China Human Capital Report Series

Human Capital in China
2022

Principal Investigator
Haizheng Li

Center for Human Capital and Labor Market Research
Central University of Finance and Economics
Beijing, China

December 2022

This project is funded by

National Natural Science Foundation of China
and
Central University of Finance and Economics

Research Team Members

Principal Investigator

Haizheng Li	Special-term Professor, Center for Human Capital and Labor Market Research (CHLR), Central University of Finance and Economics (CUFE) Professor, Georgia Institute of Technology

Faculty Team Members

Belton Fleisher	Special-term Professor and Senior Fellow, CHLR (2008- present) Professor Emeritus of Economics, The Ohio State University Editor, *China Economic Review*
Barbara Fraumeni	Special-term Professor and Senior Fellow, CHLR (2008- present) Professor Emerita of Public Policy, University of Southern Maine
Zhiqiang Liu	Special-term Professor, CHLR (2008- present) Professor of Economics, State University of New York at Buffalo
Xiaojun Wang	Special-term Professor, CHLR (2008- present) Associate Professor of Economics, University of Hawaii at Manoa
Cynthia Bansak	Special-term Professor, CHLR (2018- present) Professor of Economics, St. Lawrence University
Sophie Xuefei Wang	Associate Professor, CHLR (2012- present)
Fanzheng Yang	Associate Professor, CHLR (2013- present)
Ning Jia	Associate Professor, CHLR (2015- present)
Nina Yin	Associate Professor, CHLR (2015- present)
Chen Huang	Assistant Professor, CHLR (2019- present)

Yulong Chen	Assistant Professor, CHLR (2020-present)
Yi Zhang	Assistant Professor, CHLR (2020-present)
Xianfang Xiong	Assistant Professor, CHLR (2021-present)

2022 Student Team

Project Management Committee

Manager	Xu Wang
Members	Lingyan Hu, Zengxiu Kang, Chunxiao Zhang, Xiaofei Jin

Graduate Students, CHLR

Lin Bo, Xue Chen, Shuxin Deng, Xu Fang, Xiaoyuan Kang, Mengyao Nie, Chang Qian, Kai Wang, Yifan Wang, Zhe Wang, Mengyuan Wu, Luhui Xu, Wentao Xu, Jin Xu, Sijia Zhang, Yue Zhao, Zhiwen Zheng, Tengxiao Zhu

Doctoral and postdoctoral students participating in the project:

Xiaofei Jin	Doctoral Student, CHLR (2020- present)
Chunxiao Zhang	Doctoral Student, CHLR (2020- present)
Mingyu Ma	Doctoral Student, CHLR (2019- present)
Xin Li	Doctoral Student, CHLR (2019- present)
Yiting Xu	Doctoral Student, CHLR (2018- present)

Administrative Members at the CHLR

Rong Huang	Executive Assistant to Director/Project Coordinator (2015- present)
Shujia Zhao	Project Coordinator (2018- present)

2021 Student Team

Project Management Committee

Manager	Hao Zhong
Members	Xiaoxue Chang, Xinwei Guo, Zhebin Zhang

Graduate Students, CHLR

Yifan Chen, Jingfei Gao, Li He, Lingyan Hu, Xiaofei Jin, Zengxiu Kang, Wenbo Li, Yi Li, Hongyu Lin, Yaxin Ou, Qi Shao, Xu Wang, Chunxiao Zhang, Lianfeng Zhang, Meilian Zhang

2020 Student Team

Project Management Committee

Manager	Chaoqi Wang
Members	Lingyan Shi, Yiting Xu, Hanjun Wang

Graduate Students, CHLR

Xiaoxue Chang, Xiaojie Gong, Xinwei Guo, Yufeng Hong, Li Li,Ruobing Li, Zuo Li, Ruohong Xu, Lei Shi, Rui Tong, Xiaoyu Xiang, Ziru Wang, Hao Zhong, Wei Zhang, Zhebin Zhang

2019 Student Team

Project Management Committee

Manager	Mingyu Ma

Members	Xin Li, Yan Su, Xinli Xu, Zesen Ye

Graduate Students, CHLR

Xian Dong, Yue Du, Xiaoxuan He, Huan Liu, Lingyan Shi, Yabing Tang, Chaoqi Wang, Hanjun Wang, Guangyin Wen, Heng Xu, Hongyu Yang

2018 Student Team

Project Management Committee

Manager	Shuning Yuan
Members	Ce Guo, Jiantao Ma

Graduate Students, CHLR

Siyao Dai, Lingxiao Huang, Xin Li, Junjian Liu, Mingyu Ma, Xinli Xu, Zeshen Ye, Xin Zhang, Yong Zhang

2017 Student Team

Project Management Committee

Manager	Yue Sun
Members	Youfang Gao, Yue Guo, Wenjun Mao, Hongbin Pan

Graduate Students, CHLR

Ce Guo, Kerui Geng, Xiaowen Liang, Jiantao Ma,

Kun Yi, Shuning Yuan, Ping Zhang,

2016 Student Team

Project Management Committee

Manager	Liyuan Ma
Members	Zhiying Bian, Miaomiao Mo, Bing Wang

Graduate Students, CHLR

Hongchen Ba, Youfang Gao, Yue Guo, Wenjun Mao,
Hongbin Pan, Yue Sun, Huiying Wang, Yi Yang,
Kanran Yin, Yisi Zeng, Qiuyue Zhang,

2015 Student Team

Project Management Committee

Manager	Xiang Zheng
Members	Xing Chen, Qiang Gao, Liyuan Ma, Yuzhe Ning, Xibo Wan
	Bing Yan, Yangyang Zheng,

Graduate Students, CHLR

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

2014 Student Team

Project Management Committee

Members	Yulong Chen, Hanqing You, Haibo Zhao, Xiang Zheng

Graduate Students, CHLR

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 Student Team

Project Management Committee

Members Tingting Ding, Junzi He, Bo Li

Graduate Students, CHLR

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 Student Team

Project Management Committee

Members Lu Feng, Yang He, Bo Li, Wenwei Li, Yan Li, Qinyi Liu

Graduate Students, CHLR

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

2011 Student Team

Graduate Students, CHLR

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

Biao Luo, Lina Zhai, Li Zhang

2010 Student Team

Graduate Students, CHLR

Jing Bai, Jing Fang, Chao Guo, XinGao, XiaoyanGan,

Jun Li, Jin Li, Tianyi Liu, Dandan Wu, YuanyuanXin,

Pengfei Xing, Yanqiu Yang, Chen Zhang, Linghua Zhang

Graduate Students, School of Economy and Trade, Hunan University

Lin Ding, Hongling Wang, Qiujie Wu, Xiaomin Yan

Graduate Student, Georgia Institute of Technology： Chongyu Lu, Yuxi Xiao

2009 Student Team

Graduate Students, CHLR

Huajuan Chen, Yuhua Dong, Mengxin Du, Jinquan Gong,

Jingjing Jiang, Rui Jiang, Qian Li, Sen Li,

Chen Qiu, Xinping Tian, Mo Yang

Former Faculty Team Members：

Shan Li	Assistant Professor, CHLR (2016-2020)
Li Yu	Associate Professor, CHLR (2010-2018)
Fang Xia	Assistant Professor, CHLR (2013-2016)
Kang-Hung Chang	Associate Professor, CHLR (2009-2015)
Chun-Wing Tse	Assistant Professor, CHLR (2012-2015)
Ake Blomqvist	Special-term Professor, CHLR (2009-2011)

Song Gao	Assistant Professor, China Academy of Public Finance and Public Policy, CUFE (2009-2010)

Former doctoral and postdoctoral students participated in this project:

Yan Su	Doctoral Student, CHLR (2017-2022)
Xing Chen	Doctoral Student, CHLR (2015-2020)
Yuzhe Ning	Doctoral Student, CHLR (2015-2020)
Dazhi Guo	Doctoral Student, CHLR (2012-2017)
Yuefang Qiu	Doctoral Student, CHLR (2012-2017)
Junzi He	Doctoral Student, CHLR (2013-2017)
Yue Sun	Doctoral Student, CHLR (2013-2017)
Tang Tang	Doctoral Student, CHLR (2012-2016)
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 (2011-2014), Georgia Institute of Technology (2014-2018)
Xiaobei Zhang	Doctoral Student, Hunan University (2010-2013)
Zhiyong Liu	Post-doctoral fellow, CHLR (2011-2013)

Former administrative Members at the CHLR

Jing Xiao	Graduate Coordinator (2010- 2018)
Beiwen Sun	Executive Assistant to Director (2011-2016)

Hao Deng	Graduate Coordinator / Executive Assistant to Director (2008-2011)
Ruiju Wang	Executive Assistant to Director (2008-2010)

Invited Commentator of the Human Capital Report for Each Year[1]

Invited Commentator of the Thirteenth Human Capital Report (December 11, 2021)

Steven Lehrer	Professor of Economics, Queen's University, Canada
Fangwen Lu	Professor of School of Economics, Renmin University of China

Invited Commentator of the Twelfth Human Capital Report (December 5, 2020)

Yongmiao Hong	Director and Professor of Economics and Management, University of Chinese Academy of Sciences (UCAS)
Jong-Wha Lee	Professor of Economics, University of Korea, Korea

Invited Commentator of the Eleventh Human Capital Report (December 14, 2019)

Yaojiang Shi	Director, The Center for Experimental Economics in Education, China

Invited Commentator of the Tenth Human Capital Report (December 9, 2018)

Guoen Liu	Professor of Economics, Peking University National Development Research Institute; Director of Center for Health Economic Research
Zhuo Chen	Professor, University of Georgia, USA

Invited Commentator of the Ninth Human Capital Report (December 9, 2017)

Junjie Hong	Professor and Dean, School of International Economics and Trade, University of International Business and Economics

[1] The first and the fifth Human Capital Report do not invite commentator.

Weiguo Yang	Dean, School of Labor and Human Resources, Renmin University of China

Invited Commentator of the Eighth Human Capital Report (December 10, 2016)

Min Tang	State Council Counselor; Vice President of Youcheng Entrepreneur Foundation for Poverty Alleviation
Boqing Wang	Founder of MyCOS; Vice President of China International Talent Professional Committee

Invited Commentator of the Seventh Human Capital Report (December 12, 2015)

Gary Jefferson	Professor of Brandeis University, USA
Scott D. Rozelle	Professor of Stanford University, USA
Shi Li	Professor of Beijing Normal University
Tao Xin	Professor of Beijing Normal University

Invited Commentator of the Sixth Human Capital Report (October 12, 2014)

Shujie Han	Director of Editorial Department of China Human Resources Development Magazine
Martina Lubyova	Director of the Institute of Prediction, Slovak National Academy of Sciences
Peter F. Orazem	Professor, Lowa State University, USA

Jeffrey S. Zax	Professor, University of Colorado, Boulder

Invited Commentator of the Fourth Human Capital Report (December 12, 2012)

Weizhong Hou	Professor of Economics, California State University, Long Beach
Weiping Li	Chief Expert of the Academy of Human Resources and Social Security
Tao Yang	Professor, Darden School of Business, University of Virginia, USA
Yansui Yang	Professor, School of Public Administration, Tsinghua University

Invited Commentator of the Third Human Capital Report (October 28, 2011)

Desheng Lai	Professor and Dean, School of Economics and Business Administration, Beijing Normal University
Yang Du	Professor, Institute of Population and Labor Economics, Chinese Academy of Social Sciences
Zhaoming Gui	Professor, School of Management, Wuhan Institute of Technology

Invited Commentator of the Second Human Capital Report (October 15, 2010)

Ardo Hansson	Chief Economist, World Bank in China
Danling Zhao	Deputy Inspector, Personnel Department, Ministry of Education
Yuetian Li	Deputy Director, Policy Research Division, Ministry of Human Resources and Social Security
Guoqiang Long	Minister of Foreign Economic Research, Development Research

Center of the State Council

Pictures of Project Team for Each Year

2022 Project Team Student Members

2021 Project Team Student Members

2020 Project Team Student Members

2019 Project Team Student Members

2018 Project Team Student Members

2017 Project Team Student Members

2016 Project Team Student Members

2015 Project Team Student Members

2014 Project Team Student Members

2013 Project Team Student Members

2012 Project Team Student Members

2011 Project Team Student Members

2010 Project Team Student Members

(This picture was taken at the 2009 release of the 1st China Human Capital Report.)

2009 Project Team Student Members

(In the middle, Professor Barbara Fraumeni, the late Nobel Laurent Professor Kenneth Arrow, Professor Dale Jorgenson (late) and his wife Linda.)

A Brief Introduction to

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 international research center for the study of human capital and labor markets, focusing on China and related economies.

Current members of the advisory board include Nobel Laureate James Heckman and previously include Professor Dale W. Jorgenson of Harvard University, founder of the income-based method for measuring human capital, who recently passed away.

The major research in the Center is related to the broad area of human capital and labor markets, including but are not limited to human capital and skill measurement, human capital investment, human capital mobility, human capital and innovation, and health economics. The main research project at the Center level is China human capital measurement.

All faculty and research fellows of the CHLR attended major universities in North America and Europe, and some are senior professors at U.S. universities. Currently the Center has 8 full-time faculty members, 5 special-term professors, and 5 senior research fellows.

The CHLR has Master's, doctoral and post-doctoral programs. The Center's graduate programs are internationally oriented. The curriculum and instruction are rigorously designed following research universities in the United States and some master's students continue as PhD students in the US, UK, Europe and Canada. All courses are taught in English. As of September 2022, 1 post-doctoral student, 11 doctoral students and 144 master students have graduated. Currently, the Center has 52 students, with 45 Master's students and 7 doctoral students enrolled in the program.

The Impact of the Human Capital Project and its in-depth research project

The research project "China's Human Capital: Measurement and Index Construction," is conducted by the 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 measurement metrics, 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. At the same time, it also provides preliminary work for China's human capital measurement methods and indicators to become a part of the international human capital index system, and for human capital to be incorporated into the national wealth measurement system as a part of the national economic account.

The project is led by Professor Haizheng Li. The research team includes Professor Barbara M. Fraumeni (a pioneer scholar in developing the Jorgenson-Fraumeni method of human capital calculation), all full-time and special-term professors, graduate students, and administrative staff at the CHLR.

The human capital project was established in 2009 and is one of the landmark achievements of the Central University of Finance and Economics. The project has been funded by the National Natural Science Foundation of China for twelve consecutive years and entered the final defense of the key project of the National Natural Science Foundation of China in 2019 (the project was not approved due to the problem of author order labeling).

The project team has issued "China Human Capital Report" (Chinese and English version) annually for 13 consecutive years. Participants at the conference included the Nobel Prize winner Professors James J. Heckman and Kenneth J. Arrow (late), Professor Dale Jorgenson (late) of Harvard University, officials from the World Bank and OECD, and many other international scholars; Zhenghua Jiang, vice chairman of the National People's Congress, Keng He, vice chairman of the Finance

and Economics Committee, Guoqiang Long, deputy director of the Development Research Center of the State Council, Xianchun Xu, deputy director of the National Bureau of Statistics, and many domestic scholars.

After the "China Human Capital Report 2020" was released on December 5, 2020, the topic initiated by China News Network based on part of the "China Human Capital Report 2020" on the Weibo platform, triggered a heated discussion and ranked at the top of the hot list. By 18:00 on December 19, 2020, the related topics had been read 17.83 million times and discussed 2,306 times. Nearly 20 mainstream media outlets, including CNR.cn, QQ.com, Sina Education, Workers' Daily, and China News Network, made special reports on the main contents of the report from different perspectives. Subsequently, more than 10 mainstream media such as People's Daily Online, Guangming.com, China.org.cn, Xinhuanet.com, China Youth Daily, and so on reprinted it successively.

After the release of China Human Capital Report 2021 on December 11, 2021, China Business Network concluded with "Report: The title "The average age of the national labor force population is 38.8 years old, the highest in the three northeastern provinces" made a special report on the human capital report from the aspects of the average age and education level of the national labor force population. Subsequently, more than a dozen media reprinted the special report on the website and Weibo platform, which has produced a wide social impact. In the nearly ten days after the conference ended, there were special reports and reports on human capital. Among them, Guangming Daily reported on December 14, 2021 with the title of "2021 China Human Capital Index Report released". As of December 20, 2021, nearly 20 major media outlets have featured the release of the report and different aspects of its main content.

China's human capital report series and the calculation results, intermediate data, and original data over the years have been widely used, forming a Chinese human capital database based on panel data. The relevant information and data can be downloaded from the official websites of the Human Capital Center and the Joint Data Research Center of the Central University of Finance and Economics and the University of Electronic Science and Technology of China for free use by the community：

The official website of Center for Human Capital and Labor Market Research:

http://humancapital.cufe.edu.cn/rlzbzsxm.htm

The official website of Central University of Finance and Economics & University of Electronic Science and Technology of China Joint Research Data Center:

http://cedcdata.cufe.edu.cn/cedc/metadata/list.html

Since the publication of the report series on China's Human Capital compiled by the research results in 2009, it has received much attention from the international and domestic academia, international organizations, and Chinese government departments, and produced a wide range of social impacts.

The Impact of China Human Capital Report series

I. Papers published based on China Human Capital Report (in reverse chronological order):

- "Human Capital Measurement: from Individual to Aggregate", Haizheng Li, Yan Su, Xianfang Xiong and Yiting Xu, *China Journal of Econometrics*, Vol. 3, pp. 518-540, 2021.
- "Regional Distribution and Dynamics of Human Capital in China 1985-2014", Barbara M. Fraumeni, Junzi He, Haizheng Li and Qinyi Liu, *Journal of Comparative Economics*, Volume 47, pp. 853-866, 2019.
- "Physical Capital Estimates for China's Provinces, 1952-2015 and Beyond", Holz, A. Carsten and Yue Sun, *China Economic Review*, Volume 51, pp. 342-357, 2018.
- "Advance in Human Capital and Economic Growth: A Comparison among East, Central and Western Regions", Zhiyong Liu, Haixuan Li, Yongyuan Hu and Chenhua Li, *Economic Research Journal*, Volume 53, pp. 50-63, 2018.
- "Regional Distribution and Dynamics of Human Capital in China 1985-2014: Education, Urbanization, and Aging of the Population", Haizheng Li, Junzi He, Qinyi Liu, Barbara M. Fraumeni and Xiang Zheng, National Bureau of Economic Research (NBER), working paper, No. 22906, 2016.
- "Human Capital Estimates in China: New Panel Data 1985-2010", Haizheng Li, Qinyi Liu, Bo Li, Barbara M. Fraumeni and Xiaobei Zhang, *China Economic Review*, Volume 30, pp.397-418, 2014.
- "China's Human Capital Measurement: Method, Results and Application", Haizheng Li, Bo Li, Yuefang Qiu, Dazhi Guo and Tang Tang, *Journal of Central University of Finance and Economics*, Volume 5, pp. 69-78, 2014.
- "Regional Distribution and Development of Human Capital in China", Haizheng Li, Na Jia, Xiaobei Zhang and Barbara M. Fraumeni, *Economic*

Research Journal, Volume 48, pp. 49-62, 2013.

- "Human Capital in China, 1985-2008", Haizheng Li, Yunling Liang, Barbara M. Fraumeni, Zhiqiang Liu and Xiaojun Wang, *Review of Income and Wealth*, Volume 59, pp. 212-234, 2013.
- "Human Capital Measurement and Index Construction in China", Haizheng Li, Yunling Liang, Barbara M. Fraumeni, Zhiqiang Liu and Xiaojun Wang, *Economic Research Journal*, Volume 45, pp.326-353, 2010. (Reprinted in China Social Science Digest, 2010, No. 12.)

  "Human Capital Index in China", Haizheng Li, Barbara M. Fraumeni, Zhiqiang Liu and Xiaojun Wang, National Bureau of Economic Research (NBER), working paper, 2012 (http://papers.nber.org/papers/w15500).

II. Books/Book Chapters published based on China Human Capital Report:

- "Human Capital of Mainland China, Hong Kong and Taiwan, 1997-2018", Xianfang Xiong, Xing Chen, Yuzhe Ning, Haizheng Li and Belton M. Fleischer, Chapter 6, in: Measuring Human Capital, Barbara M. Fraumeni, editor, Cambridge, MA, USA: Academic Press, 139-166, forthcoming, 2021.
- "Senior Expert to Review the Results and Analysis of Human Capital Accounts", Report to the World Bank, Barbara Fraumeni, 2017.
- "Human Capital and Physical Capital Comparison of Beijing", Haizheng Li, Yue Sun, Yuefang Qiu and Dazhi Guo, in: Beijing Human Resources Development Report 2015-2016, Beijing Human Recourses Bluebook Series, edited by Minhua Liu, Social Science Literature Press, Beijing, China, in Chinese, 2016.
- "Human Capital Comparison among Beijing, Tianjin and Hebei Province", Haizheng Li, Dazhi Guo and Yuefang Qiu, in: Beijing Human Resources Development Report 2013-2014, Beijing Human Recourses Bluebook Series, edited by Miao Yu, Social Science Literature Press, Beijing, China, in Chinese, 2014.
- "The Rural-Urban Disparity of Human Capital in China", Haizheng Li, Xiaobei Zhang, Na Jia and Yunling Liang, Chinese Economists Society Presidential Forum, in: Economic Reform and Future Development Directions, edited by Yanling Yang and Kunwan Li, Nankai University Press, pp.209-227, 2012.
- "Human Capital in Beijing-A Measurement Based on the Jorgenson-Fraumeni Income Approach", Haizheng Li, Na Jia and Xiaobei Zhang, 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", Haizheng Li and Barbara M. Fraumeni, in: The Changing Wealth of Nations, Washington, DC: World Bank, Chapter 6, pp. 105-114, 2010.

III. Speeches and Presentations:

- May 3, 2022, the Human Capital Center project team was invited to attend "A Study on the Measurement of Human Capital Incorporating Educational,"

hosted by Professor Jong-wha Lee and his team at Korea University Quality and Corporate Management Skills. Professor Li Haizheng, the project leader, was invited to Korea University to participate in the international seminar offline, and had in-depth discussions with the professors and scholars of the Korean team on topics such as invisible human capital, education quality measurement, and management human capital.

- December 11, 2021, China Human Capital Report 2021 was released at the 13th International Conference on Human Capital (online conference).
- November 20, 2021, the project leader, Professor Haizheng Li, was invited to organize the 91st Annual meeting of Southern Economic Association and discuss human capital related issues in the Presidential Session Organizer.
- On September 22, 2021, Professor Li Haizheng, the project leader, was invited to attend a series of human capital courses held by School of Labor and Human Resources, Renmin University of China, and gave a special lecture on wage-based Human Capital Measurement: From Micro Individuals to Macro Aggregates.
- China Human Capital Report 2020 was released at the 12th International Seminar on Human Capital (online conference), December 5, 2020.
- Professor Haizheng Li was invited to organize two meetings of the 90th Annual Meeting of the Southern Economic Association to discuss issues related to human capital in the presidential session, November 21-23, 2020.
- Professor Haizheng Li was invited to speak as the keynote speaker at the 257th Shuangqing Forum, National Natural Science Foundation of China, "High-quality Economic Development and Human Capital" (online conference), September 21-22, 2020.
- The 11th International Symposium on Human Capital, Plenary Session Presentation, "Measuring China's Human Capital-2019", Beijing, China, December 14, 2019.
- Professor Haizheng Li was invited to speak as the keynote speaker at the 4th Migrants Health and Development Forum, "Migrants Data and Human Capital Research", Migrants Monitoring and Research Center, National Health Commission, December 7, 2019.
- Professor Haizheng Li was invited to attend the International Conference on "Challenges to Asia and Global Economy", Korea University, "Unobserved Human Capital and Regional Inequality: Evidence from China", Seoul, South Korea, May 31, 2019.
- The 10th International Symposium on Human Capital, Plenary Session Presentation, "Measuring China's Human Capital-2018", Beijing, China, December 9, 2018.
- Professor Haizheng Li was invited to attend the Society for Economic Measurement 2018 Conference, cosponsored by the Xiamen University, the University of Kansas, Carnegie Mellon University, and the Center for Financial Stability, "Human Capital Metrics and Their Impacts on Economic Development", Xiamen, China, June 8-10, 2018.
- Professor Haizheng Li was invited to attend the 5th World KLEMS Conference in Harvard University, invited plenary session presentation, "Human Capital Measures and Its Effect on Economic Convergence in China", Boston, USA,

June 4-5, 2018.

- The 9th International Symposium on Human Capital, Plenary Session Presentation, “Measuring China’s Human Capital-2017”, Beijing, China, December 10, 2017.
- Professor Haizheng Li was invited to attend the 61st World Statistics Conference, “Regional Distribution and Dynamics of Human Capital in China 1985-2014: Education, Urbanization, and Aging of the Population”, Marrakech, Morocco, July 18, 2017.
- The 8th International Symposium on Human Capital, Plenary Session Presentation, “Measuring China’s Human Capital-2016”, Beijing, China, December 10, 2016.
- Professor Haizheng Li was invited to attend the 2016 China Conference of the Chinese Economists Society, “Regional Distribution and Trend of China’s Human Capital 1985-2012: The Impact of Urbanization, Education, and Population Aging”, Shenzhen, China, June 12, 2016.
- Professor Haizheng Li was invited to attend the 7th International Symposium on Human Capital, Plenary Session Presentation, “Measuring China’s Human Capital-2015”, Beijing, China, December 12, 2015.
- Professor Haizheng Li was invited to speak as the keynote speaker at the keynote speaker at the 5th Changqing Expert Lecture, “Human Capital and Pre-college Education”, Beijing, China, June 16, 2015.
- Professor Haizheng Li was invited to speak as the keynote speaker at the Shaanxi Normal University, International Symposium: Human Capital and Challenge of economic growth in China, “Rural Human Capital in China and the Economic Growth in Future”, Xi’an, Shaanxi, June 6-7, 2015.
- Professor Haizheng Li was invited to attend the 6th International Symposium on Human Capital and Labor Markets and the Release of the China Human Capital Report, Plenary Session Presentation, “Human Capital in China 2014”, Beijing, China, 2014.
- Professor Haizheng Li was invited to take presentation at the University of Chicago, Symposium on China's Economy and Governance, “Reginal Distribution of Human Capital in China”, Haizheng Li, Chicago, USA, August 27, 2014.
- Professor Haizheng Li was invited to speak as the keynote speaker at the 26th Annual Meetings of the Chinese Economics Society of Australia, “Regional Distribution and Growth of China’s Human Capital 1985-2010: Urbanization, Education, and Aging”, Haizheng Li, Monash University, Melbourne, Australia, July 6-9, 2014.
- Professor Haizheng Li was invited as the speaker at the 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 3rd World KLEMS Conference: Growth and Stagnation in the World Economy, invited presentation, “Human Capital Estimates in China: New Panel Data 1985-2010,” Haizheng Li, Tokyo, Japan, May 19-20, 2014.
- American Economic Association Annual Meeting, “Human Capital Estimates in China, New Panel Data 1985-2010”, Haizheng Li, Philadelphia, USA,

January 3-5, 2014.

- Invited Speaker, 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”, Haizheng Li, Nanjing, China, May10-13, 2013.
- Invited Speaker, 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”, Haizheng Li, February 24-25, 2011.
- Invited speaker, The Chinese Economists Society (CES) President Forum, “Human Capital and its Contributions”, Haizheng Li, Nankai University, Tianjin, China, December 10, 2010,
- Invited Speaker, High-Level Working Group on Skills and Human Capital hosted by the Lisbon Council, “Measuring Human Capital in China”, Haizheng Li, Brussels, November 16, 2010.
- Invited plenary session presentation, The 31st IARIW General Conference of the International Association for Research in Income and Wealth, “Human Capital in China”, Haizheng Li, St. Gallen, Switzerland, August 23-28, 2010.
- Invited Speaker, The 25th Anniversary of the Sino-US Exchange on Economics Education (Ford Class) Renown Scholar Forum, Renmin University of China, “Human Capital in China”, Haizheng Li, Beijing, China, July 23, 2010.
- Plenary Session Chair and co-organizer, Beijing Municipal Government Conference, “World Talent, World City”, Haizheng Li, Beijing, May 28, 2010.

IV. Related Funded Projects and Others:

- In 2022, State Administration of Foreign Experts Affairs high-end foreign experts Introduction program, "Population structure and human capital Improvement under Aging and fewer children", funding period of 2 years (2022-2023).
- 2021, National Natural Science Foundation International (Regional) Cooperation and Exchange Program, Korea University Collaboration Project, "Measurement of Human Capital: Based on the expansion of educational quality and business management skills", 2 years (2022-2023).
- In 2019, the Joint Data Research Center (CEDC) of the Central University of Finance and Economics and the University of Electronic Science and Technology of China (UESTC) cooperated with the Human Capital Project to establish a large-scale human capital database with a three-year funding period.
- In 2021, the major special project application of National Natural Science Foundation of China, "Population quantity, Quality and China's economic development", entered the final defense.
- In 2019, the key project application of National Natural Science Foundation of China, "Research on China's Human Capital Development Strategy in the New Era", entered the final defense.
- National Natural Science Foundation of China, “Research on Human Capital Measurement in China: Expansion and Deepening”, 2018-2021.

- National Natural Science Foundation of China, “Research on Human Capital Measurement in China: Improvement and Application”, 2013-2016.
- European Union project (2012-2015), invited participation, “Lifelong Learning, Innovation, Growth and Human Capital Tracks in Europe”, 2012-2015 (study human capital, skills and outcomes with other eight research teams from various countries/regions).
- 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 that the CHLR human capital research team participate in the OECD human capital consortium as China’s officially designated representative, 2010.
- National Natural Science Foundation of China (NSFC), “China Human Capital Measurement and Index”, 2010-2012.
- State Councilor Yandong Liu visited the CHLR in October 2009 and complimented the Center’s achievement in human capital research.
- The “China Human Capital Report” series has been requested by the Ministry of Education as a reference since 2009.
- “China Human Capital Report 2009” was requested by the Organization Department of the Central Committee of Communist Party as a reference for policy making, 2009.

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Improvements in the 2022 Report

- Updated national and provincial human capital estimates for 1985-2020.
- Compared the results of the population imputation with the newly released data from the 7th Census for accuracy.
- Considering the impact of "One million higher vocational enrollment expansion" plan, different human capital estimation processing is adopted for fresh graduates and non-fresh graduates respectively.
- Update the CHFS2018 database.
- Calculate employment rate data for 2016-2020 based on the 7th National Population census and China Population and Employment Statistical Yearbook 2021.
- Updated physical capital data to 2017.

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:

Mainland: age 0-55 for females and age 0-60 for males

Hong Kong: age 0-60 for females and age 0-65 for males

Taiwan: age 0-60 for females and age 0-60 for males

- Labor force human capital:

Mainland: age 16-54 for female and 16-59 for male, excluding students

Hong Kong: age 15-59 for female and 15-64 for male, excluding students

Taiwan: age 15-59 for both male and female, excluding students

Contents

Executive Summary

The report estimates and describes the distribution and development of human capital in China. We use a large amount of data and a variety of methods to measure human capital comprehensively and systematically at national and provincial levels in China, and construct a number of human capital indexes.

In addition to traditional measures based on education level, we adopt the widely used Jorgenson-Fraumeni income calculation method (hereinafter referred to as "J-F method") to estimate the stock of human capital in China. Compared with traditional measurement methods (such as education level), J-F method can reflect the situation of human capital in a more comprehensive way. Due to lack of relevant data, J-F method cannot be directly applied to China. Based on human capital theory, we combine micro-survey data, provincial-level data and Mincer equation to improve J-F method, which greatly increases the feasibility and rationality of applying the method to Chinese data.

In this report, we calculate the stock of human capital at the national and provincial levels of China from 1985 to 2020 based on the J-F method.[2] The report includes including the total amount of human capital by gender and by urban and rural areas, and the corresponding per capita human capital. We also provide measures of traditional human capital based on education. To compare with human capital, we also calculate the national and provincial physical capital stock from 1985 to 2017 (the data used is only updated to 2017) and establish the inter-provincial cost of living comparison index LCI (purchasing power Parity index) to make inter-provincial comparison of

[2] Results for Hong Kong Special Administrative Region and Chinese Taiwan starting from 1997.

human capital based on the monetary value of purchasing power parity.

According to China's current retirement policy, the age of the working population on the mainland is defined as 16 to 59 for men and 16 to 54 for women. The age of Taiwan's labor force is defined as 15 to 59 years old for both males and females. Hong Kong's working population is defined as aged 15 to 64 for males and 15 to 59 for females. In consideration of the consistency of statistical caliber, the whole country and the mainland in this report refer to the 31 provinces (autonomous regions and municipalities directly under the Central Government) of the mainland, excluding Hong Kong, Macao and Taiwan. Unless otherwise noted, all inter-provincial comparisons of human capital are adjusted for the LCI deflator (based on 1985 with Beijing as the reference province). The calculation method of the annual growth rate is to calculate the annual growth rate first and then take the annual average to reflect the annual change of the growth rate.

