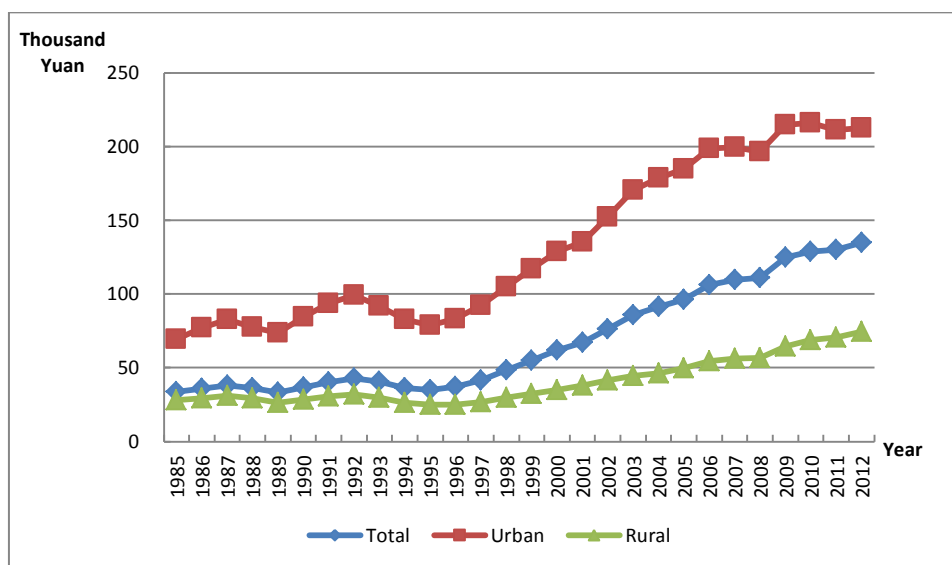
Figure GX-2.2 Real Human Capital Per Capita by Region for Guangxi，1985-2012

27.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

27.3.1 Total labor force human capital

The total labor force human capital for Guangxi is reported in Table GX-3.1 From 1985 to 2012, the nominal and real labor force human capital for Guangxi show differential increases. Nominal labor force human capital increases 18.72 times, from 457 billion Yuan to 9,000 billion Yuan. Real labor force human capital increases almost 3.2 times, from 457 billion Yuan to1,916 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	457		457	
1986	539		507	
1987	632		556	
1988	754		553	
1989	878		527	
1990	1033		605	
1991	1191		678	
1992	1354		727	
1993	1530		681	
1994	1724		608	
1995	1922		573	
1996	2205		616	
1997	2508		695	
1998	2835		811	
1999	3218		942	
2000	3630	3582	1065	1051
2001	3920	3883	1144	1133
2002	4198	4171	1237	1229
2003	4484	4469	1307	1303
2004	4858	4862	1355	1356
2005	5228	5233	1424	1425
2006	5721	5730	1539	1541
2007	6209	6220	1574	1576
2008	6719	6730	1577	1580
2009	7414	7426	1780	1783
2010	8400	8418	1956	1960

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	8770	8793	1927	1932
2012	9000	9014	1916	1919

27.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables GX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Guangxi show differential increases. Nominal average labor force human capital increases more than 13.68 times, from 24,810 Yuan to 364,150 Yuan. Real average labor force human capital increases more than 2.12 times, from 24,810 Yuan to 77,500 Yuan.

Table GX-3.2 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	24.81	43.19	21.87	24.81	43.19	21.87
1986	28.38	52.22	24.36	26.72	49.17	22.94
1987	32.36	62.86	27.17	28.48	53.71	24.18
1988	36.85	71.40	30.45	27.04	49.48	22.89
1989	41.52	80.86	33.93	24.91	46.81	20.69
1990	46.98	92.70	37.85	27.51	54.60	22.11
1991	52.72	104.73	41.68	30.00	60.06	23.63

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
1992	58.47	116.90	45.72	31.41	62.65	24.59
1993	65.39	131.13	50.30	29.12	57.00	22.72
1994	72.97	146.81	55.13	25.75	50.89	19.68
1995	85.27	164.52	63.59	25.41	48.33	19.14
1996	92.02	183.19	65.76	25.71	51.01	18.43
1997	103.48	203.24	71.58	28.69	56.20	19.90
1998	115.71	224.37	77.24	33.10	63.89	22.19
1999	128.93	246.17	82.98	37.75	72.12	24.27
2000	144.74	269.67	89.39	42.47	79.00	26.28
2001	155.57	287.47	97.05	45.40	83.14	28.65
2002	165.11	302.27	104.74	48.63	88.39	31.13
2003	175.97	317.58	113.02	51.29	92.04	33.16
2004	190.31	336.74	120.76	53.09	93.75	33.78
2005	205.45	358.42	129.49	55.97	96.88	35.65
2006	225.12	383.13	145.97	60.54	101.91	39.83
2007	246.05	409.29	162.21	62.36	103.10	41.44
2008	268.61	434.61	178.88	63.04	101.75	42.12
2009	297.51	470.59	196.35	71.42	112.53	47.42
2010	328.35	508.19	213.54	76.45	118.10	49.87
2011	348.61	523.44	232.24	76.60	115.08	50.98
2012	364.15	528.48	251.51	77.50	112.59	53.44

Chapter 28   Human Capital for Hainan

28.1 Total human capital

Table HaN-1.1 presents the results of nominal and real total human capital and real physical capital for Hainan. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Hainan.

Table HaN-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 (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	226		226		6
1986	267		255		8
1987	313		273		9
1988	360		246		10
1989	412		222		11
1990	472		245		13
1991	564		282		15
1992	670		316		20
1993	788		308		25
1994	913		281		32
1995	1044		283		37
1996	1188		310		41
1997	1344		347		44
1998	1517		402		47
1999	1673		451		51

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	1942	1966	517	523	55
2001	2071	2088	559	563	60
2002	2382	2405	647	653	64
2003	2781	2822	757	768	70
2004	3067	3117	804	817	77
2005	3334	3381	862	875	85
2006	3683	3745	939	955	94
2007	4038	4110	982	1000	106
2008	4416	4499	1008	1028	122
2009	4677	4757	1074	1093	138
2010	5063	5147	1110	1129	162
2011	5407	5496	1120	1138	188
2012	5711	5797	1146	1164	224

28.2 Human capital per capita

To obtain 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. Table HaN-2.1 presents human capital per capita for Hainan by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 16.99 times from 41,410 Yuan to 744,890 Yuan. Real human capital per capita increases 2.61 times from 41,410 Yuan to 149,420 Yuan.

Figure HaN-2.1 illustrates the trends of human capital per capita by gender for Hainan. The real human capital per capita of male is similar to

that of female for Hainan. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
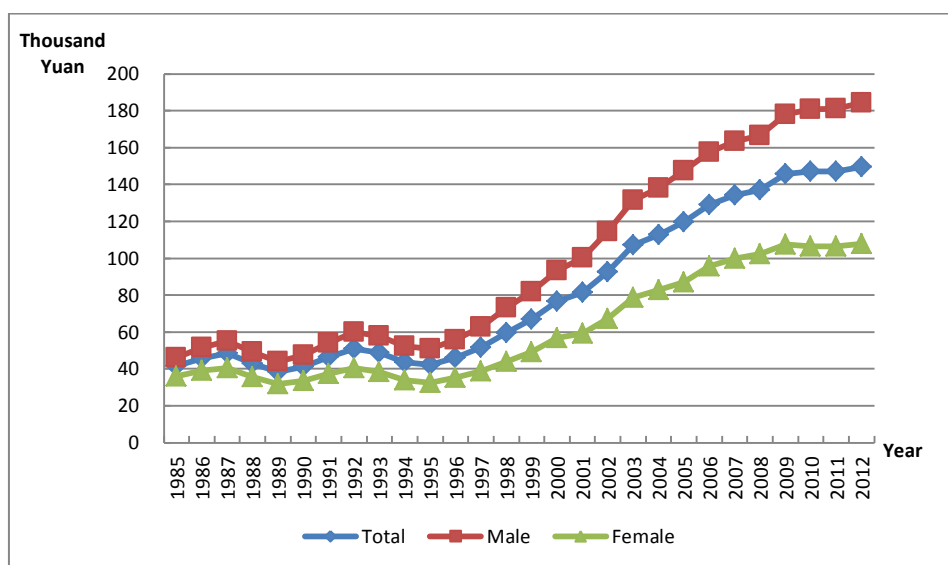
Figure HaN-2.1 Human Capital Per Capita by Gender for Hainan，1985-2012

Table HaN-2.1 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	41.41	80.30	32.82	41.41	80.30	32.82
1986	47.98	95.06	36.54	45.88	91.67	34.76
1987	55.54	109.78	41.16	48.39	96.41	35.66
1988	62.90	124.76	45.18	42.95	84.74	30.97
1989	71.17	140.84	49.72	38.27	75.74	26.73
1990	79.31	156.50	54.44	41.08	84.50	27.08
1991	92.71	183.17	60.24	46.39	95.10	28.92
1992	108.00	212.69	66.50	50.87	101.31	30.88

259

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	124.67	241.46	74.03	48.71	92.98	29.51
1994	141.76	269.16	81.85	43.70	82.52	25.45
1995	155.93	291.55	89.29	42.35	80.81	23.45
1996	177.18	330.86	95.64	46.16	87.51	24.22
1997	199.86	370.65	102.21	51.55	96.59	25.80
1998	225.21	414.50	109.15	59.75	110.67	28.53
1999	248.30	449.01	116.77	66.86	120.97	31.36
2000	287.59	520.03	125.24	76.54	138.04	33.57
2001	301.89	531.01	134.62	81.43	142.66	36.71
2002	341.64	600.20	144.89	92.76	162.88	39.43
2003	393.79	693.13	157.13	107.22	189.24	42.38
2004	430.23	747.86	170.88	112.77	197.85	43.32
2005	462.57	777.47	184.69	119.63	203.04	46.03
2006	506.56	857.20	199.83	129.18	221.21	48.69
2007	551.86	918.32	215.85	134.19	226.56	49.52
2008	600.91	987.42	232.51	137.14	229.60	49.03
2009	635.34	1024.87	250.46	145.86	239.51	53.35
2010	670.54	1067.28	268.48	146.97	238.68	54.05
2011	710.63	1114.16	285.61	147.13	236.17	53.34
2012	744.89	1148.50	304.46	149.42	235.86	55.11

Figure HaN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
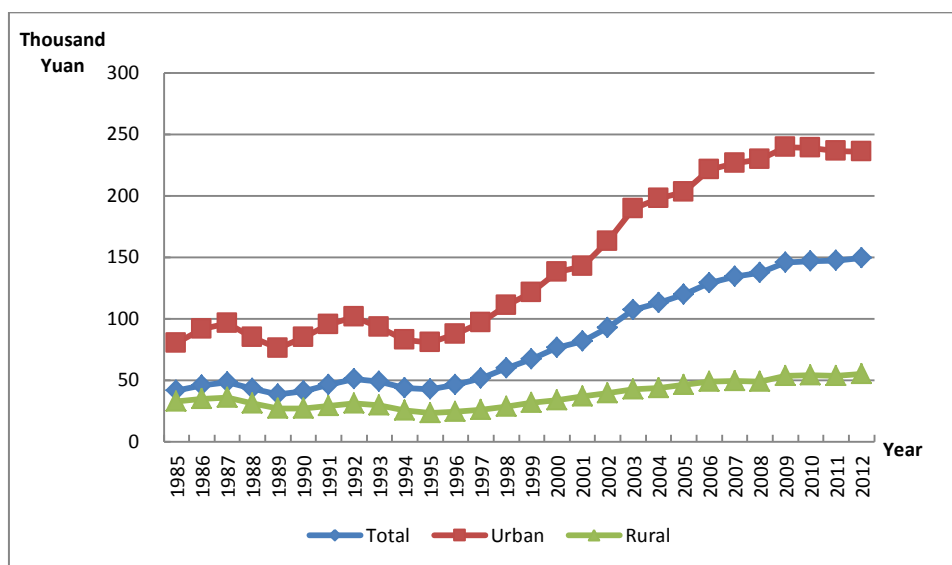
Figure HaN-2.2 Real Human Capital Per Capita by Region for Hainan，1985-2012

28.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

28.3.1 Total labor force human capital

The total labor force human capital for Hainan is reported in Table HaN-3.1 From 1985 to 2012, the nominal and real labor force human capital for Hainan show differential increases. Nominal labor force human capital increases 23.56 times, from 86 billion Yuan to 2,122 billion Yuan. Real labor force human capital increases almost 3.86 times, from 86 billion Yuan to 420 billion Yuan.

Table HaN-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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	86		86	
1986	102		97	
1987	121		105	
1988	145		99	
1989	172		93	
1990	208		107	
1991	242		121	
1992	287		135	
1993	335		131	
1994	393		121	
1995	474		129	
1996	526		137	
1997	606		156	
1998	675		179	
1999	735		198	
2000	804	800	214	213
2001	889	884	240	238
2002	1025	1022	278	278
2003	1114	1114	303	303
2004	1157	1162	302	304
2005	1239	1244	319	321
2006	1352	1360	343	345
2007	1546	1556	374	376
2008	1706	1716	387	389
2009	1818	1828	415	417
2010	1981	1991	431	433

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	2048	2061	419	422
2012	2122	2133	420	423

28.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables HaN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Hainan show differential increases. Nominal average labor force human capital increases more than 12.37 times, from 30,980 Yuan to 414,300 Yuan. Real average labor force human capital increases more than 1.65 times, from 30,980 Yuan to 82,030 Yuan.

Table HaN-3.2 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	30.98	47.05	27.70	30.98	47.05	27.70
1986	35.06	54.56	30.76	33.48	52.61	29.27
1987	40.16	64.89	34.12	34.95	56.99	29.57
1988	46.15	75.91	37.72	31.53	51.56	25.86
1989	52.94	88.18	41.38	28.46	47.42	22.25
1990	60.72	102.21	45.37	31.37	55.19	22.57
1991	69.36	117.74	50.06	34.60	61.13	24.03

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
1992	80.79	139.54	55.14	38.03	66.47	25.60
1993	92.32	158.11	61.13	36.12	60.88	24.37
1994	105.13	177.29	67.51	32.42	54.35	20.99
1995	118.54	198.06	74.45	32.16	54.90	19.55
1996	130.84	218.97	79.09	34.05	57.92	20.03
1997	148.61	250.29	83.99	38.31	65.22	21.20
1998	164.31	274.05	89.03	43.57	73.17	23.27
1999	177.72	288.67	94.16	47.83	77.77	25.29
2000	191.93	303.12	100.11	51.09	80.46	26.84
2001	207.85	331.50	107.86	56.09	89.06	29.41
2002	231.11	372.46	116.12	62.76	101.08	31.60
2003	247.16	396.61	125.50	67.24	108.28	33.85
2004	253.59	399.09	134.89	66.27	105.58	34.19
2005	268.14	406.93	145.51	69.11	106.27	36.27
2006	292.58	452.18	158.70	74.27	116.69	38.67
2007	328.95	508.73	171.82	79.60	125.51	39.42
2008	355.58	542.60	185.22	80.59	126.17	39.06
2009	373.80	559.75	199.87	85.23	130.81	42.57
2010	390.30	572.82	214.54	84.82	128.10	43.19
2011	402.34	581.55	230.60	82.33	123.27	43.07
2012	414.30	588.25	246.34	82.03	120.81	44.59

Chapter 29   Human Capital for Chongqing

29.1 Total human capital

Table CQ-1.1 presents the results of nominal and real total human capital and real physical capital for Chongqing. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Chongqing.

Table CQ-1.1 Real physical capital, Nominal and Real Human Capital for Chongqing

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	867		867		31
1986	980		941		34
1987	1108		969		36
1988	1282		913		40
1989	1457		887		43
1990	1687		1012		47
1991	1995		1118		50
1992	2336		1178		54
1993	2720		1155		60
1994	3126		1024		66
1995	3510		963		75
1996	3968		992		83
1997	4428		1072		93
1998	4919		1235		107
1999	5601		1416		122

| Year | Nominal Human Capital (Billions of Yuan) | | Real Human Capital (Billions of 1985 Yuan) | | Real physical capital (Billions of 1985 Yuan) |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	6265	6357	1638	1662	139
2001	7214	7335	1855	1886	158
2002	7873	7992	2032	2063	182
2003	9058	9235	2325	2370	215
2004	10145	10380	2510	2569	255
2005	10937	11165	2685	2741	303
2006	12634	12949	3029	3103	354
2007	13732	14000	3144	3206	414
2008	14987	15251	3250	3307	480
2009	16917	17250	3728	3802	553
2010	18394	18756	3928	4005	641
2011	20296	20677	4114	4193	749
2012	22012	22402	4350	4428	861

29.2 Human capital per capita

To obtain 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. Table CQ-2.1 presents human capital per capita for Chongqing by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 25.21 times from 37,140 Yuan to 973,580 Yuan. Real human capital per capita increases 4.18 times from 37,140 Yuan to 192,410 Yuan.

Figure CQ-2.1 illustrates the trends of human capital per capita by gender for Chongqing. The real human capital per capita of male is similar

to that of female for Chongqing. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
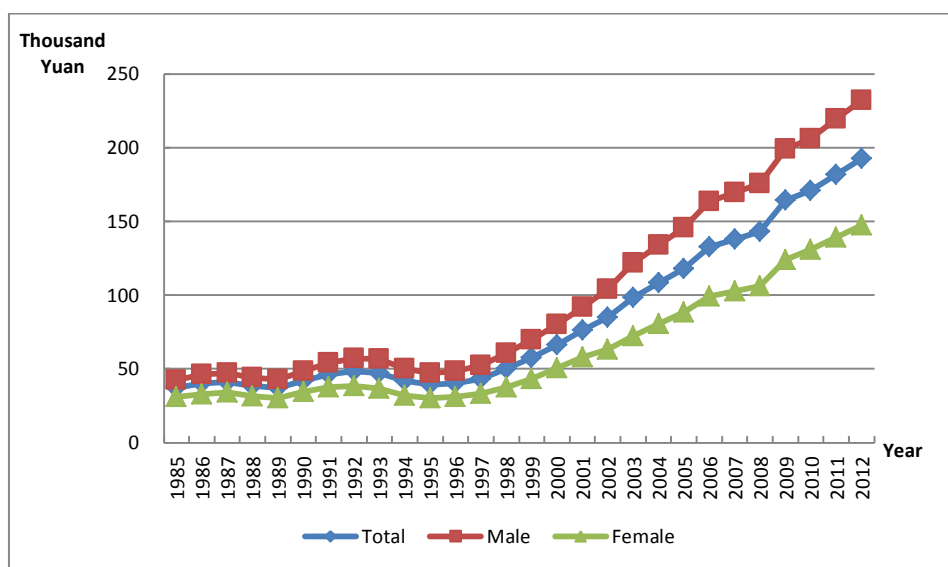
Figure CQ-2.1 Human Capital Per Capita by Gender for Chongqing，1985-2012

Table CQ-2.1 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	37.14	71.19	25.89	37.14	71.19	25.89
1986	41.75	80.38	29.01	40.07	77.14	27.84
1987	46.91	90.96	32.44	41.00	79.50	28.35
1988	53.88	106.72	36.38	38.38	76.02	25.92
1989	60.97	122.43	40.60	37.09	74.47	24.70
1990	70.07	144.25	45.35	42.03	86.54	27.20
1991	82.55	174.14	50.01	46.28	97.64	28.04
1992	96.20	204.83	55.06	48.50	103.28	27.76

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	111.48	236.76	61.20	47.35	100.57	26.00
1994	127.74	269.62	67.61	41.84	88.30	22.14
1995	142.97	296.17	74.56	39.21	81.24	20.45
1996	161.13	332.51	81.06	40.29	83.14	20.27
1997	179.47	365.58	88.17	43.44	88.49	21.34
1998	199.27	400.80	95.87	50.03	100.64	24.07
1999	227.16	456.90	104.19	57.44	115.53	26.35
2000	254.04	506.07	113.76	66.43	132.33	29.75
2001	296.12	577.84	123.46	76.12	148.57	31.74
2002	328.22	615.41	135.12	84.73	158.87	34.88
2003	383.88	702.19	147.95	98.51	180.19	37.96
2004	438.79	776.31	163.68	108.56	192.10	40.50
2005	480.30	815.10	183.79	117.91	200.10	45.12
2006	554.08	921.60	204.12	132.82	220.94	48.93
2007	602.58	967.63	228.50	137.96	221.56	52.32
2008	659.33	1027.71	255.24	142.98	222.84	55.34
2009	745.69	1138.24	286.62	164.34	250.82	63.16
2010	800.86	1191.70	317.04	171.01	254.45	67.69
2011	896.45	1287.88	349.02	181.73	261.15	70.77
2012	973.58	1365.41	385.25	192.41	269.85	76.14

Figure CQ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
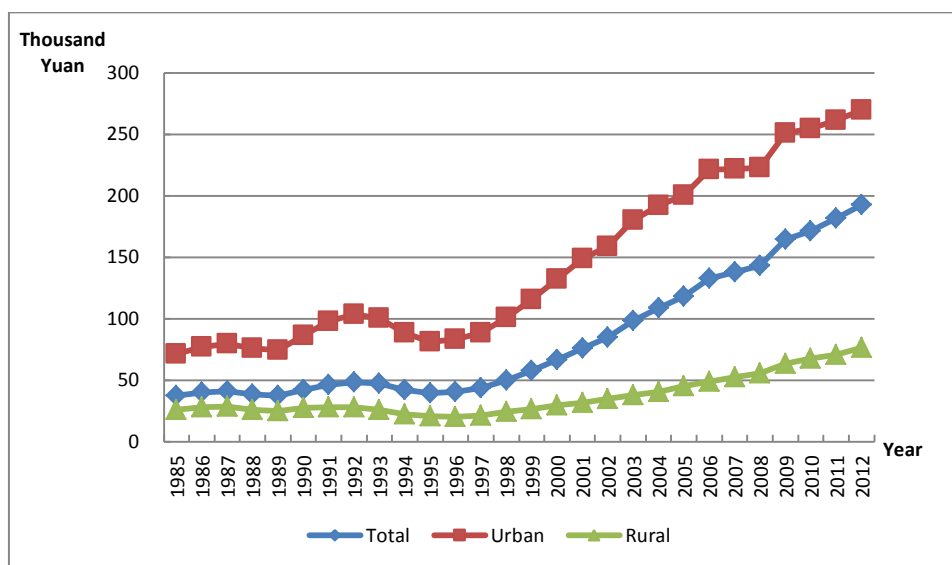
Figure CQ-2.2 Real Human Capital Per Capita by Region for Chongqing，

1985-2012

29.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

29.3.1 Total labor force human capital

The total labor force human capital for Chongqing is reported in Table CQ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Chongqing show differential increases. Nominal labor force human capital increases 21.17 times, from 354 billion Yuan to 7,849 billion Yuan. Real labor force human capital increases almost 3.38 times, from 354 billion Yuan to 1,551 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	354		354	
1986	424		407	
1987	513		449	
1988	607		433	
1989	711		433	
1990	837		502	
1991	964		540	
1992	1088		549	
1993	1226		521	
1994	1353		443	
1995	1512		415	
1996	1673		418	
1997	1831		443	
1998	2024		508	
1999	2212		560	
2000	2432	2382	636	623
2001	2582	2548	664	655
2002	2782	2755	718	711
2003	2947	2932	756	752
2004	3080	3087	762	764
2005	3308	3320	812	815
2006	3770	3788	904	908
2007	4236	4258	970	975
2008	4776	4807	1036	1042
2009	5484	5522	1208	1217
2010	6478	6536	1383	1396

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	7166	7240	1453	1468
2012	7849	7926	1551	1566

29.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables CQ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Chongqing show differential increases. Nominal average labor force human capital increases more than 19.56 times, from 25,270 Yuan to 519,750 Yuan. Real average labor force human capital increases more than 3.06 times, from 25,270 Yuan to 102,690 Yuan.

Table CQ-3.2 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	25.27	42.78	19.89	25.27	42.78	19.89
1986	29.27	50.45	22.40	28.08	48.42	21.50
1987	33.99	58.85	25.33	29.71	51.44	22.14
1988	38.98	68.68	28.74	27.76	48.92	20.47
1989	44.47	79.81	32.36	27.05	48.55	19.69
1990	51.03	92.56	36.49	30.61	55.53	21.89
1991	57.66	105.26	40.78	32.33	59.01	22.87

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
1992	64.66	120.00	45.23	32.61	60.50	22.80
1993	72.64	136.65	50.03	30.85	58.04	21.25
1994	80.50	151.27	54.78	26.36	49.54	17.94
1995	89.85	168.30	59.73	24.65	46.16	16.38
1996	99.26	184.66	63.90	24.82	46.17	15.98
1997	109.03	201.60	68.60	26.39	48.80	16.60
1998	119.96	219.70	73.73	30.12	55.16	18.51
1999	131.07	237.00	78.62	33.15	59.93	19.88
2000	143.91	257.03	83.81	37.64	67.21	21.92
2001	157.26	275.22	89.81	40.43	70.76	23.09
2002	171.17	290.04	96.81	44.19	74.87	24.99
2003	185.28	304.57	103.86	47.54	78.15	26.65
2004	199.62	318.46	109.90	49.39	78.80	27.19
2005	219.88	341.05	116.53	53.97	83.72	28.61
2006	248.87	377.81	133.77	59.67	90.57	32.07
2007	280.08	416.20	152.12	64.13	95.30	34.83
2008	316.39	460.76	171.47	68.61	99.91	37.18
2009	363.20	520.44	193.86	80.02	114.68	42.72
2010	416.64	584.93	216.43	88.96	124.90	46.21
2011	473.06	648.65	244.27	95.91	131.53	49.53
2012	519.75	697.55	274.68	102.69	137.86	54.29

Chapter 30   Human Capital for Sichuan

30.1 Total human capital

Table SC-1.1 presents the results of nominal and real total human capital and real physical capital for Sichuan. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Sichuan.

Table SC-1.1 Real physical capital, Nominal and Real Human Capital for Sichuan

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1985	2089		2089		60
1986	2388		2280		67
1987	2736		2439		74
1988	3186		2364		79
1989	3672		2268		84
1990	4264		2538		88
1991	4927		2846		94
1992	5703		3077		101
1993	6553		3022		108
1994	7488		2756		117
1995	8459		2619		130
1996	9378		2647		145
1997	10410		2791		162
1998	11515		3093		183
1999	13008		3537		204

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	14760	14933	4002	4044	229
2001	16442	16606	4353	4393	255
2002	18197	18384	4824	4869	286
2003	19991	20212	5214	5267	323
2004	21965	22236	5460	5519	367
2005	23509	23740	5747	5799	419
2006	27489	27833	6542	6615	485
2007	30806	31134	6906	6973	566
2008	34350	34739	7322	7400	660
2009	37760	38200	7981	8067	762
2010	41530	42010	8504	8596	881
2011	45980	46520	8928	9025	1013
2012	49670	50170	9398	9483	1152

30.2 Human capital per capita

To obtain 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. Table SC-2.1 presents human capital per capita for Sichuan by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 23.85 times from 30,960 Yuan to 769,520 Yuan. Real human capital per capita increases 3.7 times from 30,960 Yuan to 14,560 Yuan.