We have assembled human capital, physical capital and other relevant data, including raw data and processed intermediate data collected in the calculation process, to build a human capital database at the national and provincial levels in China for the benefit of academic research and policy analysis. We make the database freely available to the public. It can be downloaded free of charge at:

Official website of Center for Human Capital and Labor Market Research:

http://humancapital.cufe.edu.cn/rlzbzsxm.htm

Official website of Central University of Finance and Economics & University of Electronic Science and Technology of China Joint Research Data Center:

http://cedcdata.cufe.edu.cn/cedc/metadata/list.html

The Main Findings of the 2022 Human Capital Report

A. Human Capital at National Level

(I) Traditional Human Capital Measures

1.1 Age-based measures of human capital

1. In 2020, the **average age** of the labor force at the national level was 39.0 years. The five provinces with the oldest labor force were Heilongjiang, Liaoning, Jilin, Chongqing and Zhejiang, and the five provinces with youngest labor force were Xinjiang, Guangdong, Hainan, Guizhou and Tibet.
2. In 2020, the proportion of the population aged 0-15 among non-retired people at the national level was 23.0%, and their human capital accounted for 51.0% of total human capital.
3. In 2020, the proportion of the population aged 25-45 to the total labor force was 55.3% at the national level, and their human capital accounted for 68.6% of the total labor force human capital.

1.2 Education-based measures of human capital

4. In 2020, the **average schooling years** of the labor force at the national level was 10.7. The five provinces with highest years of schooling were Beijing, Shanghai, Tianjin, Jiangsu and Liaoning, and the five provinces with the lowest years of schooling were Gansu, Guizhou, Yunnan, Qinghai and Tibet.
5. In 2020, the proportion of the labor force with high school education or

higher was 43.1%, with 22.0% in rural areas and 56.5% in urban areas.

6. In 2020, the proportion of the labor force with college education or above was 21.8%, with 5.7% in rural areas and 32.0% in urban areas.

(II) Comprehensive human capital calculated based on the international Jorgenson-Fraumeni (J-F) method

7. The J-F measure of China's **nominal total human capital** reached 3108.8 trillion yuan in 2020, with 2694.4 trillion yuan (86.7%) in urban areas and 414.4 trillion yuan (13.3%) in rural areas.
8. **Nominal human capital per capita** was 2.8 million yuan in 2020, 3.6 million yuan for urban residents and 1.1 million yuan for rural residents. Average human capital for male was 3.6 million yuan and for female was 1.8 million yuan.
9. In 2020, the five provinces with highest **human capital stock** were Jiangsu, Shandong, Guangdong, Henan and Hebei, and the five provinces with lowest human capital stock were Gansu, Hainan, Ningxia, Qinghai and Tibet.
10. In 2020, the five provinces with highest **human capital per capita** were Beijing, Shanghai, Tianjin, Jiangsu and Shandong, and the five provinces with lowest level were Xinjiang, Yunnan, Tibet, Gansu and Qinghai.
11. In 2020, the five provinces with highest **total labor force human capital** were Guangdong, Shandong, Jiangsu, Henan and Sichuan, and the five provinces with lowest level were Gansu, Hainan, Ningxia, Qinghai and Tibet.
12. In 2020, the five provinces with highest **average labor force human capital** were Beijing, Tianjin, Shanghai, Jiangsu and Zhejiang, and five

provinces with the lowest level were Tibet, Hainan, Yunnan, Gansu and Qinghai.

13. China's **total real human capital** in 2020 was 10.9 times its level in 1985, having grown at an average annual rate of 7.5%. The average annual growth rate during 2010-2020 was 7.8%.
14. From 1985 to 2020, rural **human capital** grew at an average annual rate of 3.0%, and urban human capital grew at 10.1%; while during 2010-2020, the growth rate was 9.2% for urban areas but only 2.4% for rural areas.
15. Before 1994, the total amount of **human capital** in rural areas was higher than that in urban areas. Since 1994, the total amount of urban human capital has been higher than that of rural areas.
16. **Human capital per capita** grew from 49 thousand yuan to 507 thousand yuan, at an average annual rate of 7.1% over the period 1985-2020 and at a rate of 7.9% over the years 2010-2020.
17. The average annual growth rate of **human capital per capita** during the period of 1985-2020 was 6.3% and 5.0% for urban and rural areas, respectively. For the years 2010-2020, the growth rates were 7.0% and 5.5%, respectively.

B. Human Capital in Hong Kong Special Administrative Region and Chinese **Taiwan**

18. In 2020, the **average age** of the labor force was 42.1 years in Hong Kong and 40.8 years in Taiwan.
19. In 2020, the proportion of the population aged 0-15 among non-retired people was 16.8% in Hong Kong, and their human capital accounted for 21.0% of total human capital in Hong Kong.

20. In 2020, the proportion of the population aged 0-15 among non-retired people was 17.0% in Taiwan, and their human capital accounted for 19.4% of total human capital in Taiwan.
21. In 2020, the proportion of the population aged 25-45 to the total labor force was 46.9% in Hong Kong, and their human capital accounted for 63.5% of total labor force human capital in Hong Kong.
22. In 2020, the proportion of the population aged 25-45 to the total labor force was 55.1% in Taiwan, and it accounted for 73.1% of total labor force human in Taiwan.
23. In 2020, the **average schooling years** of the labor force were 12.5 years in Hong Kong and 13.8 years in Taiwan.
24. In 2020, the proportion of the labor force with high school education or above was 74.8% in Hong Kong and 88.4% in Taiwan.
25. In 2020, the proportion of the labor force with college education or above was 42.3% in Hong Kong and 56.9% in Taiwan.
26. In Hong Kong, the average annual growth rate of J-F based **total human capital** between 1997 and 2020 was 0.8% while the annual growth rate of human capital per capita was 0.4%. Over the years 2010-2020, the corresponding rates were 2.9% and 2.8%, respectively.
27. In Taiwan, during 1997-2020, the average annual growth rate of J-F based **total human capital** was -1.3%, and it was -0.9% for human capital per capita; while over the years 2010-2020, the corresponding rates were -1.1% and -0.2%, respectively.

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). Human capital, according to a recent report, accounts for 54% of the total capital on average between 1990 and 2010 (UNU-IHDP and UNEP, 2014, page 29).

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.[3] 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.

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 China's economic development, there has not

[3] 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 2010,2014,2015).

been a comprehensive measurement of the total human capital stock in China until 2009, with the first China Human Capital Report issued by this Center. 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 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. These changes include:

1. China has undergone substantial demographic changes in the past 65 years that involve
   (1) The encouragement of large families;
   (2) Subsequently discouragement of population growth due to the one-child policy;
   (3) Dramatic improvements in health and longevity;
   (4) Massive interregional migration and urbanization.
2. 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 else in human history or across nations.

Until the inception of this Project, 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 areas of schooling, for example, there has been a remarkable increase in the educational attainment of the Chinese population, which in 1985 was 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 those with 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 World Bank has used J-F methodology since 2018 when constructing human capital for over 140 countries (Lange, et al., 2018; World Bank, 2021). More detailed J-F estimates have been constructed for individual countries. The U.S. Bureau of Economic Analysis has supported research on human capital (Abraham 2010 and Christian 2010, 2015). 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, joined an OECD consortium to develop J-F human capital accounts (Liu, 2011). J-F human capital accounts have been constructed for several other countries independent of the consortium efforts. These countries include Argentina (Coremberg, 2010), India (Gundimeda, Sanyal, Sinha, and Sukhdev, 2007), 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 O'Mahoney and Samek (2021) determined the impact of health on human capital using a J-F formulation.[4] The country estimates will facilitate cross-country comparisons. 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), and Hu (2005).

The limitations of past studies have precluded implementation of internationally recognized methods for human capital estimation based on Chinese data. The methodology used in 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 there are no measures of changes of human capital in rural and urban areas and for males and females.

[4] The Inclusive Wealth Report series also uses a lifetime income approach based on a model by Arrow, et al. (2012) to estimate human capital for up to 165 countries. See UNU-IHDP and UNEP, 2015 and Managi and Pushpam, 2018.

A comprehensive measure of human capital in China is constructed by applying the methods used in other countries after modifying them to fit China's particular situation. Total human capital at the national level and provincial level is estimated, for males and females, and for urban and rural areas from 1985 to 2020. Our estimates include nominal values, real values, indexes, and quantity measures. Wherever possible, the Jorgensen-Fraumeni (J-F) lifetime income based approach is adopted as discussed above.

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, the well-known Mincer equation is applied to estimate earnings from available household surveys where comprehensive data are not available. By obtaining imputed earnings for the entire population, it is possible 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, changes caused by rapid urbanization and the large scale rural-urban migration that has taken place since the beginning of the economic reform are captured. 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 descriptive statistics of some indicators for the national and provincial labor population. The national estimates of human capital are reported in Chapter 6. Chapter 7

presents the cross-province comparison results. The disaggregated human capital results for 31 provinces, Hong Kong and Taiwan are presented in Chapters 8-40.

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) the sum of investment, minus depreciation, added over time to the initial stock; and ii) the present value of the income flow over an expected lifetime. The first method i.e., the perpetual inventory method, adopts the cost approach (e.g., Kendrick, 1976); the second method adopts the income-based approach (e.g., Jorgenson and Fraumeni, 1987, 1992a, 1992b). However, measuring human capital using the perpetual inventory approach only considers the costs and expenditures as investment, which is then valued by the purchase price that is often not available for human capital.

Measures of human capital that have been used by researchers in existing studies include:

(1) the cost approach of Kendrick (1976)

(2) the lifetime income approach of Jorgenson and Fraumeni (1989, 1992a, 1992b); and

(3) the lifetime income/shadow price approach of the Inclusive Wealth Report (UNU-IHDP and UNEP, 2015; UNEP and Urban Institute, forthcoming)

Before adopting J-F methodology (Lange, et al., 2018; World Bank, 2021), the World Bank used a residual approach (2006). Laroche and Merette (2000) developed a measure of human capital growth.

Indexes of human capital that have been used by researchers in existing studies include:

(1) World Bank (IBRD and the World Bank, 2018; World Bank, 2020);

(2) World Economic Forum (2017);

(3) Institute for Health Metrics and Evaluation (Lim, et al., 2018);

(4) Lisbon Council (2006);

(5) The human capital index included in the United Nations Development Programme's Human Development Index (UNDP, 2020).[5]

The monetary measures of human capital and the Laroche and Merette measure of growth in human capital per capita will be elaborated in the next four sections.

2.1 Kendrick cost-based 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 direct child rearing costs such as food and clothing. 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 because 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.

The cost of parental time is not included in measuring tangible human capital. Intangible human capital investment in formal and informal education includes both private and government costs. Private formal education costs include net rental for the private education sector's plant and equipment and students' expenditures on supplies. Estimated opportunity cost depends on a student's imputed foregone compensation. Government formal education costs include all types of expenditure, including those for construction. Personal informal education expenditures include a portion of outlays for radio, TV,

[5] For more information on the six major measures of human capital which each cover at least 130 countries, see Fraumeni (2021).

records, books, periodicals, libraries, museums, and similar activities. 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 measured, 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, which is a double declining balance formula with a switch to a straight-line method.

Kendrick's estimate of the stock of nominal human capital is about five times Gross Domestic Product. However, the J-F human capital estimate is substantially larger than Kendrick's.[6] 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, government statistics ninety years back may be needed to do the calculation. This is impossible, given the People's Republic of China was only 73 years old in 2022.

Additionally, the Kendrick approach gives no clear rationale for some

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

important assumptions, such as for the split of health expenses between investment and preventative costs. For all of these reasons, this approach is not adopted.

2.2 Jorgenson-Fraumeni income-based approach

The Jorgenson-Fraumeni (J-F) method estimates human capital stock based on the expected future lifetime income of all individuals, which would be its asset price if human capital could be traded in the market like physical capital.[7] 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, which will be described in more detail later in this report, is the most widely used method in estimating human capital stock, and it has been adopted by a number of countries in constructing human capital accounts. 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

[7] 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 wage 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. Even in the United States and other developed countries, wages do not fully reflect marginal productivity because labor markets are not perfectly competitive. Even so, wages are still representative of the human capital gains from an individual perspective, and they are a reasonable a measure of human capital in that sense. With the improvement of the market mechanism in China, this limitation will gradually decrease. According to estimates provided in the current literature, wages are generally lower than labor' s marginal productivity (see Fleisher, Li and Zhao, 2010). Therefore, from this perspective, our calculation can be interpreted as a conservative estimate of human capital.

produce goods and services, foster innovation and growth through managerial and creative activities, and generate income that allows for the acquisition of market goods and services. Nonmarket activities 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, they are excluded in the estimates of China's human capital.[8]

2.3 Inclusive Wealth Report income/shadow price-based approach

The Inclusive Wealth Report (IWR) estimates human capital wealth based on shadow prices and the expected future lifetime income of individuals, where wealth is a synonym for stock in IWR. The Arrow, et al. (2012) model is the main basis for the wealth estimates currently for 165 countries, which in addition to human capital include produced and natural assets. Human capital is estimated by using the following formula:

$$HC = \underbrace{e^{\rho \cdot Edu}}_{Term_1} \cdot \underbrace{P_{5+Edu}}_{Term_2} \cdot \underbrace{\int_0^T w \cdot e^{-\delta\tau} d\tau}_{Term_3} \qquad (1)$$

where ρ is the return of years of schooling, Edu is the expected years of schooling, P_{5+edu} is the educated individuals who are aged 5 or older, T is an individual's expected remained working years, w is the average annual compensation, and δ is the discount rate. Both ρ and δ are set to 8.5 percent, the former based on research by Klenow, P.J., Rodriguez-Clare, A. (1997).

[8] Among the most recent human capital estimates, i.e., Mira and Liu (2010), Gu and Ambrose (2008), Greaker and Liu (2008) and Christian (2010), Fraumeni, Christian and Samuels (2017), Fraumeni and Christian (2019), Fraumeni, Christian and Samuels (2021), those authored or co-authored by Christian, Fraumeni, or Samuels with the estimates 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.

$Term_1$ represents the 'Education effect', which is determined by the expected years of schooling; $Term_2$ represents the 'Educated population effect', which is determined by the number of educated individuals; and $Term_3$, the lifetime income term, represents the 'Compensation to human capital effect', which is primarily determined by the labor compensation and the expected remained working years. w is held constant over the whole period of analysis, which is from 1990 forward. It is also the same for males and females because of the lack of data to do otherwise; other terms in the human capital expression have a gender component. The equation above is the featured basis for the human capital estimate for all of the IWR except for that published in 2018 (UNU-IHDP and UNEP 2015, Managi and Kumar 2018, UNEP and Urban Institute 2020).

2.4 Laroche and Merette

The Larouche and Merette (2000) model determines the rate of growth of human capital per capita as their estimates are set equal to 1.0 in the initial year. These authors based their approach on the pioneer work of Mulligan and Sala-i-Martin (1997) and Koman and Marin (1997), who applied a similar method to Austria and Germany. Larouche and Merette constructed their logarithm of human capital per capita with a Cobb-Douglas index number. In this index, the weights are the proportion of the wage income of workers of a particular age and education level in the total wage bill in the economy. These weights are applied to the logarithm of the proportion of working age individuals of a particular age and education level in the total number of working age individuals. Their measure is called a Cobb-Douglas index as the income in the weights is determined by Mincer equations.

A modified version of the Larouche and Merette method of determining the population of individuals by age and education is used in establishing the demographics underlying the human capital estimates in this report. It will be described later in this report.

2.5 Conclusion

To sum up, taking into account data availability, the J-F income approach is chosen as it is most suitable for measuring China's human capital. Moreover, this method is widely used internationally, so it enables comparisons of China's human capital level with those in other countries. Finally, it is less computationally intensive than Kendrick's cost approach.

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 employment. Expected future wages and income are estimated from currently observed wages and income of a cross-section of 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 with a discount rate. Estimation is conducted in a backward recursive fashion, from those aged 59, 58, 57, and so forth to those aged 0,[9] and modified to the China's own context with various needed assumptions about the method and parameters.[10]

3.1 Estimate lifetime income by backward recursion

To apply the J-F income-based approach, we need actual data-or estimates of individual's annual market labor income per capita. Lifetime income is calculated according to whether an individual is in school, works, or is retired. The backward recursion methods is based on five life stages, and calculation begins with the fifth stage backward to the first stage, from the oldest individuals to the youngest, and modified as needed to accommodate China data availability. The equations used for calculating the lifetime expected

[9] 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 that have adopted the J-F methodology.

[10] The J-F for China does not include nonmarket income.

income are as follows.

The final stage is for retirement, individuals who are not in school and not working--older than 59 years old for males and older than 54 years old for females)):

$$mi_{y,s,a,e} = 0 \qquad (4)$$

where the subscript y, s, a, and e denote year, sex, age and educational attainment respectively, mi is the lifetime market labor income per capita.[11]

The fourth stage is for individuals who are working but not in school (23-59 years old for males and 23-54 years old for females). The equation for this stage is the same as equation 3.

$$mi_{y,s,a,e} = ymi_{y,s,a,e} + sr_{y,s,a} \cdot mi_{y,s,a+1,e} \cdot \frac{1+G}{1+R} \qquad (5)$$

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

The third stage is applied to individuals who are either in school or working (16-22 years old), as it is assumed that anyone who goes to school does not work, even part-time.[12] This stage is bounded by age 22 because of data limitations, and the age distribution of college and above are calculated by senior age distribution. For individuals who work, the equation is same as (4), for individuals who go to college or university, for example, at the first year of university, the equation becomes:

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[11] Survival probability is available for every year for every age, e.g., the probability that someone lives from age 50 to 51 can be different in 2000 and 2001. Jorgenson and Fraumeni only had one set of survival probabilities for all years, so that the probability of survival for a specific age is constant over time.

[12] As students in the United States frequently work as well as go to school, particularly when they are enrolled in higher education, Jorgenson and Fraumeni allowed individuals to work and go to school. As students in China rarely work, we assume that no students work.

$$mi_{y,s,a,uni\_1} = sr_{y,s,a} \cdot sr_{y+1,s,a+1} \cdot sr_{y+2,s,a+2} \cdot sr_{y+3,s,a+3} \cdot mi_{y,s,a+4,uni-completed} \cdot \left(\frac{1+G}{1+R}\right)^4 \quad (6)$$

For individuals who are in junior or senior high school, for example, at first year of senior high school, the equation becomes:

$$mi_{y,s,a,sm\_1} = [senr_{y,s,a,sm\_1-col\_1} \cdot mi_{y,s,a+3,col\_1} + notenr_{y,s,a,sm\_1-col\_1} \cdot mi_{y,s,a+3,sm-completed}] \cdot \left(\frac{1+G}{1+R}\right)^3 \quad (7)$$

where *senr* is the promotion rate, which is the probability of the number of students in e educational level entering into e+1 educational level, and *notenr* is the probability that someone who does not enroll in e+1 educational level will complete the e educational level. The calculation equation is

$$notenr_{y,s,a,sm\_1-col\_1} = sr_{y,s,a} \cdot sr_{y+1,s,a+1} \cdot sr_{y+2,s,a+2} - senr_{y,s,a,sm\_1-col\_1} \quad (8)$$

The second stage is for someone going to school but not working (7-15 years old). The equation for students varies depending on the level of enrollment. For those enrolled in the first year of primary school, the equation is

$$mi_{y,s,a,pri\_1} = [senr_{y,s,a,pri\_1-jm\_1} \cdot mi_{y,s,a+6,jm\_1} + notenr_{y,s,a,pri\_1-jm\_1} \cdot mi_{y,s,a+6,pri-completed}] \cdot \left(\frac{1+G}{1+R}\right)^6 \quad (9)$$

The first stage is for individuals neither in school nor working (0-6 years old):

$$mi_{y,s,a,e} = sr_{y,s,a} \cdot mi_{y,s,a+1,e} \cdot \frac{1+G}{1+R} \quad (10)$$

Let $L_{y,s,a,e}$ stand for the population in the respective categories; the expected present value of lifetime income in a country, i.e., the total human capital stock, can be written as:

$$MI(y) = \sum_s \sum_a \sum_e mi_{y,s,a,e} L_{y,s,a,e} \quad (11)$$

Similar equations can be applied to estimate lifetime nonmarket labor

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

$$LIFE(y) = \sum_s \sum_a \sum_e (mi_{y,s,a,e} + nmi_{y,s,a,e}) \cdot L_{y,s,a,e} \qquad (12)$$

3.2 Estimating current income using Mincer models

A critical 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 projections based on the basic Mincer (1974) equation. It has been shown that there are significant differences in the parameters of the earnings equation across gender and between the rural and urban population. To ensure our income estimates are accurate as possible, we estimate the parameters separately 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 2020.

The data used for estimating the parameters of the earnings equation come from six 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 1986 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, and 2011. The third data set is the Chinese Household Income Project (CHIP) for the year of 1988, 1995, 1999, 2002, 2007,

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

and 2013. The fourth data set is the China Household Finance Survey (CHFS) for the year of 2010 and 2012. The fifth data set is the Chinese Family Panel Studies (CFPS) for the year of 2010, 2012， 2014 and 2016. The sixth data set is the China Labor-force Dynamic Survey (CLDS) for the year of 2014, this is a new data set we added this year. CHIP (except 2009), CHNS, CHFS, CFPS and CLDS cover both urban and rural population, but UHS covers only the urban population.

UHS is a representative sample of the urban population. Individual earnings are measured as the annual labor income, which includes 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, community college equals 15 years of schooling, and college or above equals 16 years of schooling. Suppose that schooling begins at age 7, years of work experience are imputed 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. The self-employed and temporary job holders are excluded, as 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.

The Chinese Household Income Project (CHIP) survey, reports income, consumption, job, production and other related information for the urban and rural populations. Appendix B.3.2 provides a complete description of the income and education definitions and sampling standards. Table B.1.3 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 socioeconomic, 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.1.2 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, 2013, 2015 and 2017. Information of the statistics on household income starts from the year of 2010, 2012, 2014 and 2016. The urban sample includes only personal income data, comprising wage income. Rural income includes personal income and household income. Personal income primarily consists of wage income. Rural household income is mainly net agricultural income. As 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 workers 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 minus 6. We restrict the sample to males 16-60 years old and females 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.1.5 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 is the total income in the recent year. Urban income includes wage income. Rural income includes agriculture production income. We restrict the sample to males of 16-60 years old and females of 16-55 years old. AppendixB.1.4 contains the complete definitions of income, education, other variables and also the sample selection criteria of CFPS. Table B.1.4 of Appendix B lists the descriptive statistical indicators of CFPS.

CLDS is a nationwide longitudinal survey conducted by the social science survey center (CSS) of Sun Yat-Sen University. CLDS conducted a trial survey in Guangdong province in 2011, completed the first nationwide survey in 2012, completed the first follow-up survey in 2014, and conducted the second follow-up survey in 2016. Due to the limitations of data quality and availability, this report uses only 2014 survey data. Information on household income is the total income in the recent year. Rural income mainly includes agricultural production income. We restrict the sample to males of 16-60 years old and females of 16-55 years old. Appendix C.2.7 contains the complete definitions of income, education, other variables and also the sample selection criteria of CLDS. Table C.1.6 of Appendix B lists the descriptive statistical indicators of CLDS.

We use the Taiwan Family Income and Expenditure Survey covering both urban and rural population for the analysis of Taiwan. The survey is completed by the national research center of Taiwan. We restrict our sample to individuals

who are currently employed and are between 15 and 60 years old for male workers and between 15 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 the Hong Kong 1% Sample Population Census 1981, the Hong Kong 1% Sample Population By-Census 1986, the Hong Kong 5% Sample Population Census 1991, 2001, 2011 and 2016, and the 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 Estimating current income using Mincer models at the national level

We first estimate the basic Mincer equation:

$$ln(inc) = \alpha + \beta \cdot e + \gamma \cdot Exp + \delta \cdot Exp^2 + u \qquad (13)$$

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 (12) 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 report evidence consistent with 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 convention reported in published literature, we estimate equation (10) by ordinary least squares[14].

We use UHS, CHIP, CHNS， CHFS, CFPS and CLDS to estimate parameters of 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 any schooling and working experience. Figure 3.2.1 shows the intercept gap between urban and rural population during 1985-2020. 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 little difference between males and females in rural areas.

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

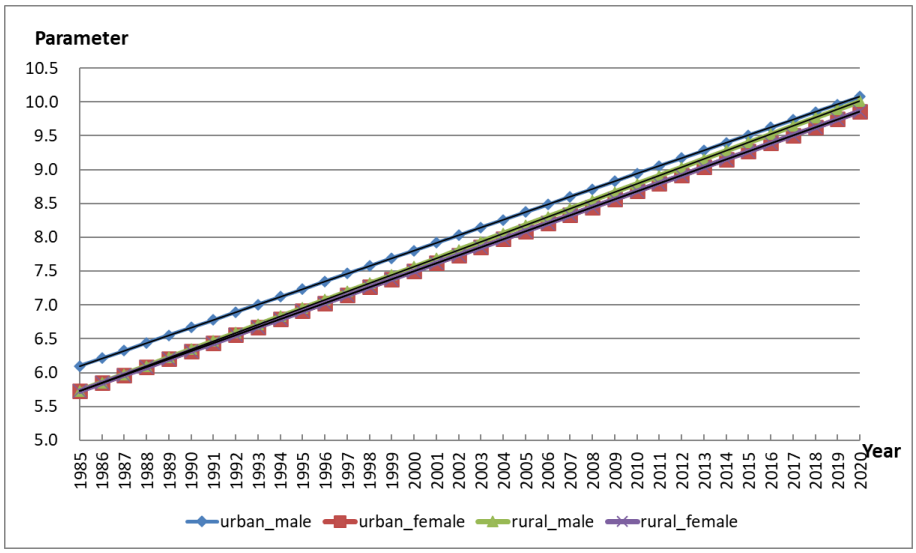

Figure 3.2.1 Mincer Intercepts by Gender and Location

Estimated regression parameters for years of schooling permit measurement of the rate of return rate of return to education. Considering the current development of the Chinese economy and education, we assume that the rate of return to education follows a nonlinear trend. Figure 3.2.2 shows the trends of the return to education for males and females in rural and urban areas. The trends of returns to schooling vary across rural and urban areas, it shows that the rate of return to education for rural women is increasing year by year, while for urban and rural men, the corresponding rate shows a trend of first increasing and then decreasing. In addition, we find that the rate of return to education for males was lower than that for female in urban areas, and the rate of return to education for males is higher than that of females in rural areas. When the Soviet-type wage grid was replaced by market wages (Fleisher, Sabirianova, Wang 2005), increasing rate of return to education has been a common phenomenon. But many studies recently show that rate of return to education in urban areas follows a decreasing trend associated with increased enrollment. Wang, Fleisher, and Li (2009) also find that female rates of return exceed male returns, and they argued that rising returns to education have been

a ubiquitous phenomenon in transitional economies.

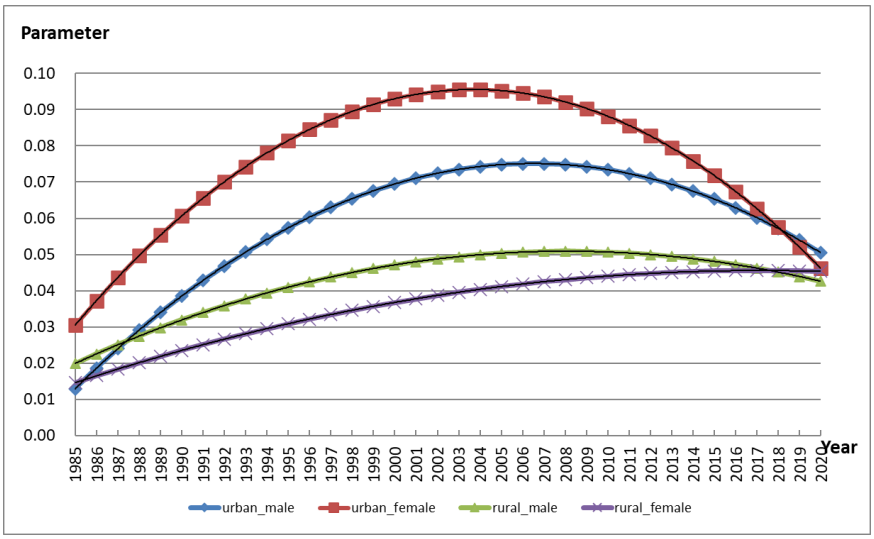

Figure 3.2.2 Rates of Return to Education by Gender and Location

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 rate of return to experience by gender and region. As shown in the figures, although the returns to work experience are positive all along, they have been decreasing over time. In urban areas, return to experience for males is higher than that for females overall. In rural areas, the return to experience for males is higher than that for females in their middle years of age.

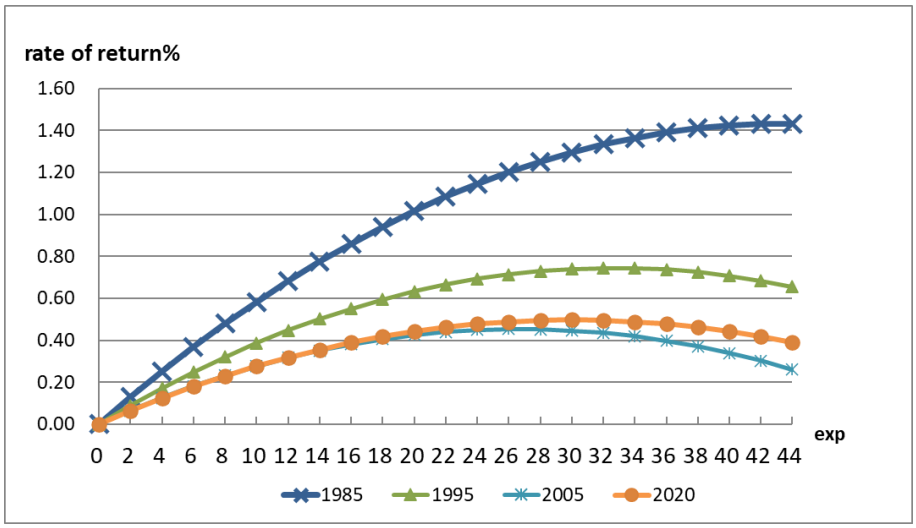

Figure 3.2.3 Return to Experience for Urban Males

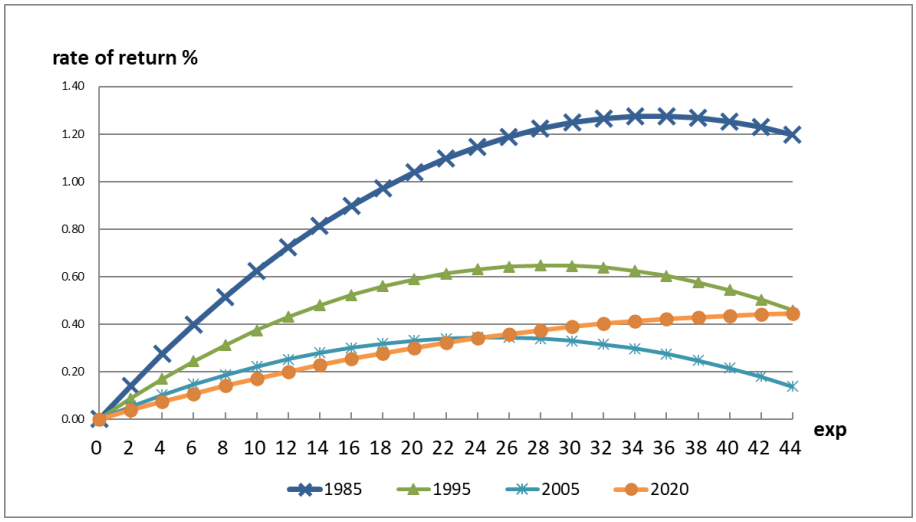

Figure 3.2.4 Return to Experience for Urban Females

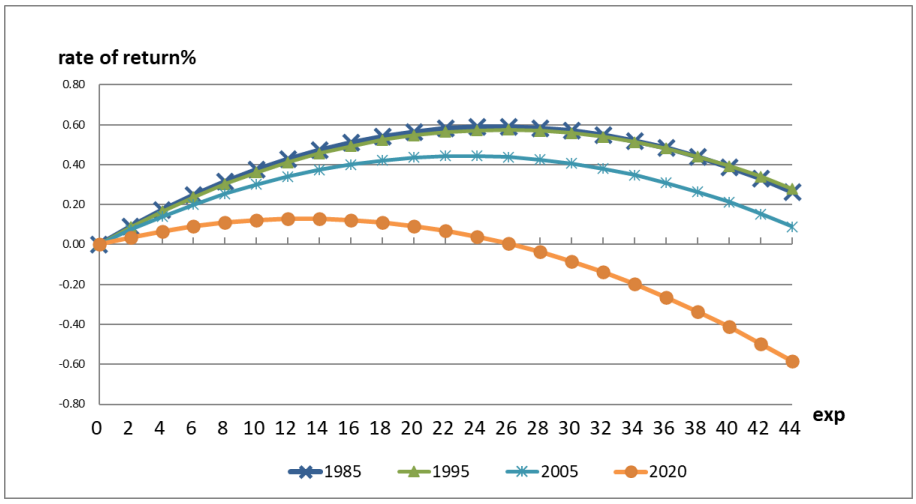

Figure 3.2.5 Return to Experience for Rural Males

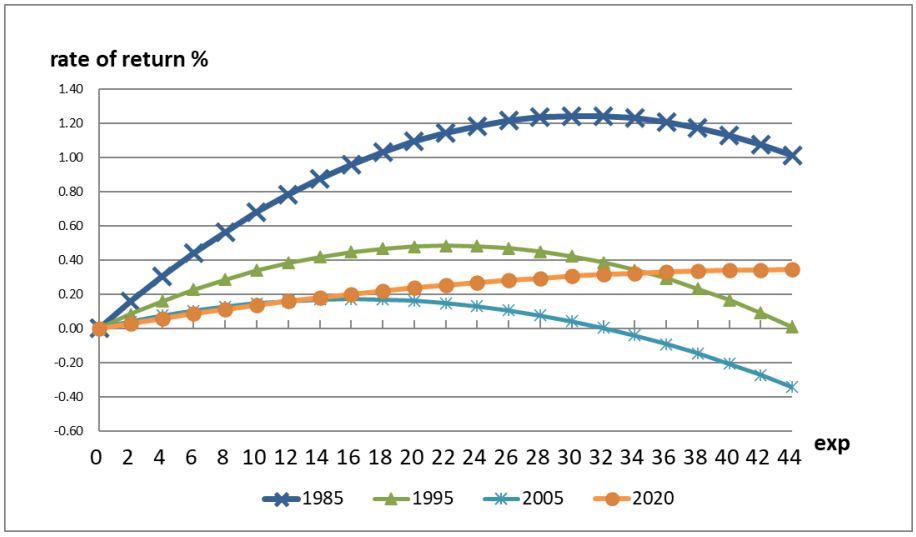

Figure 3.2.6 Return to Experience for Rural Females

3.2.2 Estimating current income using Mincer models at the provincial level

At the province level, we estimate the Mincer equation with macro data as follows:

$$ln(inc) = \beta_0 + \beta_1 \cdot ln(Avwage) + \beta_2 \cdot Sch + \beta_3 \cdot Sch \cdot Avgdp + \beta_4 \cdot Sch \cdot Ratio + \beta_5 \cdot Exp + \beta_6 \cdot Exp^2 + \mu \quad (14)$$

where *ln(inc)* is the logarithm of earnings, *Sch* is years of schooling, *Exp* and *Exp2* represent years of work experience and experience squared respectively, and u denotes a random error. The variable avwage represents the average employee nominal salary for both the rural and urban population at the provincial level. *Avgdp* stands for nominal GDP per capita. *Ratio* is the primary industry employment ratio of the total working population. The parameters of *Sch·Avgdp* and *Sch·Ratio* reflect the labor market conditions 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* to the equation in order to make better use of the existing data and to aid in solving missing data problems as well as to make 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 in the national Mincer parameter estimation, provincial data used for estimation also come from UHS, CHIP, CHNS， CHFS, CFPS and CLDS. We use the ordinary least squares (OLS) to estimate equation (12). When all data sets are available for a sample year, we drop CHNS and use UHS, CHIP, CHFS, CFPS and CLDS due to the relatively low quality of CHNS income measures. The estimates are weighted for obtaining a larger and representative sample making estimates more accurate. 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 2020. Graphs show that when we plot each of the parameter estimates against time, they are generally trended. We adopt a 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: 2003-2020 to estimate the age distribution (1982-2020) 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 2020. Detailed information can be found in the appendices.

For Hong Kong, we have data of the number of first grade students in school by age, sex, and education from 1990 to 2020. Thus, we could compute age distribution by using the number of students of first grade in school. The data before 1990 is replaced by the data in 1990.

For Taiwan, we have data of the number of first grade students in school by age, sex, and education from 1985 to 2020. Thus, we compute age distribution by using the number of students of first grade in school.

3.3.2 Survival rate

We obtain survival rates (1-death rate) by age, sex and region. 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 1983-1985, 1987, 1988 and 1991-1993, the death rates of the missing years are fitted by using the other available data of the closet year.

For Hong Kong, the data sources of growth rate are Hong Kong Life Tables. We obtain the survival rate (1-death rate) by age and sex. With population and death rates, 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.

For Taiwan, the data sources of growth rate are Taiwan Life Tables. We obtain survival rates (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 0-6), school only (age 7-15), work and school (age 16-26), work only (26 to retirement), and retirement (age 60+ for male and 55+ for female). Each status implies a different age-income profile, and therefore the method of computing lifetime income will be different.

We first estimate a standard Mincer equation 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 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 or above, or for six categories of schooling where we divide college or 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 or above is the highest educational level. 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 and are described in Appendix A.

To impute two critical components of the J-F human capital estimates, we proceed as described below: 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. 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, where 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.

Each continuing student is tracked from age of initial enrollment, through individual grade levels, until advancing to the next higher level. The number of years discounted until attaining the higher level of lifetime income depends on the number of years required to advance given the current grade of enrollment.

The terminal educational level is treated as a probabilistic event, allowing us to forecast lifetime income 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 example, 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, $\mathrm{empr}(y, s, a, e)$ by age, sex and educational for individuals older than 16, we use the data from census years of 1987, 1995, 2000, 2005, 2010 and 2015 and interpolate middle years'

employment rates using the average of these years.

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:

$$empr(y,s,a,e) = [employed(y,s,a,e)]/pop(y,s,a,e) \quad (15)$$

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

Data	Sources
The employed by age,sex and education in 1987	"China Population Census 1987"
Population by age, sex and education in 1987	"China Population Census 1987"
The employed by age, sex and education in 1995	"China Population Census 1995"
Population by age, sex and education in 1995	"China Population Census 1995"
The employed by age, sex and education in 2000	"China Population Census 2000"
Population by age, sex and education in 2000	"China Population Census 2000" Long table data
Population by age, sex and region in 2005	"China Population Census 2005"
Population by region, sex and education in 2005	"China Population Census 2005"
Population by age, sex and education in 2005	"China Population Census 2005"
The employed by age group, sex and education in 2005	"China Population and Employment Statistics Yearbook 2006"
Population by age, sex and region in 2010	"China Population Census 2010" Long table data
Population by region, sex and education in 2010	"China Population Census 2010" Long table data
Population by age, sex and education in 2010	"China Population Census 2010"
The employed by age group, sex and education in 2010	"China Population and Employment Statistics Yearbook 2011"
Population by age, sex and region in 2015	"China Population Census 2015"
Population by region, sex and education in 2015	"China Population Census 2015"
Population by age, sex and education in 2015	"China Population Census 2015"

Note:1. The 1% sample population in 1987 is converted into the whole population by the actual sampling percentage of 0.999%6%.

2. The 1% sample population in 1995 is converted into the whole population by the actual sampling percentage of 1.02666%.
3. The working population in the long table data of "China Census 2000" is transformed into the working population of the whole country according to the sampling ratio of 9.5% in each province, autonomous region, and municipality.
4. The "China Census 2010" long form selects 10% of households to fill in the report. The working population in the long form data is converted into the national working population at a sampling ratio of 9.554% in each province, autonomous region, and municipality directly under the Central Government. Calculation method: Long form sampling ratio = Long table total population / Census total population.

Employed individuals in China Population Census 2000 for each province, autonomous region and municipality directly under the central government are aggregated to the whole population using the actual sampling percentage of 9.5%. To divide the age group data in 2005 and 2010 we assume that the employment rate in each age in the same age group has the same increasing rate. For example, the employment rate of a 25-year-old individual in 2005 equals to the employment rate of a 25-year-old individual in 2000 times the growth rate of the employment rate of the individual's corresponding age group (25-29) between 2000 and 2005.

For Taiwan and Hong Kong, employment rate $\mathrm{empr}(y, s, a, e)$ includes data by age, sex and education for individuals older than 15 from 1985 to 2020 Taiwan and 1990 to 2020 (Hong Kong). The formula used to calculate the employment rate is:

$$empr(y, s, a, e) = [employed(y, s, a, e)]/pop(y, s, a, e) \quad (16)$$

For Hong Kong the data before 1990 is replaced by the data in 1990.

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.[15]

The data used to calculate the rural growth rate are real rural income, where real rural income is nominal income deflated with the rural CPI. The rural real income growth rate in period T 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 formula is below:

$$Gr\_Rate_T = (Real\_Income_T - Real\_Incom_{T-1})/Real\_Income_{T-1} \quad (17)$$

The data used to calculate the urban growth rate are real urban income, where real urban income is nominal income deflated with the urban CPI. The urban real income growth rate in period T 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.

Our calculations show that for the 34-year period from 1985 to 2020, the growth rate is on average 6.23% and 8.15% annually in the rural and urban sectors, respectively, and we use these in the J-F calculation.[16]

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

[15] In China, there are also growth rates of real annual income in urban areas reported in the series of the *China Statistical Yearbook*, but this income only includes labor wages 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.

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

growth rates for urban and rural areas are shown in Table 3.3.1, where we assume that each province grows at a fixed annual rate.

Table3.3.1 Provincial Growth Rate

Unit: %

Province	Urban	Province	Rural
Beijing	9.73%	Zhejiang	7.27%
Shanghai	9.43%	Fujian	7.23%
Zhejiang	8.59%	Henan	7.00%
Anhui	8.49%	Hebei	6.70%
Tianjin	8.46%	Shandong	6.63%
Inner Mongolia	8.43%	Jiangsu	6.59%
Shandong	8.39%	Guangxi	6.57%
Chongqing	8.31%	Jiangxi	6.56%
Sichuan	8.28%	Anhui	6.55%
Guizhou	8.28%	Sichuan	6.53%
Hainan	8.28%	Chongqing	6.47%
Nation	8.20%	Tianjin	6.41%
Hubei	8.19%	Heilongjiang	6.38%
Jiangsu	8.15%	Jilin	6.33%
Yunnan	8.11%	Nation	6.30%
Fujian	8.08%	Hubei	6.21%
Hebei	8.07%	Inner Mongolia	6.18%
Jiangxi	8.04%	Guangdong	6.17%
Xizang	8.04%	Shaanxi	5.99%
Guangxi	7.95%	Ningxia	5.86%
Jilin	7.91%	Liaoning	5.80%
Guangdong	7.89%	Shanxi	5.71%
Henan	7.87%	Hunan	5.69%
Shaanxi	7.82%	Guizhou	5.61%
Liaoning	7.77%	Yunnan	5.60%
Ningxia	7.69%	Gansu	5.53%
Heilongjiang	7.66%	Hainan	5.30%
Xinjiang	7.61%	Xinjiang	5.27%
Hunan	7.53%	Qinghai	5.21%

Shanxi	7.16%	Beijing	5.16%
Gansu	6.37%	Xizang	7.27%
Qinghai	9.73%	Shanghai	—

For Hong Kong, the data used to calculate growth rate is the average wage index, which we adjust to derive a real wage index. Calculated using the 1980-2020 Hong Kong Real Wage Index published on the website of the Hong Kong Census and Statistics Department (1999Q1 = 100). Calculation method: The actual salary index is adjusted to 1999Q4=100. The actual salary growth rate in year T is equal to the difference between the actual salary index in year T and the actual salary in year T-1 divided by the actual salary index in year T-1. We obtain an average annual growth rate for Hong Kong of 2.55%.

For Taiwan, the data used to calculate growth rate is regular salary (1980-2020). Its calculation method: The consumer price index is adjusted to 1985 as the base period, the actual salary level is equal to the regular salary divided by the actual consumer price index, and the actual salary growth rate in year T is equal to the difference between the actual salary in year T and the actual salary in year T-1 The value is divided by the actual salary in T-1 year. The result shows that, the growth rate on average is 1.95% annually in Taiwan.

3.3.6 The discount rate

After the future income is calculated, it needs to be converted into a present value using a discount rate to reflect the time value of money. However, the choice of discount rate is often a highly controversial issue in such studies. Because different discount rates will lead to different results, even different conclusions. In the calculation of human capital in various countries, there is no uniform choice of the discount rate. In order to objectively and comprehensively reflect the impact of the discount rate, we used the following four methods to estimate the discount rate and calculated the quantity of human

capital with these discount rates (see Appendix E for the calculation methods of various discount rates) .

We adopt the discount rate of 4.58% which is also used by Jorgenson and Fraumeni (1992a) as well as by the OECD consortium (OECD 2010).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 To test the sensitivity of our results to the choice of discount rate, we use alternative discount rates 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%[17], the average benchmark lending rate over 5 years in China from 1996 to 2009, 5.51%[18], and the social discount rate based on the method from the World Bank, 8.14%.[19] Only results based on the discount rate of 4.58% are reported here.

[17] 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.

[18] 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.

[19] We calculated the average growth rate of individual consumption over the period 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 in China

4.1 Population imputation

We use several data sources and methodologies to estimate human capital by year, age, sex, and educational attainment as outlined in Chapter 3. Data for the urban and rural populations disaggregated by age and gender are available for the years 1987, 1995, 2005 and 2015 from the 1% Population Sampling Survey and for 1982, 1990, 2000 and 2010 from the Population Census. For all other years, we use birth and mortality rates by age and sex, and enrollment at different levels of education and regions； to impute yearly urban and rural populations by age, sex and educational attainment. The levels of educational attainment are: illiterate (no schooling), primary school (Grades 1-6), junior middle school (Grades 7-9), senior middle school (Grades 10-12), and college or above. Additional statistical information is available since the year 2000, enabling separation college-level population into those who have completed college and those who report university or above.

We use the following perpetual inventory formula to impute population by age, sex and educational attainment in the missing years:

$$L(y,e,a,s)=L(y-1,e,a,s)*(1-\delta(y,a,s))+IF(y,e,a,s)-OF(y,e,a,s)+EX(e,a,s) \quad (18)$$

where 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 includes individuals who achieved this level of education in a given year, while outflow includes those who achieved the next level of

education in that year. EX (e, a, s) is a discrepancy term.20 Thus,

$$IF(y,e,a,s) = \lambda(y,e,a,s) \cdot ERS(y,e,s) \qquad (19)$$

$$OF(y,e,a,s) = \lambda(y,e+1,a,s) \cdot ERS(y,e+1,s) \qquad (20)$$

$$\sum_a \lambda(y,e,a,s) = 1 \qquad (21)$$

where ERS is the matriculation at level e; and λ is the age distribution at education level e. To obtain an accurate estimate of λ, we use macroeconomic data available in the China Education Statistical Yearbook, 1987-2020. Details are reported in Appendix A.

4.2 Trend of population and education distribution

We present several features of China's population growth, based on the imputed population by educational attainment, age, sex, and rural-urban location.

China's total population increased from 1.00 billion in 1982 to 1.44 billion in 2020. The urban population increased by 700 million, while the rural population decreased by 264 million (Figure 4.2.1[21]).

[20] For example, the discrepancy can be caused by migration, but we do not have the data.
[21] The nation and the mainland in this report refer to the 31 provinces (autonomous regions and municipalities) of the mainland, excluding Hong Kong, Macau, and Taiwan.

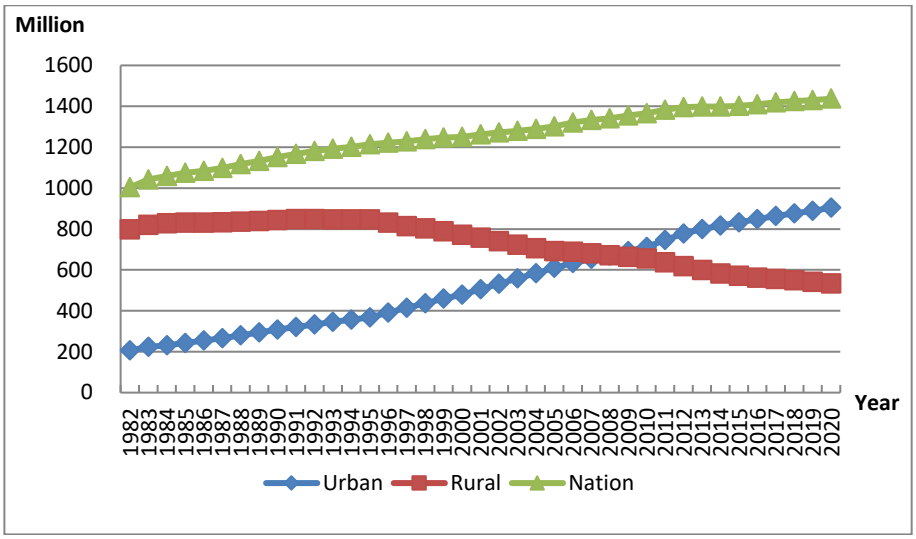

Figure 4.2.1 Population in China by Location 1982-2020

Figures 4.2.2-4.2.4 show the time paths of the national, urban and rural populations classified by educational attainment from 1982 to 2020. The illiterate population fell from 321 million in 1982 to139 million in 2000, but it was relatively stable from 2000 to 2020. The number of primary school graduates increased from 343 million in 1982 to the peak of 402 million in 1997, after which it declined gradually, reaching 188 million in 2020. This decline is the complement of the increased attainment of higher levels of education; reflected in the rapid growth of junior middle school graduates.

The number of junior middle school students grew most among all education levels, increasing from 176 million in 1982 to 410 million in 2020. Senior middle school graduates increased from 66 million in 1982 to 209 million in 2020, while those who graduated from college or above increased from only 6 million in 1982 to 205 million in 2020. The growth of senior middle school and college-and-above graduates was sharply boosted by college expansion program initiated in 1999. Moreover, the growth of these groups in rural areas is much slower than that in the urban areas.

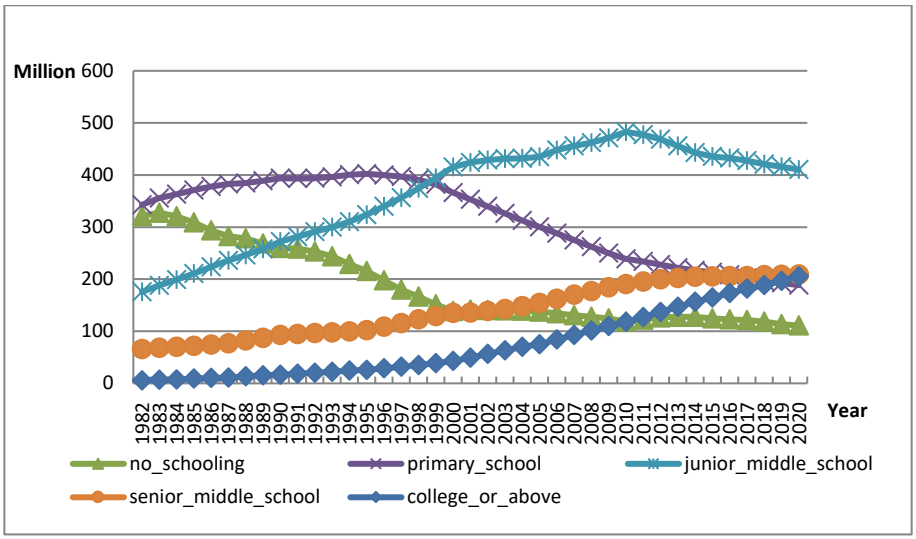

Figure 4.2.2 Population by Education Attainment in China 1982-2020

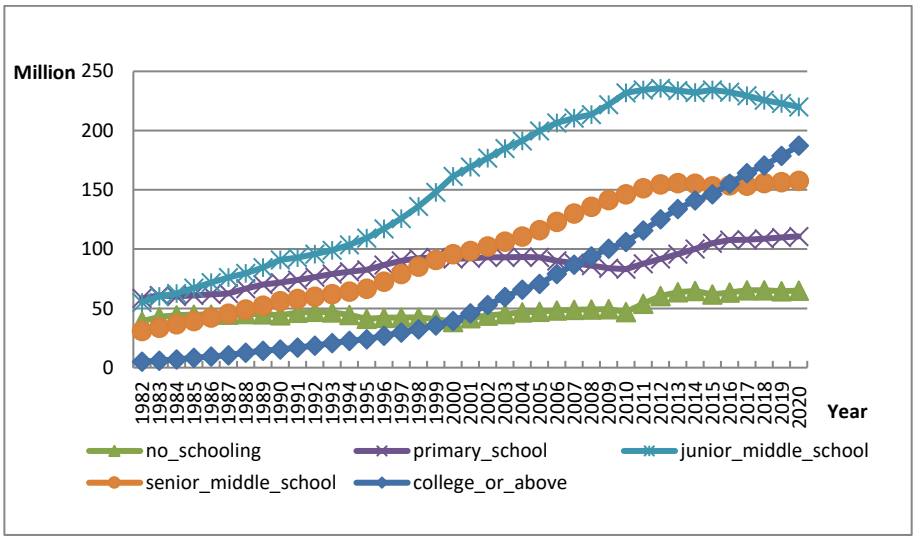

Figure 4.2.3 Urban Population by Educational Attainment 1982-2020

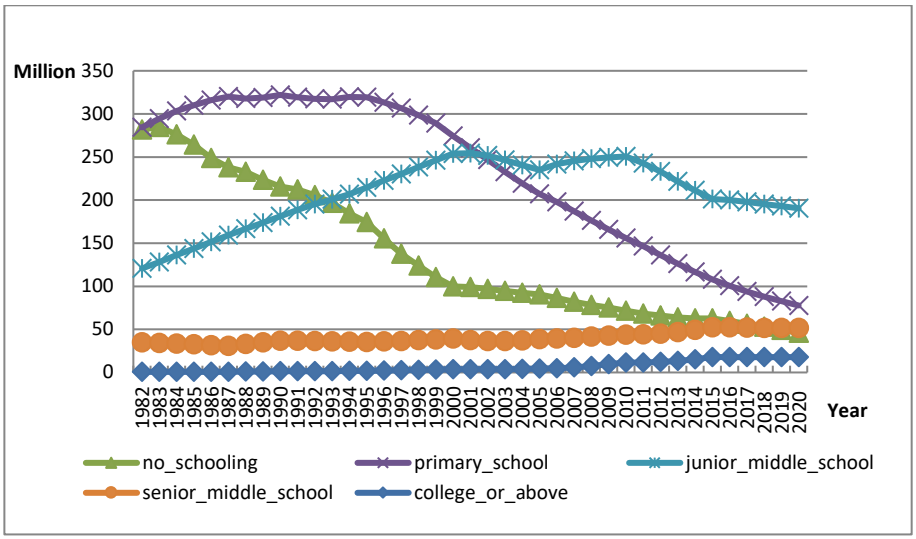

Figure 4.2.4 Rural Population by Educational Attainment 1982-2020

Figures 4.2.5 to 4.2.8 illustrate the increase in educational attainment over the years 1985, 1995, 2010, 2015, and 2020 categorized by gender and region. In 1985, among the five education levels, the proportion of the illiterate population and those achieving only primary education dominated the distribution. The 1995 distribution is dominated by individuals with maximum primary and junior middle education while by 2010, junior middle had become the dominant level of education achievement. Junior middle school continues to be the dominant education level in 2015. In 2020, the number of individuals achieving college or above schooling is nearly close to that of individuals achieving senior middle school[22]. Female educational attainment has increased relative to that of males; the number of illiterate females decreased at a greater rate than that of illiterate males, and the gender gap at higher education levels also shrank considerably.

[22] The data is from the seventh national census rather than estimation results.

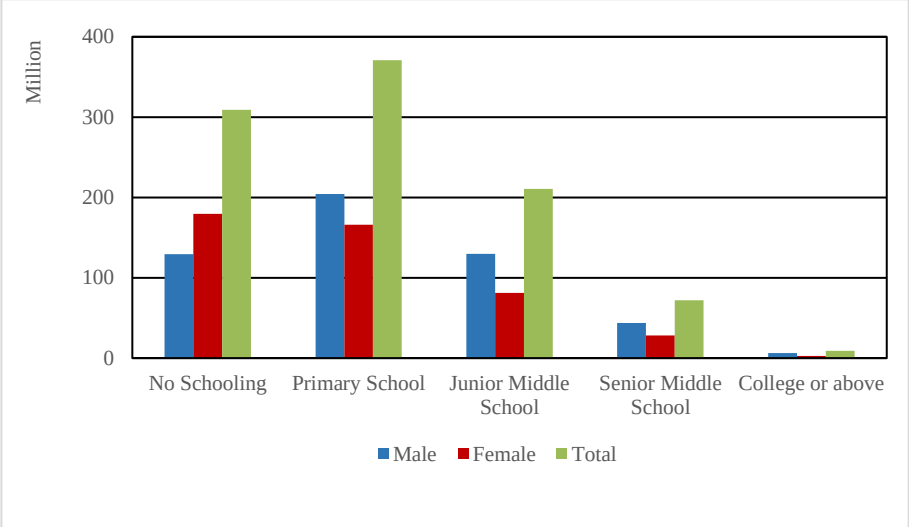

Figure 4.2.5 Population of Different Educational Levels by Gender, 1985

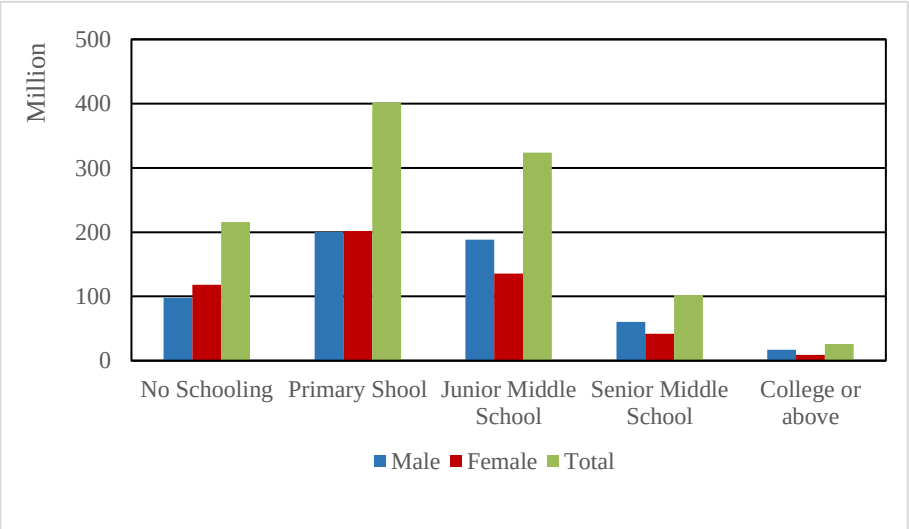

Figure 4.2.6 Population of Different Educational Levels by Gender, 1995

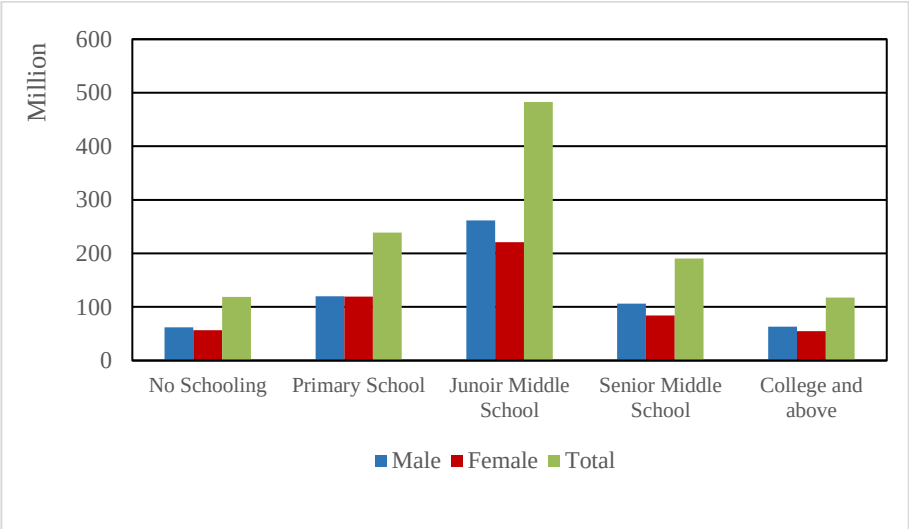

Figure 4.2.7 Population of Different Educational Levels by Gender, 2010

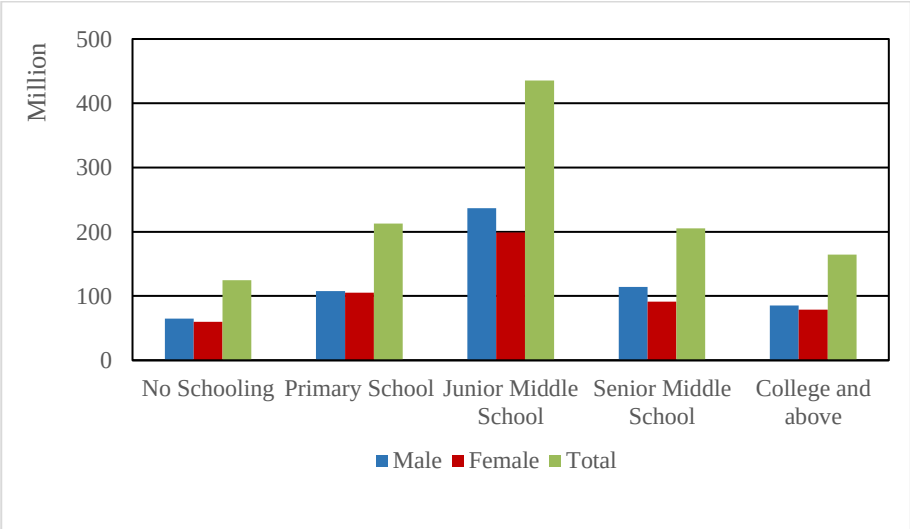

Figure 4.2.8 Population of Different Educational Levels by Gender, 2015

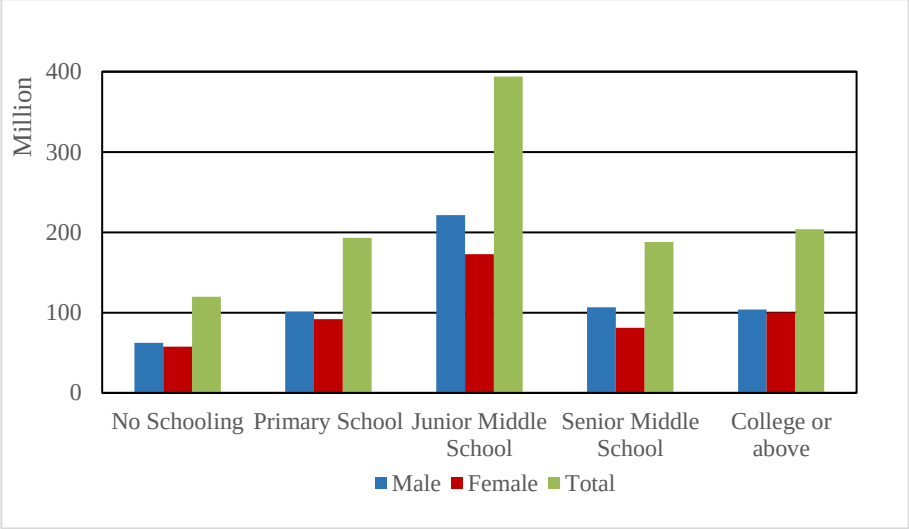

Figure 4.2.8 Population of Different Educational Levels by Gender, 2020[23]

[23] The data is from the seventh national census, in line with the previous national census.

Chapter 5 Age and Education of the Labor Force

In order to know more about the aging of the labor force, education status and higher education penetration rate of each province, we calculated the average age of the labor force, the average number of years of education and the proportion of the population with high school or above education levels in each province.

Through analysis of these three indicators, the results of the cross-provincial comparison of human capital in China can be explained to some extent. Further urban-rural comparisons help to determine the main reasons for the human capital urban-rural provincial disparities.

Through longitudinal comparison, we can see the trend of the three indicators over time, which is helpful to understand the growth of human capital in China.

5.1 Definition of the Labor Force and Education Levels

Definition of the Labor Force:

Mainland: age 16-55 for female excluding students and age 16-60 for male excluding students.

Hong Kong: age 15-60 for female excluding students and age 15-65 for male excluding students.

Taiwan: age 15-60 for female excluding students and age 15-60 for male excluding students.

Definitions of educational attainment levels are shown in the table below:

Table5.1.1 Levels of Educational Attainment before 2000

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

Table5.1.2 Levels of Educational Attainment since 2000

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

5.2 Average Age of the National Labor Force

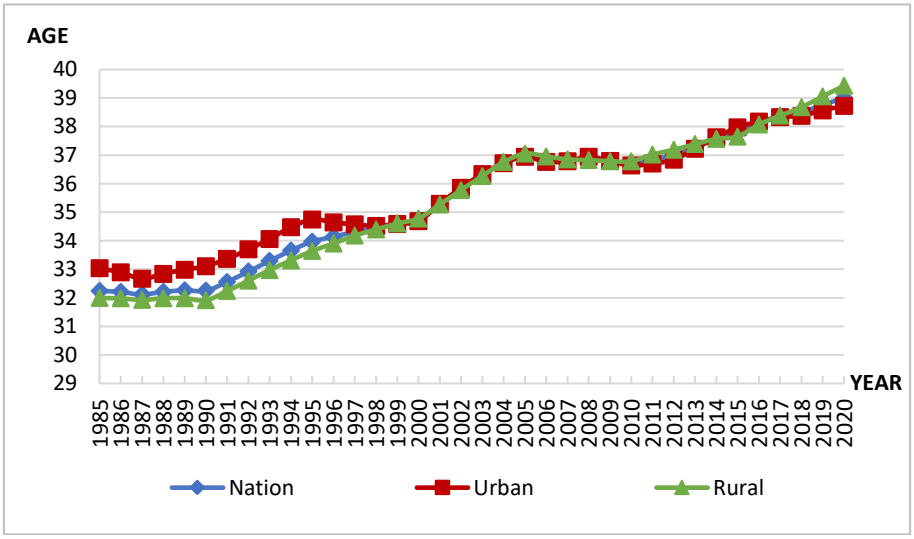

Figure5.2.1 Average Age of the National Labor Force[24]

[24] Note: The average age of the national labor force is calculated according to census data and 1% sample data.