Figure SC-2.1 illustrates the trends of human capital per capita by gender for Sichuan. The real human capital per capita of male is similar to

that of female for Sichuan. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
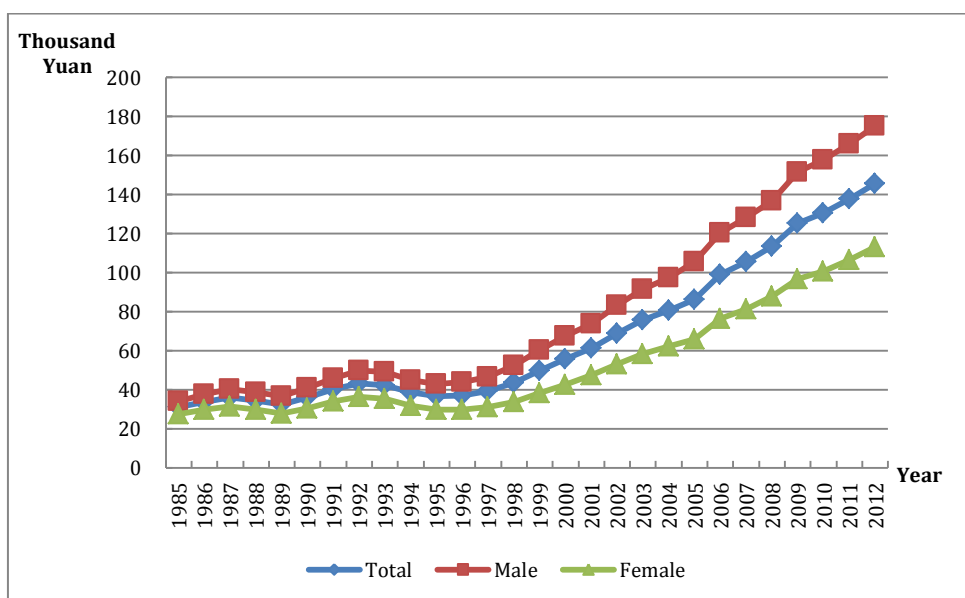
Figure SC-2.1 Human Capital Per Capita by Gender for Sichuan，1985-2012

Table SC-2.1 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	30.96	63.11	25.20	30.96	63.11	25.20
1986	35.41	73.49	28.23	33.81	70.12	26.96
1987	40.44	85.33	31.58	36.05	73.95	28.56
1988	46.37	99.09	35.43	34.40	69.88	27.04
1989	52.73	113.21	39.57	32.57	67.77	24.90
1990	60.38	132.25	44.07	35.94	78.00	26.41
1991	69.50	155.33	48.84	40.14	87.83	28.66

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	80.16	183.08	53.80	43.25	94.28	30.19
1993	91.96	209.65	59.94	42.41	92.36	28.82
1994	104.99	238.65	66.47	38.64	82.20	26.09
1995	118.52	267.40	73.49	36.70	77.40	24.38
1996	131.69	293.27	80.04	37.17	77.31	24.34
1997	146.09	322.26	87.22	39.17	80.83	25.26
1998	161.84	352.66	95.05	43.47	88.63	27.67
1999	183.33	399.14	104.16	49.85	102.26	30.63
2000	205.88	451.92	113.45	55.82	116.13	33.16
2001	231.62	505.14	123.89	61.32	127.51	35.26
2002	259.49	558.26	135.96	68.79	141.62	38.69
2003	289.71	613.77	149.19	75.56	152.80	42.08
2004	324.06	677.26	164.59	80.55	161.20	44.13
2005	353.26	718.47	181.73	86.36	168.14	47.96
2006	415.94	826.77	202.17	98.99	188.96	52.15
2007	470.65	899.77	225.45	105.51	194.18	54.87
2008	531.49	979.03	250.80	113.29	201.80	57.80
2009	592.26	1050.61	280.30	125.18	215.12	63.98
2010	637.45	1096.10	310.98	130.53	217.18	68.87
2011	708.53	1183.07	341.44	137.58	223.03	71.47
2012	769.52	1240.44	375.72	145.60	227.48	77.11

Figure SC-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

276
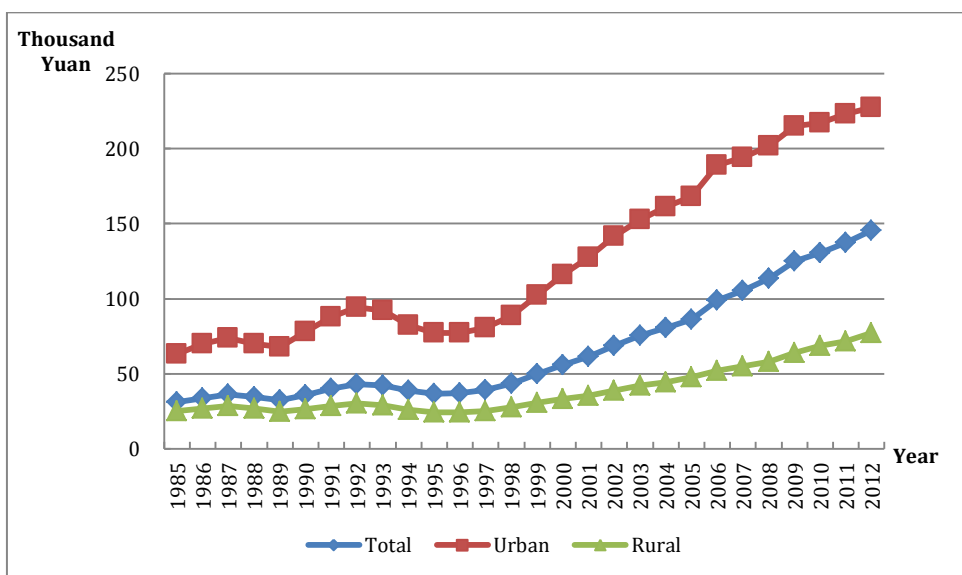
Figure SC-2.2 Real Human Capital Per Capita by Region for Sichuan，1985-2012

30.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

30.3.1 Total labor force human capital

The total labor force human capital for Sichuan is reported in Table SC-3.1 From 1985 to 2012, the nominal and real labor force human capital for Sichuan show differential increases. Nominal labor force human capital increases 19.08 times, from 925 billion Yuan to 185,77 billion Yuan. Real labor force human capital increases almost 2.85 times, from 9,25 billion Yuan to 35,64 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	925		925	
1986	1078		1030	
1987	1272		1135	
1988	1534		1141	
1989	1825		1129	
1990	2169		1292	
1991	2510		1453	
1992	2854		1550	
1993	3211		1493	
1994	3555		1326	
1995	3948		1240	
1996	4323		1238	
1997	4760		1294	
1998	5275		1434	
1999	5779		1589	
2000	6357	6304	1741	1726
2001	6701	6603	1792	1766
2002	7039	6964	1887	1867
2003	7381	7333	1951	1937
2004	7671	7661	1931	1927
2005	8096	8090	2002	1999
2006	9191	9190	2221	2219
2007	10279	10277	2345	2342
2008	11618	11630	2517	2518
2009	13366	13386	2867	2868
2010	15872	15920	3291	3299

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	17258	17323	3395	3404
2012	18577	18607	3564	3567

30.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables SC-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Sichuan show differential increases. Nominal average labor force human capital increases more than 17.70 times, from 22,510 Yuan to 421,030 Yuan. Real average labor force human capital increases more than 2.59 times, from 22,510 Yuan to 80,770 Yuan.

Table SC-3.2 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	22.51	39.35	19.39	22.51	39.35	19.39
1986	25.85	46.41	21.85	24.68	44.29	20.87
1987	29.86	54.78	24.70	26.65	47.48	22.34
1988	34.47	64.07	28.06	25.64	45.18	21.42
1989	39.57	74.36	31.66	24.48	44.52	19.92
1990	45.42	86.43	35.67	27.06	50.97	21.38
1991	51.44	98.64	39.87	29.77	55.78	23.40

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
1992	57.69	111.47	44.29	31.34	57.41	24.85
1993	64.55	125.95	49.04	30.02	55.49	23.58
1994	71.74	140.50	53.80	26.76	48.40	21.12
1995	79.87	157.46	58.87	25.08	45.58	19.53
1996	87.98	173.88	63.23	25.18	45.84	19.23
1997	96.89	191.92	68.10	26.33	48.14	19.72
1998	107.06	210.86	73.34	29.11	52.99	21.35
1999	117.47	229.39	78.36	32.29	58.77	23.04
2000	128.36	247.88	83.82	35.14	63.70	24.50
2001	138.84	265.62	89.77	37.13	67.05	25.55
2002	148.57	279.45	96.51	39.82	70.89	27.47
2003	159.07	293.57	103.71	42.04	73.09	29.25
2004	169.97	308.55	110.64	42.78	73.44	29.66
2005	183.67	327.24	118.39	45.41	76.58	31.24
2006	210.50	365.43	137.51	50.87	83.52	35.47
2007	238.05	401.54	158.21	54.31	86.66	38.50
2008	271.47	444.87	179.50	58.81	91.70	41.37
2009	312.02	499.54	203.23	66.93	102.28	46.39
2010	353.57	555.15	227.18	73.31	110.00	50.31
2011	388.54	593.33	253.02	76.43	111.86	52.96
2012	421.03	619.19	280.21	80.77	113.55	57.51

Chapter 31　　Human Capital for Guizhou

31.1 Total human capital

Table GZ-1.1 presents the results of nominal and real total human capital and real physical capital for Guizhou. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1985	727		727		23
1986	834		791		25
1987	961		846		27
1988	1108		818		29
1989	1277		795		30
1990	1481		904		32
1991	1768		1031		34
1992	2058		1111		36
1993	2398		1115		38
1994	2780		1052		40
1995	3245		1011		42
1996	3633		1033		45
1997	4041		1110		50
1998	4416		1211		55

| Year | Nominal Human Capital (Billions of Yuan) | | Real Human Capital (Billions of 1985 Yuan) | | Real physical capital (Billions of 1985 Yuan) |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1999	4782		1322		61
2000	5514	5579	1531	1548	69
2001	6040	6109	1644	1662	78
2002	6877	6956	1889	1911	90
2003	7586	7673	2058	2082	102
2004	8433	8542	2199	2228	116
2005	9056	9151	2338	2363	132
2006	10137	10251	2573	2602	151
2007	10966	11057	2619	2641	172
2008	11898	12006	2646	2670	198
2009	12831	12956	2891	2920	226
2010	13629	13763	2982	3011	265
2011	15124	15259	3147	3175	306
2012	16422	16542	3328	3352	358

31.2 Human capital per capita

To obtain 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. Table GZ-2.1 presents human capital per capita for Guizhou by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 20.59 times from 26,310 Yuan to 568,020 Yuan. Real human capital per capita increases 3.38 times from 26,310 Yuan to 115,110 Yuancc.

Figure GZ-2.1 illustrates the trends of human capital per capita by gender for Guizhou. The real human capital per capita of male is similar to

that of female for Guizhou. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
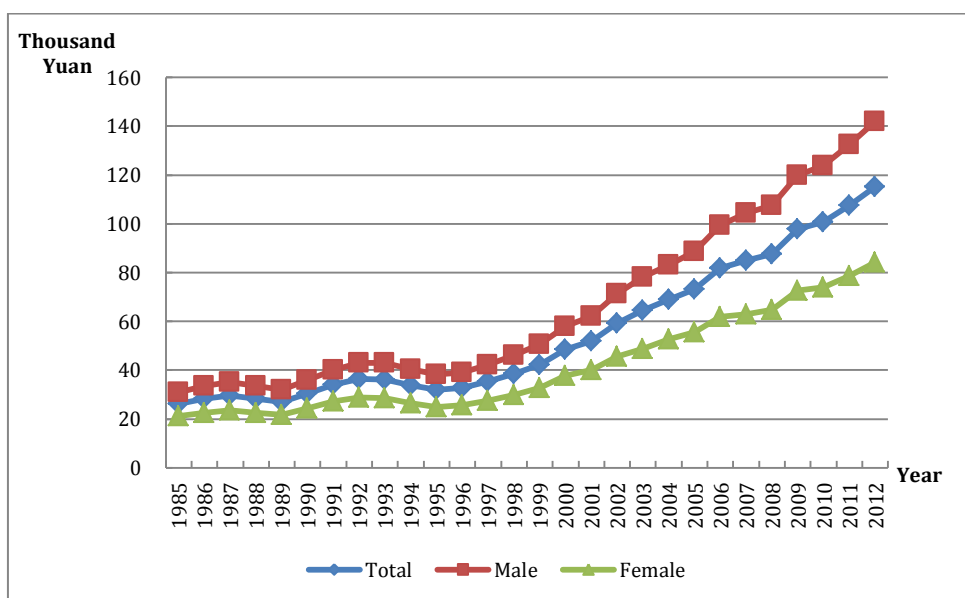
Figure GZ-2.1 Human Capital Per Capita by Gender for Guizhou，1985-2012

Table GZ-2.1 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	26.31	64.19	17.43	26.31	64.19	17.43
1986	29.79	74.31	19.32	28.25	69.84	18.47
1987	33.70	86.95	21.22	29.68	74.50	19.18
1988	38.29	100.77	23.62	28.26	71.06	18.21
1989	43.52	117.04	26.25	27.11	70.00	17.04
1990	49.70	136.58	29.16	30.34	80.80	18.41
1991	58.45	161.43	32.22	34.09	91.92	19.36

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	67.34	185.24	35.65	36.34	97.03	20.03
1993	77.75	212.42	39.75	36.14	96.08	19.22
1994	89.39	242.11	44.14	33.84	89.77	17.27
1995	102.70	277.68	49.01	31.99	86.15	15.38
1996	115.48	317.06	52.80	32.82	88.94	15.37
1997	128.37	357.63	56.97	35.27	97.02	16.03
1998	140.77	394.07	61.48	38.59	106.38	17.38
1999	152.91	428.85	66.34	42.27	117.06	18.81
2000	174.90	502.20	71.69	48.56	138.18	20.28
2001	190.46	533.97	78.25	51.85	143.48	21.89
2002	215.90	602.90	85.09	59.30	163.80	23.98
2003	237.53	653.29	92.37	64.44	175.91	25.52
2004	264.09	719.49	100.50	68.88	187.19	26.37
2005	283.68	756.43	109.52	73.22	195.62	28.14
2006	322.55	827.46	120.94	81.88	210.62	30.47
2007	355.84	869.05	133.52	85.00	208.89	31.32
2008	394.17	922.81	146.82	87.66	207.30	31.65
2009	434.29	974.10	162.55	97.84	221.92	35.40
2010	459.83	989.51	179.12	100.62	218.66	38.02
2011	516.67	1074.28	196.52	107.51	225.44	39.80
2012	568.02	1137.60	216.14	115.11	232.45	42.58

Figure GZ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

284
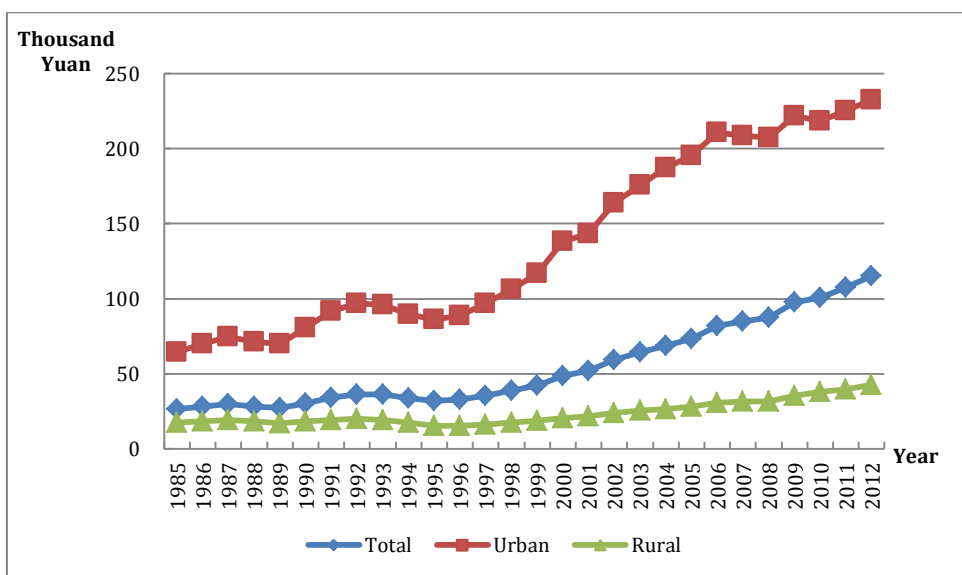
Figure GZ-2.2 Real Human Capital Per Capita by Region for Guizhou，1985-2012

31.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

31.3.1 Total labor force human capital

The total labor force human capital for Guizhou is reported in Table GZ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Guizhou show differential increases. Nominal labor force human capital increases 17.51 times, from 2,62 billion Yuan to 48,49 billion Yuan. Real labor force human capital increases almost 2.73 times, from 2,62 billion Yuan to 9,78 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	262		262	
1986	309		294	
1987	368		325	
1988	443		328	
1989	531		332	
1990	643		393	
1991	772		451	
1992	905		490	
1993	1058		493	
1994	1224		464	
1995	1413		441	
1996	1501		427	
1997	1611		444	
1998	1755		482	
1999	1913		530	
2000	2142	2111	595	587
2001	2267	2245	619	613
2002	2406	2391	663	659
2003	2561	2555	697	695
2004	2753	2757	719	720
2005	2985	2992	770	772
2006	3182	3188	807	808
2007	3404	3411	810	812
2008	3636	3646	804	806
2009	3994	4005	895	898
2010	4542	4561	990	994

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	4710	4730	976	980
2012	4849	4860	978	980

31.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables GZ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Guizhou show differential increases. Nominal average labor force human capital increases more than 14.05 times, from 19,100 Yuan to 287,400 Yuan. Real average labor force human capital increases more than 2.03 times, from 19,100 Yuan to 57,940 Yuan.

Table GZ-3.2 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	19.10	37.85	14.04	19.10	37.85	14.04
1986	21.67	44.80	15.59	20.57	42.11	14.90
1987	25.10	53.58	17.38	22.15	45.91	15.71
1988	29.09	63.77	19.47	21.52	44.97	15.01
1989	33.37	75.40	21.71	20.83	45.09	14.09
1990	38.53	89.45	24.23	23.54	52.91	15.30
1991	44.61	103.10	26.95	26.05	58.70	16.19

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**
1992	50.67	117.21	29.86	27.41	61.39	16.78
1993	57.66	133.93	33.08	26.86	60.58	15.99
1994	65.40	151.50	36.37	24.80	56.17	14.23
1995	73.75	170.24	39.96	22.99	52.82	12.54
1996	80.20	187.33	43.07	22.83	52.55	12.53
1997	86.91	205.93	46.43	23.93	55.87	13.07
1998	94.84	226.15	49.89	26.07	61.05	14.10
1999	103.09	246.16	53.13	28.56	67.19	15.06
2000	113.21	269.37	56.82	31.48	74.12	16.07
2001	120.63	285.51	61.30	32.92	76.72	17.15
2002	127.56	301.36	65.93	35.15	81.88	18.58
2003	134.50	317.21	70.98	36.58	85.42	19.61
2004	143.43	336.38	76.13	37.43	87.52	19.97
2005	154.59	357.67	81.72	39.88	92.50	21.00
2006	168.35	378.58	91.12	42.67	96.36	22.95
2007	184.58	403.98	100.62	43.94	97.10	23.60
2008	201.66	426.41	110.44	44.59	95.79	23.81
2009	225.73	459.59	121.38	50.59	104.71	26.43
2010	252.50	494.46	132.36	55.02	109.26	28.09
2011	270.85	522.06	146.27	56.12	109.56	29.62
2012	287.40	537.65	161.71	57.94	109.86	31.86

Chapter 32   Human Capital for Yunnan

32.1 Total human capital

Table YN-1.1 presents the results of nominal and real total human capital and real physical capital for Yunnan. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Yunnan.

Table YN-1.1 Real physical capital, Nominal and Real Human Capital for Yunnan

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1985	756		756		57
1986	884		835		59
1987	1031		911		61
1988	1197		884		63
1989	1378		859		66
1990	1626		987		70
1991	1901		1119		77
1992	2238		1202		85
1993	2639		1172		95
1994	3100		1162		103
1995	3586		1113		111
1996	4070		1164		121
1997	4565		1253		132
1998	5133		1384		147

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1999	5735		1556		161
2000	6379	6441	1768	1786	174
2001	7175	7246	2012	2034	187
2002	8137	8214	2293	2317	203
2003	9304	9408	2596	2627	223
2004	10403	10521	2741	2773	249
2005	11456	11574	2975	3008	276
2006	12970	13154	3311	3360	307
2007	13844	14001	3335	3375	340
2008	14922	15100	3406	3448	375
2009	15920	16101	3616	3659	434
2010	16820	17011	3682	3724	528
2011	17907	18088	3738	3776	644
2012	18732	18879	3800	3831	777

32.2 Human capital per capita

To obtain 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. Table YN-2.1 presents human capital per capita for Yunnan by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 17.85 times from 24,510 Yuan to 462,020 Yuan. Real human capital per capita increases 2.82 times from 24,510 Yuan to 93,730 Yuan.

Figure YN-2.1 illustrates the trends of human capital per capita by gender for Yunnan. The real human capital per capita of male is similar to

that of female for Yunnan. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
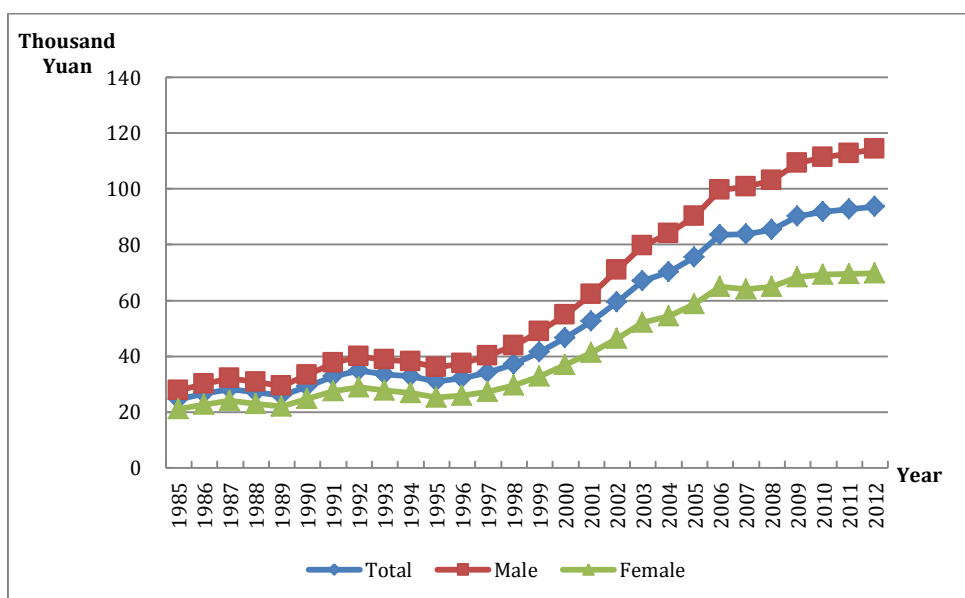
Figure YN-2.1 Human Capital Per Capita by Gender for Yunnan，1985-2012

Table YN-2.1 Nominal and Real Human Capital Per Capita by Region for Yunnan

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	24.51	59.79	18.99	24.51	59.79	18.99
1986	28.03	70.92	21.12	26.48	67.68	19.85
1987	32.00	82.94	23.56	28.29	73.69	20.77
1988	36.58	97.90	26.33	27.03	71.82	19.54
1989	41.54	114.01	29.32	25.89	70.95	18.28
1990	48.16	137.42	32.63	29.23	84.17	19.68
1991	55.77	161.00	36.36	32.82	94.99	21.36

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	64.82	187.92	40.33	34.83	100.43	21.77
1993	75.46	218.84	44.90	33.51	98.45	19.66
1994	87.51	253.47	49.78	32.81	97.22	18.17
1995	99.90	286.51	54.89	31.00	91.34	16.45
1996	111.94	318.93	59.30	32.03	93.71	16.34
1997	124.19	348.54	64.15	34.09	97.91	17.01
1998	138.09	383.91	69.15	37.23	105.32	18.14
1999	152.70	419.80	74.36	41.42	116.56	19.37
2000	167.70	453.51	80.47	46.48	129.02	21.30
2001	187.25	489.64	87.93	52.51	141.99	23.14
2002	211.13	536.76	96.15	59.50	156.76	25.17
2003	239.81	597.94	105.03	66.92	172.38	27.23
2004	266.53	645.25	115.10	70.21	175.33	28.17
2005	291.21	685.21	125.15	75.62	183.07	30.33
2006	327.47	756.50	136.83	83.59	198.35	32.58
2007	348.04	772.73	149.49	83.85	191.32	33.61
2008	374.22	804.55	162.58	85.42	188.99	34.48
2009	397.66	826.68	177.93	90.31	193.19	37.65
2010	419.52	841.90	194.72	91.84	189.55	39.77
2011	444.28	860.07	211.28	92.74	184.77	41.14
2012	462.02	859.52	228.98	93.73	179.27	43.58

Figure YN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

292
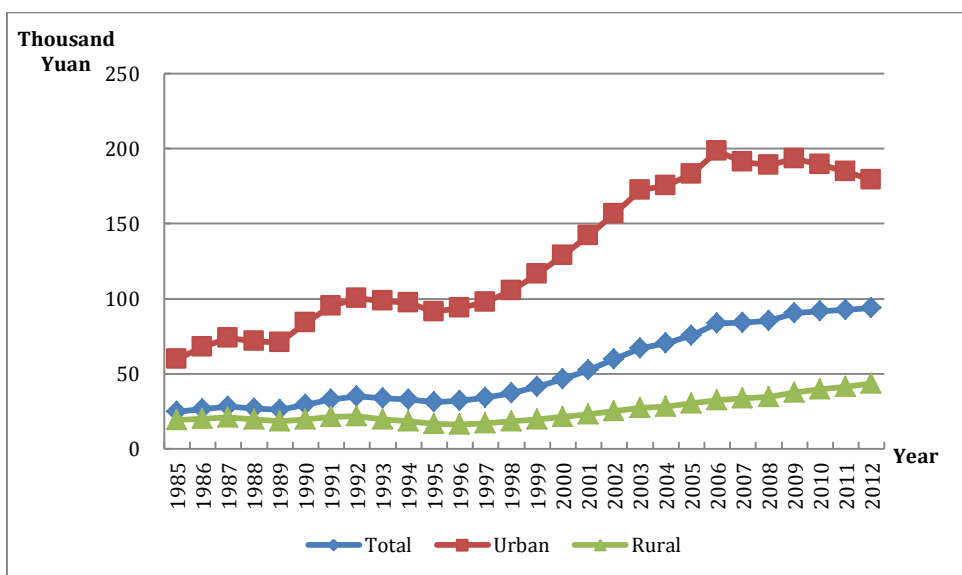
Figure YN-2.2 Real Human Capital Per Capita by Region for Yunnan，1985-2012

32.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

32.3.1 Total labor force human capital

The total labor force human capital for Yunnan is reported in Table YN-3.1 From 1985 to 2012, the nominal and real labor force human capital for Yunnan show differential increases. Nominal labor force human capital increases 24.42 times, from 316 billion Yuan to 8032 billion Yuan. Real labor force human capital increases almost 4.11 times, from 316 billion Yuan to 1616 billion Yuan.