Figure 5.2.1 shows the average age of the labor force, which is calculated with census data and the 1% sample data. It is worth noting that in the 1987, 1995, and 2005 1% sample data, the age structures and education levels are questionable. For example, comparing the 2000 1% sample data to the 2005 1% sample data, the population with an education level of high school or above was 182.30 million in 2000; while in 2005, the population with the same education level was 215.72 million, which is 33.42 million more than those in 2000. Total high school enrollment from 2001 to 2005 was 58.17 million. All of these figures can be accurate only if the number of deaths in this time period is as high as 24.76 million, accounting for 13.58% of individuals with a high school or above level of education in 2000.

Also, according to the 2005 1% sample data, the male population 20-24 years old was 37.73 million, this part of the population was 64.02 million in 2010 according to the census, indicating an increase of 26.29 million. Taking into account of deaths, this part of the population should have decreased in 2010. Due to minor statistical errors, there may have been an increase in 2010, but the population increase rate of 69.67% is too high. Thus, it implies that the age structure and education level data in the 2005 1% sample data are unreliable.

The national average age of labor force rose from age 32.25 in 1985 to age 39 in 2020, the average age of labor force in rural areas increased from age 31.99 in 1985 to age 39.43 in 2020, and the average age in urban increased from age 33.03 in 1985 to age 38.73 in 2020. After 2005, as the labor force (mainly young labor force) migrated into urban areas, the difference in average age of labor force between the urban and rural areas gradually narrowed.

Table 5.2.1 Average Age of the National Labor Force（1985-2019）

Unit：Year (of age)

Year	Average Age of the Labor Force		
	Nation	Urban	Rural
1985	32.25	33.03	31.99
1986	32.21	32.89	31.98
1987	32.12	32.67	31.93
1988	32.21	32.84	31.99
1989	32.26	32.99	31.99
1990	32.25	33.10	31.91
1991	32.56	33.37	32.24
1992	32.92	33.70	32.60
1993	33.30	34.06	32.98
1994	33.66	34.48	33.31
1995	33.97	34.74	33.64
1996	34.14	34.65	33.90
1997	34.31	34.57	34.18
1998	34.44	34.52	34.40
1999	34.60	34.59	34.60
2000	34.74	34.69	34.78
2001	35.28	35.29	35.27
2002	35.81	35.85	35.78
2003	36.30	36.34	36.27
2004	36.74	36.71	36.76
2005	37.00	36.94	37.06
2006	36.86	36.76	36.95
2007	36.82	36.79	36.85
2008	36.88	36.94	36.83
2009	36.79	36.79	36.79
2010	36.71	36.64	36.78
2011	36.85	36.70	37.02
2012	36.99	36.84	37.19
2013	37.29	37.22	37.39
2014	37.60	37.63	37.56
2015	37.84	37.98	37.65
2016	38.13	38.18	38.07
2017	38.35	38.33	38.38
2018	38.50	38.38	38.68

Year	Average Age of the Labor Force		
	Nation	Urban	Rural
2019	38.76	38.57	39.06
2020	39.00	38.73	39.43

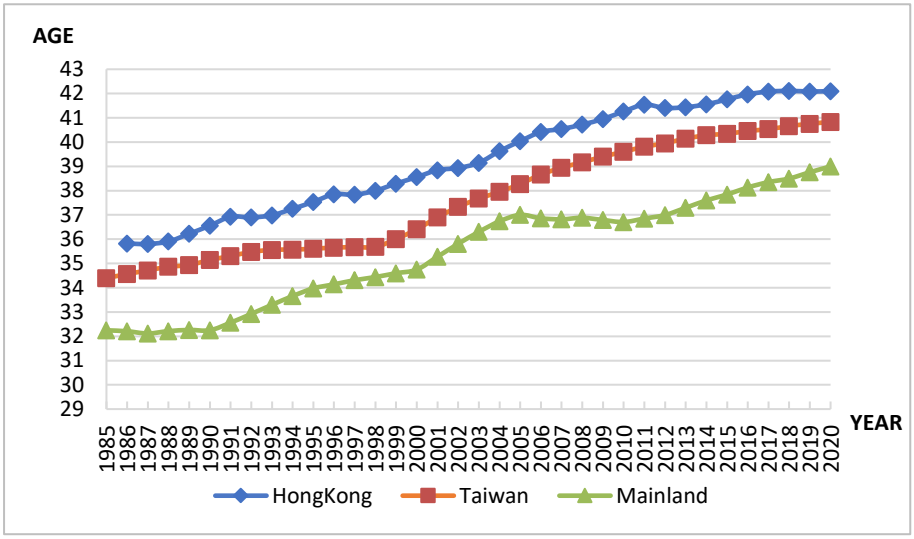

Figure5.2.2 Average Age of the Labor Force in Mainland, Hong Kong and Taiwan

Figure 5.2.2 shows the trends of the average age of the labor force in Mainland, Hong Kong and Taiwan. Table 5.2.2 shows the specific data. The average age of the labor force in Mainland increased from 32.25 in 1985 to 39.00 in 2020. The average age of the labor force in Hong Kong increased from 35.82 in 1986 to 42.10 in 2020, while that of Taiwan increased from 34.40 in 1985 to 40.83 in 2020. The labor force average age of Taiwan always lies between that of Hong Kong and Mainland.

Table5.2.2 Average Age of the Labor Force in Mainland, Hong Kong and Taiwan

Unit：Year (of age)

Year	Average Age of the Labor Force		
	Hong Kong	Taiwan	Mainland
1985		34.40	32.25
1986	35.82	34.56	32.21
1987	35.80	34.71	32.12
1988	35.91	34.86	32.21
1989	36.22	34.94	32.26
1990	36.56	35.14	32.25
1991	36.92	35.30	32.56
1992	36.90	35.47	32.92
1993	36.99	35.56	33.30
1994	37.25	35.57	33.66
1995	37.54	35.61	33.97
1996	37.85	35.65	34.14
1997	37.83	35.67	34.31
1998	38.00	35.68	34.44
1999	38.29	36.00	34.60
2000	38.56	36.41	34.74
2001	38.85	36.90	35.28
2002	38.93	37.33	35.81
2003	39.15	37.67	36.30
2004	39.63	37.95	36.74
2005	40.04	38.28	37.00
2006	40.42	38.66	36.86
2007	40.54	38.95	36.82
2008	40.73	39.17	36.88
2009	40.95	39.40	36.79
2010	41.26	39.60	36.71
2011	41.54	39.81	36.85
2012	41.41	39.95	36.99
2013	41.44	40.14	37.29
2014	41.56	40.28	37.60
2015	41.76	40.34	37.84
2016	41.97	40.46	38.13
2017	42.08	40.54	38.35
2018	42.11	40.66	38.50
2019	42.09	40.76	38.76
2020	42.10	40.83	39.00

5.3 Average Years of Schooling of the National Labor Force

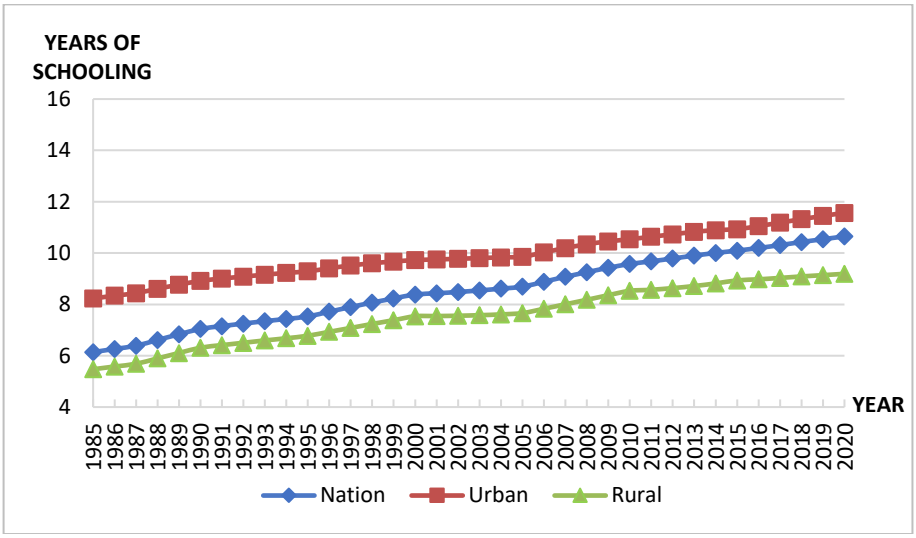

Figure5.3.1 Average Years of Schooling of the National Labor Force[25]

Figure 5.3.1 shows average schooling years of the national labor force, calculated on all the census data and 1% sample data and it shows the upward trend in average schooling years of the national labor force from 1985 to 2020. The national average years of schooling increased from 6.14 years in 1985 to 10.65 in 2020. The rural average years of schooling increased from 5.47 in 1985 to 9.19 in 2020 while the urban average years increased from 8.23 to 11.57 during the same period.

Table5.3.1 Average Years of Schooling of the National Labor Force (1985-2020)

Unit: Year

Year	Average Years of Schooling		
	Nation	Urban	Rural
1985	6.14	8.23	5.47
1986	6.27	8.34	5.58
1987	6.39	8.44	5.69
1988	6.61	8.61	5.90

[25] Note: The average age of the national labor force is calculated using census data and 1%-sample data.

Year	Average Years of Schooling		
	Nation	Urban	Rural
1989	6.83	8.77	6.11
1990	7.04	8.92	6.31
1991	7.15	9.01	6.41
1992	7.25	9.08	6.50
1993	7.35	9.16	6.60
1994	7.43	9.23	6.68
1995	7.53	9.29	6.78
1996	7.72	9.41	6.93
1997	7.90	9.52	7.08
1998	8.07	9.60	7.24
1999	8.23	9.67	7.38
2000	8.38	9.73	7.54
2001	8.43	9.75	7.55
2002	8.48	9.78	7.56
2003	8.54	9.80	7.58
2004	8.61	9.83	7.61
2005	8.69	9.86	7.66
2006	8.88	10.03	7.83
2007	9.07	10.19	8.00
2008	9.25	10.34	8.18
2009	9.42	10.46	8.36
2010	9.57	10.54	8.53
2011	9.68	10.64	8.57
2012	9.79	10.73	8.63
2013	9.90	10.82	8.72
2014	10.00	10.89	8.82
2015	10.10	10.93	8.93
2016	10.20	11.05	8.98
2017	10.31	11.18	9.03
2018	10.43	11.32	9.09
2019	10.54	11.45	9.14
2020	10.65	11.57	9.19

Figure5.3.2 and Table 5.3.2 show the trends of average years of schooling of the labor force in the Mainland, Hong Kong and Taiwan. The

labor force average years of schooling of Hong Kong increased from 8.84 in 1986 to 12.45 in 2020, while that of Taiwan increased from 8.70 in 1985 to 13.75 in 2020. The labor force years of schooling of Hong Kong and Taiwan were similar in 1985-2000, and both of them were significantly higher than that of the Mainland.

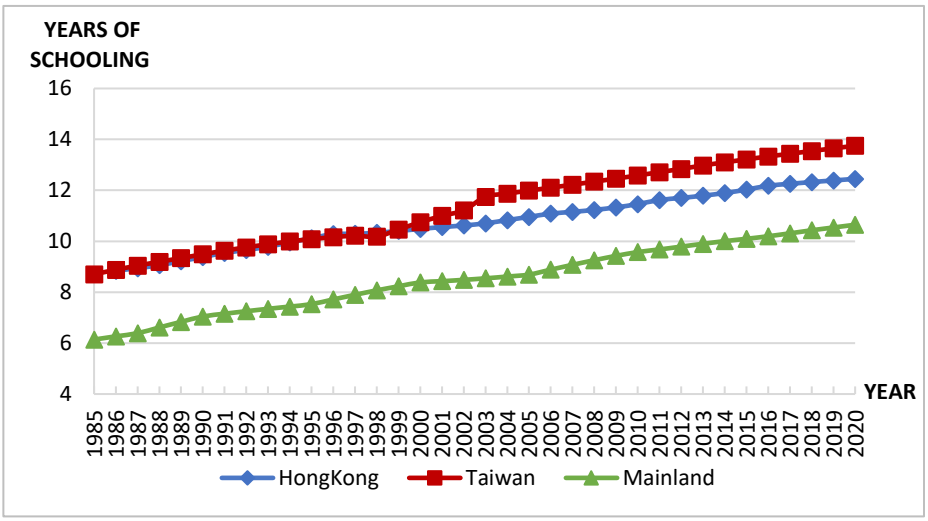

Figure 5.3.2 Average Years of Schooling of the Labor Force in Mainland, Hong Kong and Taiwan

Table5.3.2 Average Years of Schooling of the Labor Force in Mainland, Hong Kong and Taiwan

Unit: Year

Year	Average Years of Schooling		
	Hong Kong	Taiwan	Mainland
1985		8.70	6.14
1986	8.84	8.88	6.27
1987	8.94	9.04	6.39
1988	9.06	9.19	6.61
1989	9.22	9.34	6.83
1990	9.38	9.49	7.04
1991	9.54	9.63	7.15
1992	9.66	9.76	7.25

Year	Average Years of Schooling		
	Hong Kong	Taiwan	Mainland
1993	9.79	9.88	7.35
1994	9.95	9.99	7.43
1995	10.12	10.08	7.53
1996	10.28	10.16	7.72
1997	10.29	10.22	7.90
1998	10.33	10.18	8.07
1999	10.41	10.46	8.23
2000	10.48	10.74	8.38
2001	10.56	11.00	8.43
2002	10.62	11.22	8.48
2003	10.70	11.74	8.54
2004	10.83	11.87	8.61
2005	10.96	11.99	8.69
2006	11.08	12.10	8.88
2007	11.15	12.22	9.07
2008	11.23	12.34	9.25
2009	11.33	12.46	9.42
2010	11.46	12.58	9.57
2011	11.62	12.71	9.68
2012	11.70	12.84	9.79
2013	11.79	12.98	9.90
2014	11.89	13.10	10.00
2015	12.03	13.21	10.10
2016	12.18	13.33	10.20
2017	12.25	13.44	10.31
2018	12.32	13.54	10.43
2019	12.39	13.65	10.54
2020	12.45	13.75	10.65

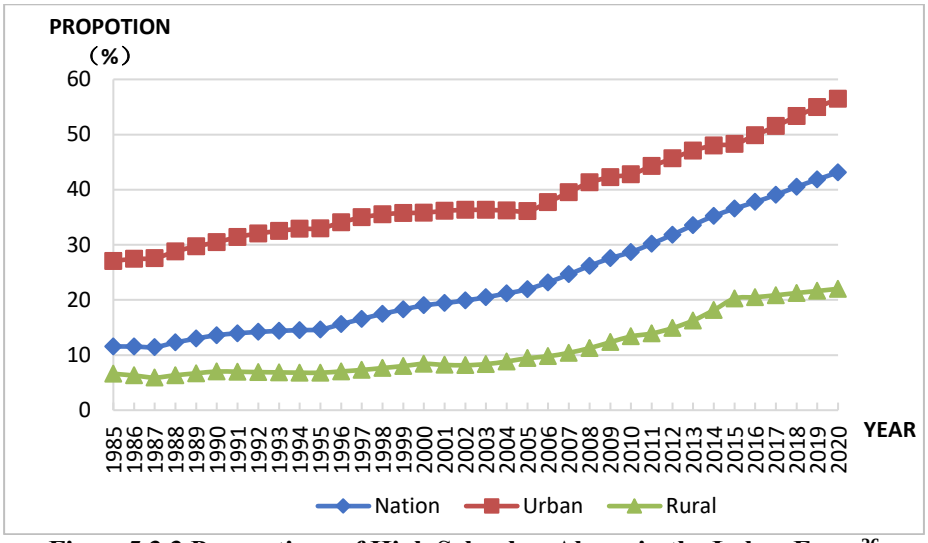

Figure5.3.3 Proportions of High School or Above in the Labor Force[26]

Figure 5.3.3 shows the proportion of high school education level or above in the labor force, which is calculated based on the census data and 1% sample data. It shows that the proportion as a whole had a significant upward trend over time. The national proportion of labor force with at least high school education increased from 11.56% in 1985 to 43.13% in 2020, the rural proportion increased from 6.61% in 1985 to 22.02% in 2020, and the urban proportion increased from 27.07% in 1985 to 56.45% in 2020.

Table5.3.3 National Proportions of High School or Above of the National Labor Force (1985-2020)

Unit: %

Year	Proportions of High School or Above		
	Nation	Urban	Rural
1985	11.56	27.07	6.61
1986	11.54	27.44	6.29
1987	11.45	27.58	5.92
1988	12.28	28.78	6.34
1989	12.99	29.73	6.69

[26] Note: The average age of the national labor force is calculated using census data and 1%-sample data.

Year	Proportions of High School or Above		
	Nation	Urban	Rural
1990	13.60	30.46	7.01
1991	13.95	31.40	6.97
1992	14.19	32.05	6.90
1993	14.38	32.51	6.85
1994	14.52	32.89	6.81
1995	14.64	32.96	6.79
1996	15.60	34.08	7.03
1997	16.56	34.98	7.30
1998	17.47	35.51	7.64
1999	18.26	35.75	8.01
2000	19.01	35.82	8.41
2001	19.43	36.14	8.22
2002	19.90	36.33	8.15
2003	20.48	36.31	8.36
2004	21.19	36.23	8.82
2005	21.94	36.10	9.43
2006	23.17	37.70	9.78
2007	24.63	39.53	10.41
2008	26.18	41.30	11.26
2009	27.55	42.27	12.33
2010	28.68	42.77	13.38
2011	30.19	44.27	13.91
2012	31.82	45.66	14.88
2013	33.57	47.08	16.26
2014	35.23	48.03	18.15
2015	36.55	48.29	20.26
2016	37.76	49.88	20.50
2017	39.06	51.51	20.85
2018	40.51	53.32	21.25
2019	41.85	54.96	21.62
2020	43.13	56.45	22.02

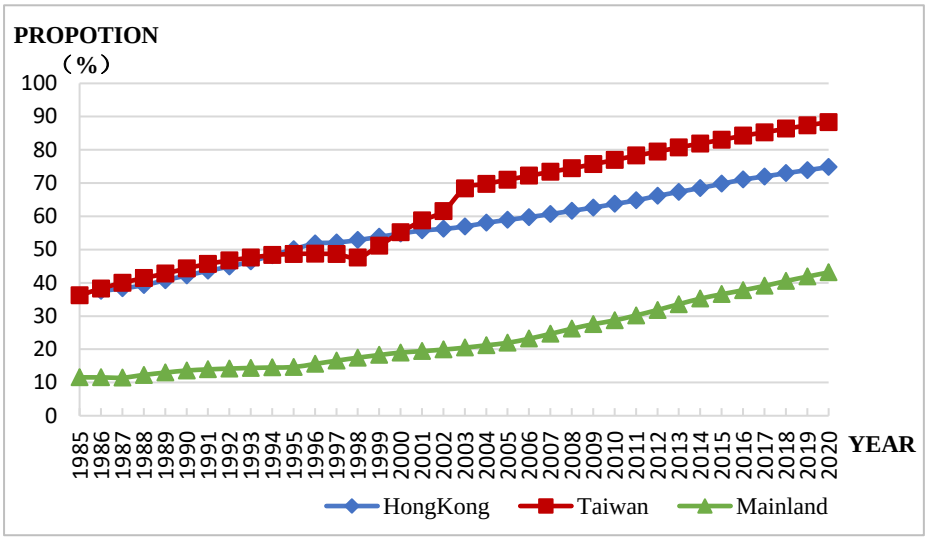

Figure 5.3.4 Proportions of High School Education or Above in the Labor Force of Mainland, Hong Kong and Taiwan

Figures 5.3.4 and Table 5.3.4 show the trends in proportions of population with high school educational attainment or above in the labor force of Mainland, Hong Kong and Taiwan. The proportion in Hong Kong increased from 37.55% in 1986 to 74.49% in 2020 while that of Taiwan increases from 36.20% in 1985 to 88.35% in 2020. The proportion in Hong Kong was greater than that in Taiwan before 2001, but the former one became smaller than the latter one since 2001; the proportions in both regions always exceeded that in Mainland China.

Table5.3.4 Proportions of High School Education or Above in the Labor Force of Mainland, Hong Kong and Taiwan

Unit: %

Year	Proportions of High School Education or Above		
	Hong Kong	Taiwan	Mainland
1985	-	36.20	11.56
1986	37.55	38.28	11.54
1987	38.31	39.98	11.45
1988	39.30	41.43	12.28
1989	40.76	42.78	12.99

Year	Proportions of High School Education or Above		
	Hong Kong	Taiwan	Mainland
1990	42.20	44.32	13.60
1991	43.58	45.69	13.95
1992	44.90	46.71	14.19
1993	46.40	47.58	14.38
1994	48.29	48.31	14.52
1995	50.09	48.68	14.64
1996	51.81	48.73	15.60
1997	52.12	48.61	16.56
1998	52.85	47.55	17.47
1999	53.83	51.16	18.26
2000	54.80	55.17	19.01
2001	55.73	58.74	19.43
2002	56.21	61.54	19.90
2003	56.94	68.41	20.48
2004	58.04	69.77	21.19
2005	58.92	71.00	21.94
2006	59.75	72.19	23.17
2007	60.67	73.37	24.63
2008	61.66	74.48	26.18
2009	62.63	75.68	27.55
2010	63.71	76.96	28.68
2011	64.79	78.25	30.19
2012	66.14	79.45	31.82
2013	67.35	80.72	33.57
2014	68.51	81.90	35.23
2015	69.78	83.02	36.55
2016	71.05	84.24	37.76
2017	71.98	85.27	39.06
2018	72.97	86.35	40.51
2019	73.90	87.36	41.85
2020	74.79	88.35	43.13

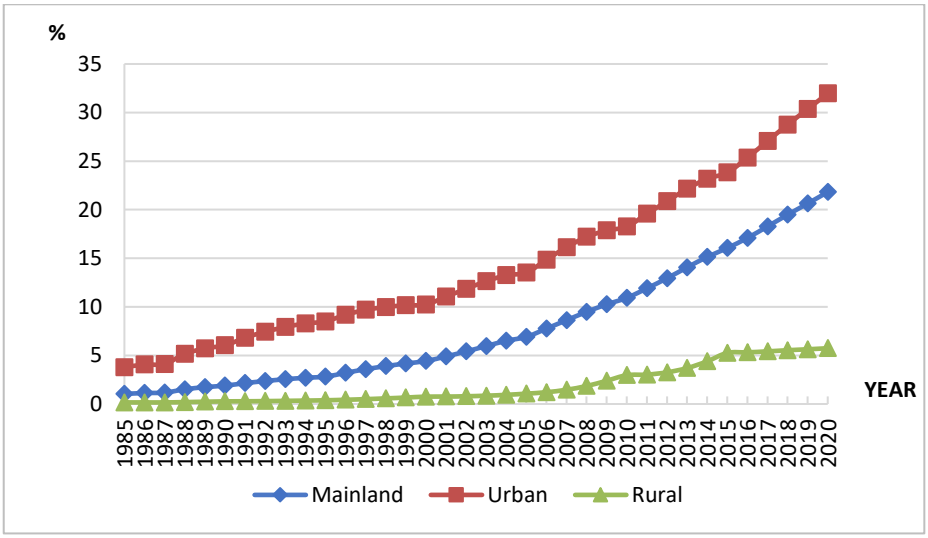

Figure 5.3.5 National Proportions of College Education or Above of the National Labor Force[27]

Figure 5.3.5 shows proportion workers with education of college or above in labor force. We use census data and the 1%-sample data to obtain these results. It shows that national proportion of labor force with schooling of college or above in the labor force increased from 1.04% in 1985 to 21.82% in 2020. Besides, the proportion in the rural areas increased from 0.16% in 1985 to 5.74% in 2020, while that in the urban areas increased from 3.78% to 31.97%. The upward trend is consistent with the improvement and expansion of higher education in China.

Table 5.3.5 National Proportions of College or Above of the National Labor Force (1985-2019)

Unit: %

Year	Proportions of College or Above		
	Nation	Urban	Rural
1985	1.04	3.78	0.16

[27] Note: The average age of the national labor force is calculated using census data and 1%-sample data.

Year	Proportions of College or Above		
	Nation	Urban	Rural
1986	1.13	4.06	0.16
1987	1.17	4.12	0.16
1988	1.51	5.15	0.20
1989	1.74	5.73	0.23
1990	1.89	6.03	0.27
1991	2.15	6.81	0.28
1992	2.36	7.43	0.30
1993	2.55	7.91	0.32
1994	2.70	8.29	0.35
1995	2.81	8.49	0.38
1996	3.20	9.18	0.43
1997	3.58	9.69	0.50
1998	3.89	9.98	0.58
1999	4.17	10.15	0.66
2000	4.42	10.23	0.76
2001	4.89	11.05	0.76
2002	5.41	11.85	0.80
2003	5.96	12.63	0.85
2004	6.50	13.26	0.94
2005	6.91	13.52	1.07
2006	7.76	14.85	1.21
2007	8.63	16.13	1.46
2008	9.48	17.21	1.85
2009	10.25	17.86	2.39
2010	10.93	18.25	2.97
2011	11.90	19.58	3.03
2012	12.94	20.86	3.26
2013	14.06	22.16	3.69
2014	15.14	23.18	4.39
2015	16.05	23.82	5.26
2016	17.09	25.35	5.32
2017	18.27	27.06	5.42
2018	19.48	28.75	5.53
2019	20.64	30.35	5.63
2020	21.82	31.97	5.74

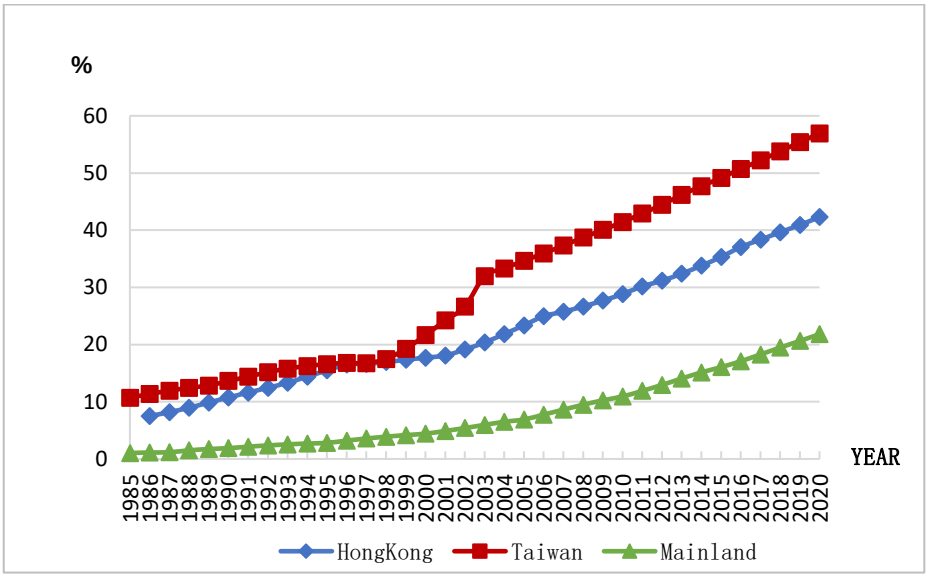

Figure 5.3.6 Proportions of College Education or Above in the Labor Force of Mainland, Hong Kong and Taiwan

Figures 5.3.6 and Table5.3.6 show the trends in the proportions of labor force with college educational attainment or above in the labor force of Mainland, Hong Kong and Taiwan. The proportion in Hong Kong increased from 7.49% in 1986 to 42.30% in 2020, while that in Taiwan increased from 10.70% in 1985 to 56.92% in 2020. The proportion in Taiwan was greater than that of Hong Kong in general, and the proportions in these two areas were always much greater than that in Mainland China.

Table5.3.6 Proportions of College Education or Above in the Labor Force of Mainland, Hong Kong and Taiwan

Unit: %

Year	Proportions of College Education or Above		
	Hong Kong	Taiwan	Mainland
1985	-	10.70	1.04
1986	7.49	11.37	1.13
1987	8.19	11.93	1.17

Year	Proportions of College Education or Above		
	Hong Kong	Taiwan	Mainland
1988	8.95	12.45	1.51
1989	9.85	12.84	1.74
1990	10.75	13.63	1.89
1991	11.61	14.39	2.15
1992	12.45	15.17	2.36
1993	13.32	15.80	2.55
1994	14.40	16.24	2.70
1995	15.48	16.58	2.81
1996	16.50	16.78	3.20
1997	16.63	16.75	3.58
1998	16.94	17.47	3.89
1999	17.34	19.27	4.17
2000	17.72	21.64	4.42
2001	18.08	24.22	4.89
2002	19.14	26.66	5.41
2003	20.37	31.97	5.96
2004	21.85	33.31	6.50
2005	23.37	34.66	6.91
2006	24.96	35.94	7.76
2007	25.74	37.32	8.63
2008	26.67	38.71	9.48
2009	27.68	40.07	10.25
2010	28.83	41.42	10.93
2011	30.17	42.92	11.90
2012	31.17	44.45	12.94
2013	32.40	46.18	14.06
2014	33.79	47.69	15.14
2015	35.32	49.16	16.05
2016	37.05	50.72	17.09
2017	38.34	52.22	18.27
2018	39.64	53.78	19.48
2019	40.91	55.38	20.64
2020	42.30	56.92	21.82

5.4 Average Age of the Labor Force at the Provincial Level

Table 5.4.1 shows the comparison of average age of the labor force in 2020 among all provinces in China in descending order in the total, rural and urban labor forces. In general, the average age of the labor force is between 32 and 41 years (of age) in 2020, and the three northeast provinces of China (Heilongjiang， Liaoning, and Jilin) ranked at the oldest, while Tibet is the youngest.

Table 5.4.1 Average Age of the Labor Force at Provincial Level (2020)

Unit: Year (of age)

Rank	Province	Average Age		
		Sub-Total	Urban	Rural
1	Heilongjiang	40.84	40.72	41.02
2	Liaoning	40.44	40.33	40.67
3	Jilin	40.31	40.04	40.69
4	Chongqing	39.97	39.64	40.68
5	Zhejiang	39.77	39.22	41.06
6	Inner Mongolia	39.7	39.11	40.77
7	Hunan	39.69	39.69	39.69
8	Shandong	39.65	38.95	40.8
9	Jiangsu	39.48	39.12	40.37
10	Hubei	39.36	38.75	40.34
11	Sichuan	39.27	38.57	40.11
12	Hebei	39.1	38.78	39.49
13	Shanghai	39.08	39.08	-
14	Tianjin	38.92	38.81	39.49
15	Fujian	38.88	38.59	39.48
16	Jiangxi	38.79	38.86	38.7
17	Qinghai	38.7	38.51	38.94
18	Anhui	38.62	38.3	39.01
19	Shanxi	38.6	38.58	38.64
20	Guangxi	38.44	37.85	39.11
21	Yunnan	38.39	38.12	38.64
22	Beijing	38.32	38.13	39.69

Rank	Province	Average Age		
		Sub-Total	Urban	Rural
23	Shaanxi	38.3	37.45	39.52
24	Gansu	38.27	37.85	38.63
25	Ningxia	38.2	38.26	38.1
26	Henan	38.06	37.86	38.28
27	Xinjiang	37.82	38	37.66
28	Guangdong	37.61	37.6	37.64
29	Hainan	37.31	37.05	37.7
30	Guizhou	36.77	36.18	37.35
31	Tibet	36.64	32.94	39.18
	Mainland	39	38.73	39.43

5.5 Education Indicators at the Provincial Level

Table 5.5.1 shows the provincial rankings of average years of schooling of the labor force in 2020 in the total, rural and urban labor forces. In general, the average years of education of the labor force in the provinces with better economic development, such as Beijing, Shanghai, and Tianjin, are correspondingly longer; the average years of education in the provinces with lower development levels, such as Tibet, Qinghai, and Yunnan, are shorter. Judging from the comparison of urban and rural provincial areas, the urban labor force in all mainland provinces has more years of education than rural, and this difference will be even greater in economically underdeveloped provinces. For example, the difference in years of education between urban and rural areas in Tibet is as high as 4.47 years, while the gap in Beijing is only 2.81.

Table 5.5.1 Average Years of Schooling of the Labor Force at Provincial Level (2020)

Unit: Year

Rank	Province	Average Years of Schooling		
		Sub-total	Urban	Rural
1	Beijing	13.14	13.49	10.68
2	Shanghai	12.16	12.16	-
3	Tianjin	11.58	11.93	9.63
4	Jiangsu	11.2	11.75	9.85
5	Liaoning	11.18	12.06	9.16
6	Shaanxi	11.04	12.08	9.57
7	Hubei	11	11.97	9.44
8	Shanxi	10.92	11.8	9.71
9	Hunan	10.86	11.82	9.66
10	Inner Mongolia	10.79	11.66	9.17
11	Shandong	10.78	11.66	9.34
12	Guangdong	10.75	11.16	9.62
13	Jilin	10.69	11.95	8.95
14	Chongqing	10.68	11.43	9.08
15	Zhejiang	10.58	11.05	9.48
16	Hebei	10.53	11.5	9.35
17	Heilongjiang	10.52	11.61	8.88
18	Hainan	10.52	11.26	9.45
19	Henan	10.47	11.42	9.42
20	Anhui	10.41	11.42	9.17
21	Fujian	10.4	11.02	9.11
22	Jiangxi	10.39	11.29	9.26
23	Ningxia	10.31	11.39	8.64
24	Guangxi	10.25	11.41	8.92
25	Sichuan	10.25	11.45	8.82
26	Xinjiang	10.24	11.86	8.75
27	Gansu	9.96	11.8	8.37
28	Guizhou	9.6	10.89	8.33
29	Yunnan	9.52	11.01	8.18
30	Qinghai	9	10.55	7
31	Tibet	7.5	10.15	5.68
	Mainland	10.65	11.57	9.19

Table 5.5.2 shows the 2020 provincial rankings for the proportion of labor force with high school education or above in the total, rural and urban labor

forces. Beijing, Shanghai and Tianjin have the highest proportion, while Tibet and Yunnan are at the bottom.

Table5.5.2 The Proportion of High School Education or Above of the Labor Force at Provincial Level (2020)

Unit: %

Rank	Province	The proportion of high school education or above		
		Sub-total	Urban	Rural
1	Beijing	73.73	77.92	44.37
2	Shanghai	60.94	60.94	-
3	Tianjin	52.9	58.4	22.45
4	Jiangsu	50.07	57.63	31.23
5	Shaanxi	47.51	61.34	27.82
6	Hunan	47.44	61.73	29.58
7	Hubei	47.26	61.47	24.21
8	Shanxi	46.1	59.65	27.3
9	Liaoning	46.09	59.91	14.51
10	Inner Mongolia	45.61	58.17	22.52
11	Guangdong	45.5	51.59	28.55
12	Chongqing	44.87	55.33	22.49
13	Ningxia	43.2	56.8	22.17
14	Shandong	42.79	55.94	21.4
15	Zhejiang	42.13	48.07	28.16
16	Jilin	40.65	60.28	13.52
17	Hainan	40.61	53.05	22.35
18	Fujian	40.59	48.8	23.71
19	Gansu	40.09	62.94	20.29
20	Sichuan	39.88	56.53	20.05
21	Henan	39.77	55.3	22.62
22	Jiangxi	39.29	52.86	22.5
23	Anhui	38.4	54.13	19.17
24	Hebei	38.23	53.61	19.46
25	Xinjiang	38.07	65.84	12.6
26	Heilongjiang	37.63	54.6	11.84
27	Guangxi	36.56	54.07	16.53
28	Qinghai	34.19	50.13	13.45
29	Guizhou	33.68	51.53	15.99

Rank	Province	The proportion of high school education or above		
		Sub-total	Urban	Rural
30	Yunnan	31.54	50.14	14.73
31	Tibet	22.39	35.7	13.24
	Mainland	43.13	56.45	22.02

Table 5.5.3 shows the provincial rankings for the proportion of workers with college education or above in the labor force in 2020 in the total, rural and urban labor forces. The rankings are basically consistent with the rankings of the proportion of workers with high school education in general. However, because the permanent population includes many college students who are from other provinces, the number of college students is influenced by the number and quality of universities in the province, resulting in the ranking of the proportion of college-level or above education and the ranking of the proportion of high school level or above education is slightly different.

Table 5.5.3 Proportion of the Provincial Level labor Force with College Education or Above (2020)

Unit: %

Rank	Province	The proportion of college education or above		
		Sub-total	Urban	Rural
1	Beijing	55.34	60.67	17.93
2	Shanghai	42.14	42.14	-
3	Tianjin	33.6	38.28	7.71
4	Liaoning	28.07	38.45	4.34
5	Shaanxi	27.78	41.16	8.75
6	Jiangsu	27.42	34.58	9.56
7	Hubei	25.43	36.65	7.22
8	Inner Mongolia	24.02	32.95	7.59
9	Zhejiang	23.77	29.86	9.42
10	Ningxia	23.16	33.39	7.35
11	Ji Lin	22.82	36.29	4.19
12	Shandong	22.4	33.12	4.96

Rank	Province	The proportion of college education or above		
		Sub-total	Urban	Rural
13	Chongqing	22.35	30.46	5.02
14	Shanxi	21.92	32.67	7
15	Fujian	21.45	28.66	6.64
16	Hunan	20.64	32.76	5.5
17	Heilongjiang	20.56	32	3.16
18	Gansu	20.11	36.28	6.1
19	Guangdong	19.58	24.7	5.31
20	Sichuan	19.4	31.32	5.21
21	Anhui	19.12	30.32	5.43
22	Hebei	19.04	30.93	4.54
23	Xinjiang	18.07	33.78	3.66
24	Jiangxi	17.79	28.06	5.08
25	Hainan	17.63	25.26	6.44
26	Guangxi	17.57	29.71	3.7
27	Henan	16.2	27.11	4.14
28	Qinghai	16.11	24.88	4.7
29	Yunnan	16.04	29.03	4.3
30	Guizhou	14.57	24.72	4.5
31	Tibet	13.63	28.32	3.54
	Mainland	21.82	31.97	5.74

Chapter 6 National human capital

6.1 Trends in human capital

It is more meaningful to discuss the trends of the real value of human capital stock than the nominal value.

We use the consumer price index (CPI) in 1985 as the base period to calculate the real value of national human capital. The reason for adopting this method is that: on the one hand, other published deflators are not available for recent years, which makes it inconvenient to update the calculation of real human capital, and the national statistical department updates the consumer price index every year. On the other hand, the real value of human capital calculated based on the consumer price index is smaller than the result calculated using capital deflator index of Zhang Jun et al. (2004) and Holz (2006). Therefore, we give a relatively conservative estimate of the real human capital stock in China.

Discussions of human capital categorized by gender and by region are important in our report, as they can reflect the gender difference and urban-rural difference of human capital. Table 6.1.1 shows real human capital for the country as a whole based on 6-education categories, by gender, and by region. From 1985 to 2020, human capital increased 10 times from 47.74 trillion Yuan to 569.23 trillion Yuan, an average annual growth rate of 7.50%. The reason for this rapid growth lies in 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 have trended upward between 1985-2020. Rural real human capital increased from 29.77 trillion Yuan to 79.74 trillion Yuan – just more than doubling the level of human capital over this time period; urban real human capital grew from 17.97

trillion Yuan to 489.50 trillion Yuan which is a 26-fold rise – or human capital rose over 26 times over this period in urban areas. The corresponding annual growth rates are 2.98% for rural areas and 10.10% for urban areas. Before 1994, urban real human capital is smaller than rural real human capital, while after 1994 urban human capital exceeds that in rural areas.

Table 6.1.1 National Real Human Capital by Gender and Region

Billions of 1985 Yuan

Year	National	Male	Female	Urban	Rural
1985	47742	25442	22300	17969	29773
1986	51755	29211	22545	21146	30609
1987	54400	31394	23006	22717	31683
1988	52543	30928	21615	22490	30054
1989	51131	30660	20472	23022	28109
1990	57284	34724	22560	27053	30231
1991	63159	38738	24422	30440	32719
1992	67260	41655	25606	32853	34408
1993	66096	41315	24781	32901	33195
1994	59750	37573	22177	30256	29494
1995	56659	35778	20881	29356	27303
1996	60008	38240	21768	32856	27152
1997	67198	43076	24123	38543	28655
1998	77599	49955	27644	46222	31377
1999	90245	58008	32237	55874	34371
2000	102506	65988	36519	65194	37312
2001	114811	73603	41208	75135	39676
2002	128335	82537	45798	86536	41799
2003	140690	90906	49784	96703	43987
2004	150305	96756	53550	105695	44611
2005	162149	104106	58043	115838	46311
2006	184984	119369	65616	133879	51105
2007	202614	130620	71994	149106	53508
2008	217314	139925	77389	161953	55361
2009	248966	160381	88585	187382	61584
2010	271561	174783	96778	206262	65298

Year	National	Male	Female	Urban	Rural
2011	295527	190233	105294	231819	63708
2012	325660	209851	115808	261344	64316
2013	364479	235691	128788	299773	64706
2014	395273	257481	137793	328657	66617
2015	417596	277071	140525	347640	69956
2016	450511	300578	149934	378947	71564
2017	487572	327370	160202	413229	74343
2018	519064	352366	166698	442520	76544
2019	547301	375550	171751	469517	77784
2020	569231	394524	174707	489495	79736

Note: Some discrepancy may exist when summing up male and female, urban and rural to get the national amount. This is caused by rounding.

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, and was even higher than urban before 1989. However, since 1998, rural real human capital has shown a relatively lower growth rate compared to the accelerating growth rate of urban real human capital, and therefore, the gap between urban and rural increased. From the perspective of population size, the reason for this different change in urban and rural areas lies in the fact that the early rural population is much larger than the urban population, which in turn makes the total rural human capital larger.

For example, in 1985 the rural population at 808 million was more than three times the size of the urban population at 251 million, however, by 2020, the population in rural China had fallen to 510 million, lower than the urban population of 902 million.

From other perspectives, there are two main reasons for the disparity in real human capital between urban and rural after 1998. One is the rapid urbanization process during the economic transition, as there was a large-scale migration from rural to urban. The second reason for the growing

disparity is the increasing education gap between the population in urban and rural areas over this time period. In addition, we find that in the figure the real human capital changes in urban are basically the same as the pattern of exponential growth that is observed in the whole country.

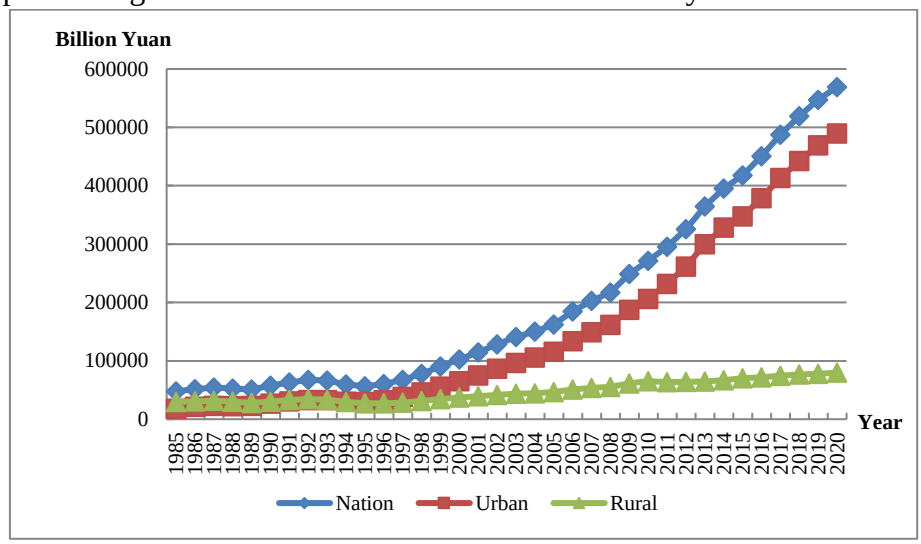

Figure 6.1.1 National Real Human Capital by Region,1985-2020

Table 6.1.2 shows the real human capital index of China from 1985 to 2020 and the real human capital index by gender and region based on 1985. It intuitively shows the trend of human capital.

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

Year	National	Male	Female	Urban	Rural
1985	100	100	100	100	100
1986	108.41	114.81	101.10	117.69	102.81
1987	113.95	123.40	103.17	126.42	106.42
1988	110.06	121.56	96.93	125.16	100.94
1989	107.10	120.51	91.80	128.12	94.41
1990	119.99	136.49	101.17	150.56	101.54
1991	132.29	152.26	109.51	169.41	109.90
1992	140.88	163.73	114.82	182.83	115.57
1993	138.45	162.39	111.13	183.10	111.49
1994	125.15	147.68	99.45	168.38	99.06

Year	National	Male	Female	Urban	Rural
1995	118.68	140.63	93.64	163.37	91.70
1996	125.69	150.30	97.62	182.85	91.20
1997	140.75	169.31	108.17	214.50	96.25
1998	162.54	196.35	123.96	257.24	105.39
1999	189.03	228.00	144.56	310.95	115.44
2000	214.71	259.37	163.76	362.82	125.32
2001	240.48	289.30	184.79	418.15	133.26
2002	268.81	324.42	205.37	481.60	140.39
2003	294.69	357.31	223.25	538.18	147.74
2004	314.83	380.30	240.13	588.22	149.84
2005	339.64	409.19	260.29	644.67	155.55
2006	387.47	469.19	294.24	745.07	171.65
2007	424.40	513.41	322.85	829.81	179.72
2008	455.19	549.99	347.04	901.31	185.95
2009	521.49	630.39	397.24	1042.83	206.85
2010	568.81	687.00	433.98	1147.90	219.32
2011	619.01	747.72	472.17	1290.13	213.98
2012	682.13	824.84	519.32	1454.45	216.02
2013	763.44	926.40	577.53	1668.32	217.33
2014	827.94	1012.05	617.91	1829.06	223.75
2015	874.70	1089.04	630.16	1934.71	234.96
2016	943.65	1181.44	672.35	2108.94	240.37
2017	1021.27	1286.75	718.40	2299.73	249.70
2018	1087.24	1385.00	747.53	2462.74	257.09
2019	1146.38	1476.12	770.19	2612.98	261.26
2020	1192.32	1550.70	783.44	2724.17	267.82

6.2 Human capital per capita

Increases in real human capital are not only due to factors such as increased educational attainment, increased returns to education, increased returns of on-the-job training and “learning-by-doing”, but also by factors like

population growth, demographic changes (e.g., the size of retirement group), regional migration or urbanization (e.g., an individual can achieve higher value of human capital by moving from a rural to an urban areas). In order to further understand the dynamic changes of the national human capital, we calculated the per capita human capital. The so-called per capita human capital refers to the ratio of real human capital to the size of non-retired population. Although human capital per capita is also affected by the age distribution of the population, it can eliminate the influence of the total population size, so it can better reflect the development of human capital in a region.

Table 6.2.1 shows real human capital per capita for the country as a whole based on 6-education categories, by gender, and by region. From 1985 to 2020, the real human capital per capita in the country showed a growing trend, of which the real human capital per capita increased from 49.1 thousand yuan to 506.5 thousand yuan, an increase of about 9 times. China's average annual growth rate of real human capital per capita from 1985 to 2020 was about 7.06%. Such a high growth rate of real human capital per capita stems from China's rapid economic growth since 1978, the rapid expansion of the scale of “all forms” of education, the transformation to the market economic system (human capital can achieve higher value under market economy conditions) and the large scale of rural-urban migration. Judging from the calculation results of human capital per capita by region, from 1985 to 2020, the human capital per capita of urban has been higher than that of rural.

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	49.14	49.48	48.76	81.51	39.64
1986	52.88	56.16	49.15	91.85	40.89
1987	55.02	59.76	49.64	94.79	42.29
1988	52.32	57.71	46.16	88.81	40.02

Year	National	Male	Female	Urban	Rural
1989	50.23	56.33	43.22	86.52	37.39
1990	55.35	62.78	46.82	97.22	39.95
1991	60.38	69.37	50.08	105.64	43.17
1992	63.82	74.20	51.99	110.21	45.52
1993	62.38	73.40	49.89	106.95	44.14
1994	56.17	66.76	44.27	95.86	39.43
1995	52.97	63.50	41.25	90.59	36.62
1996	55.82	67.38	42.90	95.08	37.22
1997	62.19	75.40	47.37	105.01	40.16
1998	71.26	86.69	53.92	119.03	44.78
1999	82.35	99.88	62.58	136.78	50.00
2000	93.36	113.29	70.84	152.70	55.61
2001	104.09	126.17	79.31	167.80	60.56
2002	116.24	141.71	87.79	184.49	65.82
2003	127.51	156.59	95.23	197.64	71.63
2004	136.45	167.31	102.34	208.13	75.14
2005	147.14	180.37	110.59	219.93	80.50
2006	165.57	203.09	123.92	244.68	89.64
2007	180.06	219.68	135.66	264.16	95.41
2008	192.29	233.45	145.80	279.94	100.36
2009	218.48	264.53	166.12	314.02	113.45
2010	236.45	285.28	180.62	335.62	122.30
2011	255.49	307.96	195.35	360.28	124.12
2012	280.82	338.62	214.48	391.40	130.73
2013	315.76	382.90	239.06	439.05	137.23
2014	344.23	420.28	257.25	474.11	146.39
2015	365.44	455.17	263.16	496.16	158.26
2016	394.16	495.06	279.82	531.84	166.26
2017	428.26	540.95	300.38	573.55	177.84
2018	458.62	582.75	316.24	609.30	188.76
2019	485.65	621.26	328.75	640.66	197.39
2020	506.51	652.02	336.78	660.68	208.22

Figure 6.2.1 shows the trend of urban and rural real human capital per capita. From the figure, not only can we find that between 1985 and 2020, urban

real human capital per capita is significantly higher than that of rural, but the real human capital per capita gap between urban and rural regions continues to widen. Although the real human capital per capita in urban and rural areas have both shown significant growth since 1997, the growth rate in urban is significantly higher than that in rural, and the absolute gap in real human capital per capita between urban and rural areas has gradually widened. Based on Fleisher, Li and Zhao (2009), human capital is a significant contributing factor (total factor productivity) to economic growth.

Therefore, the increase in real human capital per capita gap between urban and rural regions will further widen the urban-rural economic gap, thereby exacerbating the uneven urban-rural development. 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 6.2.2 shows the trend of urban and rural real human capital per capita index.

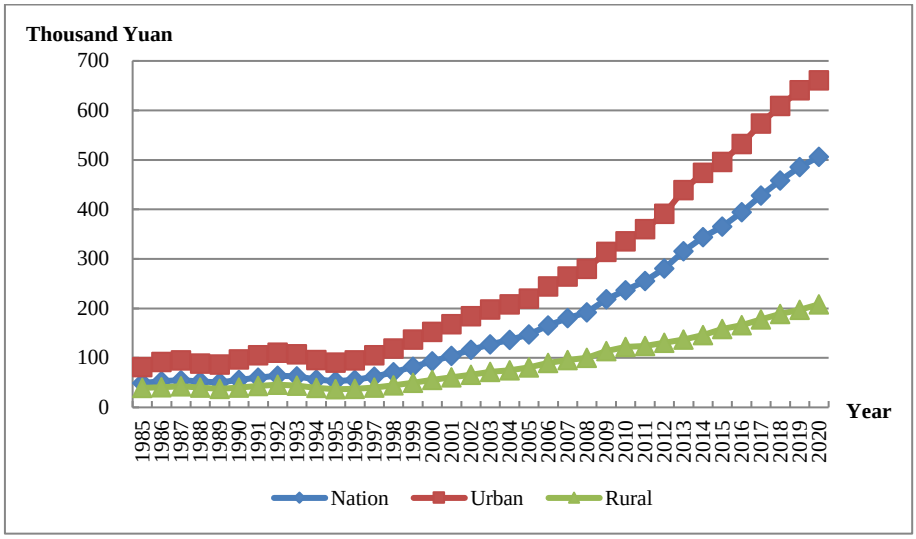

Figure 6.2.1 National Real Human Capital Per Capita by Region, 1985-2020

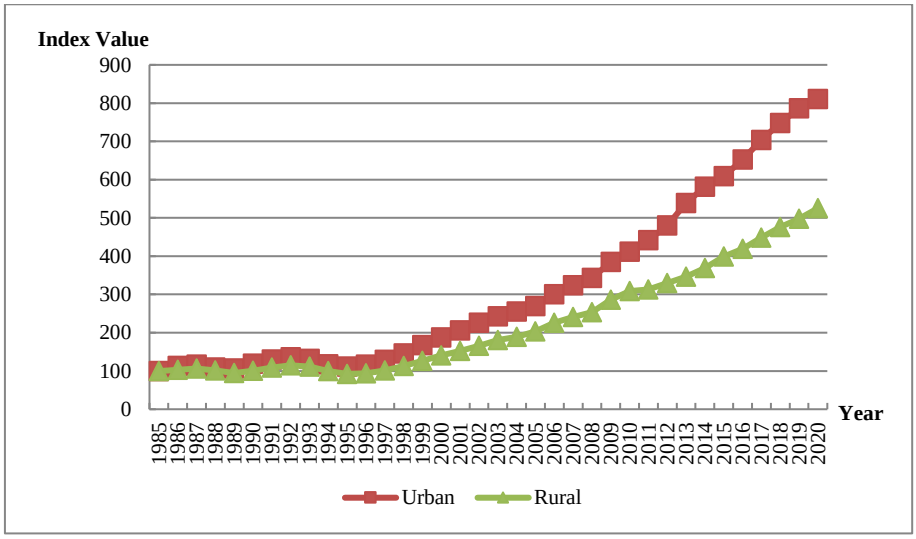

Figure 6.2.2 National Real Human Capital Per Capita Index by Region, 1985-2020

6.3 Labor force human capital

Labor force human capital is estimated in the same way as national human

capital, using the J-F method. Labor force human capital refers to human capital of people who are capable of working. Labor force human capital includes the human capital of those non-retired people over 16 years old and out-of-school.

6.3.1 National labor force human capital

Table 6.3.1 is the labor force human capital estimated using the national income parameters, population and discount rate of 4.58%. The first column is the nominal labor force human capital calculated according to the six education levels. The second column is the real labor force human capital calculated according to the six education levels. Real human capital in 1985 yuan is nominal human capital deflated by the consumer price index. The last column of Table 6.3.1 also shows the ratio of nominal GDP to nominal labor force human capital.

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 GDP to labor force human capital
1985	20256	20256	9099	0.45
1986	23239	21831	10376	0.45
1987	26769	23450	12175	0.45
1988	30666	22608	15180	0.50
1989	35374	22078	17180	0.49
1990	41040	24833	18873	0.46
1991	46123	26961	22006	0.48
1992	51451	28268	27195	0.53
1993	57084	27327	35673	0.62
1994	63367	24443	48638	0.77
1995	70431	23168	61340	0.87
1996	80379	24350	71814	0.89

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 GDP to labor force human capital
1997	92064	27061	79715	0.87
1998	105250	31112	85196	0.81
1999	119322	35702	90564	0.76
2000	135378	40269	100280	0.74
2001	148520	43777	110863	0.75
2002	162412	48123	121717	0.75
2003	178209	52097	137422	0.77
2004	195534	54913	161840	0.83
2005	216238	59543	187319	0.87
2006	255525	69235	219439	0.86
2007	294600	76100	270092	0.92
2008	334482	81546	319245	0.95
2009	385783	94624	348518	0.90
2010	443189	105126	412119	0.93
2011	502195	112813	487940	0.97
2012	563881	123279	538580	0.96
2013	619032	134384	592963	0.96
2014	680877	144303	643563	0.95
2015	744904	155586	688858	0.92
2016	815788	166920	746395	0.91
2017	890049	179197	832036	0.93
2018	969400	191108	919281	0.95
2019	1050707	201281	986515	0.94
2020	1135842	208969	1013567	0.89

A decrease in the ratio of nominal GDP to nominal labor force human capital over time may reflect growing productivity of human capital, but when its growth rate slows down it may also 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 the ratio's growth slows down in recent years, before

decreasing.

The ratio of nominal GDP to nominal labor force human capital can not only reflect the efficiency of human capital utilization in a region, but also reflect the impact of human capital on sustainable GDP growth from a certain aspect. The higher the ratio means that the higher the contribution of unit human capital to GDP, the higher the efficiency of human capital utilization. As shown in Figure 6.3.1, overall, from 1985 to 2020, the ratio of GDP to labor force human capital showed an upward trend but the growth rate slowed down.

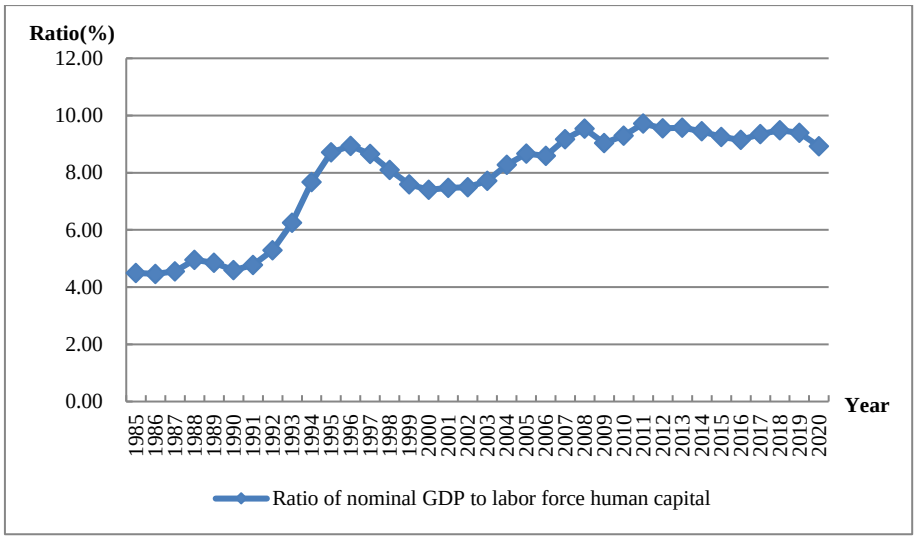

Figure 6.3.1 Nominal National Ratio of GDP to Labor Force Human Capital, 1985-2020

Table 6.3.2 and 6.3.3 show the labor force human capital by gender and region respectively, compare the national human capital development status from gender and region. These results are based on the six education levels, the first three columns are nominal labor force human capital, and the last three columns are real labor force human capital.

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

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	20256	11053	9203	20256	11053	9203
1986	23239	13074	10165	21831	12272	9559
1987	26769	15454	11314	23450	13502	9948
1988	30666	18125	12541	22608	13307	9302
1989	35374	21297	14076	22078	13265	8813
1990	41040	25086	15954	24833	15177	9656
1991	46123	28665	17458	26961	16735	10226
1992	51451	32349	19102	28268	17735	10533
1993	57084	36200	20883	27327	17295	10033
1994	63367	40426	22941	24443	15570	8873
1995	70431	45127	25304	23168	14831	8336
1996	80379	52388	27991	24350	15862	8489
1997	92064	60752	31312	27061	17854	9208
1998	105250	70150	35100	31112	20740	10372
1999	119322	80062	39259	35702	23969	11733
2000	135378	91342	44037	40269	27194	13075
2001	148520	100211	48309	43777	29571	14206
2002	162412	109622	52790	48123	32518	15605
2003	178209	120240	57969	52097	35193	16904
2004	195534	131743	63791	54913	37037	17876
2005	216238	145212	71026	59543	40024	19520
2006	255525	172402	83123	69235	46753	22482
2007	294600	198914	95686	76100	51417	24683
2008	334482	225773	108710	81546	55069	26477
2009	385783	260680	125103	94624	63958	30666
2010	443189	299316	143872	105126	71007	34120
2011	502195	339104	163091	112813	76173	36640
2012	563881	381818	182063	123279	83458	39821
2013	619032	418238	200794	134384	90779	43605

Year	Nominal labor force human capital (Billions of Yuan)			Real labor force human capital (Billions of 1985 Yuan)		
	National	Male	Female	National	Male	Female
2014	680877	464927	215950	144303	98496	45807
2015	744904	511042	233862	155586	106679	48907
2016	815788	561125	254663	166920	114726	52194
2017	890049	614756	275293	179197	123643	55553
2018	969400	671724	297676	191108	132258	58850
2019	1050707	730356	320351	201281	139720	61561
2020	1135842	792205	343637	208969	145438	63531

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

Table 6.3.3 shows the nominal and real labor force human capital for urban and rural regions, respectively. As shown in the table, both nominal and real labor force human capital have upward trend between 1985-2019. The national nominal and real labor force human capital both were increasing during 1985-2020. 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 1998. The regional gap increased from almost -0.875 trillion Yuan in 1997 to over 115.157 trillion Yuan in 2020. In 2020, the national real labor force human capital was 3.46 times than 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	20256	7563	12692	20256	7563	12692
1986	23239	9020	14218	21831	8430	13401
1987	26769	10777	15992	23450	9257	14192
1988	30666	12696	17970	22608	9035	13573
1989	35374	14994	20380	22078	9175	12903

Year	Nominal labor force human capital			Real labor force human capital (Billions of 1985 Yuan)		
	National	Urban	Rural	National	Urban	Rural
1990	41040	17680	23360	24833	10680	14153
1991	46123	20262	25861	26961	11646	15316
1992	51451	22938	28514	28268	12140	16129
1993	57084	25723	31361	27327	11726	15602
1994	63367	28681	34686	24443	10459	13984
1995	70431	32309	38121	23168	10088	13080
1996	80379	38983	41396	24350	11187	13163
1997	92064	47038	45026	27061	13093	13969
1998	105250	56064	49186	31112	15699	15413
1999	119322	65628	53693	35702	18620	17082
2000	135378	76839	58539	40269	21627	18642
2001	148520	86356	62165	43777	24137	19640
2002	162412	97336	65076	48123	27481	20642
2003	178209	109306	68903	52097	30585	21511
2004	195534	123471	72063	54913	33445	21468
2005	216238	140159	76078	59543	37367	22176
2006	255525	169185	86340	69235	44439	24795
2007	294600	197470	97130	76100	49635	26465
2008	334482	226086	108396	81546	53814	27732
2009	385783	264658	121125	94624	63538	31086
2010	443189	308905	134284	105126	71861	33265
2011	502195	361371	140824	112813	79835	32978
2012	563881	415599	148282	123279	89401	33877
2013	619032	462928	156104	134384	99687	34697
2014	680877	515612	165265	144303	108219	36084
2015	744904	567604	177300	155586	117371	38215
2016	815788	626811	188976	166920	126948	39972
2017	890049	688325	201724	179197	137076	42121
2018	969400	755071	214329	191108	147275	43833
2019	1050707	822489	228218	201281	156055	45226
2020	1135842	892072	243770	208969	162063	46906

Figure 6.3.3 shows the trends of real labor force human capital for urban and rural regions, respectively. Before 1996, the real labor force human capital for the rural was higher than that for urban. After 1996, the real labor force human capital for urban increased more rapidly than that for rural, 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. In addition, the figure shows that the trend of the real labor force human capital in urban is basically the same as that in the whole country. It can be considered that the trend of the national real labor force human capital depends on the trend of urban labor force human capital.

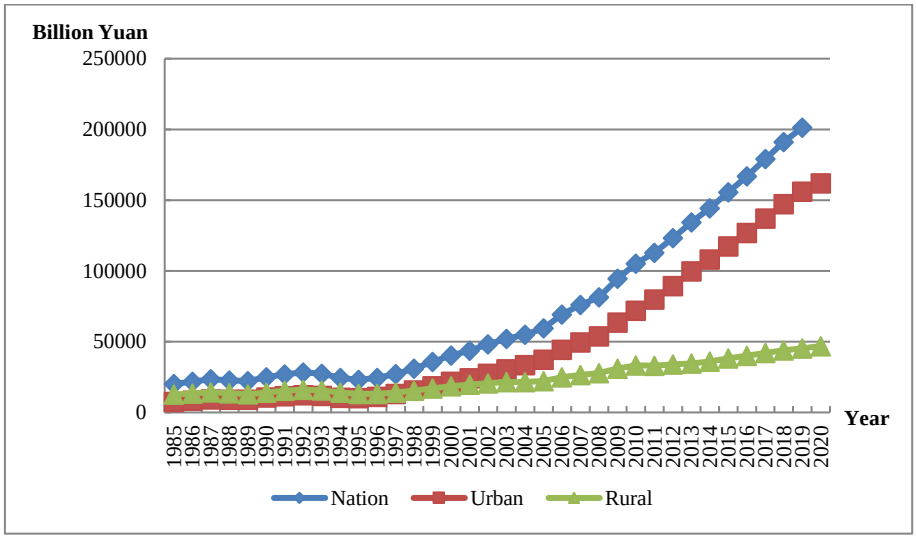

Figure 6.3.3 National Real Labor Force Human Capital by Region, 1985-2020

Figure 6.3.4 shows the national ratio of labor force human capital to total human capital by six 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 1990, the ratio grew steadily, but it dropped dramatically after that, rebounding somewhat in 1996 and fluctuating subsequently. The overall 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.

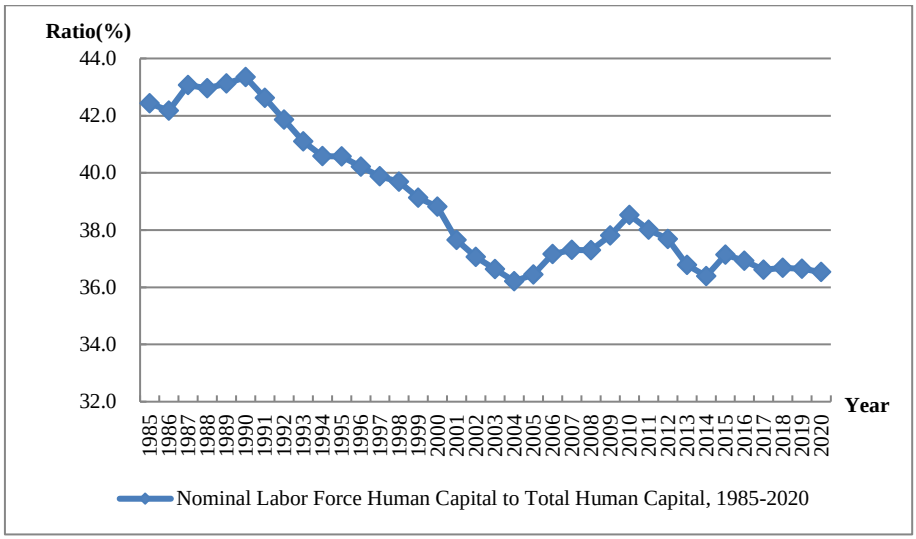

Figure 6.3.4 National Ratio of Labor Force Human Capital to Total Human Capital, 1985-2020

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. Although labor force human capital per capita is also affected by the age distribution of the population, it can eliminate the impact of the size of the labor force population, so it can reflect the development status of labor force human capital per capita in a region. The labor force human capital per capita refers to the ratio of the total labor force human capital to the labor force population, and the labor force population refers to the non-retired population over 16 years old who are out of school.