Table YN-3.1 Nominal and Real Labor Force Human Capital for Yunnan

| Year | Nominal Labor Force Human Capital (Billions of Yuan) | | Real Labor Force Human Capital (Billions of 1985 Yuan) | |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	316		316	
1986	381		360	
1987	467		413	
1988	548		405	
1989	638		397	
1990	751		456	
1991	886		522	
1992	1039		558	
1993	1222		542	
1994	1431		535	
1995	1674		518	
1996	1916		546	
1997	2171		594	
1998	2457		661	
1999	2745		742	
2000	3063	3026	846	836
2001	3326	3302	928	921
2002	3671	3649	1027	1021
2003	4024	4009	1112	1108
2004	4397	4402	1146	1148
2005	4843	4855	1245	1249
2006	5322	5338	1344	1348
2007	5735	5752	1367	1372
2008	6190	6214	1398	1404
2009	6726	6752	1513	1519
2010	7276	7308	1579	1586

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	7696	7728	1592	1599
2012	8032	8054	1616	1621

32.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables YN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Yunnan show differential increases. Nominal average labor force human capital increases more than 14.24 times, from 19,140 Yuan to 291,720 Yuan. Real average labor force human capital increases more than 2.07 times, from 19,140 Yuan to 58,690 Yuan.

Table YN-3.2 Nominal and Real Average Labor Force Human Capital by Region for Yunnan

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	19.14	40.39	15.38	19.14	40.39	15.38
1986	22.37	49.67	17.20	21.14	47.39	16.16
1987	26.47	60.72	19.30	23.40	53.94	17.02
1988	29.90	69.48	21.75	22.09	50.98	16.14
1989	33.60	79.14	24.39	20.93	49.25	15.21
1990	38.28	91.64	27.35	23.23	56.13	16.50
1991	43.79	106.70	30.54	25.77	62.96	17.93

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
1992	49.71	122.46	33.96	26.72	65.45	18.33
1993	56.64	140.72	37.89	25.11	63.31	16.59
1994	64.42	160.86	41.96	24.08	61.70	15.32
1995	73.41	183.73	46.26	22.70	58.57	13.87
1996	81.88	205.14	49.94	23.34	60.28	13.76
1997	91.40	227.12	53.86	25.01	63.80	14.28
1998	101.36	248.42	58.11	27.27	68.15	15.24
1999	111.05	267.36	62.23	30.02	74.23	16.21
2000	121.56	287.48	66.80	33.58	81.79	17.68
2001	132.19	307.23	72.90	36.87	89.10	19.18
2002	144.83	332.54	79.64	40.51	97.12	20.85
2003	156.58	353.48	87.16	43.27	101.91	22.59
2004	169.66	374.05	95.02	44.21	101.64	23.26
2005	183.84	397.44	103.21	47.26	106.19	25.01
2006	199.58	420.52	112.60	50.38	110.26	26.81
2007	214.34	437.77	122.01	51.10	108.39	27.43
2008	229.84	453.59	132.01	51.89	106.55	28.00
2009	246.48	470.23	143.52	55.44	109.89	30.37
2010	264.03	484.45	155.42	57.28	109.07	31.75
2011	280.06	501.02	167.89	57.92	107.63	32.69
2012	291.72	502.58	180.83	58.69	104.82	34.42

Chapter 33　Human Capital for Tibet

33.1 Total human capital

Table XZ-1.1 presents the results of nominal and real total human capital and real physical capital for Tibet. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Tibet.

Table XZ-1.1 Real physical capital, Nominal and Real Human Capital for Tibet

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1985	42		42		5
1986	50		47		5
1987	59		52		6
1988	68		52		6
1989	79		51		6
1990	94		58		7
1991	109		62		7
1992	127		66		9
1993	147		67		10
1994	168		60		12
1995	193		58		15
1996	233		64		17
1997	274		72		19
1998	310		81		21
1999	359		93		24

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	411	416	106	108	26
2001	494	500	128	130	29
2002	570	578	147	149	35
2003	646	654	165	167	44
2004	734	744	183	185	57
2005	806	815	198	200	73
2006	916	929	220	223	91
2007	955	964	223	225	110
2008	1030	1039	227	229	131
2009	1096	1105	239	241	154
2010	1167	1177	249	251	190
2011	1271	1281	258	260	220
2012	1355	1364	266	268	258

33.2 Human capital per capita

To obtain 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. Table XZ-2.1 presents human capital per capita for Tibet by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 19.63 times from 23,290 Yuan to 480,420 Yuan. Real human capital per capita increases 3.05 times from 23,290 Yuan to 94,350 Yuan.

Figure XZ-2.1 illustrates the trends of human capital per capita by gender for Tibet. The real human capital per capita of male is similar to that

of female for Tibet. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
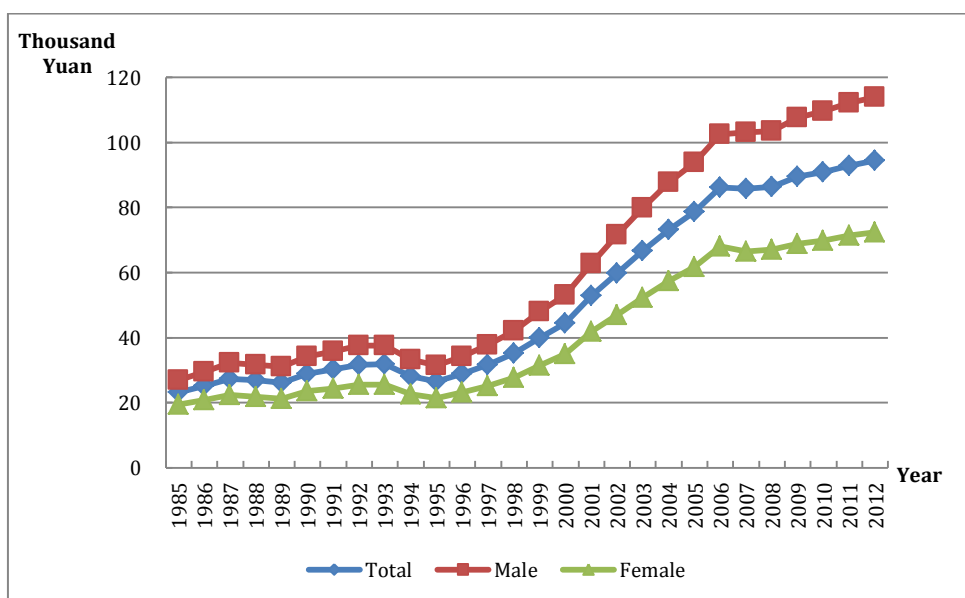

Figure XZ-2.1 Human Capital Per Capita by Gender for Tibet, 1985-2012

Table XZ-2.1 Nominal and Real Human Capital Per Capita by Region for Tibet

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	23.29	86.36	15.51	23.29	86.36	15.51
1986	26.88	104.43	17.07	25.22	97.60	16.07
1987	31.03	125.05	18.83	27.35	107.86	16.90
1988	35.25	143.37	20.91	26.84	104.98	16.48
1989	40.38	167.28	23.23	26.23	105.68	15.49
1990	46.78	201.03	25.79	28.92	120.73	16.43
1991	53.37	229.96	28.81	30.22	126.24	16.86
1992	60.93	265.11	32.14	31.69	133.51	17.33

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	69.31	301.73	36.05	31.75	131.91	17.42
1994	78.36	341.61	40.15	28.05	119.00	14.85
1995	88.63	379.69	44.95	26.53	109.04	14.15
1996	104.65	429.38	49.14	28.89	112.61	14.58
1997	121.02	472.01	53.81	31.68	118.12	15.12
1998	134.96	494.78	58.59	35.10	124.06	16.22
1999	153.74	541.66	63.63	39.98	136.64	17.53
2000	171.34	583.12	69.14	44.42	146.51	19.09
2001	203.70	701.59	76.10	52.82	177.70	20.82
2002	232.58	798.61	83.58	59.84	200.27	22.89
2003	261.52	888.85	92.03	66.70	221.13	24.98
2004	294.41	991.93	101.42	73.27	241.94	26.62
2005	320.12	1059.18	111.14	78.63	254.52	28.91
2006	358.19	1174.85	122.20	86.21	277.05	31.04
2007	367.95	1162.10	134.13	85.83	266.32	32.70
2008	390.86	1207.26	146.69	86.30	261.75	33.83
2009	410.60	1235.62	160.53	89.48	264.00	36.57
2010	425.63	1252.10	175.48	90.85	261.76	39.11
2011	457.14	1318.04	190.52	92.92	261.92	40.56
2012	480.42	1350.07	205.77	94.35	258.97	42.36

Figure XZ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
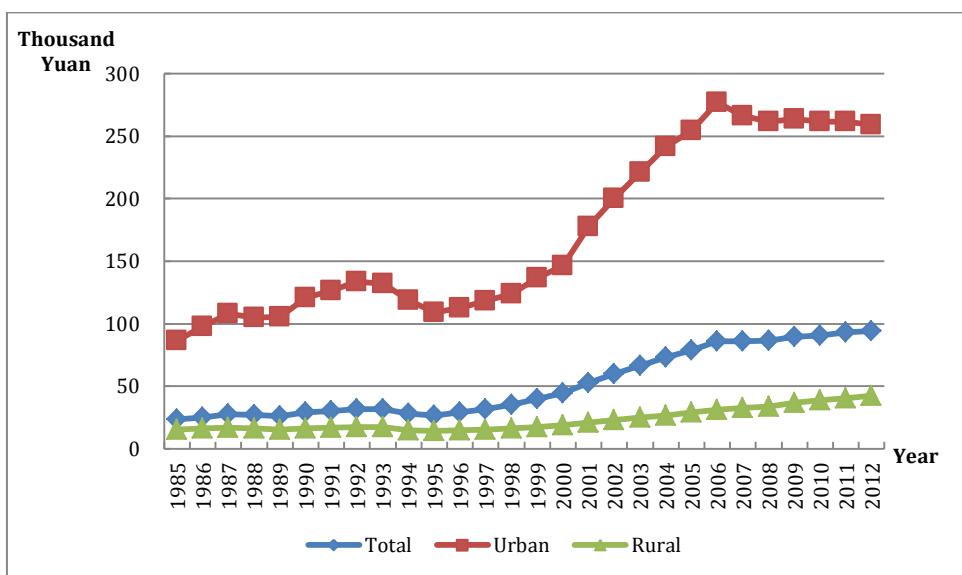
Figure XZ-2.2 Real Human Capital Per Capita by Region for Tibet, 1985-2012

33.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

33.3.1 Total labor force human capital

The total labor force human capital for Tibet is reported in Table XZ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Tibet show differential increases. Nominal labor force human capital increases 31.81 times, from 16 billion Yuan to 525 billion Yuan. Real labor force human capital increases almost 5.5 times, from 16 billion Yuan to 104 billion Yuan.

Table XZ-3.1 Nominal and Real Labor Force Human Capital for Tibet

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	16		16	
1986	19		18	
1987	22		19	
1988	25		20	
1989	30		20	
1990	36		22	
1991	41		24	
1992	48		25	
1993	57		26	
1994	66		24	
1995	77		23	
1996	90		25	
1997	105		28	
1998	124		32	
1999	145		38	
2000	169	168	44	44
2001	179	177	47	46
2002	191	190	50	49
2003	209	208	54	54
2004	226	227	57	57
2005	249	250	62	62
2006	282	283	69	69
2007	310	311	73	74
2008	347	349	77	78
2009	392	395	86	87
2010	467	470	101	101

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	496	499	102	103
2012	525	527	104	105

33.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables XZ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Tibet show differential increases. Nominal average labor force human capital increases more than 16.22 times, from 16,640 Yuan to 286,500 Yuan. Real average labor force human capital increases more than 2.42 times, from 16,640 Yuan to 56,950 Yuan.

Table XZ-3.2 Nominal and Real Average Labor Force Human Capital by Region for Tibet

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	16.64	47.70	13.60	16.64	47.70	13.60
1986	18.71	55.74	15.02	17.58	52.10	14.14
1987	21.19	66.32	16.54	18.81	57.20	14.85
1988	24.27	78.58	18.40	18.70	57.54	14.50
1989	27.66	92.14	20.37	18.12	58.21	13.59
1990	31.62	108.31	22.58	19.72	65.04	14.38
1991	36.39	128.19	24.96	20.78	70.37	14.60

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
1992	42.06	151.14	27.58	22.05	76.12	14.87
1993	48.93	178.22	30.59	22.62	77.91	14.78
1994	56.37	205.52	33.78	20.27	71.59	12.50
1995	65.06	233.16	37.35	19.57	66.96	11.76
1996	73.97	251.62	40.89	20.59	65.99	12.14
1997	84.09	271.86	44.91	22.19	68.03	12.62
1998	96.15	297.29	49.20	25.15	74.54	13.62
1999	108.80	321.74	53.63	28.43	81.16	14.77
2000	121.08	343.96	58.57	31.56	86.42	16.17
2001	127.75	378.81	64.61	33.41	95.95	17.68
2002	134.34	412.19	71.31	35.02	103.37	19.53
2003	144.35	449.30	78.61	37.38	111.78	21.34
2004	154.14	487.84	86.67	38.94	118.99	22.75
2005	167.67	535.67	95.09	41.86	128.72	24.74
2006	184.60	586.36	104.78	45.11	138.27	26.62
2007	199.00	618.18	114.99	47.01	141.67	28.03
2008	216.89	653.41	125.97	48.47	141.67	29.05
2009	237.58	688.48	138.17	52.37	147.10	31.47
2010	263.93	716.86	151.22	56.85	149.87	33.71
2011	276.12	742.27	163.83	56.75	147.51	34.88
2012	286.50	749.05	176.44	56.95	143.68	36.33

Chapter 34   Human Capital for Shaanxi

34.1 Total human capital

Table SaX-1.1 presents the results of nominal and real total human capital and real physical capital for Shaanxi. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of 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 (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1985	802		802		33
1986	927		875		39
1987	1076		943		44
1988	1251		926		49
1989	1450		900		54
1990	1694		1026		57
1991	1969		1120		61
1992	2295		1192		65
1993	2691		1228		70
1994	3129		1122		75
1995	3589		1082		80
1996	4058		1110		85
1997	4588		1195		91
1998	5135		1359		98

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1999	5852		1583		107
2000	6506	6606	1763	1788	118
2001	7219	7348	1933	1965	129
2002	7886	8026	2134	2170	142
2003	8761	8921	2332	2373	158
2004	9608	9782	2480	2525	178
2005	10487	10661	2675	2720	204
2006	11917	12123	2990	3041	237
2007	13468	13673	3211	3261	282
2008	15143	15397	3395	3450	339
2009	16970	17265	3789	3853	405
2010	19773	20141	4245	4324	489
2011	22261	22675	4522	4606	580
2012	24776	25247	4900	4992	680

34.2 Human capital per capita

To obtain 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. Table SaX-2.1 presents human capital per capita for Shaanxi by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 25.43 times from 29,560 Yuan to 781,320 Yuan. Real human capital per capita increases 4.23 times from 29,560 Yuan to 154,530 Yuan.

Figure SaX-2.1 illustrates the trends of human capital per capita by gender for Shaanxi. The real human capital per capita of male is similar to

that of female for Shaanxi. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
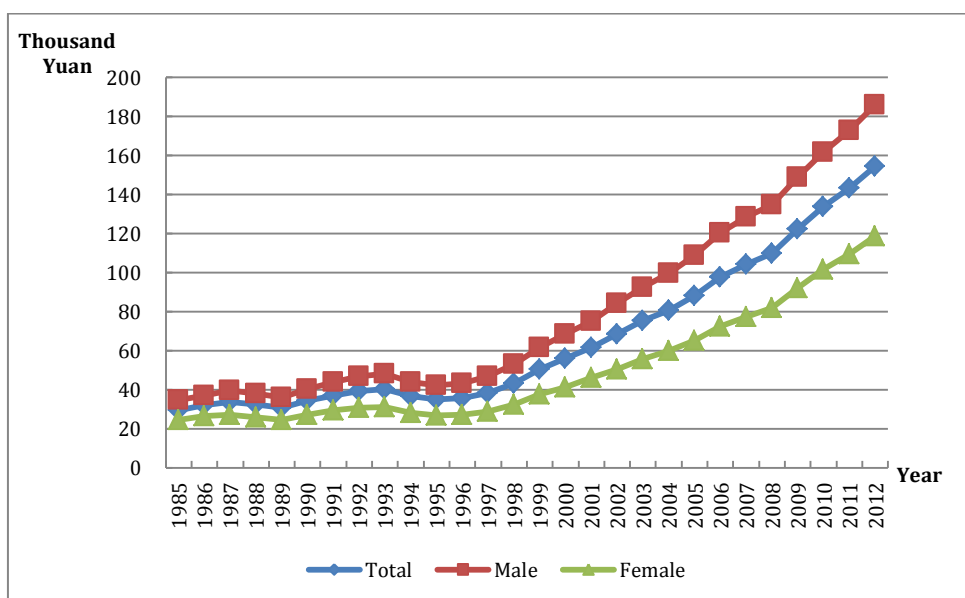

Figure SaX-2.1 Human Capital Per Capita by Gender for Shaanxi，1985-2012

Table SaX-2.1 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	29.56	67.39	20.05	29.56	67.39	20.05
1986	33.84	78.06	22.53	31.95	73.22	21.39
1987	38.42	89.26	25.27	33.69	76.68	22.57
1988	43.65	101.91	28.21	32.32	72.89	21.58
1989	49.53	115.96	31.62	30.72	70.53	19.99
1990	56.52	133.26	35.29	34.23	79.00	21.85
1991	65.25	154.13	39.24	37.12	85.15	23.07

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	75.59	179.32	43.51	39.26	89.10	23.84
1993	88.14	209.84	48.48	40.21	91.45	23.51
1994	101.87	242.13	53.87	36.54	82.31	20.86
1995	116.16	273.13	59.80	35.01	78.69	19.32
1996	130.62	304.11	65.44	35.71	79.43	19.29
1997	147.00	339.89	71.38	38.30	84.39	20.23
1998	163.91	374.96	77.68	43.38	95.29	22.17
1999	186.26	425.73	84.50	50.40	111.31	24.51
2000	206.29	462.90	93.42	55.88	120.67	27.37
2001	229.94	498.16	101.90	61.56	129.73	29.01
2002	252.85	526.94	111.67	68.42	139.73	31.67
2003	282.70	571.24	122.18	75.24	150.28	33.48
2004	313.08	612.68	134.21	80.80	156.49	35.63
2005	345.07	653.27	148.30	88.03	165.37	38.68
2006	389.34	715.01	166.57	97.70	177.27	43.27
2007	437.95	783.45	184.69	104.42	184.64	45.65
2008	490.48	856.73	204.41	109.95	190.12	47.35
2009	548.01	934.20	228.44	122.34	207.31	51.98
2010	623.76	1050.79	253.41	133.92	224.87	55.07
2011	705.18	1159.55	280.60	143.24	234.77	57.75
2012	781.32	1255.52	311.71	154.53	247.73	62.22

Figure SaX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
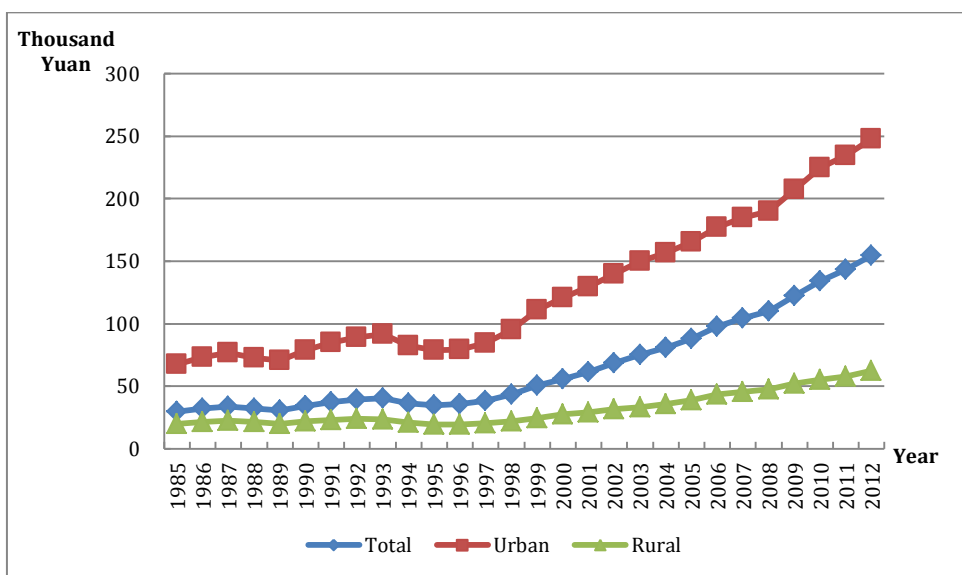
Figure SaX-2.2 Real Human Capital Per Capita by Region for Shaanxi，1985-2012

34.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

34.3.1 Total labor force human capital

The total labor force human capital for Shaanxi is reported in Table SaX-3.1 From 1985 to 2012, the nominal and real labor force human capital for Shaanxi show differential increases. Nominal labor force human capital increases 30.15 times, from 326 billion Yuan to 10,155 billion Yuan. Real labor force human capital increases almost 5.17 times, from 326 billion Yuan to 2010 billion Yuan.

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)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	326		326	
1986	382		361	
1987	464		408	
1988	562		417	
1989	670		416	
1990	802		487	
1991	913		521	
1992	1029		538	
1993	1165		536	
1994	1303		473	
1995	1457		443	
1996	1611		445	
1997	1788		471	
1998	2007		536	
1999	2243		612	
2000	2557	2471	698	675
2001	2753	2696	742	727
2002	3005	2967	817	807
2003	3287	3271	878	873
2004	3514	3526	910	913
2005	3909	3923	1000	1003
2006	4440	4461	1119	1124
2007	5105	5131	1223	1229
2008	5874	5911	1323	1331
2009	6852	6902	1533	1544
2010	8337	8408	1792	1808

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	9212	9311	1874	1894
2012	10155	10271	2010	2033

34.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables SaX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Shaanxi show differential increases. Nominal average labor force human capital increases more than 21.69 times, from 20,760 Yuan to 470,980 Yuan. Real average labor force human capital increases more than 3.49 times, from 20,760 Yuan to 93,230 Yuan.

Table SaX-3.2 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	20.76	40.46	15.99	20.76	40.46	15.99
1986	23.89	47.75	18.01	22.58	44.79	17.10
1987	27.82	56.80	20.34	24.46	48.79	18.18
1988	32.07	65.88	22.92	23.84	47.12	17.53
1989	36.74	75.89	25.64	22.82	46.16	16.21
1990	42.36	88.07	28.66	25.69	52.21	17.74
1991	47.69	99.35	31.87	27.21	54.89	18.74

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
1992	53.50	112.28	35.24	27.96	55.79	19.31
1993	60.22	126.96	39.01	27.70	55.33	18.92
1994	67.17	141.61	42.90	24.37	48.14	16.61
1995	75.02	158.07	47.02	22.84	45.54	15.19
1996	82.84	174.36	50.68	22.90	45.54	14.94
1997	91.76	192.72	54.68	24.19	47.85	15.50
1998	101.91	211.98	59.13	27.22	53.87	16.88
1999	112.74	231.83	63.70	30.77	60.61	18.48
2000	126.67	257.94	69.08	34.57	67.24	20.24
2001	138.58	272.91	75.45	37.33	71.07	21.48
2002	149.65	284.15	82.22	40.69	75.35	23.32
2003	162.20	299.00	89.60	43.31	78.66	24.55
2004	173.38	308.96	97.35	44.91	78.91	25.85
2005	191.58	333.06	106.19	49.00	84.31	27.70
2006	216.55	368.45	121.72	54.58	91.35	31.62
2007	245.94	414.45	138.45	58.93	97.67	34.22
2008	279.26	463.26	155.59	62.88	102.81	36.04
2009	320.38	522.74	175.40	71.69	116.01	39.91
2010	371.25	597.61	195.96	79.80	127.89	42.59
2011	422.29	669.31	215.91	85.91	135.52	44.43
2012	470.98	731.17	236.41	93.23	144.27	47.19

Chapter 35   Human Capital for Gansu

35.1 Total human capital

Table GS-1.1 presents the results of nominal and real total human capital and real physical capital for Gansu. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Gansu.

Table GS-1.1 Real physical capital, Nominal and Real Human Capital for Gansu

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan) (5)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	
1985	415		415		29
1986	486		457		31
1987	568		497		34
1988	670		496		37
1989	787		493		39
1990	915		555		42
1991	1060		611		44
1992	1211		652		46
1993	1391		649		48
1994	1580		594		50
1995	1819		572		52
1996	2024		578		55
1997	2268		629		58
1998	2517		705		62
1999	2801		804		68

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	3126	3158	901	910	75
2001	3569	3603	989	998	84
2002	4022	4057	1115	1125	95
2003	4571	4622	1254	1267	107
2004	5080	5136	1362	1378	121
2005	5618	5669	1481	1495	137
2006	6186	6253	1611	1629	155
2007	6668	6727	1646	1660	176
2008	7204	7272	1644	1660	201
2009	7737	7812	1743	1760	229
2010	8300	8375	1793	1810	263
2011	8874	8950	1815	1831	302
2012	9339	9408	1852	1867	347

35.2 Human capital per capita

To obtain 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. Table GS-2.1 presents human capital per capita for Gansu by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 18.69 times from 21,920 Yuan to 431,740 Yuan. Real human capital per capita increases 2.91 times from 21,920 Yuan to 85,460 Yuan.