Table 6.3.4 shows that the average labor force human capital in nominal and real terms. The first column is the nominal labor force human capital per capita calculated at six education levels, and the second column is the real labor force human capital per capita under the six education levels. The real values in this table are calculated by deflating the nominal values with the CPI using 1985 as the base year. The nominal results based on both education

categories are 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）	Real average labor force human capital （Thousands of 1985 Yuan）
1985	34.75	34.75
1986	38.79	36.44
1987	43.37	38.00
1988	48.60	35.83
1989	54.60	34.08
1990	61.47	37.20
1991	67.99	39.74
1992	74.93	41.17
1993	82.41	39.45
1994	90.54	34.93
1995	99.64	32.77
1996	112.37	34.04
1997	127.00	37.33
1998	142.84	42.23
1999	159.26	47.65
2000	177.94	52.93
2001	194.42	57.30
2002	212.23	62.88
2003	232.46	67.96
2004	255.18	71.66
2005	281.07	77.40
2006	326.85	88.56
2007	373.49	96.48
2008	421.50	102.76
2009	480.58	117.87
2010	544.70	129.21
2011	613.45	137.81
2012	687.89	150.39
2013	758.29	164.62
2014	836.86	177.36
2015	916.90	191.51

Year	Nominal average labor force human capital （Thousands of Yuan）	Real average labor force human capital （Thousands of 1985 Yuan）
2016	1002.63	205.15
2017	1100.58	221.58
2018	1208.54	238.25
2019	1317.08	252.31
2020	1431.83	263.42

Tables 6.3.5 and 6.3.6 report the average labor force human capital by gender and by region separately at the six educational level. The first 3 columns are nominal labor force human capital per capita, the last 3 columns are real labor force human capital per capita. From 1985-2020, the nominal and real labor force human capital per capita exhibit upward 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	34.75	35.89	33.48	34.75	35.89	33.48
1986	38.79	41.42	35.86	36.44	38.88	33.73
1987	43.37	47.65	38.64	38.00	41.63	33.97
1988	48.60	54.34	42.17	35.83	39.89	31.28
1989	54.60	61.93	46.31	34.08	38.57	29.00
1990	61.47	70.63	51.07	37.20	42.73	30.91
1991	67.99	79.52	54.92	39.74	46.43	32.17
1992	74.93	88.94	59.14	41.17	48.76	32.61
1993	82.41	99.13	63.77	39.45	47.36	30.64
1994	90.54	110.16	68.92	34.93	42.43	26.66
1995	99.64	122.43	74.80	32.77	40.24	24.64
1996	112.37	139.77	82.21	34.04	42.32	24.93
1997	127.00	159.41	91.07	37.33	46.85	26.78
1998	142.84	180.76	100.65	42.23	53.44	29.74

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
1999	159.26	202.36	111.03	47.65	60.58	33.18
2000	177.94	227.06	122.82	52.93	67.60	36.47
2001	194.42	249.19	133.54	57.30	73.53	39.27
2002	212.23	273.22	145.02	62.88	81.05	42.87
2003	232.46	300.27	158.31	67.96	87.89	46.16
2004	255.18	330.20	173.68	71.66	92.83	48.67
2005	281.07	363.61	191.98	77.40	100.22	52.76
2006	326.85	421.74	222.85	88.56	114.37	60.27
2007	373.49	478.60	256.42	96.48	123.71	66.15
2008	421.50	536.46	291.69	102.76	130.85	71.04
2009	480.58	609.07	333.83	117.87	149.43	81.83
2010	544.70	687.11	380.59	129.21	163.00	90.26
2011	613.45	772.32	429.68	137.81	173.48	96.53
2012	687.89	867.05	479.92	150.39	189.52	104.97
2013	758.29	955.65	530.22	164.62	207.43	115.14
2014	836.86	1064.45	573.06	177.36	225.51	121.56
2015	916.90	1173.79	620.26	191.51	245.03	129.71
2016	1002.63	1291.04	671.90	205.15	263.96	137.71
2017	1100.58	1420.91	732.04	221.58	285.78	147.72
2018	1208.54	1555.84	803.71	238.25	306.33	158.89
2019	1317.08	1691.78	875.17	252.31	323.65	168.18
2020	1431.83	1835.74	949.97	263.42	337.02	175.63

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 1985-2020.

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	35	54	29	35	54	29
1986	39	61	32	36	57	30
1987	43	68	35	38	59	31
1988	49	76	39	36	54	29
1989	55	85	43	34	52	27
1990	61	94	49	37	57	29
1991	68	105	53	40	60	32
1992	75	115	58	41	61	33
1993	82	127	64	39	58	32
1994	91	139	70	35	51	28
1995	100	152	77	33	48	26
1996	112	172	85	34	49	27
1997	127	194	93	37	54	29
1998	143	216	103	42	60	32
1999	159	237	114	48	67	36
2000	178	261	125	53	73	40
2001	194	282	136	57	79	43
2002	212	305	146	63	86	46
2003	232	329	159	68	92	50
2004	255	357	171	72	97	51
2005	281	388	186	77	104	54
2006	327	451	212	89	118	61
2007	373	513	241	96	129	66
2008	422	574	271	103	137	69
2009	481	649	307	118	156	79
2010	545	729	344	129	170	85
2011	613	823	371	138	182	87
2012	688	921	402	150	198	92
2013	758	1010	436	165	217	97
2014	837	1108	474	177	233	104

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
2015	917	1202	521	192	249	112
2016	1003	1311	563	205	266	119
2017	1101	1433	614	222	285	128
2018	1209	1567	669	238	306	137
2019	1317	1699	728	252	322	144
2020	1432	1834	794	263	333	153

6.4 International comparison

The Jorgenson-Fraumeni lifetime earnings approach is now used by the World Bank in its Changing Wealth of Nation's series (CWON' s) to measure human capital for 141 countries (Lange et al. 2018, Word Bank 2021). Table 6.4.1 shows the ratio of labor force human capital to GDP by category, where the human capital and GDP estimates are the web published World Bank figures. The category figures are created by weighting individual country ratios by the share of the population in the country in total population for the category. If human capital and GDP figures are added across countries, as opposed to being population weighted, a number of country figures would be under-estimated relative to figures for the United States. An alternative approach is to use Purchasing Power Parities (PPIs) to adequately reflect the differential buying power of country currencies. According to data for China available from the World Bank, the ratio of PPPs to market exchange RMB vary from a low of .32 in 1995 to a high of .62 in 2018 in the years shown in table 6.4.1. This means that PPPs value the RMB substantially more than market exchange rates do (data obtained from https://data.worldbank.org/indicator/PA.NUS.PPPC.RF?locations=CN). In chapter 4 of CWON an exploratory set of PPP-based wealth measures are

constructed (World Bank 2021). This chapter demonstrates that PPP-based measures and market exchange-based measures are typically very different. The estimates in table 6.4.1 are market-based as this is the only type available from the World Bank data site. Population estimates are used to weight the market-based measures which appear in table 6.4.1 to derive figures by region. The human capital to GDP ratios are calculated in constant 2015 US dollars. The percent that each category's population is in the total population for all 141 countries is indicated in the table underneath the human capital to GDP ratios in percentage terms.

The 141 countries account for 93 percent of World Bank web published world population estimates in all five years shown, those for which population, GDP in current and constant US dollars , and World Bank human capital is available. World Bank human capital income is constructed for individuals aged 15 to 65 (World Bank 2021, p. 147). All categories, with the exception of Europe & Central Asia and Sub-Saharan Africa, experience a decrease in the ratio between 1995 and 2018 for the years shown, but the decrease is not always monotonic. China and India, who have larger populations than any other country, both experience a significant decline in the ratio over time.

Since the last Changing Wealth of Nation's (CWON's) report was available (Lange et al. 2018), the labor income growth rates by region and income level have changed (World Bank 2021, p. 148). Previously, the labor income growth rate was assumed to be 2.46 percent for all countries, now the labor income growth rates differ for four regions: East Asia and the Pacific, Europe and Central Asia, Latin America & the Caribbean, and Middle East and North Africa, by high income countries in the region and other countries in the region. For the three remaining CWON regions: North America, South Asia, and Sub-Saharan Africa, all countries in the regions are assumed to have the same labor income growth rate. The new labor income growth rates range from .91 percent for North America to 4.00 percent for East Asia and the Pacific, excluding high income. the latter. The World Bank considers China to be an

upper-middle-income country, so its labor income growth rate for CWON is 4.00 percent. CWON continues to use 4.00 percent as the discount rate for all countries.

Table 6.4.1 Population Weighted Ratio of Labor Force Human Capital to GDP

Country Category	1995	2000	2005	2010	2015	2018	# of countries
Advanced	8.4	8.2	7.7	7.7	7.7	7.6	22
	16%	15%	15%	15%	14%	14%	
East Asia & the Pacific	14.4	13.9	13.0	11.6	11.4	11.0	13
	32%	31%	31%	30%	29%	29%	
Europe & Central Asia	5.5	5.3	5.0	5.5	5.5	5.5	25
	7%	6%	6%	6%	5%	5%	
Latin America & the Caribbean	7.2	7.2	7.1	7.0	7.2	7.1	23
	8%	8%	8%	8%	8%	8%	
Middle East & North Africa	6.0	5.6	5.0	4.9	5.1	4.8	15
	4%	4%	5%	5%	5%	5%	
South Asia	9.0	8.8	8.5	7.9	7.7	7.7	6
	23%	24%	24%	25%	25%	25%	
Sub-Saharan Africa	7.5	6.9	6.9	7.7	8.0	8.2	37
	10%	10%	11%	12%	13%	14%	
141 countries	9.9	9.6	9.1	8.6	8.5	8.4	141
	100%	100%	100%	100%	100%	100%	

Table Note: The table above only includes countries for which there is complete information.
The Advanced category includes: Australia; Austria; Belgium; Denmark; Finland; France; Germany; Greece; Iceland; Ireland; Italy; Japan; Luxembourg; Netherlands, Norway, Portugal; Spain; Sweden; Switzerland; Turkey; United Kingdom; and United States.
The East Asia and the Pacific category includes: Cambodia, China, Indonesia, Korea (Republic of), Lao People's Democratic Republic, Malaysia, Mongolia, Papua New Guinea, Philippines, Singapore, Solomon Islands, Thailand, and Vietnam.
The Europe & Central Asia category includes: Albania; Armenia; Azerbaijan; Belarus; Bosnia & Herzegovina; Bulgaria; Croatia; Czech Republic; Estonia; Georgia; Hungary; Kazakhstan; Kyrgyz Republic; Latvia; Lithuania; Macedonia; Moldova; Poland; Romania; Russian Federation; Slovak Republic; Slovenia; Tajikistan; Turkmenistan; and Ukraine.
The Latin American & the Caribbean category includes: Argentina; Belize; Bolivia; Brazil; Chile; Colombia; Costa Rica; Dominican Republic; Ecuador; El Salvador; Guatemala; Guyana; Haiti; Honduras; Jamaica; Mexico; Nicaragua; Panama; Paraguay; Peru; Uruguay; and Venezuela, RB.
The Middle East & North America category includes: Bahrain; Egypt, Arab Republic; Iran, Islamic Republic; Iraq; Jordan; Kuwait; Malta; Morocco; Saudi Arabia; Tunisia; United Arab Emirates; Yemen, Republic; Lebanon; Oman; and West Bank and Gaza.

The South Asia category includes: Bangladesh; India; Maldives; Nepal; Pakistan; and Sri Lanka. Haiti is missing online World Bank data for GDP in 1995 and 2000, accordingly it is not included in the ratios for 1995 and 2000.
The Sub-Saharan category includes: Benin; Botswana; Burkina Faso; Burundi; Cameroon; Central African Republic; Chad; Comoros; Congo, Democratic Republic; Congo, Republic; Cote d'Ivoire; Eswatini; Ethiopia; Gabon; Gambia, The; Ghana; Guinea; Kenya; Lesotho; Madagascar; Malawi; Mali; Mauritania; Mauritius; Mozambique; Namibia; Niger; Nigeria; Rwanda; Senegal; Sierra Leone; South Africa; Tanzania; Togo; Uganda; Zambia; and Zimbabwe.

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 or above. Starting from 2000, college or above was further divided into two categories: three-year college, and four-year university or above.[28] With this more detailed information on educational attainment, we create a separate human capital series starting from 2000.[29]

Productive capital stock measures the volume (or productive capacity) of physical capital. To be used, for example, in productivity analysis. 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.

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

[29] We report the results based on six education categories from 1985-2015. Please see appendix C.7.

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. This is not surprising, given that in most other countries human capital accounts for over 60% of national wealth.[30] The nominal ratio of human capital to physical capital, (the latter as measured by Holz), decreases in almost all years, but the rate of decrease slows down after 1996. The trend in the ratio of human capital to physical capital indicates that the share of human capital is declining, but the rate of decline is gradually decreasing and has begun to show a steady upward trend. Since human capital is also related to population changes, we are still not sure whether this trend indicates that the policies adopted by the government are too focused on physical capital investment and cause relatively insufficient human capital investment.

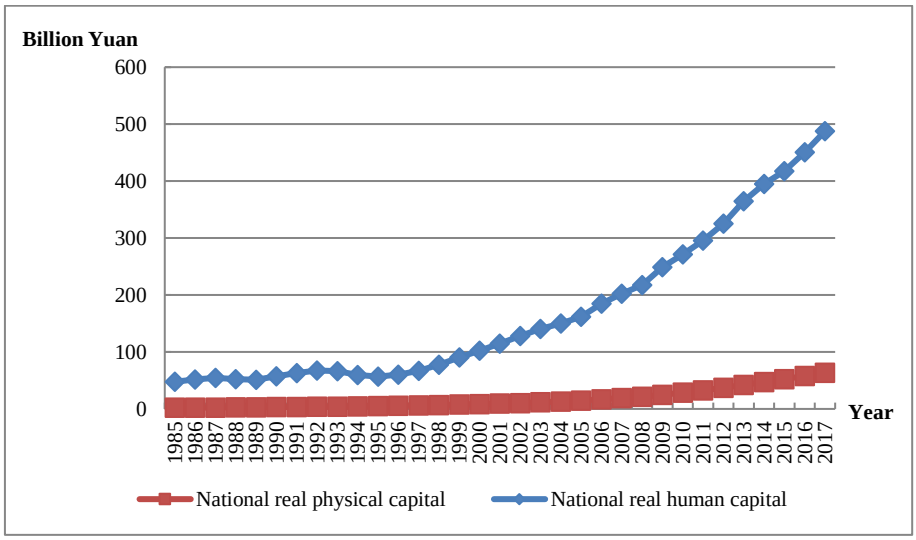

Figure 6.5.1 Real Human Capital Stock and Real Physical Wealth Capital Stock, 1985-2017

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

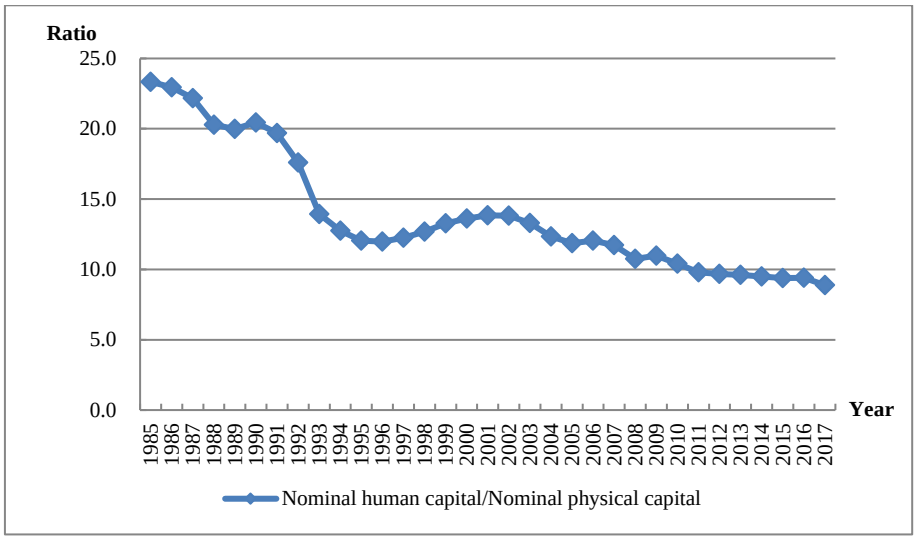

Figure 6.5.2 Human Capital to Physical Capital Ratio, 1985-2017

Chapter 7 Cross-province Comparison

By comparing the stocks of human capital across provinces and over time, we gain some understanding of the regional 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 C results). 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

The 6-education category nominal provincial human capital stocks in 2020 are shown in figure 7.1.1. Current year human capital is the nominal human capital adjusted by living cost and expressed in 1985 yuan for each province. The provinces are shown in descending order of their total real human capital stocks in 2019. Guangdong is the highest-ranked province in terms of total real human capital, followed by Jiangsu; Tibet ranks the lowest. Notable features of the differences across provinces include: (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 Guangdong, Shandong, Henan,

Jiangsu rank relatively higher. (2) Provinces at the top rank of human capital per capita (figure 7.1.1), such as Shanghai and Beijing, also rank high in terms of total stock but their total human capital is magnified by differences in their education levels and age structure.

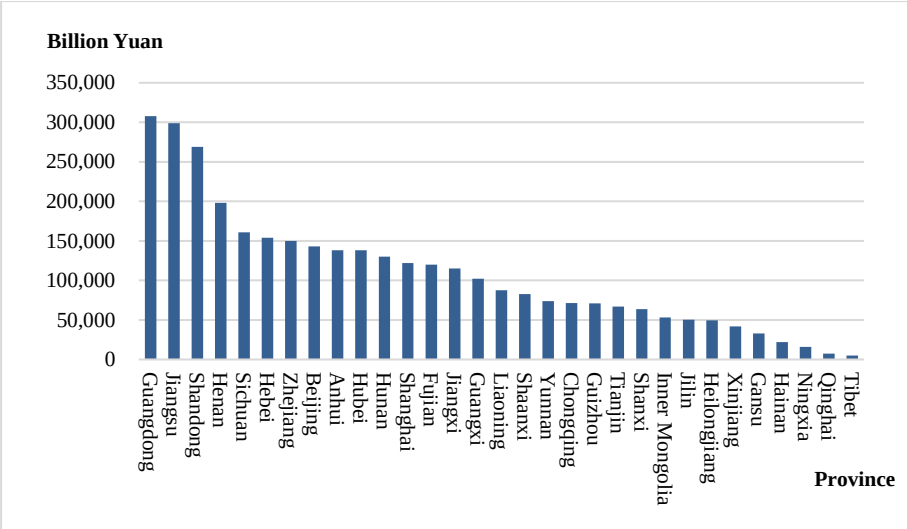

Figure 7.1.1 Provincial Real Human Capital in 2020

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).[31,32] 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: Jiangsu has the largest real human capital, followed by Shandong; Tibet ranks the lowest.

[31] Brandt Loren, Holz Carsten, 2006. Spatial price differences in China: estimates and implications. Economic Development and Cultural Change 55, 43–86.
[32] Specifically, the living cost index we use here is based on a package of commodities of 1985 in Beijing, other provinces and years are adjusted correspondingly.

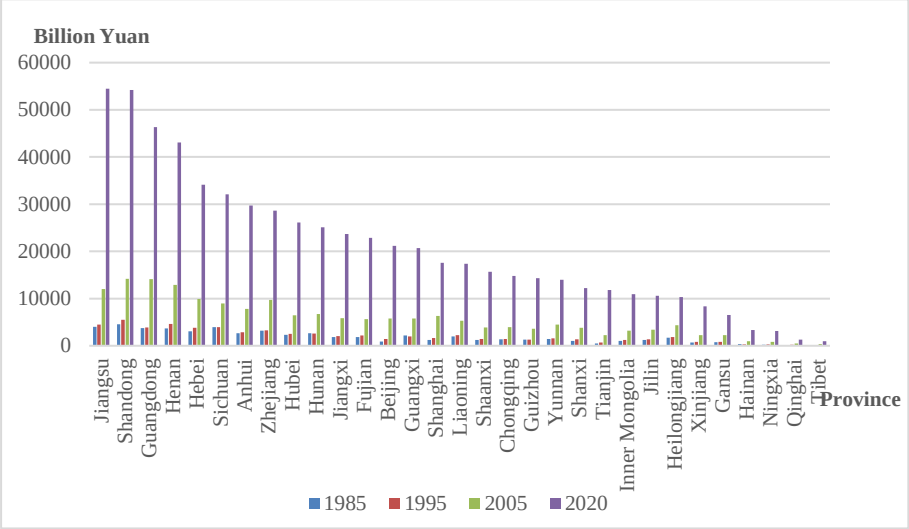

Figure 7.1.2 Provincial Real Human Capital

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 ranked as the top three and Qinghai at the bottom. The per-capita human capital ranking presents a good picture of the inequality of the development stage of the provinces. The ranking is influenced by education level and population structure. More importantly, at this stage of China's economic development, regional inequality in potential earnings has led to clustering of educated workers in the provinces where their earnings potential is highest.

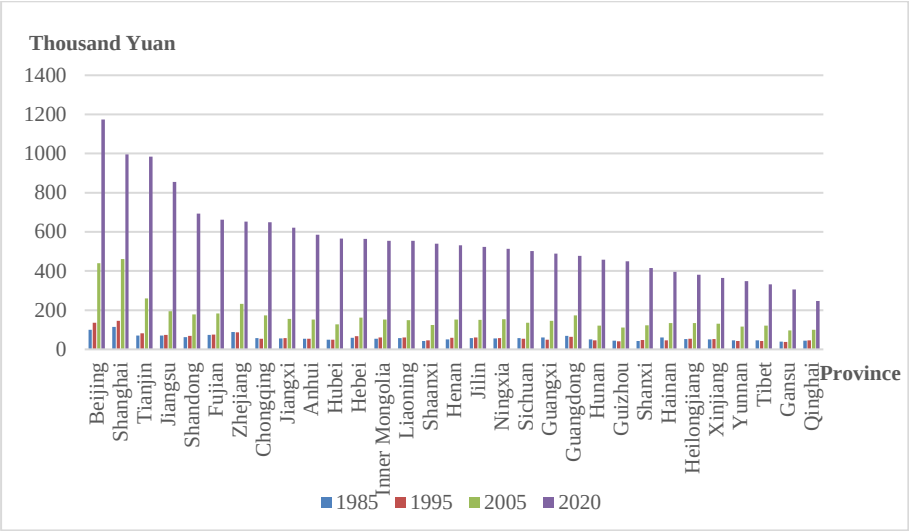

Figure 7.1.3 Provincial Real Human Capital Per Capita

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 Shandong and Jiangsu; 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.

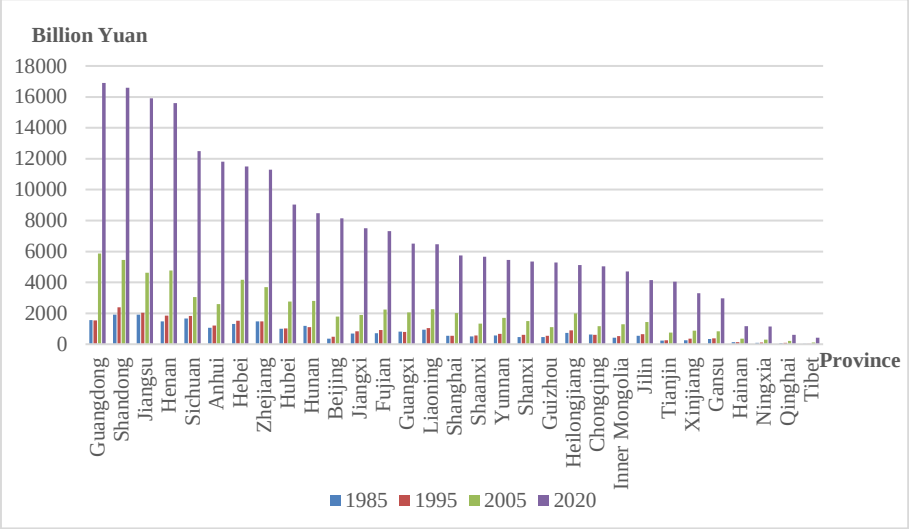

Figure 7.2.1 Provincial Real Labor Force Human Capital

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, Tianjin and Shanghai follow; Qinghai at the bottom.

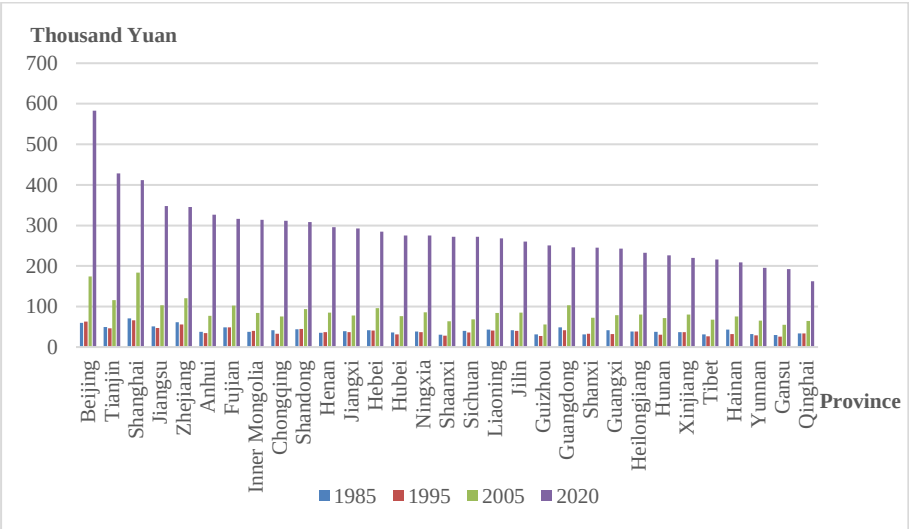

Figure 7.2.2 Provincial Real Average Labor Force Human Capital

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 proportion of young population, 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, which raises their ratios of labor-force to total human capital. In 2020, Heilongjiang ranks highest, followed by Qinghai and Gansu.

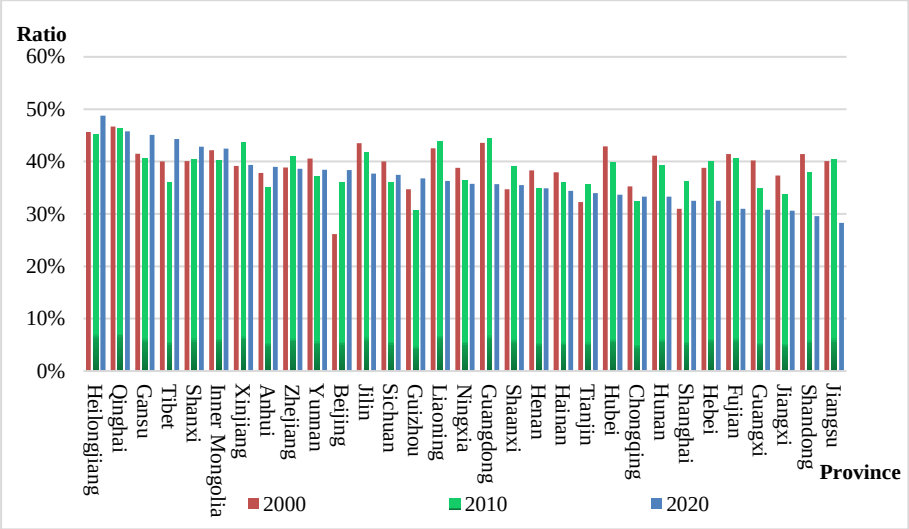

Figure 7.3.1 Ratio of Nominal Labor Force Human Capital to Total Nominal Human Capital

Figure 7.3.2 shows the comparison of human capital and human capital stock ratio of 0-15 years old in each province. 0-15 years old is the age that has not entered the labor market, and the human capital of this age group can be regarded as the reserve of human capital. To some extent, this ratio reflects

the potential of local human capital in the future, which is mainly affected by the birth population, the number of students in school and the per capita human capital. In most provinces, this ratio shows an upward trend after 2010, which to a certain extent indicates that the demographic dividend has not disappeared, while the population decreases, the amount of human capital continues to grow. In 2020, Jiangsu ranked first, followed by Fujian, Shanghai, and Shandong, and Heilongjiang ranked last.

Figure 7.3.3 shows the comparison of human capital and human capital stock ratio of 25-45 years old in each province. The age of 25-45 is the golden age for workers to work, and it is also the age of the most mobile population. Due to the great impact of population mobility, the ratio of human capital to human capital stock of 25-45 years old in some provinces with low ratio of 0-15 years old (such as Beijing) is also very high. In terms of the results, Heilongjiang, Beijing and Inner Mongolia ranked first, while Guizhou and Jiangxi ranked last.

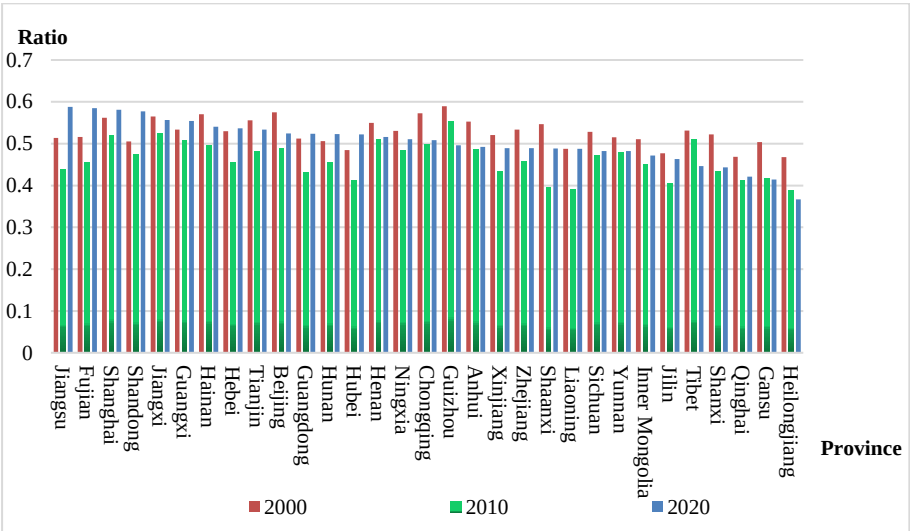

Figure 7.3.2 Ratio of Human Capital to Human Capital Stock Aged 0-15 in Each Province

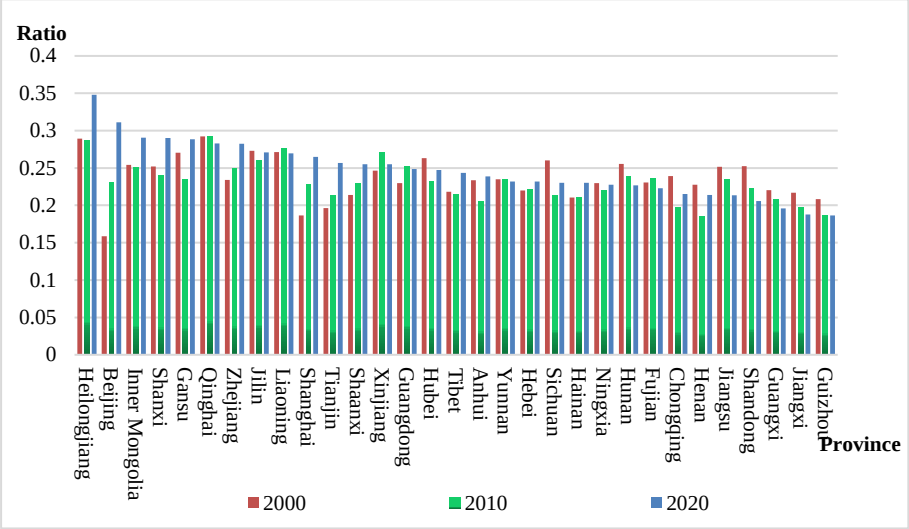

Figure 7.3.3 Ratio of Human Capital to Human Capital Stock Aged 25-45 in Each Province

Figure 7.3.4 shows the ratios of provincial nominal GDP to nominal labor force human capital. Tibet ranks at the top in 2020, followed by Qinghai, Ningxia and Hainan; Guangdong and Henan rank the bottom. These ratios reflect their persistent dispersion, and the continuing geographical disequilibrium in the allocation of labor and human capital in the Chinese economy.

Figure 7.3.5 shows the ratios of nominal physical capital to nominal labor force human capital. Qinghai ranks at the top in 2020, followed by Inner Mongolia, Tibet and Tianjin; Guizhou, Anhui and Hunan rank the bottom. It is obvious that human capital accounts for more in the total provincial wealth than physical capital in the more developed provinces than the less developed ones.

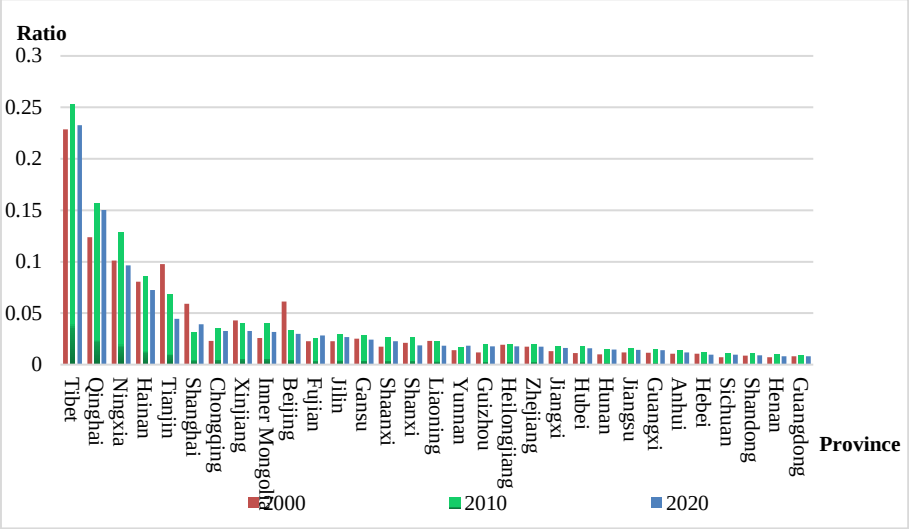

Figure 7.3.4 Ratio of Nominal GDP to Nominal Labor Force Human Capital

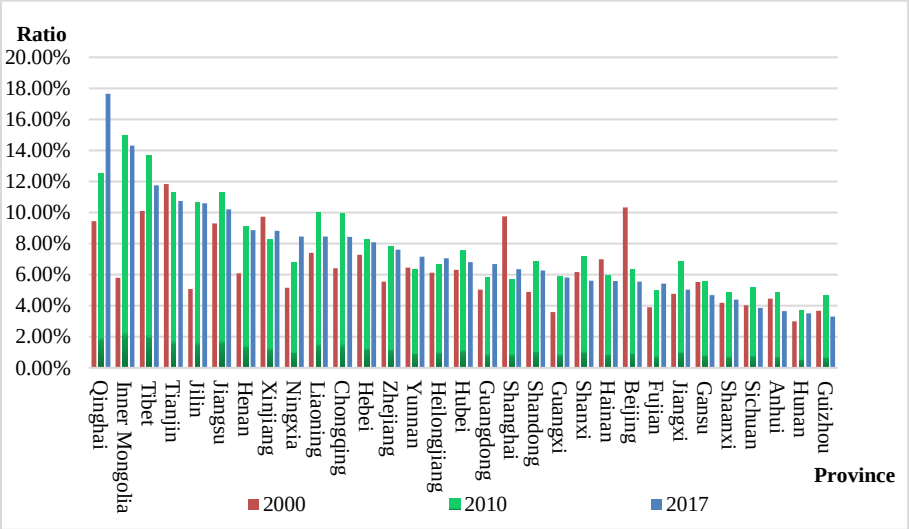

Figure 7.3.5 Ratio of Nominal Physical Capital to Nominal Labor Force Human Capital

Chapter 8 Human Capital for Beijing

8.1 Total human capital

Table BJ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Beijing. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Beijing.

Table BJ-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Beijing

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	897	897	50.6
1986	1011	946	60.1
1987	1203	1037	72.3
1988	1626	1165	86.9
1989	1901	1161	98.4
1990	2515	1458	113.7
1991	3087	1599	128.6
1992	3803	1793	147.4
1993	4565	1808	163.0
1994	5211	1653	185.4
1995	5388	1457	221.7
1996	6880	1667	255.5
1997	8366	1925	290.6
1998	10336	2322	331.6
1999	12995	2902	373.8
2000	15612	3369	421.2

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	17816	3729	475.5
2002	20021	4267	543.3
2003	21861	4650	627.9
2004	24521	5164	723.4
2005	27657	5739	830.7
2006	33758	6942	947.1
2007	40926	8219	1076.5
2008	49097	9382	1197.8
2009	54972	10664	1331.6
2010	65947	12493	1501.5
2011	71368	12803	1663.8
2012	84010	14590	1859.7
2013	87101	14643	2057.9
2014	99803	16515	2261.0
2015	101335	16472	2479.4
2016	112630	18055	2751.4
2017	115428	18158	3047.5
2018	123955	19024	—
2019	132627	19897	—
2020	142937	21086	—

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 the non-retired population. Table BJ-2.1 presents human capital per capita for Beijing by region. From 1985 to 2020, the nominal human capital per capita

increased from 96.9 thousand Yuan to 7.9 million Yuan, an increase of about 83 times; and the real human capital per capita increased from 96.9 thousand Yuan to 1.2 million Yuan, an increase of approximately 11times.

Figure BJ-2.1 illustrates the trends of human capital per capita by gender for Beijing. The growth pattern of real human capital per capita of male is similar to that of female for Beijing. Both of them kept increasing from 1985 to 2020, and the growths of human capital for male and female both accelerated, with the male's growth rate significantly higher than the female's. As a result, the gender gap has been expanding, especially from 1997.

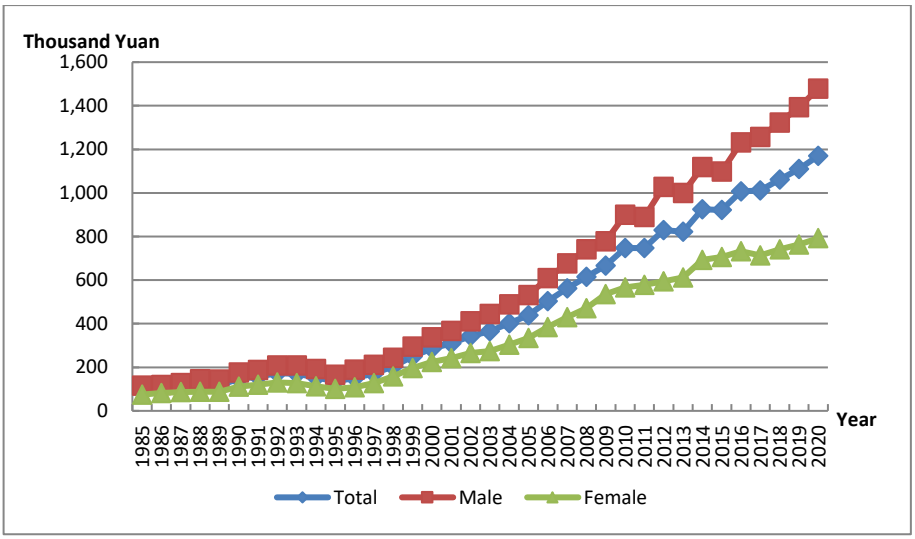

Figure BJ-2.1 Human Capital Per Capita by Gender for Beijing[33], 1985-2020

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	96.58	123.47	48.11	96.58	123.47	48.11
1986	108.19	138.32	54.45	101.30	129.51	50.99

[33] Note: The fluctuations for Beijing during 2010-2014 are probably caused by the drastic changes in high school admissions during this period. It affects the admission rates for high school and thus human capital values.

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1987	125.96	161.66	61.53	108.60	139.38	53.05
1988	165.32	212.46	70.67	118.38	152.14	50.61
1989	191.68	241.35	80.61	117.12	147.47	49.25
1990	252.44	315.86	92.04	146.34	183.10	53.36
1991	302.21	378.30	102.24	156.56	195.98	52.97
1992	365.31	457.05	112.95	172.20	215.45	53.24
1993	430.80	535.89	124.35	170.65	212.28	49.26
1994	487.09	600.85	136.44	154.48	190.56	43.27
1995	498.38	604.05	148.37	134.75	163.32	40.11
1996	623.47	756.98	164.84	151.05	183.40	39.94
1997	747.61	908.00	184.53	172.01	208.91	42.46
1998	907.52	1103.35	205.68	203.91	247.91	46.21
1999	1118.39	1362.21	229.22	249.79	304.25	51.20
2000	1324.47	1610.90	256.64	285.81	347.62	55.38
2001	1478.47	1772.58	279.33	309.45	371.01	58.47
2002	1608.76	1897.73	299.83	342.89	404.48	63.91
2003	1714.60	1995.13	327.89	364.72	424.40	69.75
2004	1906.33	2201.46	357.18	401.49	463.65	75.23
2005	2113.33	2423.19	391.32	438.51	502.81	81.20
2006	2446.62	2791.47	442.35	503.14	574.06	90.97
2007	2795.61	3173.38	500.66	561.43	637.30	100.55
2008	3221.18	3650.04	566.20	615.51	697.46	108.19
2009	3432.53	3870.95	640.45	665.88	750.93	124.24
2010	3940.61	4435.00	716.92	746.53	840.19	135.82
2011	4161.90	4665.77	765.14	746.64	837.03	137.27
2012	4776.03	5345.79	823.57	829.44	928.39	143.03
2013	4888.85	5457.59	885.29	821.91	917.53	148.83
2014	5592.67	6256.04	957.10	925.43	1035.20	158.37

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2015	5671.40	6337.01	1032.68	921.86	1030.06	167.86
2016	6281.64	7009.04	1110.90	1006.96	1123.56	178.08
2017	6427.17	7148.10	1201.82	1011.08	1124.49	189.06
2018	6914.47	7671.66	1299.14	1061.21	1177.42	199.39
2019	7401.37	8192.56	1396.97	1110.40	1229.09	209.58
2020	7931.07	8755.14	1509.07	1169.97	1291.54	222.61

Figure BJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

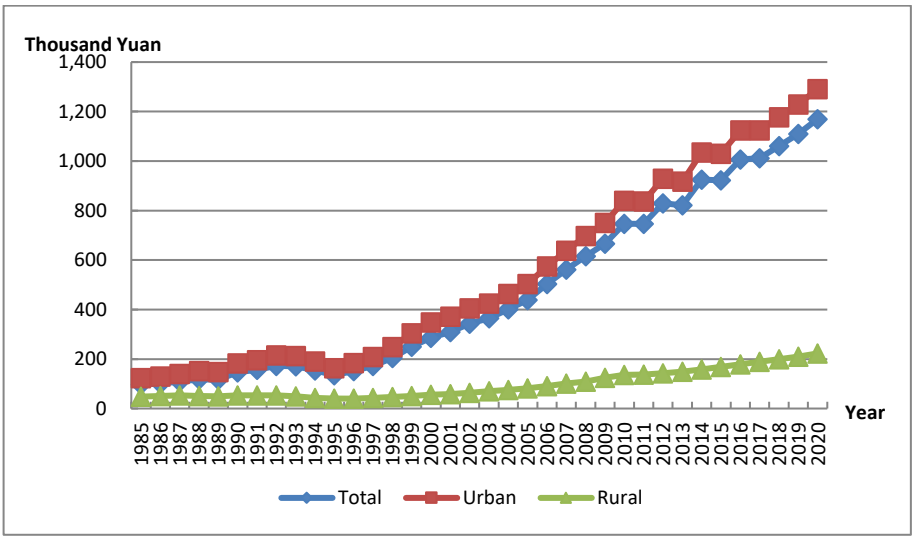

Figure BJ-2.2 Real Human Capital Per Capita by Region for Beijing, 1985-2020

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 2020, the nominal labor force human capital increased from 0.36 trillion Yuan to 54.86 trillion Yuan, an increase of more than 151 times; and the real labor force human capital increased from 0.36 billion Yuan to 8.09 trillion Yuan, an increase of approximately 21 times.

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)
1985	355	355
1986	394	368
1987	470	405
1988	582	417
1989	691	422
1990	820	475
1991	1000	518
1992	1170	552
1993	1355	537
1994	1524	483
1995	1728	467
1996	2115	512
1997	2572	592
1998	3057	687
1999	3544	791

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	4075	879
2001	4805	1006
2002	5770	1230
2003	6745	1435
2004	7442	1567
2005	8469	1757
2006	10987	2260
2007	13949	2801
2008	16612	3174
2009	19988	3878
2010	23655	4481
2011	27387	4913
2012	31663	5499
2013	35458	5961
2014	38723	6408
2015	42295	6875
2016	44940	7204
2017	47628	7493
2018	50103	7690
2019	52459	7870
2020	54860	8093

8.3.2 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. Tables BJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 57.0 thousand Yuan to 3.9 million Yuan, an increase of more than 68 times; and the real

average labor force human capital increased from 57.0 thousand Yuan to 579.2 thousand Yuan, an increase of approximately 9 times.

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	56.99	66.37	38.95	56.99	66.37	38.95
1986	62.95	73.00	43.94	58.94	68.35	41.14
1987	72.83	84.91	49.64	62.80	73.21	42.80
1988	87.53	101.57	56.66	62.68	72.73	40.57
1989	102.33	117.43	64.10	62.52	71.75	39.16
1990	119.69	135.61	72.30	69.38	78.61	41.91
1991	140.14	160.04	80.44	72.60	82.91	41.67
1992	160.45	184.17	88.32	75.63	86.81	41.63
1993	183.10	210.90	96.49	72.53	83.54	38.22
1994	204.32	235.43	104.71	64.80	74.67	33.21
1995	228.98	263.77	112.30	61.91	71.32	30.36
1996	269.95	311.06	129.03	65.40	75.36	31.26
1997	317.30	366.01	147.84	73.00	84.21	34.02
1998	363.39	418.74	168.75	81.65	94.08	37.92
1999	407.46	468.81	190.90	91.00	104.71	42.64
2000	456.59	524.99	213.87	98.53	113.29	46.15
2001	522.79	598.46	234.43	109.42	125.26	49.07
2002	603.62	687.73	254.80	128.66	146.58	54.31
2003	683.01	773.12	280.99	145.29	164.45	59.77
2004	746.72	840.62	308.38	157.27	177.04	64.95
2005	829.29	928.28	338.61	172.07	192.62	70.26
2006	1004.34	1122.33	385.36	206.54	230.80	79.25
2007	1191.10	1326.94	437.11	239.20	266.49	87.78
2008	1355.80	1507.26	497.70	259.07	288.01	95.10

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
2009	1545.36	1712.94	566.52	299.79	332.30	109.90
2010	1737.56	1920.72	637.73	329.17	363.87	120.82
2011	1976.78	2188.76	681.32	354.63	392.66	122.23
2012	2245.50	2489.05	732.64	389.97	432.27	127.24
2013	2500.33	2775.49	788.61	420.35	466.61	132.58
2014	2744.85	3053.22	847.77	454.20	505.22	140.28
2015	2994.22	3332.91	912.37	486.70	541.75	148.30
2016	3175.44	3525.04	976.11	509.03	565.07	156.47
2017	3370.38	3730.10	1049.01	530.20	586.79	165.02
2018	3568.81	3937.04	1127.89	547.73	604.24	173.10
2019	3752.12	4126.11	1208.48	562.91	619.02	181.30
2020	3926.39	4301.89	1295.49	579.21	634.61	191.11

Chapter 9 Human Capital for Tianjin

9.1 Total human capital

Table TJ-1.1presents the estimates of nominal and real total human capital and real physical capital for Tianjin. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Tianjin.

Table TJ-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Tianjin

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	510	510	37
1986	607	568	43
1987	709	622	49
1988	834	626	55
1989	975	638	61
1990	1138	722	66
1991	1331	767	73
1992	1508	780	81
1993	1718	755	89
1994	1941	688	100
1995	2148	660	112
1996	2476	699	126
1997	2842	778	142
1998	3221	886	160
1999	3990	1110	178
2000	5140	1435	197

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	5758	1589	219
2002	6455	1788	245
2003	6982	1915	278
2004	7907	2120	318
2005	8688	2295	365
2006	11391	2964	422
2007	13915	3475	492
2008	16391	3884	584
2009	19468	4660	723
2010	22191	5132	890
2011	25741	5675	1084
2012	29742	6385	1294
2013	33311	6936	1529
2014	37559	7674	1794
2015	40938	8225	2026
2016	44180	8694	2244
2017	51186	9865	2450
2018	56013	10584	—
2019	61149	11250	—
2020	67105	12095	—

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 2020, the nominal human capital per capita increased from 69.4 thousand Yuan to 5.6 million Yuan, an increase

approximately 79 times; and the real human capital per capita increased from 69.4 thousand Yuan to 1004.5 thousand Yuan, an increase of approximately 13 times.

Figure TJ-2.1 illustrates the trends of human capital per capita by gender for Tianjin. The growth pattern of real human capital per capita of male is similar to that of female for Tianjin. Both of them kept increasing from 1985 to 2020 and the growth of human capital for male and female both accelerated, with the male's growth rate significantly higher than the female's. As a result, the gender gap has been expanding, especially from 1997.

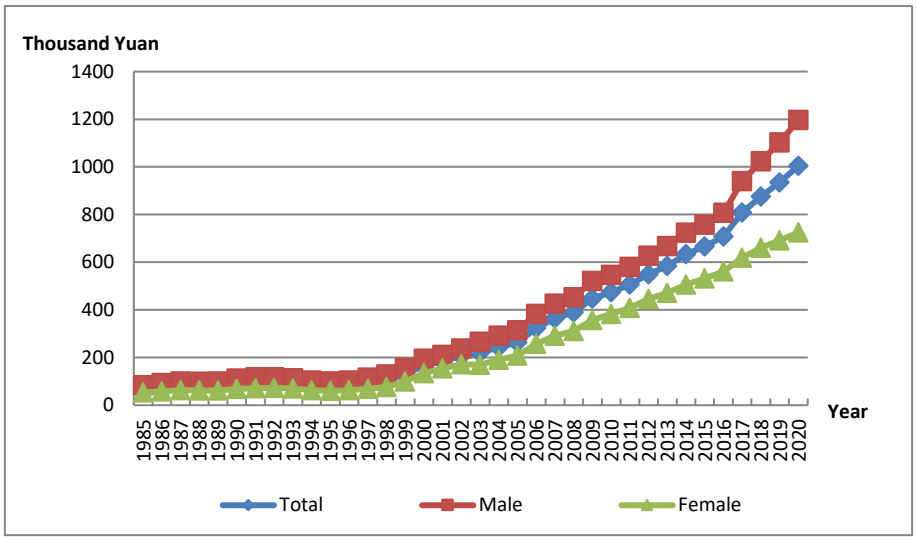

Figure TJ-2.1 Human Capital Per Capita by Gender for Tianjin，1985-2020

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	69.39	78.37	50.50	69.39	78.37	50.50
1986	81.55	93.10	57.49	76.36	87.17	53.83
1987	94.11	108.13	65.15	82.50	94.80	57.11
1988	108.04	123.37	74.63	81.02	92.53	55.97

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1989	124.11	140.94	84.85	81.15	92.16	55.48
1990	142.92	161.45	95.87	90.72	102.49	60.86
1991	165.70	188.12	109.28	95.45	108.37	62.95
1992	185.93	210.28	124.55	96.14	108.73	64.41
1993	210.67	238.20	140.45	92.64	104.74	61.76
1994	237.74	268.70	157.13	84.30	95.28	55.72
1995	262.70	295.58	173.73	80.79	90.91	53.43
1996	299.76	339.35	191.51	84.58	95.75	54.04
1997	340.88	386.60	213.57	93.29	105.80	58.45
1998	380.23	430.82	236.50	104.58	118.50	65.05
1999	465.51	535.72	259.57	129.46	148.99	72.19
2000	595.87	696.65	287.61	166.38	194.52	80.31
2001	668.03	780.50	313.80	184.32	215.35	86.58
2002	745.27	868.10	334.06	206.45	240.48	92.54
2003	803.77	928.67	363.80	220.46	254.71	99.78
2004	907.67	1046.99	392.64	243.36	280.71	105.27
2005	998.29	1149.56	423.62	263.70	303.66	111.90
2006	1245.61	1441.70	472.32	324.16	375.20	122.92
2007	1455.54	1685.02	524.15	363.53	420.84	130.91
2008	1643.58	1901.07	581.08	389.46	450.48	137.69
2009	1871.17	2164.45	647.81	447.87	518.07	155.06
2010	2052.86	2372.06	714.94	474.74	548.56	165.34
2011	2295.06	2640.24	760.15	505.96	582.06	167.58
2012	2561.62	2932.18	812.32	549.88	629.43	174.37
2013	2807.69	3202.86	866.14	584.58	666.86	180.34
2014	3104.95	3534.51	924.48	634.42	722.19	188.89
2015	3315.39	3758.80	990.28	666.09	755.18	198.96

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	3595.32	4073.84	1040.33	707.48	801.64	204.71
2017	4197.73	4763.83	1098.39	809.03	918.13	211.69
2018	4637.67	5255.61	1155.97	876.29	993.05	218.42
2019	5083.54	5750.97	1205.76	935.29	1058.08	221.84
2020	5573.06	6287.65	1264.25	1004.52	1133.32	227.87

Figure TJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

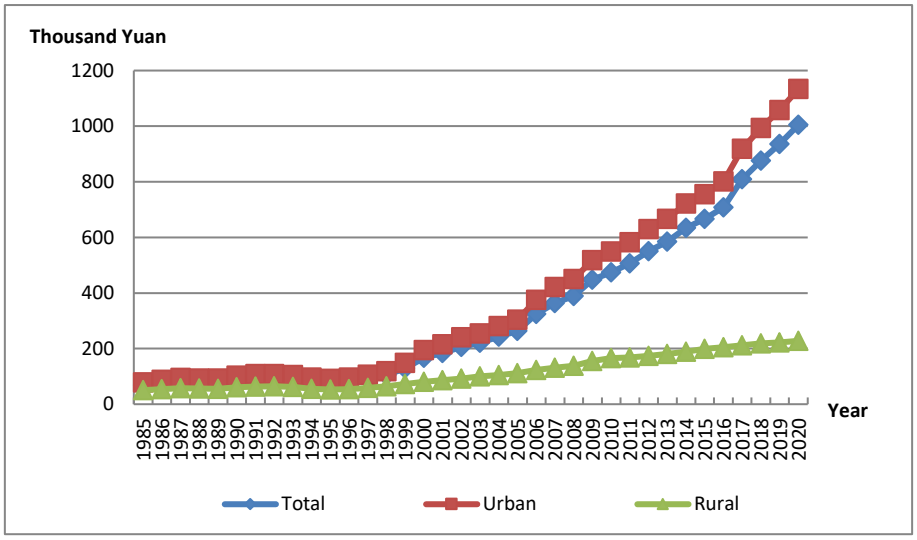

Figure TJ-2.2 Real Human Capital Per Capita by Region for Tianjin，1985-2020

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 2020, the nominal labor force human capital increased from 0.2 trillion Yuan to 22.8 trillion Yuan, an increase of more than 94 times; and the real labor force human capital increased from 0.2 trillion Yuan to 4.1 trillion Yuan, an increase of approximately 16 times.

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)
1985	242	242
1986	276	258
1987	315	276
1988	367	275
1989	422	276
1990	480	304
1991	544	313
1992	616	319
1993	687	302
1994	762	270
1995	848	261
1996	974	275
1997	1125	308
1998	1292	355
1999	1463	407

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	1664	465
2001	1861	513
2002	2105	583
2003	2332	640
2004	2586	693
2005	2852	753
2006	3700	963
2007	4598	1148
2008	5591	1325
2009	6686	1600
2010	7889	1824
2011	9305	2051
2012	10947	2350
2013	12407	2583
2014	14176	2896
2015	16119	3239
2016	17206	3386
2017	18469	3560
2018	19774	3736
2019	21239	3908
2020	22768	4104

9.3.2 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. Tables TJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 48.5 thousand

Yuan to 2.41 million Yuan, an increase of more than 48 times; and the real average labor force human capital from 48.5 thousand Yuan to 435.0 thousand Yuan, an increase of more than 7 times.

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	48.54	53.06	37.05	48.54	53.06	37.05
1986	54.62	59.66	41.89	51.14	55.86	39.22
1987	61.37	67.00	47.30	53.80	58.74	41.47
1988	69.58	75.46	54.18	52.18	56.59	40.63
1989	78.25	84.34	61.28	51.17	55.15	40.06
1990	87.49	93.85	68.23	55.54	59.58	43.31
1991	97.94	104.78	77.36	56.42	60.36	44.56
1992	109.60	116.99	87.36	56.67	60.49	45.17
1993	121.70	129.61	97.85	53.51	56.99	43.02
1994	134.66	143.28	108.44	47.75	50.81	38.45
1995	149.34	159.12	119.03	45.93	48.94	36.61
1996	167.85	178.69	134.20	47.36	50.42	37.87
1997	189.91	202.58	150.17	51.97	55.44	41.10
1998	212.99	227.30	167.17	58.58	62.52	45.98
1999	235.96	251.99	183.33	65.62	70.08	50.99
2000	262.76	281.39	199.44	73.37	78.57	55.69
2001	291.55	312.46	220.53	80.44	86.21	60.85
2002	326.66	351.93	239.29	90.49	97.49	66.29
2003	360.48	388.79	260.52	98.87	106.64	71.45
2004	398.55	431.35	279.01	106.86	115.65	74.81
2005	438.70	476.53	295.94	115.88	125.87	78.17
2006	531.89	581.13	340.49	138.42	151.24	88.61

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**
2007	623.14	682.69	386.11	155.63	170.51	96.43
2008	717.01	786.84	434.31	169.90	186.45	102.91
2009	814.81	894.48	487.91	195.03	214.10	116.78
2010	917.68	1008.48	541.36	212.22	233.22	125.20
2011	1042.46	1149.17	576.00	229.82	253.34	126.98
2012	1183.52	1306.21	620.40	254.06	280.39	133.18
2013	1312.11	1448.72	666.77	273.19	301.63	138.83
2014	1469.69	1625.43	711.11	300.29	332.12	145.30
2015	1631.51	1803.68	762.75	327.79	362.38	153.24
2016	1755.67	1942.86	801.67	345.48	382.31	157.75
2017	1904.96	2108.67	847.62	367.14	406.40	163.36
2018	2070.05	2292.16	894.63	391.14	433.11	169.04
2019	2238.43	2479.01	938.73	411.83	456.10	172.71
2020	2413.25	2670.95	987.17	434.98	481.42	177.93

Chapter 10 Human Capital for Hebei

10.1 Total human capital

Table HeB-1.1 presents the estimates of nominal and real total human capital and real physical capital for Hebei. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Hebei.

Table HeB-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Hebei

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	2435	2435	94
1986	2800	2653	103
1987	3172	2791	112
1988	3657	2728	124
1989	4205	2612	134
1990	4784	2962	145
1991	5484	3285	158
1992	6239	3536	174
1993	7080	3536	191
1994	7987	3267	213
1995	8906	3153	241
1996	10077	3319	277
1997	11431	3628	320
1998	12912	4157	369
1999	14689	4807	421
2000	16670	5454	472
2001	18659	6047	524

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2002	20891	6798	578
2003	23148	7352	645
2004	25725	7820	729
2005	28114	8389	844
2006	32596	9535	976
2007	37340	10410	1130
2008	42392	11100	1328
2009	47859	12599	1551
2010	54107	13798	1788
2011	62393	15004	2084
2012	71550	16724	2402
2013	82019	18582	2734
2014	91226	20290	3068
2015	101079	22244	3397
2016	107985	23400	3744
2017	117902	25079	4055
2018	128879	26728	—
2019	140764	28347	—
2020	153798	30298	—

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 2020, the nominal human capital per capita increased from 47.6 thousand Yuan to 2.5 million Yuan, an increase of more

than 52 times; and the real human capital per capita increased from 47.6 thousand Yuan to 0.5 million Yuan, an increase of more than 9 times.

Figure HeB-2.1 illustrates the trends of human capital per capita by gender for Hebei. The trend of real human capital per capita of male is similar to that of female for Hebei. Both of them kept increasing from 1985 to 2020, and the growths of human capital for male and female both accelerated, with the male's growth rate significantly higher than the female's. As a result, the gender gap has been expanding, especially from 1997.

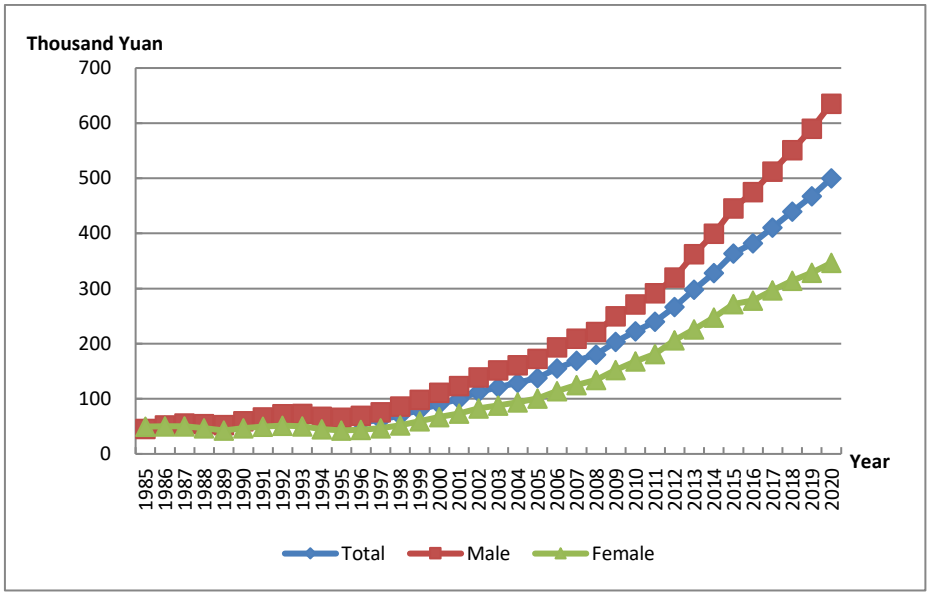

Figure HeB-2.1 Human Capital Per Capita by Gender for Hebei，1985-2020

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	47.61	72.27	42.55	47.61	72.27	42.55
1986	54.01	87.18	46.78	51.16	82.25	44.39
1987	60.25	98.09	51.58	53.02	85.52	45.56
1988	67.89	111.00	57.30	50.63	81.81	42.97
1989	76.75	125.46	64.12	47.68	79.78	39.35

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	86.01	139.72	71.46	53.25	87.79	43.90
1991	97.57	161.64	79.02	58.44	95.28	47.78
1992	110.01	184.38	87.19	62.35	100.17	50.74
1993	123.99	209.81	96.21	61.93	98.69	50.03
1994	139.00	236.58	106.15	56.85	89.10	46.00
1995	154.49	264.40	116.27	54.70	85.77	43.89
1996	173.32	299.51	127.16	57.09	90.29	44.95
1997	194.59	337.66	140.09	61.76	98.16	47.89
1998	216.97	376.88	153.84	69.85	111.01	53.61
1999	243.90	428.83	168.77	79.82	127.97	60.26
2000	275.82	488.71	186.77	90.24	145.11	67.29
2001	307.56	531.58	204.26	99.68	157.22	73.15
2002	344.23	589.20	220.16	112.02	176.73	79.24
2003	381.87	635.25	242.23	121.28	186.26	85.47
2004	424.07	691.56	265.66	128.91	195.54	89.45
2005	462.19	733.21	291.27	137.92	204.45	95.96
2006	531.49	828.39	329.16	155.47	227.13	106.63
2007	606.91	931.31	369.56	169.20	244.73	113.93
2008	687.51	1038.22	415.51	180.02	259.34	118.50
2009	773.69	1141.35	470.57	203.68	288.49	133.76
2010	872.97	1267.29	527.74	222.62	311.53	144.77
2011	997.68	1444.90	568.81	239.92	337.31	146.53
2012	1140.15	1643.17	615.62	266.50	373.65	154.77
2013	1316.35	1899.98	665.79	298.23	420.69	161.73
2014	1477.17	2118.01	722.75	328.54	461.12	172.46
2015	1652.74	2352.45	789.45	363.72	506.59	187.44
2016	1764.01	2475.88	843.45	382.26	525.29	197.30

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2017	1929.46	2681.53	910.68	410.42	558.32	210.09
2018	2119.07	2918.58	984.96	439.47	592.85	221.90
2019	2321.40	3171.83	1058.72	467.48	626.74	231.03
2020	2539.29	3432.32	1144.15	500.24	664.09	244.27

Figure HeB-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

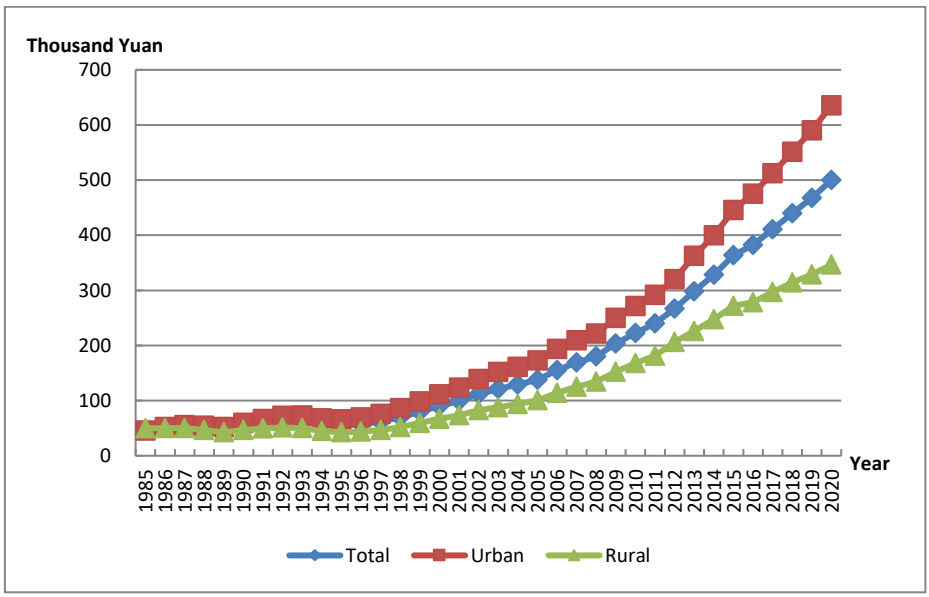

Figure HeB-2.2 Real Human Capital Per Capita by Region for Hebei，1985-2020

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 2020, the nominal labor force human capital increased from 1.04 trillion Yuan to 50.08 trillion Yuan, an increase of more than 47 times; and the real labor force human capital increased from 1.04 trillion Yuan to 9.97 trillion Yuan, an increase of more than 8 times.