Figure GS-2.1 illustrates the trends of human capital per capita by gender for Gansu. The real human capital per capita of male is similar to

that of female for Gansu. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
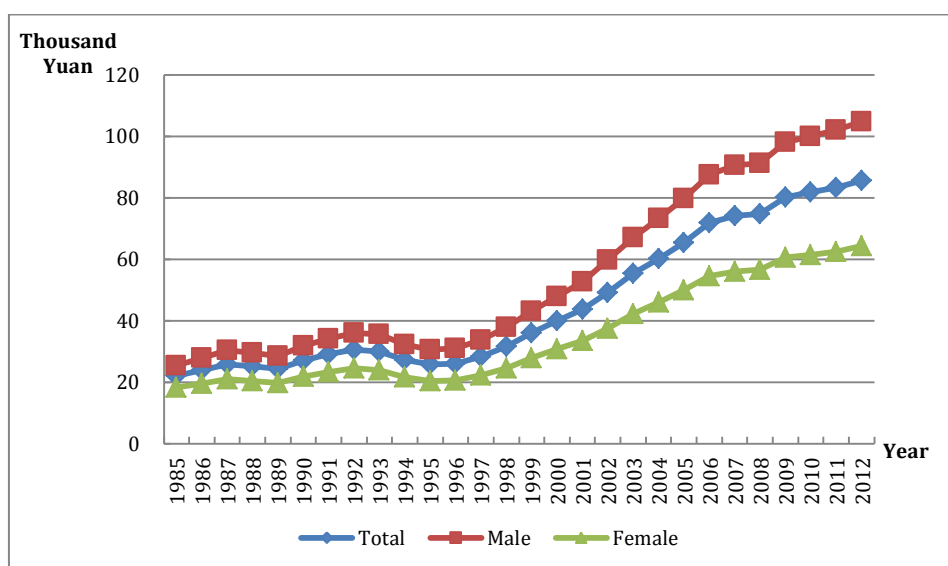

Figure GS-2.1 Human Capital Per Capita by Gender for Gansu，1985-2012

Table GS-2.1 Nominal and Real Human Capital Per Capita by Region for Gansu

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	21.92	53.34	15.03	21.92	53.34	15.03
1986	25.45	62.39	16.88	23.91	58.31	15.92
1987	29.46	72.49	18.92	25.75	62.50	16.76
1988	33.92	82.99	21.24	25.07	59.33	16.22
1989	38.94	94.69	23.84	24.38	57.27	15.48
1990	44.69	107.45	26.68	27.08	63.77	16.55
1991	50.36	122.43	29.80	29.02	68.75	17.69
1992	56.74	138.68	33.12	30.58	72.57	18.47

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	64.35	158.18	37.09	30.02	71.86	17.87
1994	72.23	177.65	41.35	27.15	64.77	16.13
1995	82.12	203.60	46.16	25.81	62.43	14.97
1996	90.99	226.11	50.63	25.98	62.86	14.96
1997	101.54	254.10	55.53	28.18	68.72	15.95
1998	112.74	283.19	60.69	31.60	77.36	17.63
1999	125.32	317.14	66.17	35.97	89.13	19.57
2000	138.21	348.57	72.62	39.83	98.75	21.46
2001	157.40	385.60	79.86	43.59	106.06	22.36
2002	177.18	420.16	87.68	49.11	116.38	24.33
2003	201.50	467.66	95.81	55.26	128.38	26.22
2004	224.40	504.48	105.00	60.18	136.71	27.55
2005	248.11	520.21	115.76	65.42	139.30	29.49
2006	275.50	577.91	128.90	71.74	152.91	32.39
2007	300.08	608.11	142.65	74.07	152.95	33.72
2008	327.81	645.32	157.16	74.78	150.29	34.17
2009	356.24	680.71	173.92	80.23	157.12	37.01
2010	378.41	703.61	191.92	81.76	155.56	39.42
2011	407.40	734.39	208.23	83.31	153.61	40.46
2012	431.74	754.39	223.70	85.64	153.05	42.16

Figure GS-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
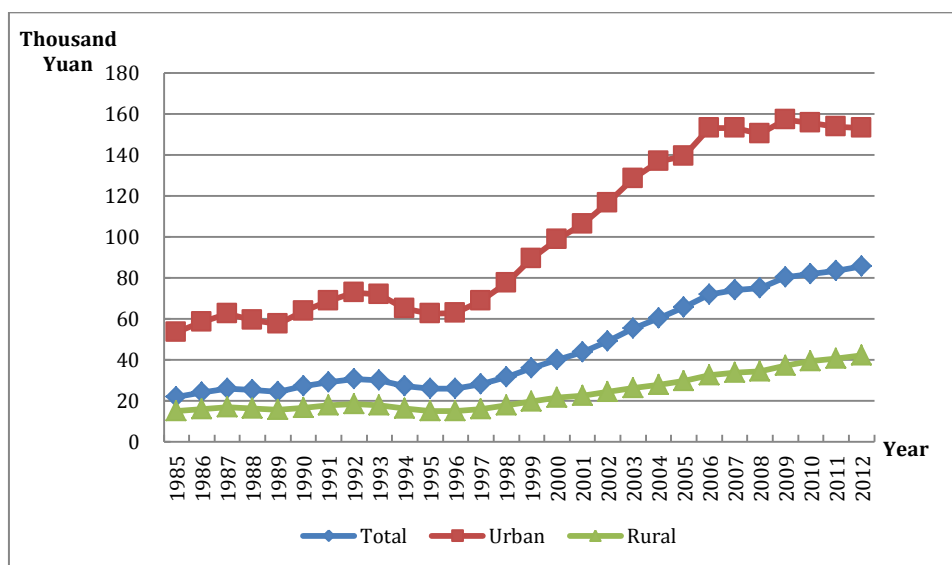
Figure GS-2.2 Real Human Capital Per Capita by Region for Gansu，1985-2012

35.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

35.3.1 Total labor force human capital

The total labor force human capital for Gansu is reported in Table GS-3.1 From 1985 to 2012, the nominal and real labor force human capital for Gansu show differential increases. Nominal labor force human capital increases 21.79 times, from 182 billion Yuan to 4,156 billion Yuan. Real labor force human capital increases almost 3.48 times, from 182 billion Yuan to 818 billion Yuan.

Table GS-3.1 Nominal and Real Labor Force Human Capital for Gansu

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	182		182	
1986	220		206	
1987	267		234	
1988	326		241	
1989	394		247	
1990	467		283	
1991	550		317	
1992	624		337	
1993	709		331	
1994	800		301	
1995	905		285	
1996	987		282	
1997	1084		301	
1998	1191		335	
1999	1310		376	
2000	1450	1438	418	415
2001	1568	1550	435	430
2002	1696	1684	470	467
2003	1836	1831	503	502
2004	2017	2019	540	540
2005	2331	2334	613	614
2006	2472	2475	641	642
2007	2660	2664	653	654
2008	2885	2892	654	656
2009	3189	3199	713	716
2010	3616	3630	777	780

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	3887	3903	789	793
2012	4156	4168	818	821

35.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables GS-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Gansu show differential increases. Nominal average labor force human capital increases more than 15.18 times, from 17,070 Yuan to 276,140 Yuan. Real average labor force human capital increases more than 2.18 times, from 17,070 Yuan to 54,320 Yuan.

Table GS-3.2 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	17.07	37.74	12.28	17.07	37.74	12.28
1986	20.00	44.88	13.82	18.79	41.95	13.03
1987	23.53	53.28	15.58	20.58	45.94	13.80
1988	27.24	61.06	17.68	20.15	43.65	13.50
1989	31.35	69.83	19.97	19.65	42.23	12.97
1990	36.35	80.15	22.34	22.03	47.57	13.86
1991	40.82	90.51	25.04	23.53	50.83	14.86

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
1992	45.49	101.09	27.68	24.53	52.90	15.44
1993	50.85	113.36	30.67	23.74	51.50	14.78
1994	56.74	126.52	33.88	21.34	46.13	13.22
1995	63.37	140.76	37.44	19.93	43.16	12.14
1996	69.21	154.57	40.87	19.78	42.97	12.08
1997	75.78	170.23	44.67	21.05	46.03	12.83
1998	83.23	187.53	48.70	23.37	51.23	14.14
1999	91.15	205.67	52.74	26.20	57.80	15.60
2000	99.54	223.79	57.37	28.72	63.40	16.95
2001	108.85	239.70	62.32	30.17	65.93	17.45
2002	117.63	254.89	67.51	32.61	70.60	18.74
2003	127.16	269.66	73.03	34.86	74.02	19.99
2004	139.47	289.13	78.61	37.31	78.35	20.63
2005	159.54	313.47	84.74	41.98	83.94	21.59
2006	170.81	332.52	95.93	44.31	87.98	24.10
2007	185.21	350.96	107.60	45.46	88.28	25.43
2008	201.62	371.26	119.87	45.71	86.46	26.07
2009	222.25	398.62	133.84	49.68	92.01	28.48
2010	244.68	429.24	148.51	52.56	94.90	30.50
2011	261.65	446.99	164.13	53.12	93.49	31.89
2012	276.14	458.30	179.74	54.32	92.98	33.87

Chapter 36　　Human Capital for Qinghai

36.1 Total human capital

Table QH-1.1 presents the results of nominal and real total human capital and real physical capital for Qinghai. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Qinghai.

Table QH-1.1 Real physical capital, Nominal and Real Human Capital for Qinghai

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	96		96		11
1986	111		105		12
1987	129		115		13
1988	151		114		14
1989	175		112		15
1990	203		122		16
1991	236		133		17
1992	273		142		19
1993	315		146		23
1994	360		136		26
1995	410		131		30
1996	457		133		35
1997	511		141		41
1998	569		156		48
1999	631		174		56

| Year | Nominal Human Capital (Billions of Yuan) | | Real Human Capital (Billions of 1985 Yuan) | | Real physical capital (Billions of 1985 Yuan) |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	708	710	195	196	65
2001	801	804	216	216	78
2002	904	908	237	238	93
2003	1012	1018	260	261	109
2004	1121	1128	279	280	127
2005	1243	1251	306	308	146
2006	1402	1411	340	342	167
2007	1574	1585	357	360	190
2008	1753	1766	362	364	217
2009	1946	1960	391	393	254
2010	2147	2164	409	412	302
2011	2360	2378	423	426	364
2012	2584	2603	450	453	447

36.2 Human capital per capita

To obtain 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. Table QH-2.1 presents human capital per capita for Qinghai by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 19.54 times from 24,820 Yuan to 509,800 Yuan. Real human capital per capita increases 2.57 times from 24,820 Yuan to 88,690 Yuan.

Figure QH-2.1 illustrates the trends of human capital per capita by gender for Qinghai. The real human capital per capita of male is similar to that of female for Qinghai. Both of them kept increasing from 1985 to 2012,

322

and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
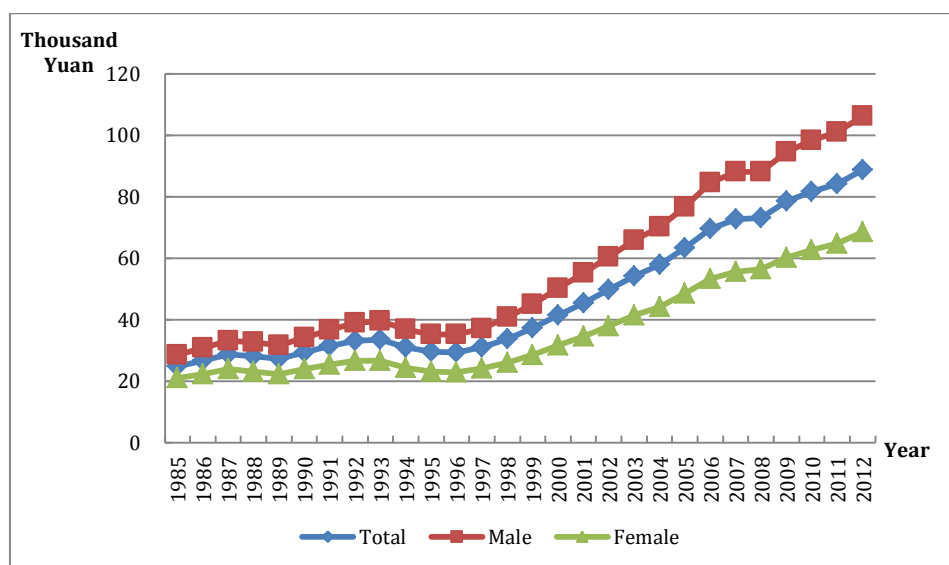
Figure QH-2.1 Human Capital Per Capita by Gender for Qinghai，1985-2012

Table QH-2.1 Nominal and Real Human Capital Per Capita by Region for Qinghai

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	24.82	49.82	16.85	24.82	49.82	16.85
1986	28.31	57.70	18.68	26.70	54.23	17.67
1987	32.34	66.75	20.77	28.62	58.20	18.67
1988	37.18	77.49	23.30	28.00	56.97	18.04
1989	42.40	88.81	26.09	27.14	55.65	17.12
1990	48.46	102.25	29.22	29.24	61.20	17.81
1991	55.59	116.79	32.62	31.30	64.31	18.90
1992	63.42	132.32	36.28	33.10	67.09	19.72
1993	72.32	149.73	40.50	33.52	66.60	19.92

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1994	81.60	166.94	45.08	30.94	60.27	18.37
1995	91.83	185.86	50.01	29.45	56.06	17.62
1996	101.14	202.24	54.59	29.37	54.75	17.67
1997	111.71	221.04	59.67	30.92	56.94	18.54
1998	123.13	241.43	65.01	33.78	61.82	20.00
1999	135.20	262.65	70.64	37.22	67.59	21.82
2000	150.03	289.99	77.09	41.41	74.93	23.95
2001	168.63	324.23	84.95	45.41	81.34	26.08
2002	189.18	362.27	93.29	49.64	89.01	27.84
2003	210.78	400.53	102.64	54.14	96.67	29.88
2004	232.47	436.64	112.91	57.77	103.22	31.16
2005	256.55	475.63	124.80	63.19	112.77	33.40
2006	287.19	519.21	138.41	69.58	120.93	36.64
2007	320.22	565.15	153.31	72.71	123.83	37.82
2008	354.33	610.71	169.21	73.10	122.88	37.17
2009	390.86	658.31	187.47	78.44	128.35	40.50
2010	428.57	704.93	207.41	81.66	130.77	42.35
2011	468.68	753.77	226.24	84.07	131.91	43.41
2012	509.80	804.44	246.08	88.69	136.64	45.80

Figure QH-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.
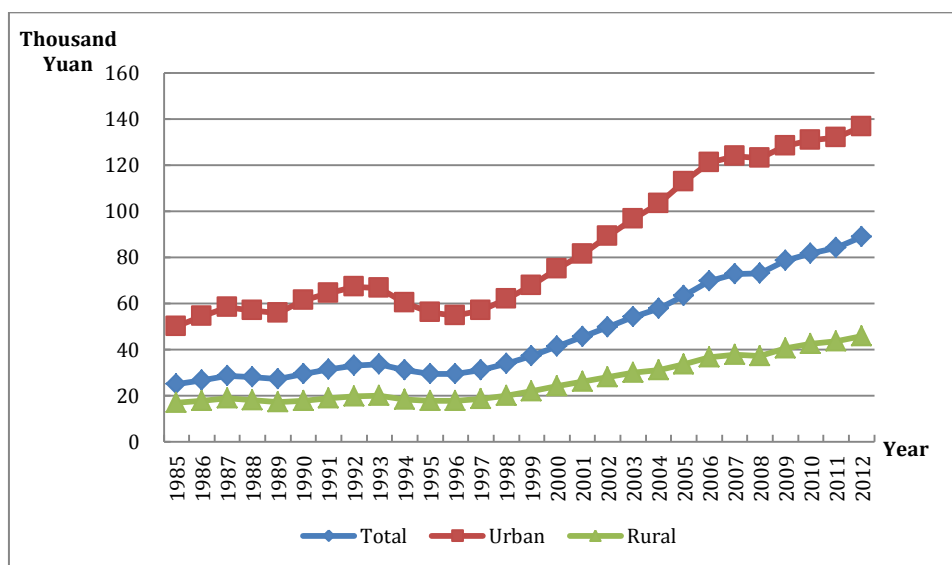
Figure QH-2.2 Real Human Capital Per Capita by Region for Qinghai，1985-2012

36.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

36.3.1 Total labor force human capital

The total labor force human capital for Qinghai is reported in Table QH-3.1 From 1985 to 2012, the nominal and real labor force human capital for Qinghai show differential increases. Nominal labor force human capital increases 30.93 times, from 37 billion Yuan to 1,189 billion Yuan. Real labor force human capital increases almost 4.59 times, from 37 billion Yuan to 208 billion Yuan.

Table QH-3.1 Nominal and Real Labor Force Human Capital for Qinghai

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	37		37	
1986	43		40	
1987	51		45	
1988	63		48	
1989	78		50	
1990	95		58	
1991	112		63	
1992	129		67	
1993	150		70	
1994	172		65	
1995	198		64	
1996	225		66	
1997	254		71	
1998	286		79	
1999	318		88	
2000	351	348	98	97
2001	385	383	105	104
2002	423	422	112	112
2003	465	465	121	121
2004	512	515	128	129
2005	560	563	139	140
2006	628	632	153	154
2007	709	714	162	163
2008	800	806	166	167
2009	906	913	183	184
2010	1022	1032	196	197

| Year | Nominal Labor Force Human Capital (Billions of Yuan) | | Real Labor Force Human Capital (Billions of 1985 Yuan) | |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	1095	1106	198	199
2012	1189	1200	208	210

36.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables QH-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Qinghai show differential increases. Nominal average labor force human capital increases more than 17.75 times, from 18,830 Yuan to 353,080 Yuan. Real average labor force human capital increases more than 2.28 times, from 18,830 Yuan to 61,770 Yuan.

Table QH-3.2 Nominal and Real Average Labor Force Human Capital by Region for Qinghai

| 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	18.83	34.03	13.95	18.83	34.03	13.95
1986	21.33	39.20	15.43	20.11	36.84	14.60
1987	24.55	45.75	17.15	21.75	39.89	15.42
1988	28.74	54.25	19.65	21.69	39.88	15.21
1989	33.39	63.70	22.36	21.40	39.92	14.67
1990	38.85	74.97	25.44	23.46	44.88	15.51
1991	44.18	85.20	28.48	24.92	46.91	16.50

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**
1992	49.76	95.91	31.76	26.07	48.63	17.27
1993	56.47	108.75	35.49	26.31	48.37	17.45
1994	63.46	121.50	39.40	24.21	43.87	16.06
1995	71.55	136.21	43.68	23.13	41.08	15.39
1996	79.41	150.44	47.57	23.24	40.73	15.40
1997	88.05	165.50	51.82	24.56	42.63	16.10
1998	97.03	180.56	56.35	26.80	46.24	17.33
1999	106.00	195.04	60.85	29.36	50.20	18.79
2000	115.59	210.37	65.80	32.13	54.36	20.44
2001	126.52	229.72	71.83	34.38	57.63	22.06
2002	137.73	248.81	78.39	36.53	61.13	23.39
2003	149.80	268.78	85.59	38.92	64.87	24.92
2004	163.23	289.77	93.09	40.95	68.50	25.69
2005	177.85	311.70	101.37	44.13	73.91	27.13
2006	197.68	339.16	113.03	48.29	78.99	29.92
2007	220.28	371.04	125.60	50.40	81.30	30.99
2008	244.73	403.45	138.97	50.80	81.17	30.53
2009	273.37	441.92	154.02	55.19	86.16	33.27
2010	304.27	480.75	169.77	58.24	89.18	34.66
2011	327.86	507.99	185.32	59.13	88.90	35.56
2012	353.08	537.55	201.19	61.77	91.30	37.44

Chapter 37   Human Capital for Ningxia

37.1 Total human capital

Table NX-1.1 presents the results of nominal and real total human capital and real physical capital for Ningxia. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Ningxia.

Table NX-1.1 Real physical capital, Nominal and Real Human Capital for Ningxia

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	134		134		11
1986	154		145		12
1987	184		162		13
1988	213		160		14
1989	253		163		14
1990	305		183		15
1991	351		198		16
1992	402		210		17
1993	462		210		18
1994	527		194		19
1995	612		193		20
1996	692		204		21
1997	796		225		22
1998	895		253		23
1999	1010		289		25

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
2000	1148	1158	330	332	28
2001	1335	1350	376	380	31
2002	1541	1558	436	441	35
2003	1796	1824	499	506	40
2004	2015	2046	539	548	47
2005	2208	2238	583	590	55
2006	2594	2643	670	682	64
2007	2851	2893	700	709	75
2008	3122	3161	706	715	91
2009	3478	3529	782	793	110
2010	3832	3886	829	840	133
2011	4247	4304	865	876	155
2012	4626	4684	922	934	181

37.2 Human capital per capita

To obtain 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. Table NX-2.1 presents human capital per capita for Ningxia by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 21.63 times from 35,960 Yuan to 813,670 Yuan. Real human capital per capita increases 3.51 times from 35,960 Yuan to 162,230 Yuan.

Figure NX-2.1 illustrates the trends of human capital per capita by gender for Ningxia. The real human capital per capita of male is similar to

that of female for Ningxia. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
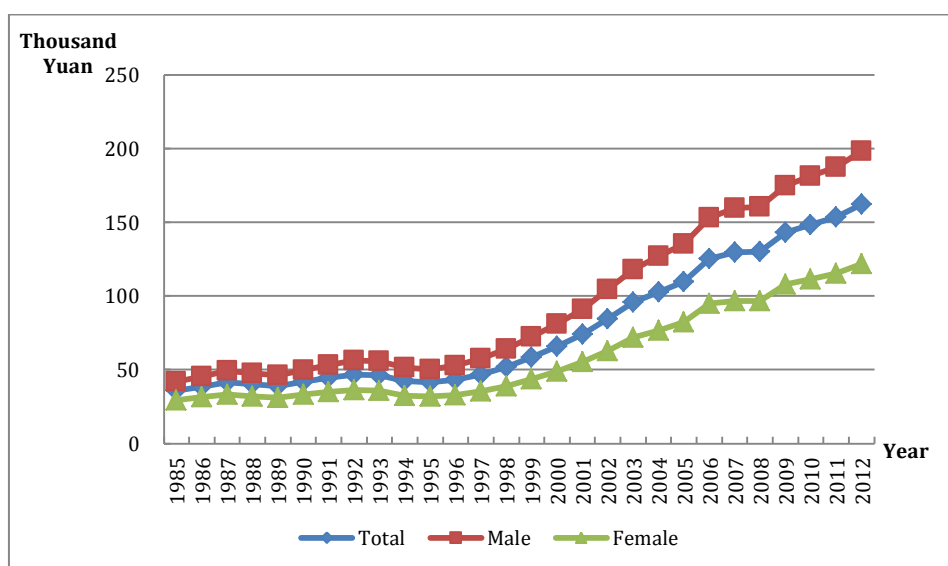
Figure NX-2.1 Human Capital Per Capita by Gender for Ningxia，1985-2012

Table NX-2.1 Nominal and Real Human Capital Per Capita by Region for Ningxia

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	35.96	70.97	23.96	35.96	70.97	23.96
1986	40.80	83.28	26.80	38.65	78.57	25.50
1987	47.13	95.32	30.17	41.46	81.83	27.26
1988	53.20	112.50	33.58	40.10	82.05	26.23
1989	60.63	129.44	37.23	38.93	81.24	24.54
1990	69.73	149.99	41.55	41.79	89.23	25.12
1991	79.01	169.49	46.30	44.57	94.32	26.58

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1992	89.41	191.39	51.49	46.66	97.45	27.76
1993	101.41	216.07	57.63	46.15	95.50	27.30
1994	114.48	242.86	64.24	42.19	86.01	25.03
1995	131.45	281.52	71.46	41.37	85.00	23.92
1996	146.24	310.21	77.91	43.06	87.86	24.40
1997	165.65	351.86	85.03	46.92	95.92	25.72
1998	183.68	386.32	92.68	52.03	105.31	28.09
1999	204.52	426.72	100.99	58.60	117.38	31.21
2000	228.61	473.81	110.69	65.67	130.73	34.38
2001	262.35	531.70	122.04	73.97	144.81	37.08
2002	299.15	593.00	134.54	84.65	162.32	41.13
2003	344.74	673.78	147.39	95.73	181.71	44.18
2004	383.64	727.22	163.32	102.70	189.86	46.84
2005	416.17	765.14	179.18	109.78	196.61	50.78
2006	483.97	878.39	197.14	125.08	221.95	54.60
2007	528.17	926.49	217.66	129.58	222.74	56.92
2008	574.83	979.52	238.58	130.06	218.26	56.79
2009	637.12	1062.53	262.52	143.18	235.94	61.55
2010	686.32	1116.99	290.13	148.42	239.08	65.01
2011	753.30	1203.43	314.06	153.37	243.46	65.46
2012	813.67	1272.65	341.41	162.23	251.92	69.97

Figure NX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

332
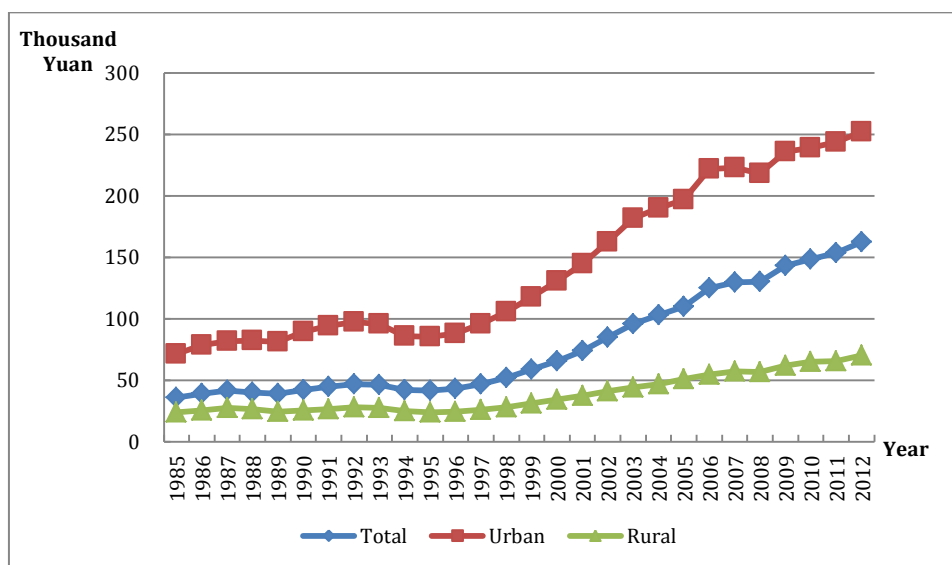
Figure NX-2.2 Real Human Capital Per Capita by Region for Ningxia，1985-2012

37.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

37.3.1 Total labor force human capital

The total labor force human capital for Ningxia is reported in Table NX-3.1 From 1985 to 2012, the nominal and real labor force human capital for Ningxia show differential increases. Nominal labor force human capital increases 35.45 times, from 47 billion Yuan to 1,718 billion Yuan. Real labor force human capital increases almost 6.29 times, from 47 billion Yuan to 344 billion Yuan.

Table NX-3.1 Nominal and Real Labor Force Human Capital for Ningxia

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	47		47	
1986	54		51	
1987	68		59	
1988	80		61	
1989	100		64	
1990	126		76	
1991	148		83	
1992	171		89	
1993	197		90	
1994	226		83	
1995	259		82	
1996	296		87	
1997	339		96	
1998	388		110	
1999	442		127	
2000	497	491	143	142
2001	546	542	155	153
2002	602	600	171	171
2003	667	667	186	186
2004	736	740	198	199
2005	821	826	218	219
2006	907	913	236	238
2007	1003	1010	248	250
2008	1125	1134	256	258
2009	1282	1292	289	292
2010	1488	1499	323	325

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	1597	1611	326	329
2012	1718	1733	344	346

37.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables NX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Ningxia show differential increases. Nominal average labor force human capital increases more than 17.97 times, from 24,950 Yuan to 464,120 Yuan. Real average labor force human capital increases more than 2.72 times, from 24,950 Yuan to 92,820 Yuan.

Table NX-3.2 Nominal and Real Average Labor Force Human Capital by Region for Ningxia

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	24.95	42.13	18.03	24.95	42.13	18.03
1986	28.32	49.21	20.37	26.84	46.43	19.38
1987	33.52	58.21	23.09	29.51	49.97	20.87
1988	38.04	68.91	25.86	28.69	50.26	20.19
1989	44.09	81.34	28.87	28.31	51.06	19.03
1990	51.67	96.38	32.29	30.96	57.34	19.53
1991	58.30	108.65	36.14	32.89	60.47	20.75

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
1992	65.17	121.23	40.31	34.02	61.72	21.73
1993	73.14	135.85	45.00	33.32	60.04	21.32
1994	82.06	152.09	49.98	30.27	53.87	19.47
1995	91.94	169.89	55.52	29.00	51.29	18.58
1996	102.19	189.83	60.74	30.18	53.77	19.02
1997	114.01	216.92	66.48	32.42	59.13	20.11
1998	127.43	245.34	72.66	36.22	66.88	22.02
1999	141.45	273.72	78.65	40.67	75.29	24.30
2000	155.51	285.51	85.19	44.83	78.77	26.46
2001	171.07	306.72	92.88	48.45	83.54	28.23
2002	187.31	329.27	101.08	53.28	90.13	30.90
2003	204.39	351.18	110.30	57.13	94.71	33.06
2004	222.52	374.27	120.43	59.95	97.71	34.54
2005	243.08	398.96	132.06	64.50	102.52	37.43
2006	266.74	429.03	147.82	69.49	108.40	40.94
2007	292.43	462.34	164.26	72.29	111.15	42.96
2008	322.30	502.04	181.23	73.35	111.86	43.13
2009	360.06	552.12	200.39	81.31	122.60	46.98
2010	401.51	606.51	220.36	87.08	129.82	49.37
2011	433.60	648.89	240.89	88.50	131.27	50.21
2012	464.12	683.04	261.29	92.82	135.21	53.55

Chapter 38   Human Capital for Xinjiang

38.1 Total human capital

Table XJ-1.1 presents the results of nominal and real total human capital and real physical capital for Xinjiang. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively. Column 5 is the real physical capital of Xinjiang.

Table XJ-1.1 Real physical capital, Nominal and Real Human Capital for Xinjiang

| Year | Nominal Human Capital (Billions of Yuan) | | Real Human Capital (Billions of 1985 Yuan) | | Real physical capital (Billions of 1985 Yuan) |
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1985	414		414		26
1986	496		462		29
1987	590		513		32
1988	690		523		35
1989	804		525		38
1990	942		585		43
1991	1094		624		48
1992	1275		669		55
1993	1489		694		64
1994	1727		633		75
1995	1976		604		86
1996	2241		620		95
1997	2530		675		103
1998	2835		754		114

Year	Nominal Human Capital (Billions of Yuan)		Real Human Capital (Billions of 1985 Yuan)		Real physical capital (Billions of 1985 Yuan)
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)	(5)
1999	3151		860		124
2000	3513	3560	966	978	136
2001	4145	4226	1094	1115	149
2002	4584	4672	1216	1238	165
2003	5143	5250	1358	1385	186
2004	5687	5803	1461	1490	209
2005	6147	6249	1567	1593	233
2006	6935	7055	1745	1775	260
2007	7719	7840	1845	1873	293
2008	8531	8661	1889	1918	330
2009	9339	9480	2056	2087	365
2010	10074	10217	2129	2160	416
2011	11007	11164	2199	2230	474
2012	11843	12002	2282	2314	560

38.2 Human capital per capita

To obtain 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. Table XJ-2.1 presents human capital per capita for Xinjiang by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 17.16 times from 32,670 Yuan to 593,260 Yuan. Real human capital per capita increases 2.5 times from 32,670 Yuan to 114,290 Yuan.

Figure XJ-2.1 illustrates the trends of human capital per capita by gender for Xinjiang. The real human capital per capita of male is similar to

338

that of female for Xinjiang. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
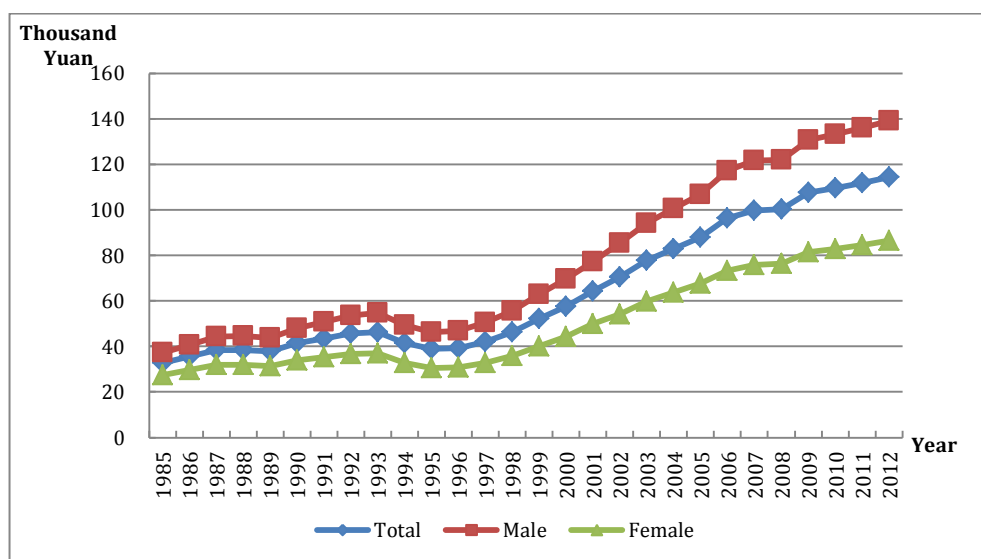
Figure XJ-2.1 Human Capital Per Capita by Gender for Xinjiang, 1985-2012

Table XJ-2.1 Nominal and Real Human Capital Per Capita by Region for Xinjiang

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	32.67	61.33	20.47	32.67	61.33	20.47
1986	38.13	72.83	22.96	35.54	67.69	21.49
1987	44.15	85.10	25.82	38.44	72.63	23.13
1988	50.80	98.32	28.86	38.50	71.72	23.17
1989	58.05	112.99	32.12	37.89	71.98	21.80
1990	66.70	130.74	35.93	41.43	79.70	23.03
1991	76.15	150.57	40.02	43.45	83.98	23.77
1992	86.88	173.73	44.58	45.59	88.65	24.61

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1993	99.53	201.08	49.85	46.35	90.32	24.83
1994	113.22	230.49	55.63	41.49	81.08	22.06
1995	127.20	260.05	61.75	38.90	77.26	19.99
1996	141.92	292.67	67.36	39.25	78.76	19.72
1997	157.68	327.86	73.20	42.06	85.25	20.63
1998	173.93	364.28	79.26	46.29	94.81	22.15
1999	190.60	400.69	85.55	52.05	106.74	24.70
2000	209.36	441.47	92.82	57.55	117.49	27.46
2001	243.53	517.96	101.68	64.27	132.54	28.98
2002	265.83	556.07	111.61	70.51	143.88	31.53
2003	294.57	611.21	122.36	77.78	157.36	34.50
2004	322.28	660.80	134.38	82.82	166.62	36.25
2005	344.85	694.46	147.31	87.93	174.07	39.27
2006	382.26	748.39	161.60	96.19	185.73	42.24
2007	417.35	796.35	176.54	99.74	188.94	43.04
2008	453.03	843.52	192.25	100.33	186.51	42.81
2009	488.24	886.86	210.41	107.48	195.79	45.93
2010	518.58	917.08	229.20	109.61	195.42	47.29
2011	559.06	967.47	246.69	111.67	195.41	47.66
2012	593.26	1004.59	265.20	114.29	196.29	48.94

Figure XJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2012, the real human capital per capita in urban area remains larger than that in rural area. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in urban area than in rural area. Therefore the gap between urban and rural expanded rapidly.

340
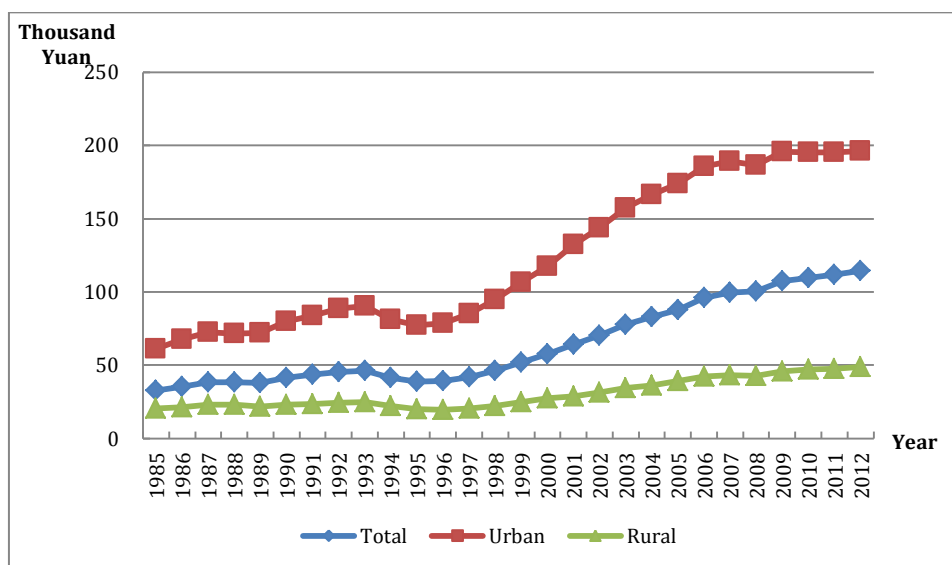
Figure XJ-2.2 Real Human Capital Per Capita by Region for Xinjiang, 1985-2012

38.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

38.3.1 Total labor force human capital

The total labor force human capital for Xinjiang is reported in Table XJ-3.1 From 1985 to 2012, the nominal and real labor force human capital for Xinjiang show differential increases. Nominal labor force human capital increases 30.8 times, from 154 billion Yuan to 4,904 billion Yuan. Real labor force human capital increases almost 5.09 times, from 154 billion Yuan to 939 billion Yuan.

Table XJ-3.1 Nominal and Real Labor Force Human Capital for Xinjiang

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	154		154	
1986	187		175	
1987	232		202	
1988	285		216	
1989	351		229	
1990	432		268	
1991	512		292	
1992	595		312	
1993	694		324	
1994	799		293	
1995	910		279	
1996	1026		284	
1997	1147		307	
1998	1292		345	
1999	1439		394	
2000	1611	1588	445	438
2001	1761	1745	468	464
2002	1924	1916	514	511
2003	2117	2118	563	563
2004	2326	2342	601	605
2005	2581	2596	662	665
2006	2872	2895	727	732
2007	3191	3215	764	770
2008	3546	3574	786	792
2009	3976	4007	874	881
2010	4462	4498	941	948

Year	Nominal Labor Force Human Capital (Billions of Yuan)		Real Labor Force Human Capital (Billions of 1985 Yuan)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2011	4705	4748	936	945
2012	4904	4946	939	948

38.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. Tables XJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2012, the nominal and real average labor force human capital for Xinjiang show differential increases. Nominal average labor force human capital increases more than 14.18 times, from 23,870 Yuan to 362,360 Yuan. Real average labor force human capital increases more than 1.91 times, from 23,870 Yuan to 69,410 Yuan.

Table XJ-3.2 Nominal and Real Average Labor Force Human Capital by Region for Xinjiang

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	23.87	38.35	16.71	23.87	38.35	16.71
1986	28.11	46.49	18.75	26.21	43.20	17.56
1987	33.58	56.47	21.31	29.25	48.19	19.09
1988	39.23	66.34	23.95	29.73	48.39	19.23
1989	45.72	78.10	26.83	29.84	49.75	18.21
1990	53.83	92.26	30.32	33.40	56.25	19.43
1991	61.26	106.31	33.91	34.92	59.29	20.14

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
1992	68.87	121.05	37.76	36.13	61.77	20.84
1993	77.93	139.00	42.10	36.30	62.44	20.98
1994	87.22	157.09	46.76	32.01	55.26	18.55
1995	97.21	176.25	51.94	29.76	52.36	16.82
1996	106.67	195.53	56.47	29.57	52.62	16.53
1997	116.94	216.21	61.32	31.26	56.22	17.28
1998	127.91	237.44	66.60	34.11	61.80	18.62
1999	138.89	258.25	71.90	38.03	68.80	20.76
2000	150.81	281.11	77.71	41.62	74.81	22.99
2001	162.29	301.37	85.21	43.13	77.12	24.29
2002	174.64	322.83	93.03	46.61	83.53	26.28
2003	187.73	343.77	102.02	49.94	88.50	28.76
2004	201.71	364.91	111.88	52.13	92.01	30.19
2005	218.86	387.57	123.36	56.11	97.15	32.89
2006	237.92	412.39	135.86	60.19	102.34	35.51
2007	257.82	440.15	148.76	61.76	104.43	36.27
2008	279.28	467.51	162.02	61.90	103.37	36.08
2009	304.69	499.44	176.54	67.00	110.26	38.54
2010	333.60	533.37	191.43	70.33	113.66	39.50
2011	350.71	550.95	205.92	69.79	111.28	39.78
2012	362.36	555.24	220.11	69.41	108.49	40.62

Chapter 39　　Human Capital for Hong Kong

39.1 Total human capital

Table HK-1.1 presents the results of nominal and real total human capital and real physical capital for Hongkong. Columns 1 is nominal human capital in five-education category. Columns 3 is real human capital in five-education category.

Table HK-1.1 Real physical capital, Nominal and Real Human Capital for Hong Kong

Year	Nominal Human Capital (Billions of HKD)		Real Human Capital (Billions of 1985 HKD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	4181		4181	
1986	4678		4520	
1987	5012		4588	
1988	5431		4603	
1989	5805		4465	
1990	6299		4397	
1991	6934		4347	
1992	7390		4229	
1993	8143		4286	
1994	8928		4318	
1995	9714		4308	
1996	10860		4528	
1997	11680		4602	
1998	12410		4756	
1999	13430		5359	
2000	14760		6116	

Year	Nominal Human Capital (Billions of HKD)		Real Human Capital (Billions of 1985 HKD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2001	16160		6813	
2002	16740		7279	
2003	17790		7932	
2004	19250		8623	
2005	19800		8791	
2006	21230		9230	
2007	22350		9533	
2008	23580		9644	
2009	24770		10070	
2010	26270		10440	
2011	28770		10860	
2012	31100		11280	

39.2 Human capital per capita

To obtain 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. The data of Hong Kong presents human capital per capita for Hongkong by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 4.93 times from 873,930 HKD to 5185,960 HKD. Real human capital per capita increases 1.15 times from 873,930 HKD to 1,880,950 HKD.

Figure HK-2.1 illustrates the trends of human capital per capita by gender for Hongkong. The real human capital per capita of male is similar to

that of female for Hongkong. Both of them kept increasing from 1985 to 2012, and the growths of human capital for male and female both accelerated, with male's growth rate significantly higher than female's. As a result the gender gap has been expanding, especially from 1997.
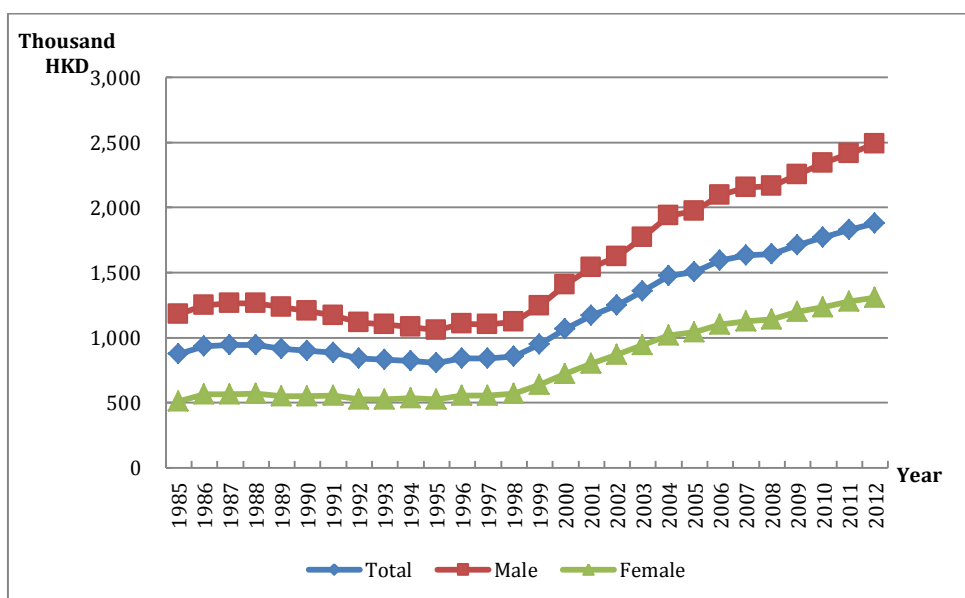
Figure HK-2.1 Human Capital Per Capita by Gender for Hong Kong, 1985-2012

39.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

39.3.1 Total labor force human capital

The total labor force human capital for Hongkong is reported in Table HK-3.1 From 1985 to 2012, the nominal and real labor force human capital for Hongkong show differential increases. Nominal labor force human

capital increases 12.02 times, from 2,070 billion HKD to 26,950 billion HKD. Real labor force human capital increases almost 3.72 times, from 2,070 billion HKD to 9,775 billion HKD.

Table HK-3.1 Nominal and Real Labor Force Human Capital for Hong Kong

Year	Nominal Labor Force Human Capital (Billions of HKD)		Real Labor Force Human Capital (Billions of 1985 HKD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	2070		2070	
1986	2313		2235	
1987	2564		2347	
1988	2837		2405	
1989	3097		2382	
1990	3437		2399	
1991	3789		2376	
1992	4165		2383	
1993	4647		2446	
1994	5178		2504	
1995	5640		2501	
1996	6219		2594	
1997	6849		2699	
1998	7507		2876	
1999	8296		3312	
2000	9314		3861	
2001	10350		4363	
2002	10850		4717	
2003	11570		5158	
2004	12700		5687	
2005	13750		6107	
2006	14950		6499	

Year	Nominal Labor Force Human Capital (Billions of HKD)		Real Labor Force Human Capital (Billions of 1985 HKD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2007	16090		6860	
2008	17790		7277	
2009	19180		7795	
2010	20880		8295	
2011	24020		9064	
2012	26950		9775	

39.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. From 1985 to 2012, the nominal average labor force human capital increases more than 6.64 times, from 701,520 HKD to 5,360,770 HKD. Real average labor force human capital increases more than 1.77 times, from 701,520 HKD to 1,944,400 HKD.

Chapter 40   Human Capital for Taiwan

40.1 Total human capital

Table TW-1.1 presents the results of nominal and real total human capital and real physical capital for Taiwan. Columns 1 and 2 are nominal human capital in five- and six- education categories respectively. Columns 3 and 4 are real human capital in five- and six- education categories respectively.

Table TW-1.1 Real physical capital, Nominal and Real Human Capital for Taiwan

Year	Nominal Human Capital (Billions of NTD)		Real Human Capital (Billions of 1985 NTD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	55930		55930	
1986	57510		57110	
1987	62390		61640	
1988	73220		71420	
1989	84860		79280	
1990	96950		86980	
1991	109900		95140	
1992	123300		102200	
1993	134100		107900	
1994	144000		111300	
1995	156700		116900	
1996	165300		119700	
1997	172000		123400	
1998	175900		124100	
1999	184200		129700	

Year	Nominal Human Capital (Billions of NTD)		Real Human Capital (Billions of 1985 NTD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2000	185300	188000	128900	130700
2001	181300	182900	126100	127200
2002	176600	178100	123100	124100
2003	180700	177900	126300	124300
2004	181600	180100	124900	123900
2005	181500	183000	122100	123000
2006	178200	181400	119100	121200
2007	177900	183100	116800	120200
2008	177100	183600	112300	116400
2009	172800	181300	110500	116000
2010	172600	180900	109400	114600
2011	173500	180800	108400	113000
2012	172300	180100	105600	110400

40.2 Human capital per capita

To obtain 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. The data of Taiwan presents human capital per capita for Taiwan by region. From 1985 to 2012, nominal and real human capital per capita show differential increases. Nominal human capital per capita increases 1.81 times from 3,153,910 NTD to 8,867,710 NTD. Real human capital per capita increases 0.72 times from 3,153,910 NTD to 5,434,510 NTD.

Figure TW-2.1 illustrates the trends of human capital per capita by gender for Taiwan. The trend of real human capital per capita for male is

similar to that for female in Taiwan. Both of them kept increasing from 1985 to 2000, and the growths of human capital for male and female both accelerated. But from 2000 to 2012, the real human capital per capita of male and female tend to be flat or even declining.
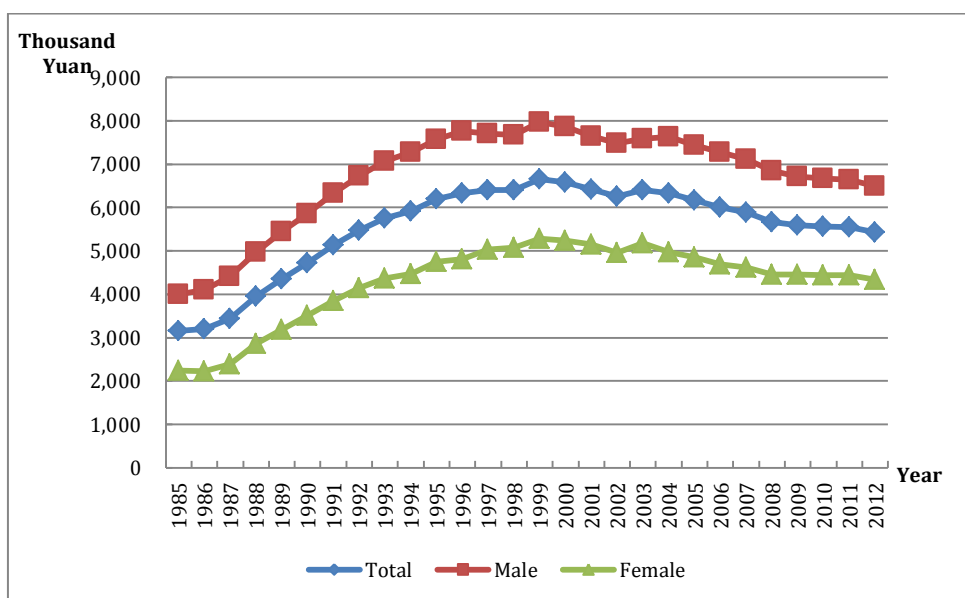
Figure TW-2.1 Human Capital Per Capita by Gender for Taiwan, 1985-2012

40.3 Labor force human capital

We also use the J-F method to estimate the labor force human capital. The labor force refers to the population that is over 16 years old, non-retired and out of school.

40.3.1 Total labor force human capital

The total labor force human capital for Taiwan is reported in Table TW-3.1 From 1985 to 2012, the nominal and real labor force human capital

for Taiwan show differential increases. Nominal labor force human capital increases 2.49 times, from 30,240 billion NTD to 105,500 billion NTD. Real labor force human capital increases almost 1.14 times, from 30,240 billion NTD to 64,640 billion NTD.

Table TW-3.1 Nominal and Real Labor Force Human Capital for Taiwan

Year	Nominal Labor Force Human Capital (Billions of NTD)		Real Labor Force Human Capital (Billions of 1985 NTD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
1985	30240		30240	
1986	31120		30910	
1987	33850		33440	
1988	39690		38720	
1989	47710		44570	
1990	53460		47960	
1991	60680		52540	
1992	68230		56550	
1993	75220		60560	
1994	80560		62310	
1995	87230		65080	
1996	91500		66230	
1997	96950		69540	
1998	99160		69950	
1999	104800		73770	
2000	106600	106600	74110	74150
2001	105500	105300	73340	73250
2002	103700	103800	72270	72320
2003	109600	108400	76630	75740
2004	111300	110700	76520	76170
2005	111500	112300	74990	75510

Year	Nominal Labor Force Human Capital (Billions of NTD)		Real Labor Force Human Capital (Billions of 1985 NTD)	
	5-education Category (1)	6-education Category (2)	5-education Category (3)	6-education Category (4)
2006	108500	110300	72500	73680
2007	108100	111100	70940	72920
2008	107200	111300	67980	70580
2009	104300	110000	66730	70360
2010	104400	110800	66140	70210
2011	105300	112000	65770	69960
2012	105500	113000	64640	69290

40.3.2 Average labor force human capital

The average labor force human capital is the ratio of the labor force human capital and the labor force population. From 1985 to 2012, the nominal average labor force human capital increases more than 1.69 times, from 2,822,880 NTD to 7,588,580 NTD. Real average labor force human capital increases more than 0.65 times, from 2,822,880 NTD to 4,649,540 NTD.

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:

Table1. 1 Data Sources of Normal Provinces

Data	Sources	Notes
National, urban and rural population aged 6 years and over, by age, sex and education level: 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*	

Data	Sources	Notes
National, urban and rural population aged 0-5 years, 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/renkoupucha /2000pucha /pucha.htm • 2005,http://www.stats.gov.cn/tjsj/ndsj/renkou/2005 /renkou.htm • 2010,*China 2010 Census and China Demographic Statistics Yearbook* 2012	We assume that the population aged 0-5 years 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	

Data	Sources	Notes
	• *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, only the mortality rate for 1986 is available. 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 China 1993-1996* edited by the Plan and Development Department of National Educational Committee	*Part of Educational Statistics Yearbook of China.* are downloaded from http://www.cnki.net/.

Data	Sources	Notes
	• *Educational Statistics yearbook of China 1997* edited by the Plan and Development Department of National Educational Ministry • *Educational Statistics yearbook of China.1998-2012* 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, grade of primary and junior school: 2003-2012	• *Educational Statistics yearbook of China.2003-2012*edited by the Plan and Development Department of National Educational Ministry	

Table HK.A.2.1 Data Sources of Hong Kong

Data	Sources	Notes
Population by age, sex and education level	• 1981, Hong Kong 1981 Population Census Main Tables • 1986, Hong Kong 1986 Population By-Census Main Tables • 1991, Hong Kong 1991 Population Census Main Tables • 1996,Hong Kong 1996 Population By-Census Main Tables	

Data	Sources	Notes
	• 2001, Hong Kong 2001 Population Census Thematic Report • 2006 Hong Kong 2006 Population By-Census Thematic Report • 2011,Hong Kong 2011 Population Census Thematic Report • 1985-2012 Census and Statistics Department of Hong Kong	
Total population	• 1980-2012,Hong Kong *Statistics Yearbook*	It is the resident population.
Enrollment by education level	• 1985-2012,Hong Kong Education Bureau	
Mortality rate by age and sex	• Hong Kong Mortality Table	
Birth by sex	• 1985-2012, Hong Kong *Statistics Yearbook*	
Employment rate by age, sex and education level	• 1985-2012, Hong Kong Census and Statistics Department	
Consumer Price Index (CPI)	• 1981-2012, Hong Kong *Statistics Yearbook*	
Enrollment rate	• Hong Kong Education Bureau	
Nominal GDP by industry	• Hong Kong *Statistics Yearbook*	
Real GDP Index by Industry	• Hong Kong *Statistics Yearbook*	
Employed population by Industry	• Hong Kong *Statistics Yearbook*	

Data	Sources	Notes
Average discount rate （based on the basic loan interest of Central Bank）	• Monetary Policy Bureau of PBC • http://www.pbc.gov.cn/publish/zhengce huobisi/631/2012/20120706181352694 274852/20120706181352694274852_.h tml	The data is not available for some years.
10-year treasury bond rate	• *China Financial Statistics Yearbook* • *China Financial Statistics Yearbook(English Version)*	The data is not available for 2009, 2005 and 1994.

Table TW.A.2.1 Data Sources of Taiwan

Data	Sources	Notes
Population age, sex and education level	• Department of Household Registration, M.O.I • Taiwan Population *Statistics Yearbook*	
Population aged 6 years and over, by age and sex gender	• Department of Household Registration, M.O.I	
Total Population	• Directorate-General of Budget, Accounting and Statistics, Executive Yuan	
Enrollment by education level	• Not available.	
Mortality rate by age and sex	• Department of Household Registration, M.O.I	Data is based on date of occurrence
Birth by sex	• Department of Household Registration, M.O.I	Data is based on the date of occurrence, which is before the end of May in the

Data	Sources	Notes
		following year.
Employment rate by age, sex and education level	• Directorate-General of Budget, Accounting and Statistics, Executive Yuan: Human Capital Survey	Before 1999 (included), "College" includes graduates
Consumer Price Index (CPI)	• Directorate-General of Budget, Accounting and Statistics, Executive Yuan	
Enrollment rate	• Taiwan Education Bureau	From 1988, Taiwan started to record enrollment rate of graduates from middle level professional school, so the table includes data from 1988.
Nominal GDP by industry	• Directorate-General of Budget, Accounting and Statistics, Executive Yuan	
Real GDP by industry	• Directorate-General of Budget, Accounting and Statistics, Executive Yuan	
Employed population by industry	• Directorate-General of Budget, Accounting and Statistics, Executive Yuan: Human Capital Survey	Before 1998, based on " Standard industrial Classification (the sixth edition)"; In 1999-2000, based on "standard industrial classification (the seventh edition)"; In 2001-2011, based on "Standard

Data	Sources	Notes
		industrial Classification (the eighth edition)"; In 2012, based on "Standard industrial Classification (the ninth edition)".

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.[1] 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.

---

[1] See Zhang, Weimin and Hongyan Cui (2003),"The estimation accuracy of China Census 2000", *Population Research*, Vol.27, No.4 (July), pp.25-35.

2.1.2 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.

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 2012, 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 proportions 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 2012, the new enrollments of vocational high school are not separated by urban and rural, thus the same processing method is applied 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.

$$IF(y,e,a,s) = \lambda(y,e,a,s) \cdot ERS(y,e,s)$$

$$OF(y,e,a,s) = \lambda(y,e+1,a,s) \cdot ERS(y,e+1,s)$$

ERS is the new enrollment of different education levels, λ is the age distribution of new enrollment of different education levels and

$$\sum_a \lambda(y,e,a,s) = 1$$

3.2 Estimate the age distribution λ

We use the data from the *China Educational Statistical Yearbook: 2003-2012* to estimate the age distribution (1982-2012) 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, region, sex and grade from 2003 to 2012.

3.2.1 Estimate the age distribution λ: 2003-2012

For primary school, we assume that the sex ratio of enrollment 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 enrollments (second column) and total female enrollments (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 enrollment 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 enrollments (first column) and total female enrollments (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 of 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: 1985-2012

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: 1985-2012

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 2012, birth rate for each year from 1983 to 2012, national, rural and urban population by age and gender from the population sampling surveys for 1987 and each year from 1989 to 2012.

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 the 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.

Tables and figures of appendix A

Table A.1 Number on School-age Population in Primary School, Rural, 2003, China Education Statistical Yearbook

	Total	**Of which: new entrant**	**Of which: female**	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**	**Grade 5**	**Grade 6**
				Enrollment					
Age	76891519	11924477	36322339	12159626	12862008	12985923	13295122	13951495	11637345
5	308950	297013	144660	302758	6052	125	8	6	1
6	5046575	4754352	2372386	4782290	257461	6647	165	10	2
7	11010378	6350637	5180829	6444175	4321918	237121	6945	204	15
8	11864959	410669	5605866	492215	7338813	3813008	213075	7553	295
9	12221282	74134	5796024	91262	711394	7682374	3514009	213151	9092
10	12995292	22398	6170350	27731	155006	927169	8067444	3604354	213588
11	13084959	8630	6211805	10868	43937	221535	1082185	8423636	3302798
12	8410789	4293	3979851	5476	17127	65676	295215	1234989	6792306
13	1468214	1616	654151	1948	7153	22371	84281	351020	1001441
14	368378	534	159283	630	2292	7181	23368	89514	245393
15	111743	201	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
Sum	1	1

Table A.3 Number of School – age Population and Enrollment in Junior Middle School, Rural, 2003, China Education Statistical Yearbook

Rural	Enrollment					
	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

Age	Male	Female
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
Sum	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
Sum	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);

(5) China Family Panel Studies (CFPS)

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 = $ Age-16, if $Sch <10$

$Exp = $ Age$-Sch-6$, if $Sch >9$

$Exp = 0$, if $Exp <0$

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, CHFS and CFPS 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 both UHS and CHNS are available for a given year, we drop CHNS estimates due to the relatively low quality of income measures.

(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, and urban parameters for 1999.

(4) [1]We use CHNS to obtain urban parameters for 2000, 2004, 2006, and rural parameters for 1989, 1991, 1993, 1997, 2000, 2004, 2006.

---

[1] We have urban datasets of UHS for 1989, 1991, 1993 and 1997, so we do not use the CHNS datasets of those years for urban parameter estimation.

(5) We use CHFS to obtain urban and rural parameters for 2010.

(6) We use CFPS to obtain urban and rural parameters for 2009 and 2011..

As an example, for the intercept term, we can obtain the urban intercept $\alpha^u 88$ (UHS), assuming the sample size is $n^u 88$ (UHS).

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 size of $n^u 88$(CHIP), $n^r 88$(CHIP) respectively. 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 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 $\hat{\ln y}$.

(5) $\hat{y} = \alpha \times e^{\hat{\ln y}}$.

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 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 is conducted in 1988, 1991, 1993, 1997, 2000, 2004, 2006, and 2009. Numbers of households participating 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 the sample households and their members, focusing on income, wage, sources of income and household expenditure. For rural households, information on assets, debts, sales and consumption of products and purchase of production means are also collected. The rural survey covers 28 provinces, 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 household finance on microcosmic level, including information on household income, consumption and production, etc. in the year of 2010. This dataset consists of both urban and rural households, covering 22 provinces. Among the samples provinces, only rural households are sampled in Guangxi, Guizhou and Shanxi; there exist only urban samples for Beijing, Tianjin and Qinghai. There are 5194 urban households with 16755 individuals; and 3244 rural households with 12569 individuals.

China Family Panel Studies (CFPS) is a nationally representative, annual longitudinal survey of Chinese communities, families, and individuals launched in 2010 by the Institute of Social Science Survey (ISSS) of Peking University, China. The CFPS is designed to collect individual, family, and community-level longitudinal data in contemporary China. The CFPS collects information biennially and focuses on the economic, as well as the non-economic, wellbeing of Chinese children and adults. A range of domains are covered including economic activities, education outcomes, family dynamics and relationships, migration, and health. In the 2010 baseline survey, CFPS interviewed around 15,000 families and over 40,000 individuals within these families. During the follow up survey in 2012, 85% of the families are interviewed with an individual level follow up rate of 82%.

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

LEVEL	Sch
Community college	15
Professional school	11
Senior middle school	12
Junior middle school	9
Primary school	6
Others	0

3.1.3 Selection of samples

(1) Include male individuals from 16 to 60 years old and female individuals from 16 to 55 years old;

(2) Discard individuals whose value of regular wage is missing, and 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 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, and subsidies), pension, other cash income and received goods from work units; household income is net household income from agriculture.

In 1999, the data set does not include rural information.

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

(2)1995

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)1999

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

(4)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

(5)2007

LEVEL	Sch
Graduate school	18
College and above	16
Professional school	15

LEVEL	Sch
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 samples

(1) Include male individuals from 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 wage file.

Generally, annual wage income is Months Worked times Average Monthly non-Retirement Wage, 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 - 2011

C8, average monthly wages (job level), 1991 - 2011

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), 1989-2011

I101, other cash income (job level), 2006-2011

I103, value of other non-cash income (job level), 2006-2011

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 – 2011

c) Business Income

Variable: INDBUS - Total individual net income from all businesses operated by household that the individual participat 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 - 2011

E9, in-kind for collective farming (individual level), 1989 - 2011

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), 1991-2011

E14A, receipts from sale of all crops (household level), 1991-2011

E16A, value of all crops consumed (household level), 1991-2011

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 - 2011

D6, market value of consumed produce, 1989 - 2011

D7, expenses to grow produce, 1991-2011

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 allocate household subsidies equally among household individuals; the household subsidies are divided by the number of members in a 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 - 2011

      I15A, gas subsidy, 1993 - 2011

      I16A, coal subsidy, 1993 - 2011

      I17A, electricity subsidy, 1993 - 2011

      I21, food/gift/discounts from work unit, 1989 - 2011

      K47, childcare subsidy, 1989 - 2011

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 - 2011

      I14B, average monthly subsidy from job 2, 2004 – 2011

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 from 16 to 60 years of age and females from 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 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 samples

(1) Include male individuals from 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 samples without income data.

(5) Second Occupation: Urban and rural samples without income data are 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.

3.5 CFPS

3.5.1 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) Agriculture income refers to the net income from farming, gardening, livestock, fishing and side-line occupation.

3.5.2 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 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.

3.5.3 Years of schooling

2009

Level	Sch
No school	0
Primary school	6
Junior middle school	9
Senior middle school/ Middle professional degree	12
College /Post-secondary professional degree	15
university	16
Master's degree	18
PhD degree	22

3.5.4 Selection of samples

(1) Include male individuals from 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. In rural sample, we delete the samples 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, CFPS 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, CFPS.

4.1.2 General idea about imputation

We use UHS, CHIP, CHNS, CHFS and CFPS 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 1985-2012. These fitted values are the final urban imputed parameters.

4.1.3 Specifications

We treat $\alpha, \beta, \gamma, \delta$ separately and use the parameters for 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 for 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 2012.

Tables and figures of appendix B

Table B.1 Micro Datasets

Year	UHS	CHIP	CHNS	CHFS	CFPS
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		U			
2000			U/R		
2001					
2002		U/R			
2003					
2004			U/R		
2005					
2006			U/R		
2007		U/R			
2008					
2009			U/R		U/R
2010				U/R	
2011			U/R		U/R

Note: CHIP: Chinese Household Income Project

UHS: Urban Household Survey

CHNS: China Health and Nutrition Survey

CHFS: China Household Finance Survey

CFPS: China Family Panel Studies

Table B.1.1 Summary Statistics: UHS Samples

Year	Variables	Male		Female	
		Mean	S.D.	Mean	S.D.
1987	inc	1544.74	610.85	1295.60	493.33
	Sch	10.61	2.91	9.84	2.71
	Exp	21.04	10.89	18.44	9.46
1988	inc	1989.98	846.68	1656.67	701.53
	Sch	10.77	2.93	9.94	2.76
	Exp	20.73	10.87	18.06	9.32
1989	inc	2275.53	1008.54	1904.01	859.59
	Sch	10.93	2.97	10.11	2.69
	Exp	20.89	10.91	18.36	9.31
1990	inc	2500.75	1083.87	2102.95	919.32
	Sch	11.09	2.93	10.29	2.70
	Exp	21.23	10.78	18.56	9.29
1991	inc	2744.34	1165.79	2336.65	1003.85
	Sch	11.26	2.95	10.50	2.65
	Exp	20.73	10.51	18.26	9.00
1992	inc	3214.50	1672.14	2679.03	1281.81
	Sch	11.34	2.81	10.56	2.66
	Exp	21.70	10.94	19.68	9.60
1993	inc	3903.40	2465.01	3275.63	1962.20
	Sch	11.39	2.72	10.75	2.55
	Exp	21.42	10.54	19.12	9.07

1994	inc	5454.89	3612.46	4494.99	2948.20
	Sch	11.51	2.77	10.93	2.49
	Exp	21.26	10.53	18.96	9.07
1995	inc	6691.21	4181.29	5580.39	3473.61
	Sch	11.61	2.72	10.97	2.48
	Exp	21.49	10.26	19.23	8.94
1996	inc	7384.58	5034.44	6174.62	4421.84
	Sch	11.64	2.69	11.07	2.43
	Exp	21.81	10.27	19.58	8.96
1997	inc	8554.39	6037.77	7109.59	5311.46
	Sch	11.64	2.69	11.12	2.42
	Exp	22.03	10.10	19.76	8.96

Table B.1.2 Summary Statistics: CHNS samples

		Urban				Rural			
		Male		**Female**		**Male**		**Female**	
Year	**Variables**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
1989	inc	1820.46	2352.06	1552.90	1888.34	1441.81	1517.84	1207.12	1210.67
	Sch	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
1991	inc	2013.74	1150.68	1685.14	1092.29	1503.47	1473.03	1238.76	1149.77
	Sch	9.06	4.01	8.44	4.06	6.69	3.94	4.90	4.31
	Exp	20.43	11.60	17.56	9.97	19.52	11.37	17.31	10.26
1993	inc	3032.9	2712.39	2625.33	2348.86	2091.26	2083.25	1758.72	1726.70
	Sch	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
1997	inc	6824.82	5543.44	5590.67	4401.66	4520.24	4215.10	3555.43	3337.10
	Sch	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

2000	inc	9648.76	10011.97	7817.31	6970.82	5399.57	5345.96	4156.64	3858.77
	Sch	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
2004	inc	12895.8	10894.26	10813.88	9460.14	7151.50	7648.53	5698.16	6451.71
	Sch	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
2006	inc	17789.3	22777.65	13521.59	14658.02	10668.79	10667.64	7556.52	7452.54
	Sch	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

Table B.1.3 Summary Statistics: CHIP samples

		Urban				Rural			
		Male		**Female**		**Male**		**Female**	
Year	**Variables**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
1988	inc	1935.97	944.34	1642.17	942.41	967.08	965.16	862.57	810.87
	Sch	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
1995	inc	6674.31	3702.17	5531.86	3041.36	4665.49	4391.55	4529.42	3982.85
	Sch	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
1999	inc	9418.04	5572.83	7756.31	4923.76				
	Sch	11.98	2.77	11.50	2.64				
	Exp	23.58	10.39	22.19	9.63				
2002	inc	12439.48	7984.14	9978.52	6863.79	5346.66	5395.65	3765.75	4009.96
	Sch	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
2007	inc	34387.14	31291.01	24596.92	24984.14	14316.64	11105.48	10808.08	10300.37
	Sch	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

Table B.1.4 Summary Statistics: CFPS samples

| Year | Variables | Urban | | | | | | | | Rural | | | | | | | |
| | | Male | | Female | | Male | | Female | | | | | | | | | |
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	inc	31305.85	31872.66	23494.04	20228.66	11199.1	12209.2	6926.05	7618.99
2009	Sch	11.06	3.83	11.32	4.02	6.92	4.18	5.24	4.50
	Exp	21.79	12.27	18.04	10.99	28.57	12.75	27.90	11.65
	inc	32407.92	33908.91	23701.14	24035.44	17491.65	17673.05	9833.52	11203.32
2011	Sch	10.29	3.83	10.37	4.24	7.72	3.77	5.56	4.49
	Exp	23.74	12.16	20.94	11.31	26.84	12.58	26.82	11.83

Table B.1.5 Summary Statistics: CHFS samples

| Year | Variables | Urban | | | | Rural | | | |
| | | Male | | Female | | Male | | Female | |
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	inc	37059.20	37748.73	30719.60	29662.54	16813.38	20499.11	13063.95	17374.53
2010	Sch	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

Figures B.1-B.4 Parameter Estimates Against Time: Urban sample

Parameter

y = 0.121x - 234.12

urban male intercept

Parameter

y = -9E-05x² + 0.374x - 376.6

urban male return to education

urban female intercept

$y = 0.1123x - 217.12$

urban female return to education

$y = -9E-05x^2 + 0.374x - 376.6$
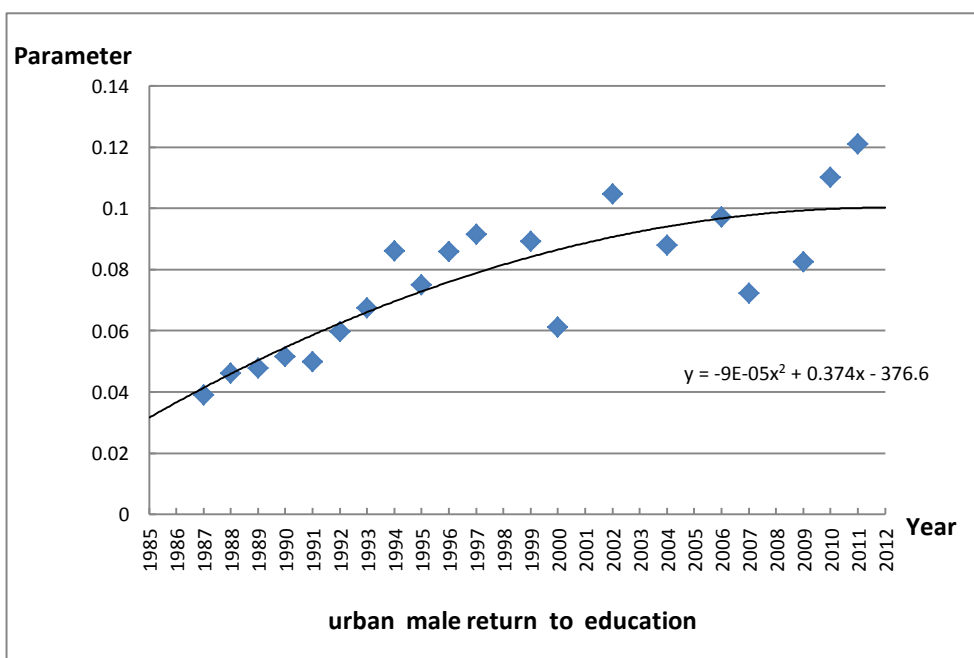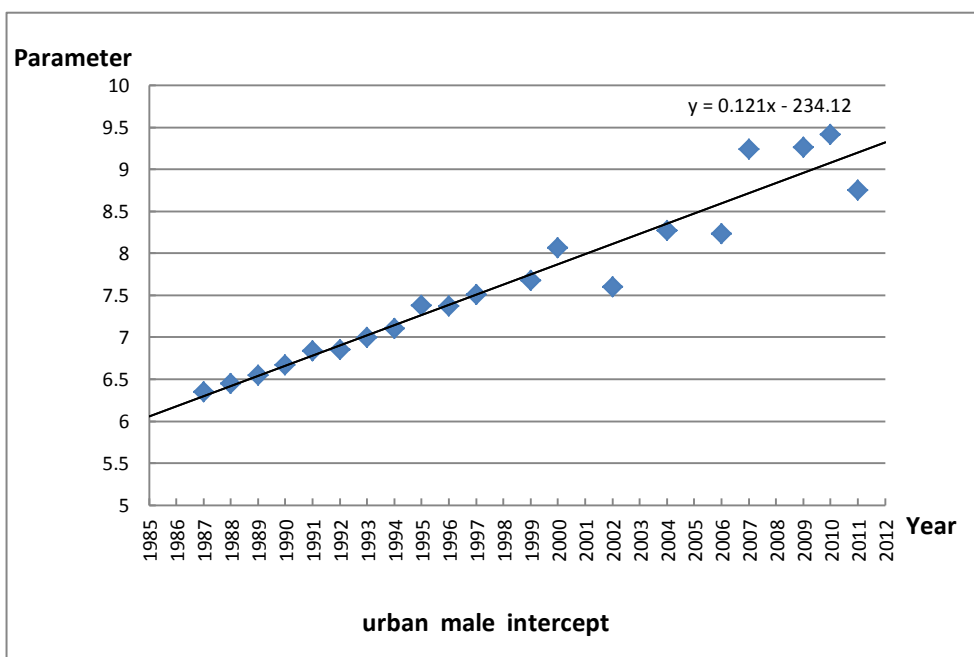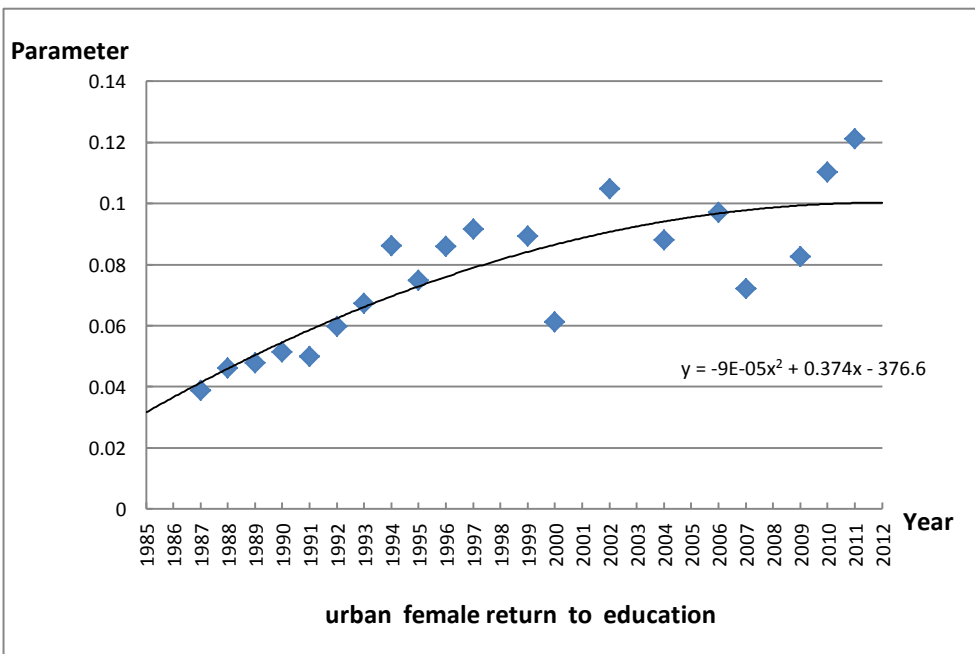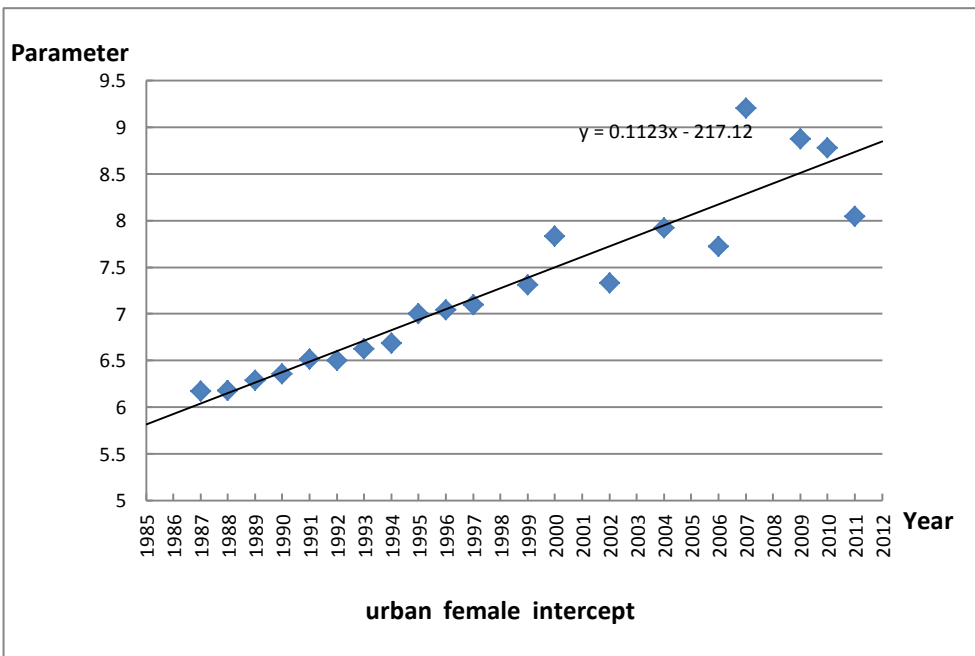
Figures B.5-B.8 Parameter Estimates Against Time: Rural Samples

$y = 0.1399x - 272.36$

rural male intercept

$y = -1E\text{-}04x^2 + 0.381x - 382.4$

rural male return to education

Parameter

y = 0.1323x - 257.17

rural female intercept

Parameter

y = 9E-06x² - 0.033x + 31.96

rural female return to education
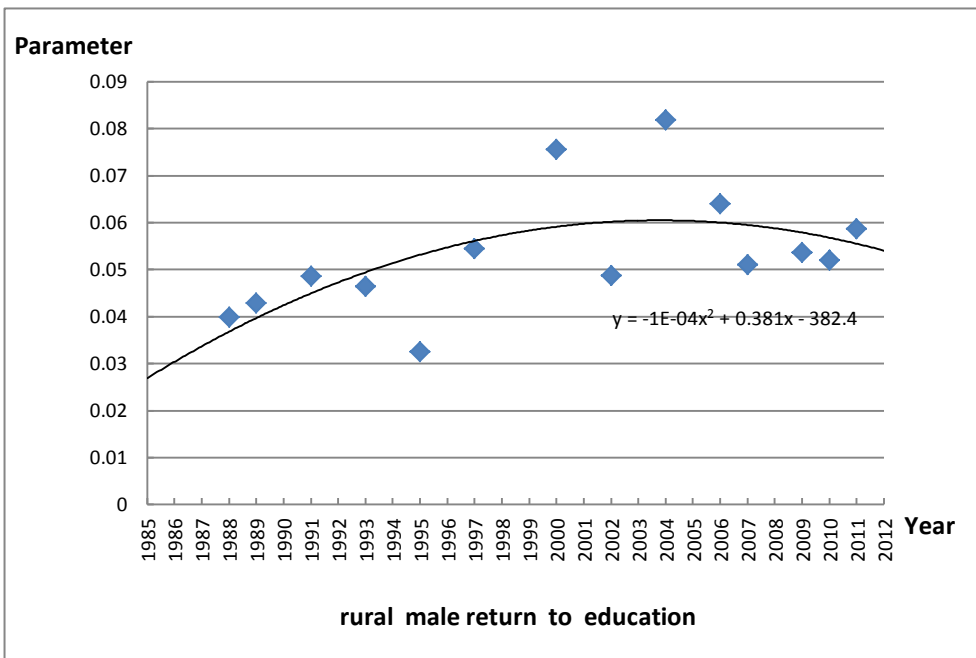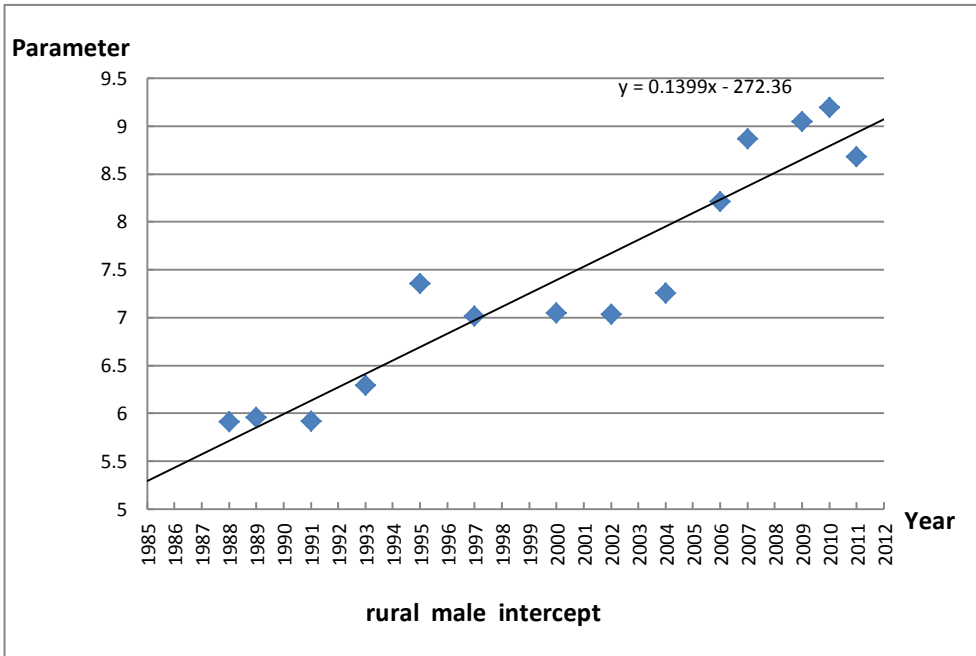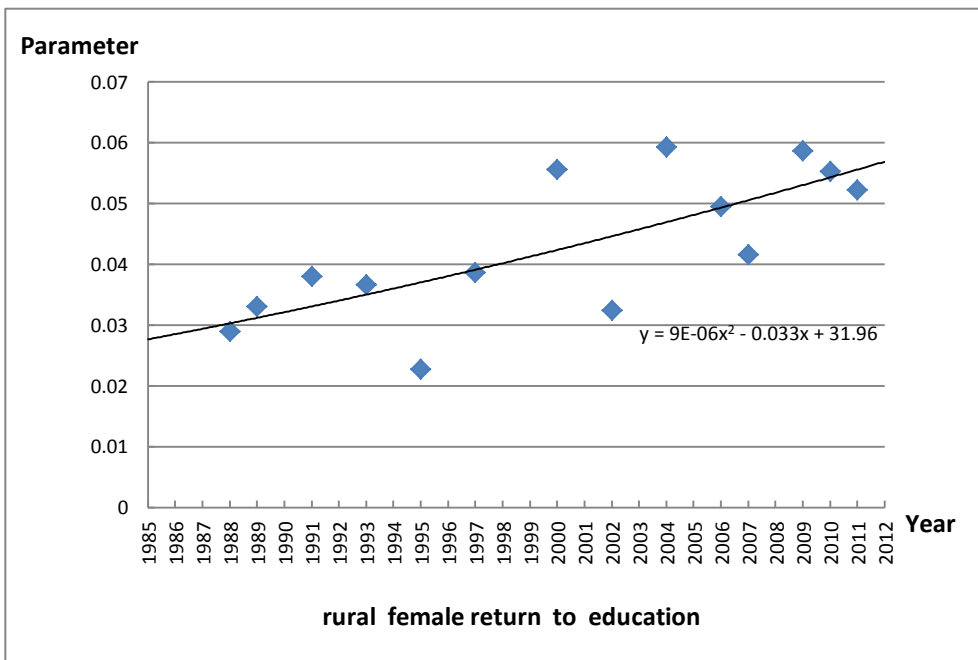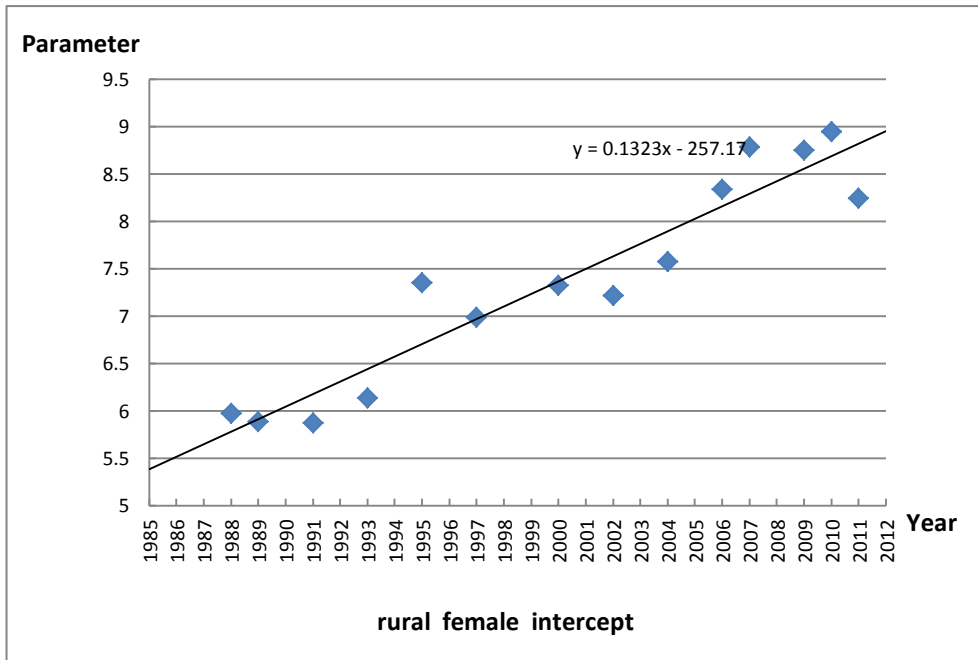
Appendix C Human Capital Stock Calculation

This section summarizes the basic methods and procedures for estimating China's human capital stock from 1985 to 2012 based on the J-F approach. In particular, it explains estimations for necessary data of the J-F approach based on China's data. We use the following notations:

y indicates calendar years from 1980 to 2012. s indicates sex equaling to one and two for males and females, respectively. a indicates age from 0 to 60. e indicates the levels of education classified into five categories for years 1985-2012 including no schooling(ns), primary school(pri), junior middle school(jm), senior middle school(sm), and college(col). For years 2000-2012, the levels of education (e) are classified into six categories including no schooling(ns), primary school(pri), junior middle school(jm), senior middle school(sm), college(col) and university(uni).

Variables used for 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 for persons with sex s, age a, and education level e;

yinc(y,s,a,e): annual income of the 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;

sr(y,s,a): survival rate in year y for persons with sex s and age a;

employed(y,s,a,e): population employed in year y with sex s, age a, and education level e;

pop(y,s,a,e): population in year y with sex s, age a, and education level e;

newEnroll(y,s,a,e): population enrolled in education level e in year y, with sex s and age a;

pop_inschool(y,s,a,e-n): number of people in school in year y with sex s, age a, education level e, and grade n+1;

senr(y,s,a,e+1,e-n): share of people enrolled in the next education level e+1 and in school in year y with sex s, age a , education level e, and grade n+1;

mi(y,s,a,e): 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): number of people in school in year y with sex s, age a, and education level e;

pop_nischool(y,s,a,e): 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): 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 calculate 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 males, 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) *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 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), UHS (Urban Household Survey), CHFS(China Household Finance Survey) and CFPS(Chinese Family Panel Studies), we regress the logarithm of annual income *ln yinc* on years of schooling *s*, work experience *exp* and work experience squared *exp²* by OLS.

$$\ln \text{yinc} = \alpha + \beta s + \gamma \exp + \delta \exp^2 + u$$

We use the fitted value of ln yinc from the equation above to obtain $m_i = e^{\ln \text{yinc}}$. We regress the annual income observed in the survey data on m_i by OLS (without the intercept) to obtain the coefficient on m_i, α[1]. Finally, we estimate the annual income of the employed as yinc$= \alpha \times e^{\ln \text{yinc}}$.

Note that the annual income used for estimating the Mincer equation is in real terms with 1985 as the based year.

---

[1] Jeffrey M. Wooldridge (2005), Introductory Econometrics: A Modern Approach, 3rd edition.

2.1.2 Coding of schooling and work experience in the Mincer equation

(1) Coding of years of schooling:

	No schooling	Primary school	Junior middle school	Senior middle school	College	University
1985-1999	0	6	9	12	15	
2000-2012	0	6	9	12	15	16

(2) Coding of work experience:

For people younger than16, working experience is: *exp*=0;

For people older than16, if s<10, working experience is: *exp*=*age*-6;

For people older than16, if s≥10, working experience is: *exp*=*age*-*sch*-6.

2.2 Estimation of annual market income

When estimate the annual income of the employed using the Mincer equation, we obtain $\mathrm{yinc_{y,s,a,e}} = \mathrm{whrs_{y,s,a,e}} \times \mathrm{com_{y,s,a,e}}$.

According to

$$\mathrm{mhrs_{y,s,a,e}} = \mathrm{whrs_{y,s,a,e}} \times \mathrm{empr_{y,s,a,e}} \;,\quad \mathrm{ymi_{y,s,a,e}} = \mathrm{whrs_{y,s,a,e}} \times \mathrm{empr_{y,s,a,e}} \times \mathrm{com_{y,s,a,e}}$$

The annual market income is given by:

$$\mathrm{ymi_{y,s,a,e}} = \mathrm{yinc_{y,s,a,e}} \times \mathrm{empr_{y,s,a,e}} \,.$$

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 for university.

412

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 rates 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 to the total population by the actual sampling percentage of 1.04%.

The employed in "China Population Census 2000" for each province, autonomous region and municipality is aggregated to get the total population employed by the actual sampling percentage of 10%.

3．Calculation of enrollment rate

Enrollment rate is the share of people with education level *e* enrolled in a higher level of education *e*+1.

3.1 Calculation of enrollment by sex, age and education level

Based on the age distribution of the enrollment number for a certain education level and sex, the enrollment number of each year by sex, age and education level is given by:

$$\text{NewEnroll }(y,s,a,e) = \text{NewEnroll }(y,s,e)*\lambda(y,s,a,e)$$

$$\sum_{a}\lambda(y,s,a,e)=1$$

Note that $\lambda(y,s,a,e)$ refers to the age distribution of the enrollment number for each education level and sex.

There is no college or university in rural areas, 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, and grade $n+1$ in year y is the enrolled population of age a-n, sex s , and education level e in year y-n:

$$\text{pop\_inschool}(y,s,a,e-n)= \text{NewEnroll }(y-n,s,a-n,e)$$

3.3 Enrollment rate of each education level and each grade

The probability of advancing to the next higher level of education is estimated by the average ratio of the sum of all students of any age in a year initially enrolled to the sum of all students of any age initially enrolled in the next higher level of education 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:

$$\text{senr}(y,s,a,\text{pri-ns}) = \text{Newenroll}(y+1,s, \text{pri})/ \text{pop}(y,s,ns)$$

The upper bound of people out of school in year y and enrolled into primary school in year y+1 is determined by the upper bound of the 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 enrolled

414

into primary school in year y+1 is 11. The upper bound of people out of school in 2007 and enrolled into primary school in 2008 is the same as in 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 be enrolled in the first grade of junior middle school six years later, and the formula is:

senr(y,s,a,jm-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 enrolled population of primary school in year y-1 by age and sex. The probability that the group in this grade can be enrolled in junior middle school 5 years later is the average enrollment rate that the group in this grade can be enrolled 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 enrolled population of primary school in year y-2 by age and sex. The probability that the group in this grade can be enrolled in junior middle school 4 years later is the average enrollment rate that the group in this grade can be enrolled 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 being enrolled 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 be enrolled 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 enrolled population of junior school in year y-1 by age and sex. The probability that the group in this grade can be enrolled in senior middle school two years later is the average enrollment rate that the group in this grade can be enrolled 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 being enrolled 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 be enrolled 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 enrolled population of senior school in year y-1 by

age and sex. The probability that the group in this grade can be enrolled in college two years later is the average enrollment rate that individuals in this grade can be enrolled 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 being enrolled 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 be enrolled 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 enrolled population of senior school in year y-1 by age and sex. The probability that the group in this grade can be enrolled in university two years later is the average enrollment rate that the group in this grade can be enrolled 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 being enrolled in university in year *y*.

Two points worth noting are as follows:

(1) By using the enrolled population in different years for calculating enrollment rates, an adjustment has already been made for the 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 enrollment rate of primary school till 2003 for lack of data. We use 2003 enrollment rates for years after 2003. Likewise, for enrollment rates of junior middle school and high school, we fix the enrollment rates for 2007 and 2008 at the 2006 levels.

4．Growth rate of real wage

The datum used to calculate rural growth rate are rural CPI and average pure income of rural residents. Calculation method: rural real income is equal to average pure income of rural residents divided by rural CPI. Rural growth rate in T-1 period is equal to the income gap between rural real income in T and T-1 period divided by rural real income in T-1 period. The datum used to calculate urban growth rate are urban CPI and average wage of urban employees. Calculation method: urban real wage is equal to average wage of urban employees divided by urban CPI. Urban growth rate in T-1 period is equal to the income gap between urban real wage in T and T-1 period divided by urban real wage in T-1 period. The result shows that, for the 28-year period, 1985-2012, growth rate on average is 5.86% and 8.50% annually in the rural and urban sectors, respectively.

5．Discount rate

The discount rate we use is 4.58%, following 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 and also adopted by the OECD consortium (OECD 2010).

6. Calculation of human capital

6.1 Human capital of in-school population

The number of years discounted until they accumulate 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 level of education, he could get human capital equal to that of 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-pri)*mi(y,s,a+6,jm)*R^6}*sr(y,s,a)*sr(y+1,s,a+1)
*sr(y+2,s,a+2) *sr(y+3,s,a+3) *sr(y+4,s,a+4) *sr(y+5,s,a+5).

(2) If an individual in the second grade of primary school can advance to the next higher level of education, his human capital is calculated as:
{senr(y,s,a,jm-pri-1)*mi(y,s,a+5,jm)*R^5}*sr(y,s,a)*sr(y+1,s,a+1)
*sr(y+2,s,a+2)*sr(y+3,s,a+3)*sr(y+4,s,a+4), 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 level of education, he could get human capital equal to that of 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*sr(y,s,a)*sr(y+1,s,a+1)

*sr(y+2,s,a+2).

(2) If an individual in the second grade of junior middle school can advance to the next higher level of education, his human capital is calculated as:

senr(y,s,a,sm-jm-1)*mi(y,s,a+2,sm)*R^2*sr(y,s,a)*sr(y+1,s,a+1),

discounted by 2 years as it takes 2 years for him 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*sr(y,s,a)*sr(y+1,s,a+1)*sr(y+2,s,a+2)

For grade 2 and 3 students, the human capital is given by:

senr(y,s,a,col-sm-1)*mi(y,s,a+2,col)*R^2*sr(y,s,a)*sr(y+1,s,a+1)

and

senr(y,s,a,col-sm-1)*mi(y,s,a+2,col)*R*sr(y,s,a),

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:

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 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 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, the survival rate does not appear in the formula.

6.2 Human capital of -out-of-school population

6.2.1 Calculation of out-of-school population

In-school population of age a, sex s, and education level e in year y, pop_inschool(y,s,a,e), is the sum of population of each grade:

$$\text{pop\_nischool(y,s,a,e)} = \sum_{n=0}^{y(e)} \text{pop\_inschool}(y, s, a, e)$$

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, and 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 and 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 and education level to the in-school population by grades, where

the weights are the proportion of population in each grade by gender, age, and education level.

6.2.2 Human capital of -out-of-school population

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: 1985-2012

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, 1985-2012

<div align="right">Unit: Billion Yuan</div>

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	11010	6334	13200	9465
1986	12540	7114	14120	9854
1987	14010	7802	15080	10270
1988	13900	7721	14610	9778
1989	14070	7779	13890	9150
1990	16760	9237	15120	9784
1991	18650	10240	16570	10540
1992	20170	11070	17650	11030
1993	20380	11110	17460	10670
1994	18920	10180	15800	9454
1995	18630	10100	14940	8799
1996	20520	11100	14980	8645
1997	23840	12760	15770	8912
1998	28310	15060	17110	9439
1999	33840	18170	18580	10000
2000	39260	21120	20330	10610
2001	44150	24090	21520	11260
2002	51520	27770	23160	12010
2003	58230	32030	24310	12480
2004	62840	35160	24750	12700
2005	70560	41220	26220	13120
2006	76610	41840	27920	13860
2007	84760	46670	28530	14030
2008	87020	47180	28850	14150
2009	97730	53710	31430	15180
2010	105800	57980	32800	15780
2011	109900	60050	32570	15730
2012	115500	65130	33510	16160

Note: The results are based on five education categories.

Table C.2 Real Human Capital by Region and Gender, 2000-2012

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	40110	21680	20160	10520
2001	45120	24750	21350	11170
2002	52730	28520	22970	11910
2003	59670	33000	24100	12370
2004	64550	36290	24510	12580
2005	72830	42820	25940	12980
2006	78360	43040	27630	13720
2007	86810	48100	28220	13870
2008	88840	48610	28530	13990
2009	99980	55600	31040	14990
2010	108200	60020	32400	15590
2011	112200	62120	32170	15540
2012	118000	67380	33020	15930

Note: The results are based on six education categories.

Table C.3 Per Capita Real Human Capital by Region and Gender, 1985-2012

Unit: Thousand Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	91.10	59.43	34.28	27.17
1986	99.53	63.57	36.55	28.23
1987	106.73	66.51	38.88	29.29
1988	101.49	63.98	37.32	27.69
1989	99.32	63.11	35.11	25.74

Year	Urban Male	Urban Female	Rural Male	Rural Female
1990	114.29	73.45	37.74	27.25
1991	124.51	78.55	41.24	29.22
1992	131.74	82.36	43.84	30.48
1993	130.89	80.23	43.36	29.43
1994	119.40	71.55	39.23	26.04
1995	115.89	69.02	37.17	24.22
1996	119.59	71.24	37.63	24.15
1997	130.93	76.92	40.24	25.35
1998	146.88	86.01	44.33	27.37
1999	166.64	99.01	48.96	29.65
2000	182.89	109.77	53.86	31.77
2001	197.89	119.46	58.41	34.36
2002	222.59	132.01	64.56	37.40
2003	244.14	146.21	69.80	39.82
2004	257.14	156.05	73.20	41.38
2005	282.08	178.78	79.06	44.00
2006	293.37	175.59	86.24	47.91
2007	310.28	189.19	90.74	50.38
2008	309.28	186.94	93.87	52.32
2009	336.19	207.94	105.17	58.09
2010	346.74	215.56	111.49	61.79
2011	349.12	217.51	114.10	63.71
2012	360.38	227.93	121.08	67.71

Note: The results are based on five education categories.

Table C.4 Per Capita Real Human Capital by Region and Gender, 2000-2012

Unit: Thousand Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	186.83	112.71	53.87	31.77
2001	202.15	122.79	58.42	34.36
2002	227.72	135.62	64.57	37.40
2003	250.11	150.70	69.80	39.83
2004	264.14	161.09	73.21	41.38
2005	291.17	185.73	79.07	44.00
2006	300.06	180.63	86.26	47.91
2007	317.77	194.97	90.77	50.39
2008	315.77	192.60	93.92	52.34
2009	343.94	215.27	105.24	58.12
2010	354.62	223.15	111.58	61.83
2011	356.65	225.02	114.20	63.75
2012	368.04	235.79	121.18	67.76

Note: The results are based on six education categories.

Table C.5 Real Labor Force Human Capital by Region and Gender, 1985-2012

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	4303	2447	5862	4069
1986	4967	2794	6351	4303
1987	5643	3132	6918	4577
1988	5805	3187	6899	4476
1989	6054	3299	6693	4273
1990	7220	3852	7367	4620
1991	7937	4265	8186	5063

Year	Urban Male	Urban Female	Rural Male	Rural Female
1992	8285	4471	8802	5365
1993	8105	4357	8672	5187
1994	7382	3950	7758	4565
1995	7192	3849	7324	4252
1996	7822	4096	7382	4167
1997	8994	4639	7836	4308
1998	10870	5511	8638	4616
1999	13170	6572	9422	4899
2000	15850	7699	10330	5226
2001	17160	8450	10860	5477
2002	18890	9352	11650	5846
2003	20460	10300	12310	6160
2004	21890	11030	12460	6215
2005	24140	12240	12980	6480
2006	26870	13320	14450	7024
2007	29220	14430	15150	7271
2008	30770	15200	15590	7416
2009	36780	18020	16980	7960
2010	42490	20800	17730	8243
2011	43750	21680	17810	8243
2012	46140	23030	18460	8520

Note: The results are based on five education categories.

Table C.6 Real Labor Force Human Capital by Region and Gender, 2000-2012

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	15430	7496	10240	5183
2001	16860	8287	10770	5433

2002	18720	9240	11560	5798
2003	20450	10280	12200	6107
2004	22110	11150	12340	6156
2005	24390	12380	12840	6410
2006	27170	13510	14300	6950
2007	29560	14650	14990	7191
2008	31160	15460	15420	7336
2009	37280	18360	16780	7865
2010	43090	21230	17530	8146
2011	44380	22150	17610	8148
2012	46870	23580	18200	8402

Note: The results are based on six education categories.

Table C.7 Per Capita Real Labor Force Human Capital by Region and Gender, 1985-2012

Unit: **Thousand Yuan**

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	56.79	36.52	26.34	20.41
1986	62.50	39.22	28.22	21.27
1987	67.70	41.45	30.26	22.20
1988	64.90	39.99	29.19	21.10
1989	64.22	39.98	27.52	19.67
1990	73.44	45.75	29.63	20.87
1991	78.72	48.38	32.33	22.35
1992	80.91	48.97	34.27	23.24
1993	78.37	46.39	33.57	22.23
1994	70.19	40.72	30.06	19.48
1995	66.83	38.21	28.26	17.98
1996	68.67	38.74	28.69	17.85
1997	74.53	41.62	30.66	18.68

Year	Urban Male	Urban Female	Rural Male	Rural Female
1998	84.34	46.49	33.90	20.17
1999	95.05	51.92	37.24	21.75
2000	105.32	56.57	40.48	23.15
2001	111.73	59.98	43.78	24.73
2002	120.28	64.25	47.88	26.67
2003	127.63	68.64	51.38	28.33
2004	133.08	71.40	53.21	29.05
2005	141.42	76.18	56.63	30.72
2006	152.89	81.87	63.60	34.00
2007	160.29	86.85	67.67	36.17
2008	164.33	90.44	70.51	37.77
2009	185.46	102.79	78.64	41.92
2010	198.30	111.10	83.48	44.51
2011	199.76	113.68	86.33	45.99
2012	205.37	118.17	91.81	48.88

Note: The results are based on five education categories.

Table C.8 Per Capita Real Labor Force Human Capital by Region and Gender,

2000-2012

Unit: Thousand Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	103.83	55.60	40.49	23.15
2001	110.83	59.29	43.79	24.73
2002	119.98	63.87	47.89	26.67
2003	128.05	68.75	51.40	28.34
2004	134.40	72.19	53.23	29.05
2005	142.86	77.08	56.65	30.73
2006	154.60	83.00	63.64	34.01

2007	162.20	88.17	67.72	36.19
2008	166.41	91.99	70.58	37.80
2009	187.95	104.73	78.75	41.97
2010	201.11	113.40	83.62	44.57
2011	202.65	116.12	86.47	46.06
2012	208.63	121.04	91.97	48.95

Note: The results are based on six education categories.

Appendix D   Physical Capital Estimation

1. Two measurements of physical capital

For each province, we calculate variations on two measures of physical capital stock:

(1) Wealth capital stock (or: net capital stock): measures the monetary value of the physical capital stock. To be used, for example, in comparisons of the value of physical to human capital.

(2) Productive capital stock: measures the volume (or productive capacity) of physical capital. To be used, for example, in productivity analysis.

In productivity analysis, what are of interest are the services rendered in a particular period by capital as an input to the production process. It is assumed that the services rendered by the productive capital stock in a particular period are in fixed proportion to the productive capital stock. In calculating aggregate growth of productive physical capital we therefore also refer to growth in capital services. (In productivity analysis, an analogue of capital services is labor services, with the services rendered by labor in the production of a particular volume of output in a particular period being assumed to be in constant proportion to the number of laborers or number of laborer-hours worked in that period.)

Our capital measures closely follow the OECD Manual (2009) on *Measuring Capital* and the physical capital chapter in the OECD Manual (2001) on *Measuring Productivity*. For the case of a hyperbolic

age-efficiency function, the methods used by the U.S. Bureau of Labor Statistics and the Australian Bureau of Statistics are consulted.

We calculate the two measures of physical capital stock in five variations:

(1) Wealth capital stock at the end of the year in (mid-year) 1985 prices, based on a geometric age-price profile.

(2) Wealth capital stock at the end of the year in current prices, based on a geometric age-price profile.

(3) An index of real growth in end-year wealth capital stock, based on a geometric age-price profile and with the 1985 value set equal to one.

(4) An index of real growth in capital services, based on a geometric age-efficiency profile and with the 1985 value set equal to one.

(5) An index of real growth in capital services, based on a hyperbolic age-efficiency profile and with the 1985 value set equal to one.

The first four variations of capital stock (and services) measures are derived using a modification of an OECD-provided model spreadsheet. The fifth variation follows from more elaborate, own calculations. (Own calculations for the first four variations confirm the results obtained via the modified OECD-provided spreadsheet.)

2. Data and data sources

For each province, the following data are needed:

(1) Investment values in form of gross fixed capital formation, with a breakdown by type of asset adopted from the investment statistics;

(2) Investment in fixed assets price index, with a breakdown by type of

asset;

(3) CPI;

(4) Aggregate income accounts with a breakdown into labor remuneration, operating surplus, depreciation, and net taxes on production.

The source of the data for the most recent years is the statistical database on the NBS website. Historical data are obtained from *GDP 1952-1995* and *Sixty Years*. Occasionally the *China Statistical Yearbook* and provincial statistical yearbooks are consulted. All constant-price values are in 1985 prices, and real growth indices use 1985 as base year (with value one).

Provincial values of gross fixed capital formation (GFCF) are obtained from the NBS website and *Sixty Years*. These are the most up-to-date values that incorporate all benchmark revisions, up to and including the benchmark revision following the 2013 economic census. GFCF values do not come with a breakdown by type of asset.

The investment statistics provide a breakdown of total investment by type of asset: structures, equipment, and "others." These province- and year-specific proportions of structures, equipment, and "others" in total investment are applied to the provincial annual GFCF values. Investment data by type of asset are available since 2003 (NBS website). For each province, values for 1951-2002 are estimated by establishing the 1950 proportions, and then connecting these 1950 proportions linearly to the average 2003-2005 proportions. Approximate 1950 proportions of the three types of assets in total economy-wide (national) investment is uniformly used for all provinces (structures 75%, equipment 20%, and "others" 5%).

Data on the investment in fixed assets price index are available for the

years since 1991, including by type of asset (NBS website). For earlier years, price changes are obtained from nominal GFCF values together with GFCF real growth rates, both published in *GDP 1952-1995*. This GFCF deflator is applied equally to all three types of assets (structures, equipment, "others"). In the case of provinces (or years) with missing nominal GFCF values and/or missing GFCF real growth rates, the deflator of industry value-added is used as proxy (with values from *Sixty Years*).

CPI data are obtained from the NBS website.

Income accounts data are obtained in two steps in order to address statistical breaks and to ensure that income accounts data and aggregate expenditure data (including GFCF) are consistent. First, the share of each income component in aggregate income is calculated. The underlying income data for the years since 1993 are from the NBS website and for the years 1978 through 1992 from *GDP 1952-1995*. Shares for the years 1950-1977 are set equal to the average 1978-1982 shares. In a second step, absolute values are obtained by multiplying the share values by aggregate expenditures (using data from the same sources as reported above for GFCF, one of the components of aggregate expenditures).

Missing data are addressed through appropriate approximations. For example, (early) Chongqing GFCF data are constructed as

$$\text{Chongqing GFCF} = \frac{Sichuan\ GFCF}{\text{Sichuan GCF}} * Chongqing\ GCF \qquad (1)$$

With the data taken from *Sixty Years* (and GCF denoting gross capital formation, i.e., GFCF plus inventory investment). A very occasional unreasonably extreme data point may be replaced by the mean of the previous and following years' values. A list of all special adjustments has

been compiled.

3. Initial capital stock

The initial year of our capital stock series is 1952. The (province-specific) capital stock value W_{1952} is obtained equally for all our measures of capital as

$$W_{1952} = \frac{GFCF_{1953}}{\delta + \theta} - GFCF_{1953} \tag{2}$$

$GFCF_{1953}$ is GFCF of the year 1953, θ is the asset-specific average annual (geometric) real growth rate of GFCF between 1953 and 1957, and δ is the asset-specific depreciation rate (using the double-declining balance method). For some but not all provinces, GFCF value would have been available for 1950-1952, and a judgment was made that the first somewhat reliable (non-erratic) post-war GFCF value is probably the value of 1953.

4. Methodology

We follow the method outlined in the OECD Manual (2009) on *Measuring Capital* and the physical capital chapter in the OECD Manual (2001) on *Measuring Productivity*. Following other countries' experiences as reported in the first manual, and our evaluation of the circumstances in China, average service lives of physical assets are taken to be 40 years for structures, 16 years for equipment, and 25 years for "others."

The procedure comprises two stages. First, constant-price GFCF of a particular type of asset is subjected to a survival function and age-efficiency

profile to obtain productive capital stock, or to a survival function and age-price profile to obtain wealth capital stock.

Second, to obtain the growth rate of aggregate capital services, the growth rates of different types of productive capital stock (structures, equipment, "others") are combined using a Tornqist index with user costs as weights. Aggregate (nominal or constant-price) wealth capital stock is obtained by summing the asset-specific wealth capital stock, while the real growth rate of the aggregate wealth capital stock is obtained by combining the real growth rates of asset-specific wealth capital using a Tornqvist index, with current-price wealth capital values used in constructing the weights.

4.1 Geometric age-efficiency profile, single type of asset

We follow common practice in the case of a geometric age-efficiency profile, of not separately including a survival function in deriving asset-specific productive or wealth capital stock. With a geometric age-efficiency profile, age-efficiency and age-price profile are identical, and thereby asset-specific productive capital stock and wealth capital stock are identical. The formula for geometric age-efficiency is

$$g_n = (1 - \delta)^n, \tag{3}$$

Where n denotes age and δ denotes the rate of efficiency decline or the depreciation rate. The rate of efficiency decline / depreciation rate is obtained using the double-declining balance method, as 2 divided by the average service life. Starting at twice the average service life, efficiency (as well as the price) is set equal to zero.

4.2 Hyperbolic age-efficiency profile, singly type of asset

The survival function is 1 minus the asset-specific cumulative normal distribution, with asset-specific average service lives given above, and a standard deviation equal to one-quarter of the average service life.

The age-efficiency profile is described by the hyperbolic function

$$g_n = \frac{(T-n)}{(T-b*n)} \tag{4}$$

With n denoting age, T is twice the average service life, and b is a shape parameter that takes the value 0.75 in the case of structures, and 0.5 otherwise.

In the case of a non-geometric age-efficiency profile, the age-price profile is not identical to the age-efficiency profile. But the two are connected: following the asset market equilibrium condition, the current year's price of an asset equals the discounted stream of future rental income from the asset, where each future period's rental income depends on the productive capacity (efficiency) of the asset at that point in time, and the current year's price of the asset thereby on the age-efficiency profile of the asset. A series of current year prices constitutes the age-price profile of an asset. Following the procedures employed by the Bureau of Labor Statistics in the U.S. and by the Australian Bureau of Statistics, a discount rate of 4% as a long-run average rate of return is assumed in deriving the age-price profile from the age-efficiency profile.

4.3 Aggregate capital values and growth rates

To obtain the real growth rate of aggregate productive capital stock or of capital services (assumed to be a fixed proportion of the productive

capital stock), the growth rates of the different types of assets—structures, equipment, and "others"—at a particular point in time t are aggregated using the Tornqvist index T:

$$T_t = \prod_{i=1}^{3} Z_{it}^{(Share_{it}+Share_{it-1})/2} \tag{5}$$

Where Z denotes the growth rate of constant-price productive capital stock K.

The asset-specific weight in the Tornqvist index is the arithmetic mean of a previous-year and a current-year value denoting the share of this asset's user cost U_i in aggregate user costs U:

$$Share_{it} = U_{it} / \sum_{i=1}^{3} U_{it} \quad . \tag{6}$$

The user cost of a particular type of asset (type of productive capital) is defined as the rental rate times the current-price productive capital stock (q*K), with the rental rate covering depreciation and a rate of return, less appreciation of the asset during the period:

$$U_{it} = \left(\delta_{it} + r_t + \frac{q_{it}-q_{it-1}}{q_{it}}\right) * q_{it}K_{it} \quad . \tag{7}$$

In some variations of the user cost formula, in particular as used by the OECD and thus in our first four measures of capital stock here, the rental rate times the current-price productive capital stock is further multiplied by one plus this year's percentage change in the consumer price index.

The rate of depreciation follows from the age-price profile, and the rate of appreciation is obtained from the investment in fixed assets price index. The rate of return is unknown and the asset-specific user costs, thus, are unknown.

To solve equation (7), the rate of return is assumed to be identical across all types of assets. An economy-wide (province-specific) value of

user costs is obtained from the income accounts data as the sum of operating surplus, depreciation and a proportion of net taxes on production. The proportion of net taxes to include is "operating surplus plus depreciation" as a share of "operating surplus plus depreciation plus labor remuneration;" i.e., total income is attributed to labor (labor remuneration) and capital (operating surplus plus depreciation), and the final income component of net taxes on production is split proportionally between labor and capital. This economy-wide value of user costs equals the sum of the user costs of the three types of assets, which allows one to solve for the rate of return r_t in:

$$U_t = \sum_{i=1}^{3} U_{it} = \sum_{i=1}^{3} \left(\delta_{it} + r_t + \frac{q_{it} - q_{it-1}}{q_{it}} \right) * q_{it} K_{it} \qquad (8)$$

Once r_t is known, the asset-specific user costs (7) can be calculated, providing the shares (6) used in the Tornqvist index to obtain the real growth rate of capital services (5).

One shortcoming of this procedure is that in the first step, the age-price profile is derived using an assumed long-run rate of return, only to obtain a depreciation rate which then allows one to, in equation (8) solve for the current-year rate of return. Alternatively, one could not calculate an age-price profile and assume a depreciation rate in equations (7) and (8), thereby abandoning the consistency between age-efficiency and age-price profile. The advantage of this procedure is that one is not limited to the use of a rather unrealistic geometric age-efficiency profile.

The absolute value of the aggregate wealth capital stock, in constant or current prices, is simply the sum of the asset-specific wealth capital stock. To obtain a real growth rate for aggregate wealth capital stock, asset-specific constant-price wealth capital stock is aggregated using the Tornqvist index,

with current-price asset values used to calculate the shares that enter the weights.

Tables of appendix D

Table D.1   Wealth Capital Stock at Constant Prices, 1985-2012（hyperbolic）
Unit: 100 millions of 1985 Yuan

Province	1985	1990	1995	2000	2005	2010
Beijing	52	117	244	460	901	2021
Tianjin	38	68	164	332	663	2460
Hebei	97	149	256	497	895	2568
Shanxi	54	81	111	166	304	954
Inner Mongolia	31	50	98	160	419	2061
Liaoning	104	166	255	347	594	1825
Jilin	40	64	105	161	292	1332
Heilongjiang	69	107	152	233	364	933
Shanghai	72	134	256	492	825	1644
Jiangsu	100	223	507	976	1952	5529
Zhejiang	15	31	157	441	1075	2734
Anhui	46	81	113	171	277	751
Fujian	32	51	94	190	347	1064
Jiangxi	45	66	109	183	374	1117
Shandong	123	216	355	603	1197	3424
Henan	100	164	263	472	873	3264
Hubei	71	107	182	359	625	1741
Hunan	49	74	106	165	282	864
Guangdong	97	166	394	805	1575	4148
Guangxi	45	57	83	129	224	947
Hainan	8	16	44	68	106	270
Chongqing	39	58	93	169	362	1034
Sichuan	74	111	163	282	513	1395
Guizhou	29	41	54	86	162	431
Yunnan	76	91	138	215	340	922
Tibet	6	9	18	32	85	303
Shaanxi	41	71	101	148	253	812

Province	1985	1990	1995	2000	2005	2010
Gansu	38	53	67	95	168	420
Qinghai	14	20	36	78	175	530
Ningxia	14	19	25	35	67	217
Xinjiang	32	53	104	168	287	682
National	**2109**	**3277**	**5378**	**8715**	**15215**	**38301**

Table D.2　Wealth Capital Stock at Constant Prices, 1985-2012（geometric）

Unit: 100 millions of 1985 Yuan

Province	1985	1990	1995	2000	2005	2010
Beijing	44	102	211	391	769	1698
Tianjin	33	57	143	285	567	2154
Hebei	79	122	215	422	759	2207
Shanxi	45	66	90	137	258	827
Inner Mongolia	26	42	83	134	370	1826
Liaoning	83	137	212	284	501	1576
Jilin	33	53	88	133	248	1164
Heilongjiang	58	88	124	192	301	810
Shanghai	61	113	219	417	691	1359
Jiangsu	86	193	440	833	1672	4736
Zhejiang	13	27	144	390	941	2321
Anhui	39	68	93	141	231	644
Fujian	27	43	80	162	295	917
Jiangxi	36	53	91	153	320	956
Shandong	104	181	296	505	1022	2930
Henan	83	136	219	397	742	2849
Hubei	58	88	153	305	527	1498
Hunan	40	60	86	136	236	747
Guangdong	82	139	344	691	1348	3544
Guangxi	36	45	68	107	189	826
Hainan	7	13	39	57	88	232
Chongqing	32	48	77	143	313	890

Sichuan	62	91	134	236	434	1192
Guizhou	24	33	43	71	137	371
Yunnan	58	71	114	179	285	801
Tibet	5	7	15	27	75	266
Shaanxi	34	59	82	121	211	704
Gansu	29	43	53	77	141	359
Qinghai	11	16	30	67	151	462
Ningxia	11	15	20	29	57	188
Xinjiang	27	44	89ES	140	240	580
National	**1730**	**2693**	**4478**	**7245**	**12791**	**32598**

References

China Statistical Yearbook.Zhongguo tongji nianjian (Statistical Yearbook of China). Beijing: Zhongguo tongji chubanshe, various years.

GDP 1952-1995. *Zhongguo guonei shengchan zongzhi hesuan lishi ziliao* (Historical Material on China's GDP Accounting). Compiled by China's National Bureau of Statistics, National Income Accounts Division. Dalian: Dongbei caijing daxue chubanshe, 1997.

NBS website. http://www.stats.gov.cn (data section)

OECD. *OECD Manual: Measuring Productivity – Measurment of Aggregate and Industry-Level Productivity Growth*. Paris: OECD, 2001.

OECD. *OECD Manual: Measuring Capital*, second edition. Paris: OECD, 2009.

Sixty Years. Xin zhongguo liushi nian tongji ziliao huibian (Comprehensive atatistical materials on 60 years of the New China [1949-2008]). Beijing: Zhongguo tongji chuba*n*she, 2010.

Reference List

Abraham, Katharine G. (2010), "Accounting for Investments in Formal Education", *Survey of Current Business,* pp. 42-53.

Abraham, Katharine (2005), *Beyond the Market: Designing Nonmarket Accounts for the United States*, National Academies Press, Washington, D.C.

Ahlroth, Sofia, A. and Bjorklund, A. Forslund (1997), "The Output of the Swedish Education Sector", *Review of Income and Wealth* Volume 43, Number 1, pp. 89-104.

Ashenfelter, Orley and Krueger, Alan (1994), "Estimates of the Economic Return to Schooling from a New Sample of Twins", *American Economic Review* 84, December, pp.1157-73.

Becker, G. (1964), *Human Capital*, 2nd edition, Columbia University Press, New York.

Brandt, Loren and Holz, Carsten (2006), "Spatial price differences in China: estimates and implications", *Economic Development and Cultural Change* 55, 43–86.

Bureau of Statistics of China (2008), *China Population Statistical Yearbook 2008*, China Statistics Press, Beijing.

Cai, Fang and Wang, Dewen(1999), "The Sustainability of China's Economic Growth and Labor Contributions", *Economic Research* (Chinese) 10, pp. 62-68.

Christian, Michael (2010), "Human Capital Accounting in the United States, 1994-2006", *Survey of Current Business*, June 2010, pp. 31-36.

Coleman, J. (1990), *Foundations of Social Theory*, Belknap.

Démurger, Sylvie (2001), "Infrastructure Development and Economic Growth: An Explanation for Regional Disparities in China?" *Journal of Comparative Economics* 19, pp. 95-117.

Ederer, Peer (2006). "Innovation at Work: The European Human Capital Index", *The Lisbon Council Policy Brief*, in conjunction with Deutschland Denken and Zeppelin University, Brussels, October 12.

Ederer, Peer, Schuller, Philipp, and Willms, Stepham (2007), "Innovation at work：The European Human Capital Index", *The Lisbon Council Policy Brief*, Brussels, Volume 2, Number 3,.

Fleisher, Belton and Chen, Jian (1997), "The Coast-Noncoast Income Gap, Productivity and Regional Economic Policy in China", *Journal of Comparative Economics* 252: pp. 220-236.

Fleisher, Belton, Sabirianova, Klara, and Wang, Xiaojun (2005), "Returns to Skills and the Speed of Reforms: Evidence from Central and Eastern Europe, China, and Russia", *Journal of Comparative Economics* 33(2), pp. 351-370.

Fleisher, Belton and Wang, Xiaojun (2004), "Skill Differentials, Return to Schooling, and Market Segmentation in a Transition Economy: the Case of Mainland China", *Journal of Development Economics* 73, pp. 315-328.

Fleisher, Belton, Li, Haizheng , and Zhao, Minqiang (2011), "Human Capital, Economic Growth, and Regional Inequality in China", *Journal of Development Economics* 92(2), pp. 215-31.

Fraumeni, Barbara M. (2006), "A Human Capital Approach to Measuring Government Education Output", presentation at the OECD/ONS/Government of Norway Workshop on the Measurement of Non-market Output and Health, London, England, UK, October 4.

Fraumeni, Barbara M. (2008a), "Human Capital and Investment in Education: A Streamlined Approach", presentation at the Fondazione Giovanni Agnelli/OECD Workshop on the Measurement of Human Capital, Turin, Italy, November 3.

Fraumeni, Barbara M. (2008b), "Human Capital: From Indicators and Indexes to Accounts," paper presented at the Fondazione Giovanni Agnelli/OECD Workshop on the Measurement of Human Capital, Turin, Italy, November 4.

Fraumeni, Barbara M. (2009), "Further Comments: Results by Country and Future Efforts", presentation at China Center for Human Capital and Labor Market Research , Central University of Finance and Economics, Beijing, China, June 19.

Greaker, Mads and Liu, Gang (2008) "Measuring the Stock of Human Capital for Norway: A Lifetime Labour Income Approach," paper presented at the Fondazione Giovanni Agnelli/OECD Workshop on the Measurement of Human Capital, Turin, Italy, November 3.

Griliches, Zvi (1977), "Estimating the Returns to Schooling." *Econometrica* 45, pp.1-22.

Gu, Wulong and Wong, Ambrose (2008), "Human Development and its Contribution to the Wealth Accounts in Canada," paper presented at the Fondazione Giovanni Agnelli/OECD Workshop on the Measurement of Human Capital, Turin, Italy, November 3.

Gu, Wulong and Wong Ambrose (2009), "Human Development and its Contribution to the Wealth Accounts in Canada," paper presented at the Canadian Economic Association Annual Conference, May 29.

Heckman, James J. (2005), "China's Human Capital Investment", *China Economic Review* 16, pp. 50-70.

Holz, Carsten A. (2006), "New Capital Estimates for China", *China Economic Review* 17, pp. 142-185.

Hou, Yafei and Cao, Yin (2000), "Analysis of the Quality of Human Capital Stock", *Chinese Journal of Population Science* (Chinese) 6, pp. 43-48.

Hu, Angang(2002), "From the Most Populous Country to A Country with Great Power of Human Capital:1980-2000", *Chinese Journal of Population Science* (Chinese) 5, pp. 1-10.

Hu, Yongyuan(2005),
"Human Capital and Economic Growth: A Co-integration Analysis", *Science and Technology Management Research* (Chinese) 4, pp. 88-90.

Jorgenson, Dale W. and Fraumeni, Barbara M. (1989), " The Accumulation of Human and Non-Human Capital, 1948-1984," in R. Lipsey and H. Tice eds., *The Measurement of Saving, Investment and Wealth*, Chicago, University of Chicago Press, NBER, pp. 227-282.

Jorgenson, Dale W. and Fraumeni, Barbara M. (1992a), "Investment in Education and U.S. Economic Growth," *Scandinavian Journal of Economics,* Vol. 94, supplement, pp. S51-70.

Jorgenson, Dale W. and Fraumeni, Barbara M. (1992b), "The Output of the Education Sector," in Z. Griliches, T. Breshnahan, M. Manser, and E. Berndt eds., *The Output of the Service Sector*, Chicago, NBER, 1992, pp. 303-341.

Jorgenson, Dale W. and Yun, K – Y (1990), "Tax Reform and U.S. Economic Growth", *Journal of Political Economy* 98, pp. S151-193.

Jorgenson, Dale W. , Ho, Mun S., and Stiroh, Kevin J. (2005), *Information Technology and the American Growth Resurgence*, volume 3 of Productivity, Harvard University Press, Cambridge, MA.

Stiglitz, Joseph E., Sen, Amartya, and Fitoussi, Jean-Paul (2009), Report by the Commission on the Measurement of Economic Performance and Social Progress, September 14.

Keeley, Brian (2007), *Human Capital, How What You Know Shapes Your Life*, OECD Insights, Paris.

Kendrick, J. (1976), *The Formation and Stocks of Total Capital*, NBER, Columbia University Press, New York, N.Y.

Koman, R. and Marin, D. (1997), "Human Capital and Macroeconomic Growth: Austria and Germany 1960-1997. An Update", *IAS Economics Series* No. 69.

Laroche, M. and Merette, M. (2000), "Measuring Human Capital in Canada",   Ministry of Finance of Canada.

Le, Trinh Van Thi, Gibson, John, and Oxley, Les (2005), "Measuring the Stock of Human Capital in New Zealand" , *Mathematics and Computers in Simulation*, Volume 68, Issue 5-6, May, pp. 485-98.

Le, Trinh, Gibson, John, and Oxley, Les (2003), "Cost- and Income-Based Measures of Human Capital", *Journal of Economic Surveys* 17(3),   pp. 271-307.

Le, Trinh, Gibson, John, and Oxley, Les (2005), "Measures of Human Capital: A Review of the Literature." *New Zealand Treasury Working Paper* 05/10.

Li, Haizheng (2003), "Economic Transition and Returns to Education in China", *Economics of Education Review* 2 317-328.

Liu, Zhiqiang (1998), "Earnings, Education, and Economic Reforms in Urban China", *Economic Development and Cultural Change* 46, pp.697-725.

Liu, Zhiqiang (2007), "The External Returns to Education: Evidence from Chinese Cities", *Journal of Urban Economics* 61 (3), pp. 542-564.

Maurer-Fazio, Maggie (1999), "Earnings and Education in China's Transition to a Market Economy: Survey Evidence from 1989 and 1992." *China Economic Review* 10, pp. 17-40.

Mincer, Jacob (1974), *Schooling, Experience and Earnings*, Columbia University Press, New York.

Mira, M. and Liu, G. (2010), "The OECD Human Capital Project: Progress Report," paper prepared for the 31st General Conference of the International Association for Research in Income and Wealth, St. Gallen, Switzerland, August 22-28 to the bibliography.

Mulligan, C. B., and Sala-i-Martin, X. (1997), "A Labor Income-based Measure of the Value of Human Capital: An Application to the States of the United States", *Japan and the World Economy* 9(2), pp. 159-191.

OECD (2001), *The Well-being of Nations: The Role of Human and Social Capital*, OECD, Paris.

Qian, Xuya and Liu, Jie(2007), "Empirical Study of Human Capital in China", *Statistic Research* (Chinese) 3, pp. 39-45.

Schultz, T. (1961), "Investment in Human Capital", *American Economic Review* 51(1), pp. 1-17.

Stroombergen, A., Rose, D. and Nana, G. (2002), "Review of the Statistical Measurement of Human Capital", *Statistics New Zealand working paper*.

Wang, Dejin and Xiang, Rongmei (2006), "Estimates of Human Capital Stock in China", *Statistics and Decision* (Chinese) 5, pp. 100-102.

Wang, Xiaojun, Fleisher, Belton, Li, Haizheng, and Li, Shi (2009) "Access to Higher Education and Inequality: A Chinese Experiment." *IZA Discussion Paper* No. 2823.

Wei, Hui (2008) "Developments in the Estimation of the Value of Human Capital in Australia," paper presented at the Fondazione Giovanni Agnelli/OECD Workshop on the Measurement of Human Capital, Turin, Italy, November 3.

World Bank (1997), "Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development", *Environmentally Sustainable Development Studies and Monographs Series* No. 17, Washington, D.C.

World Bank (2006), *Where is the Wealth of Nations, Measuring Capital for the 21st Century*, The International Bank for Reconstruction and Development/The World Bank, Washington, DC.

Yang, Dennis (2005), "Determinants of Schooling Returns during Transition: Evidence from Chinese Cities." *Journal of Comparative Economics* 33, pp. 244-264.

Yu, Shujing(2008), "Comprehensive Evaluation and Dynamic Analysis on China's Provincial-level Regional Human Capital", *Modern Management Science* (Chinese) 4, pp. 36-37.

Zhang, Fan(2000), "Estimates of Physical Capital and Human Capital in China", *Economic Research* (Chinese) 8, pp. 66-71.

Zhang Jun, Wu, Guiying, and Zhang, Jipeng (2004), "Compilation of China's Provincial Capital Stock Series Using Perpetual Inventory Method, 1952-2000", *Economic Research* (Chinese), October.

Zhang, Junsen, Zhao, Yaohui, Park, Alberb, and Song, Xiaoqing (2005), "Economic Returns to Schooling in Urban China, 1988-2001", *Journal of Comparative Economics* 33, pp. 730-752.

Zhou, Delu (2005),"Population-based Indicators of Human Capital Accounting Theory and Empirical Study", *Chinese Journal of Population Science* (Chinese) 3, pp. 56-62.

Zhou, Ya (2004), "Study on the Distribution Differences of China's Human Capital", *Education & Economics* (Chinese) 2, pp. 17-20.

Zhu, Pingfang and Xu, Dafeng(2007), "Estimation of Human Capital in Chinese Cities", *Economic Research* (Chinese) 8, pp. 84-95.