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)
1985	1042	1042
1986	1187	1125
1987	1362	1199
1988	1555	1160
1989	1778	1103
1990	2026	1253
1991	2262	1356
1992	2511	1429
1993	2777	1398
1994	3082	1276
1995	3411	1225
1996	3863	1293
1997	4393	1418
1998	5003	1641
1999	5674	1899
2000	6478	2175

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2001	7278	2420
2002	8084	2701
2003	9039	2951
2004	10090	3149
2005	11231	3435
2006	13130	3928
2007	14993	4266
2008	16947	4508
2009	19156	5108
2010	21576	5563
2011	24302	5900
2012	27077	6389
2013	29378	6719
2014	31739	7125
2015	34086	7578
2016	36806	8055
2017	39686	8532
2018	42462	8904
2019	45982	9360
2020	50080	9972

10.3.2 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. Tables HeB-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 33.1 thousand Yuan to 1.2 million Yuan, an increase of more than 36 times; and the real average labor force human capital increased from 33.1 thousand Yuan to 0.2 million Yuan, an increase of more than 6 times.

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	33.05	47.09	30.17	33.05	47.09	30.17
1986	36.78	53.50	33.13	34.84	50.47	31.43
1987	41.07	60.72	36.50	36.15	52.94	32.24
1988	45.85	67.05	40.63	34.21	49.42	30.47
1989	51.16	73.91	45.26	31.73	47.00	27.78
1990	57.03	81.00	50.53	35.27	50.90	31.04
1991	63.04	90.71	55.19	37.81	53.47	33.37
1992	69.46	100.47	60.32	39.54	54.58	35.10
1993	76.34	110.47	65.96	38.42	51.96	34.30
1994	83.82	120.47	72.44	34.70	45.37	31.39
1995	91.93	131.59	79.30	33.02	42.69	29.94
1996	102.62	149.45	87.13	34.34	45.06	30.80
1997	114.79	168.90	96.32	37.04	49.10	32.93
1998	127.93	187.67	107.11	41.96	55.28	37.32
1999	141.74	206.51	118.79	47.44	61.63	42.41
2000	158.11	229.99	132.06	53.09	68.29	47.58
2001	175.19	252.73	144.37	58.26	74.75	51.70
2002	192.43	275.67	156.64	64.29	82.69	56.38
2003	212.65	298.44	173.02	69.41	87.51	61.05
2004	234.66	323.80	190.55	73.23	91.55	64.16
2005	258.37	349.82	210.20	79.01	97.54	69.25
2006	299.27	407.71	236.87	89.54	111.79	76.73
2007	341.03	463.67	264.70	97.04	121.85	81.60
2008	385.29	519.95	295.05	102.50	129.88	84.15
2009	435.30	580.01	330.87	116.08	146.61	94.05

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**
2010	489.91	646.22	368.02	126.33	158.86	100.96
2011	550.28	736.35	392.35	133.59	171.90	101.07
2012	614.62	826.74	420.07	145.02	188.00	105.61
2013	673.72	902.97	450.39	154.08	199.93	109.41
2014	737.06	984.29	483.48	165.46	214.29	115.37
2015	800.83	1056.81	525.07	178.04	227.58	124.67
2016	869.07	1147.75	561.82	190.20	243.51	131.42
2017	948.03	1249.09	608.32	203.81	260.07	140.33
2018	1032.21	1355.18	659.46	216.45	275.27	148.57
2019	1129.41	1480.91	713.46	229.91	292.62	155.69
2020	1239.44	1619.21	776.09	246.80	313.29	165.69

Chapter 11 Human Capital for Shanxi

11.1 Total human capital

Table SX-1.1 presents the estimates of nominal and real total human capital and real physical capital for Shanxi. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Shanxi.

Table SX-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Shanxi

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	873	873	53
1986	1026	973	60
1987	1162	1025	66
1988	1347	984	71
1989	1550	944	75
1990	1798	1071	79
1991	2061	1175	84
1992	2393	1277	90
1993	2764	1289	96
1994	3196	1189	102
1995	3634	1155	109
1996	4156	1223	116
1997	4708	1342	125
1998	5399	1558	138
1999	5952	1724	151
2000	6715	1868	166

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	7754	2152	182
2002	9052	2544	202
2003	10373	2857	228
2004	11635	3074	261
2005	12935	3336	304
2006	14872	3756	356
2007	16842	4062	418
2008	18702	4206	485
2009	20923	4725	579
2010	23659	5183	687
2011	27018	5622	815
2012	30517	6193	941
2013	33802	6655	1080
2014	37429	7244	1217
2015	41016	7892	1346
2016	45186	8600	1459
2017	49788	9359	1526
2018	53879	9948	—
2019	58437	10508	—
2020	63380	11077	—

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 the non-retired population. Table SX-2.1 presents human capital per capita for Shanxi by region. From 1985 to 2020, the nominal human capital per capita

increased from 34.9 thousand Yuan to 2.2 million Yuan, an increase of approximately 61 times; and the real human capital per capita increased from 34.9 thousand Yuan to 376.7 thousand Yuan, an increase of more than 9 times.

Figure SX-2.1 illustrates the trends of human capital per capita by gender for Shanxi. The trend of the real human capital per capita of male is similar to that of female for Shanxi. Both of them kept increasing from 1985 to 2020, and the growths of human capital for male and female both accelerated, with the male's growth rate significantly higher than the female's. As a result, the gender gap has been expanding, especially from 1997.

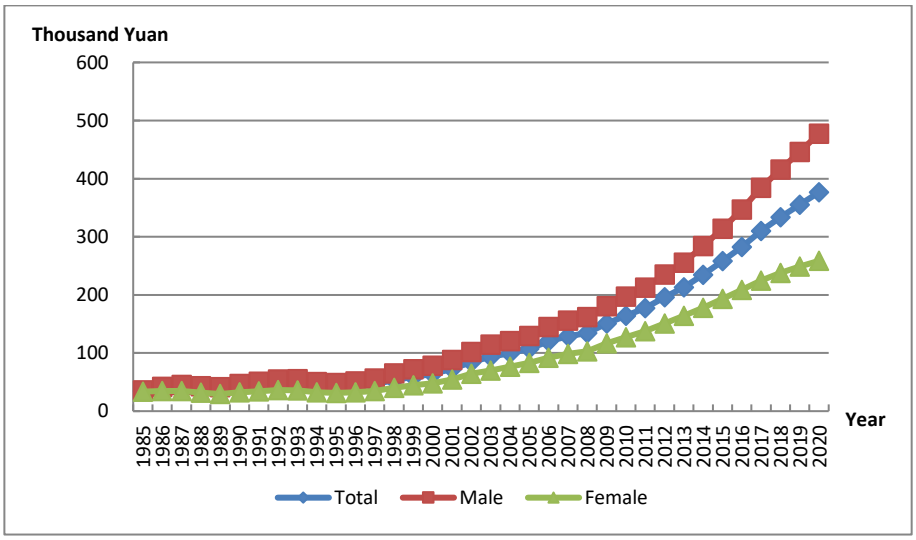

Figure SX-2.1 Human Capital Per Capita by Gender for Shanxi，1985-2020

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	34.89	55.98	28.06	34.89	55.98	28.06
1986	40.56	67.46	31.31	38.46	63.41	29.88
1987	45.55	74.83	34.89	40.19	64.82	31.23
1988	51.73	84.55	39.30	37.79	59.98	29.39

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1989	58.76	95.74	44.12	35.79	58.40	26.85
1990	67.08	109.15	49.66	39.96	65.60	29.34
1991	75.81	122.94	55.56	43.22	69.57	31.90
1992	86.72	142.05	62.15	46.28	73.68	34.11
1993	98.74	162.28	69.56	46.03	72.50	33.88
1994	112.66	186.86	77.73	41.91	66.31	30.43
1995	126.85	210.75	86.10	40.31	64.09	28.76
1996	143.91	241.57	95.00	42.34	67.83	29.57
1997	162.08	272.91	104.96	46.21	74.32	31.72
1998	184.95	314.90	116.12	53.38	86.89	35.63
1999	203.90	343.59	127.43	59.06	94.43	39.69
2000	229.62	384.44	141.27	63.86	100.91	42.73
2001	261.44	430.55	155.66	72.55	113.58	46.89
2002	299.64	489.57	169.93	84.20	131.99	51.56
2003	338.89	545.05	189.91	93.35	144.70	56.24
2004	377.46	600.08	210.46	99.71	153.76	59.16
2005	417.23	654.07	231.04	107.62	164.86	62.61
2006	475.15	736.36	258.67	120.01	182.28	68.39
2007	535.05	816.77	287.15	129.05	194.07	71.83
2008	596.75	899.53	316.82	134.21	199.76	73.61
2009	667.11	987.70	352.08	150.64	221.44	81.07
2010	749.42	1093.82	391.14	164.19	237.84	87.57
2011	852.69	1230.44	417.09	177.44	254.46	88.62
2012	964.85	1375.20	447.24	195.80	277.63	92.60
2013	1081.08	1525.55	479.03	212.85	299.07	96.06
2014	1210.90	1695.90	518.50	234.36	326.71	102.51
2015	1341.05	1863.10	569.09	258.03	356.96	111.73

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	1484.04	2049.54	609.41	282.45	388.56	118.33
2017	1650.51	2267.58	661.08	310.27	424.13	127.71
2018	1806.01	2463.68	716.57	333.44	452.62	136.03
2019	1974.83	2675.90	776.80	355.09	479.10	143.18
2020	2155.50	2897.27	846.90	376.72	504.61	151.12

Figure SX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in rural areas. Since 1997, the growths of human capital for rural and urban regions both accelerated, and the growth rate is significantly higher in urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

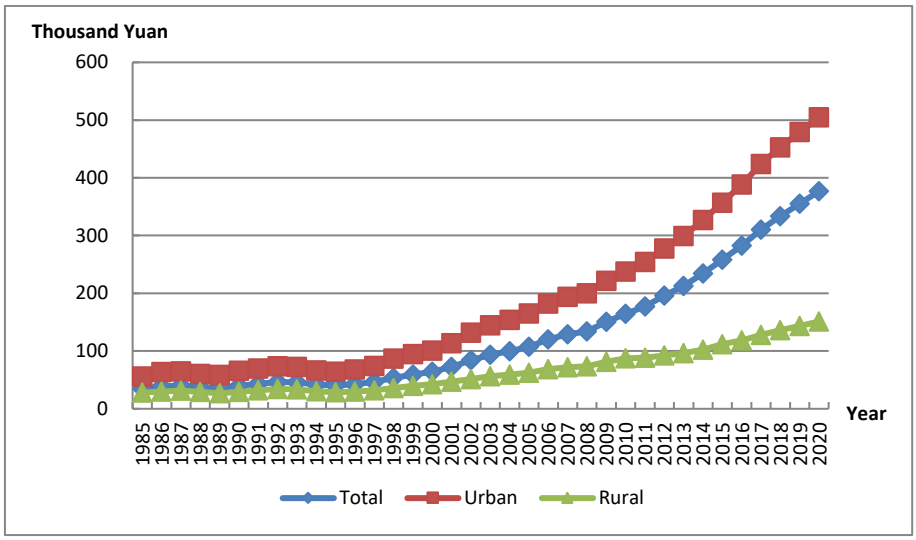

Figure SX-2.2 Real Human Capital Per Capita by Region for Shanxi，1985-2020

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 2020, the nominal labor force human capital increased from 0.4 trillion Yuan to 27 trillion Yuan, an increase of more than 70 times; and the real labor force human capital increased from 0.4 trillion Yuan to 4.8 trillion Yuan, an increase of approximately 12 times.

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)
1985	380	380
1986	443	420
1987	517	456
1988	604	442
1989	703	428
1990	820	488
1991	944	538
1992	1078	576
1993	1226	573
1994	1396	522
1995	1574	503
1996	1760	521
1997	1965	564
1998	2190	637

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	2414	706
2000	2694	758
2001	3051	858
2002	3452	983
2003	3914	1092
2004	4392	1172
2005	4931	1282
2006	5628	1432
2007	6425	1558
2008	7304	1651
2009	8356	1892
2010	9580	2105
2011	10947	2284
2012	12451	2533
2013	13903	2744
2014	15544	3017
2015	17220	3322
2016	19180	3659
2017	21185	3995
2018	23174	4292
2019	25232	4549
2020	27237	4771

11.3.2 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. Tables SX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to

2020, the nominal average labor force human capital increased from 25.7 thousand Yuan to 1250.10 thousand Yuan, an increase of approximately 48 times; and the real average labor force human capital increased from 25.7 thousand Yuan to 218.98 thousand Yuan, an increase of more than 7 times.

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	25.71	39.50	20.92	25.71	39.50	20.92
1986	29.14	44.34	23.49	27.63	41.67	22.41
1987	32.98	49.70	26.34	29.12	43.05	23.58
1988	37.57	56.44	29.73	27.46	40.04	22.23
1989	42.67	63.80	33.46	25.99	38.92	20.36
1990	48.51	72.08	37.71	28.89	43.32	22.28
1991	54.56	81.00	42.28	31.11	45.84	24.28
1992	61.21	90.89	47.19	32.71	47.14	25.90
1993	68.55	101.75	52.57	32.05	45.46	25.60
1994	76.74	113.86	58.55	28.67	40.40	22.92
1995	85.42	126.84	64.71	27.27	38.57	21.62
1996	94.43	139.93	71.13	27.95	39.29	22.14
1997	104.50	154.46	78.26	29.99	42.07	23.65
1998	115.24	169.22	86.12	33.53	46.69	26.42
1999	126.07	183.78	94.18	36.87	50.51	29.34
2000	139.25	202.15	103.24	39.17	53.06	31.22
2001	155.21	223.43	114.62	43.63	58.94	34.53
2002	172.93	248.50	126.07	49.25	66.99	38.25
2003	192.82	273.86	140.59	53.81	72.71	41.64
2004	214.42	303.39	154.46	57.23	77.74	43.42
2005	238.39	336.28	169.21	61.97	84.76	45.86

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**
2006	268.96	376.54	189.53	68.42	93.21	50.11
2007	302.95	420.62	211.38	73.47	99.94	52.87
2008	340.31	468.63	235.80	76.91	104.07	54.78
2009	383.82	522.88	264.87	86.91	117.23	60.99
2010	433.38	585.15	296.51	95.24	127.23	66.38
2011	490.83	666.40	319.77	102.42	137.82	67.94
2012	554.93	753.28	348.43	112.91	152.07	72.14
2013	619.26	837.27	380.19	122.21	164.14	76.24
2014	692.96	933.34	416.50	134.48	179.81	82.35
2015	768.46	1024.98	461.50	148.23	196.38	90.61
2016	852.32	1137.22	499.41	162.61	215.60	96.97
2017	946.41	1260.49	544.55	178.48	235.76	105.20
2018	1044.93	1388.42	592.10	193.53	255.07	112.40
2019	1147.19	1519.10	643.40	206.84	271.98	118.60
2020	1250.10	1645.19	701.63	218.98	286.54	125.20

Chapter 12 Human Capital for Inner Mongolia

12.1 Total human capital

Table NMG-1.1 presents the estimates of nominal and real total human capital and real physical capital for Inner Mongolia. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Inner Mongolia.

Table NMG-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Inner Mongolia

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	912	912	31
1986	1069	1018	34
1987	1205	1069	37
1988	1377	1052	42
1989	1558	1023	45
1990	1770	1134	49
1991	1998	1224	54
1992	2256	1296	62
1993	2532	1277	71
1994	2831	1160	81
1995	3150	1097	90
1996	3596	1162	99
1997	4148	1280	109

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1998	4728	1466	121
1999	5282	1638	133
2000	6114	1868	146
2001	6908	2092	162
2002	7898	2336	186
2003	8616	2496	229
2004	9675	2722	291
2005	10736	2951	380
2006	12611	3415	487
2007	14384	3727	619
2008	16303	4001	776
2009	18327	4510	993
2010	21213	5063	1239
2011	24403	5518	1514
2012	26951	5905	1835
2013	30164	6395	2222
2014	33767	7042	2534
2015	36789	7590	2840
2016	40269	8215	3079
2017	43923	8811	3235
2018	47288	9317	—
2019	50889	9795	—
2020	54813	10371	—

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 2020, the nominal human capital per capita increased from 47.0 thousand Yuan to2.8million Yuan, an increase of more than 59 times; and the real human capital per capita increased from 47.0 thousand Yuan to 529.27 thousand Yuan, an increase of approximately 10 times.

Figure NMG-2.1 illustrates the trends of human capital per capita by gender for Inner Mongolia. The trend of real human capital per capita of male is similar to that of female for Inner Mongolia. Both of them kept increasing from 1985 to 2020, 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.

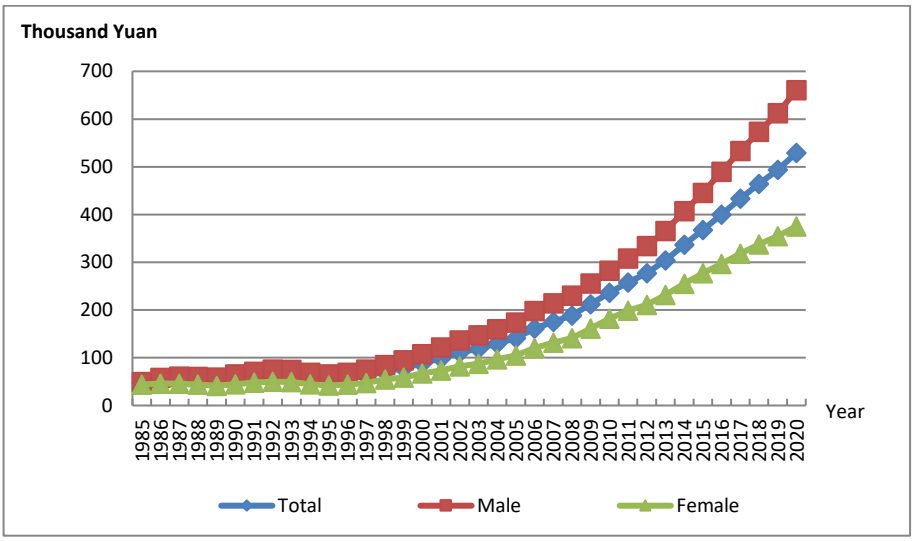

Figure NMG-2.1 Human Capital Per Capita by Gender for Inner Mongolia, 1985-2020

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	46.95	65.81	37.50	46.95	65.81	37.50
1986	54.58	80.24	40.98	51.98	76.05	39.22
1987	60.67	89.26	45.06	53.85	77.98	40.68
1988	68.69	102.53	49.52	52.50	76.56	38.87
1989	77.28	116.48	54.39	50.74	75.82	36.09
1990	87.07	132.32	60.03	55.77	84.62	38.52
1991	97.84	150.04	66.09	59.96	90.52	41.38
1992	110.47	171.60	72.78	63.45	95.24	43.86
1993	124.30	195.01	80.22	62.71	94.36	42.97
1994	139.59	221.81	88.26	57.18	86.34	38.97
1995	155.85	249.74	96.69	54.29	83.02	36.19
1996	175.99	283.10	105.73	56.86	87.54	36.74
1997	201.29	326.75	115.63	62.09	96.60	38.52
1998	227.22	369.32	126.56	70.47	109.95	42.50
1999	251.83	406.51	138.42	78.11	120.66	46.91
2000	289.52	467.49	152.49	88.44	136.98	51.06
2001	326.91	520.12	165.60	99.00	151.50	55.18
2002	374.15	591.28	177.67	110.65	170.86	56.17
2003	410.60	632.42	193.94	118.93	180.04	59.24
2004	462.20	700.81	211.10	130.04	194.64	62.06
2005	512.95	765.06	230.43	141.01	208.33	65.58
2006	595.19	875.83	256.63	161.18	235.43	71.60
2007	677.32	983.68	285.48	175.50	253.51	75.71
2008	768.84	1105.18	316.29	188.67	270.24	78.91
2009	861.70	1219.69	357.46	212.04	299.13	89.36
2010	989.82	1388.49	403.53	236.25	330.62	97.47

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2011	1140.07	1583.87	431.14	257.78	357.47	98.52
2012	1266.66	1733.59	466.12	277.51	378.77	103.92
2013	1433.44	1945.49	508.26	303.90	411.09	110.23
2014	1616.16	2174.26	563.57	337.06	451.75	120.77
2015	1781.33	2374.57	635.61	367.48	488.00	134.73
2016	1960.77	2592.19	694.43	400.00	526.93	145.45
2017	2160.67	2829.41	767.82	433.43	565.53	158.29
2018	2357.26	3057.54	850.26	464.44	600.32	172.02
2019	2566.79	3296.83	942.22	494.06	632.75	185.43
2020	2797.21	3552.34	1051.26	529.27	671.05	201.45

Figure NMG-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the trend of real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban regions both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

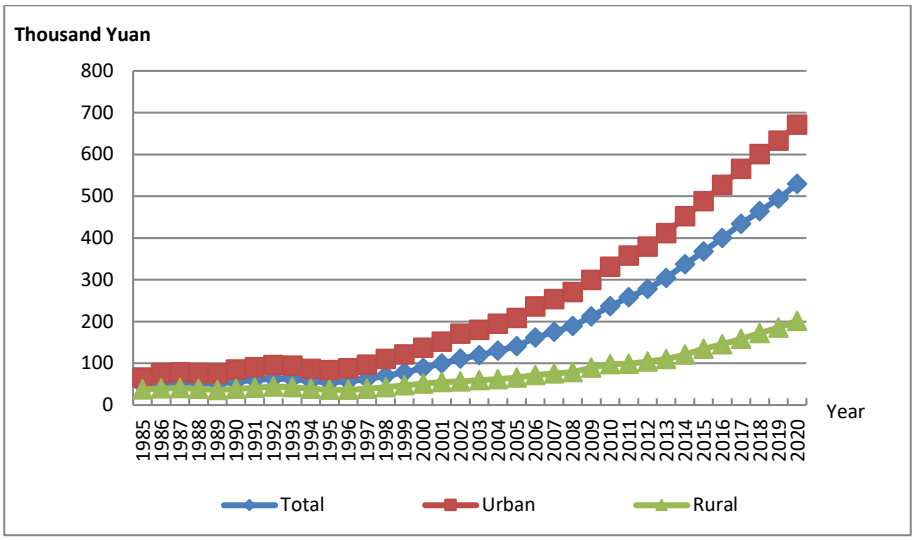

Figure NMG-2.2 Real Human Capital Per Capita by Region for Inner Mongolia，1985-2020

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 2020, the nominal labor force human capital increased from 0.36 trillion Yuan to 22.93 trillion Yuan, an increase about 63times; and the real labor force human capital increased from 0.36 trillion Yuan to 4.34 trillion Yuan, an increase of approximately 12 times.

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)
1985	361	361
1986	416	397
1987	485	431
1988	561	429
1989	651	428
1990	754	483
1991	853	524
1992	958	552
1993	1067	541
1994	1184	489
1995	1306	459
1996	1504	490
1997	1725	537
1998	1970	617
1999	2235	701
2000	2543	786
2001	2842	872
2002	3153	942
2003	3476	1014
2004	3803	1077
2005	4200	1160
2006	4946	1345
2007	5683	1477
2008	6427	1581
2009	7292	1798
2010	8372	2002
2011	9510	2153
2012	10785	2368
2013	11967	2544

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2014	13495	2823
2015	15039	3111
2016	16557	3386
2017	18182	3657
2018	19730	3897
2019	21308	4110
2020	22929	4344

12.3.2 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. Tables NMG-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 32.04 thousand Yuan to 1.53 million Yuan, an increase of more than 46 times, and the real average labor force human capital increased from 32.04 thousand Yuan to 289.05 thousand Yuan, an increase of approximately 8 times.

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	32.04	41.05	27.33	32.04	41.05	27.33
1986	35.90	46.59	30.00	34.21	44.16	28.71
1987	40.46	53.11	33.02	35.95	46.40	29.81
1988	45.73	61.29	36.34	35.02	45.76	28.53
1989	51.68	70.34	40.20	33.96	45.79	26.68
1990	58.29	80.13	44.69	37.34	51.24	28.68

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	65.02	90.41	49.04	39.91	54.54	30.70
1992	72.34	101.52	53.83	41.72	56.34	32.44
1993	80.21	113.40	59.05	40.68	54.87	31.63
1994	88.65	126.03	64.94	36.59	49.06	28.68
1995	97.52	139.30	71.16	34.24	46.31	26.63
1996	109.74	158.10	78.01	35.74	48.89	27.11
1997	122.95	177.69	85.82	38.27	52.53	28.59
1998	137.07	197.69	94.58	42.93	58.86	31.76
1999	151.91	218.17	104.09	47.63	64.76	35.28
2000	168.91	242.04	114.47	52.24	70.92	38.33
2001	186.81	266.09	124.65	57.34	77.50	41.53
2002	205.79	292.15	134.33	61.46	84.42	42.47
2003	225.99	317.29	146.43	65.96	90.33	44.72
2004	246.97	342.72	158.35	69.93	95.19	46.55
2005	272.40	375.55	171.68	75.24	102.26	48.86
2006	314.83	431.69	194.06	85.60	116.04	54.14
2007	358.64	488.16	218.70	93.22	125.81	58.00
2008	403.04	542.82	246.49	99.13	132.73	61.50
2009	455.52	606.99	279.55	112.33	148.87	69.89
2010	517.48	682.70	316.62	123.71	162.56	76.48
2011	588.57	779.70	340.17	133.26	175.98	77.73
2012	669.72	886.25	370.82	147.02	193.63	82.67
2013	750.21	988.23	407.23	159.45	208.82	88.32
2014	850.80	1115.86	452.79	177.95	231.84	97.03
2015	952.75	1235.98	512.07	197.09	254.01	108.54
2016	1051.47	1355.18	561.60	215.06	275.47	117.63
2017	1163.87	1486.37	623.70	234.09	297.09	128.58

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**
2018	1279.67	1619.53	692.05	252.77	317.98	140.01
2019	1398.52	1751.09	770.13	269.76	336.08	151.56
2020	1525.77	1885.88	863.70	289.05	356.25	165.51

Chapter 13 Human Capital for Liaoning

13.1 Total human capital

Table LN-1.1 presents the estimates of nominal and real total human capital and real physical capital for Liaoning. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Liaoning.

Table LN-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Liaoning

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1739	1739	79
1986	2045	1926	89
1987	2320	2022	100
1988	2720	2006	112
1989	3134	1950	122
1990	3532	2123	132
1991	3979	2271	144
1992	4449	2397	156
1993	4972	2338	174
1994	5498	2082	192
1995	6012	1960	207
1996	6843	2066	221
1997	7735	2255	236
1998	8661	2533	252
1999	9827	2888	268
2000	11389	3329	289
2001	12549	3662	313

2002	13589	4005	340
2003	14702	4232	378
2004	16140	4468	433
2005	17597	4782	522
2006	19912	5344	626
2007	22726	5792	742
2008	25479	6200	884
2009	28363	6892	1036
2010	31968	7528	1220
2011	35758	7987	1427
2012	40237	8719	1655
2013	44762	9453	1887
2014	49013	10159	2103
2015	52809	10785	2199
2016	61811	12408	2224
2017	69469	13744	2261
2018	74865	14438	——
2019	80681	15194	——
2020	87559	16115	—

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 2020, the nominal human capital per capita increased from 50.8 thousand Yuan to 2.8 million Yuan, an increase of more than55 times; and the real human capital per capita increased from 50.8thousand Yuan to 512.3 thousand Yuan, an increase of approximately 10 times.

Figure LN-2.1 illustrates the trends of human capital per capita by gender for Liaoning. The trend of real human capital per capita of male is similar to that of female for Liaoning. Both of them kept increasing from 1985 to 2020, 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.

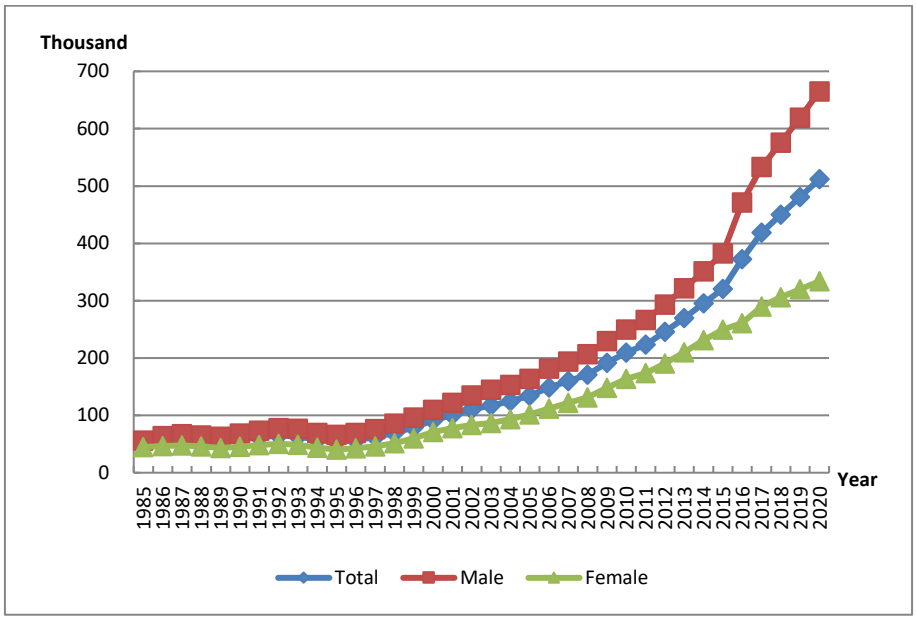

Figure LN-2.1 Real Human Capital Per Capita by Gender for Liaoning，1985-2020

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	50.76	62.50	41.15	50.76	62.50	41.15
1986	59.21	75.55	45.39	55.77	70.59	43.24
1987	66.35	85.04	50.16	57.84	72.37	45.24
1988	75.83	97.62	56.19	55.93	69.46	43.73
1989	85.84	110.38	62.58	53.43	67.02	40.54

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1990	95.80	121.99	69.49	57.58	71.85	43.26
1991	107.48	137.84	77.15	61.33	76.60	46.09
1992	120.16	154.88	85.39	64.75	79.61	49.87
1993	134.95	175.18	94.32	63.46	77.15	49.65
1994	150.55	196.45	103.73	57.01	68.61	45.18
1995	165.68	215.80	113.73	54.01	64.92	42.70
1996	188.00	248.17	124.72	56.75	69.01	43.85
1997	212.11	282.46	136.48	61.85	75.67	46.99
1998	237.08	316.58	149.10	69.33	84.98	52.01
1999	269.03	362.64	162.13	79.06	98.63	56.72
2000	312.72	427.59	176.31	91.41	116.29	61.86
2001	345.25	468.45	193.74	100.77	127.53	67.85
2002	374.37	502.31	209.67	110.35	138.27	74.40
2003	407.15	537.96	230.65	117.21	145.60	78.91
2004	449.78	589.22	251.44	124.50	155.14	80.93
2005	493.76	641.58	271.31	134.19	167.57	83.96
2006	553.40	716.78	303.26	148.52	185.18	92.37
2007	627.47	813.51	336.01	159.92	200.94	95.66
2008	703.29	911.57	370.24	171.15	215.71	99.89
2009	788.09	1020.44	408.82	191.51	241.47	109.96
2010	889.93	1151.41	446.74	209.57	265.06	115.53
2011	999.23	1286.26	470.71	223.19	281.74	115.38
2012	1133.99	1452.31	496.36	245.73	309.14	118.69
2013	1278.09	1627.27	521.26	269.90	338.25	121.73
2014	1426.35	1808.20	553.04	295.63	369.21	127.37
2015	1569.73	1978.18	593.16	320.58	398.32	134.72
2016	1856.14	2351.82	622.78	372.61	466.53	138.93
2017	2118.15	2684.90	664.25	419.05	525.27	146.56

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2018	2332.95	2946.27	710.15	449.93	561.93	153.57
2019	2552.78	3209.84	753.91	480.75	598.29	158.95
2020	2783.24	3486.18	841.55	512.25	635.58	171.57

Figure LN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban regions both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

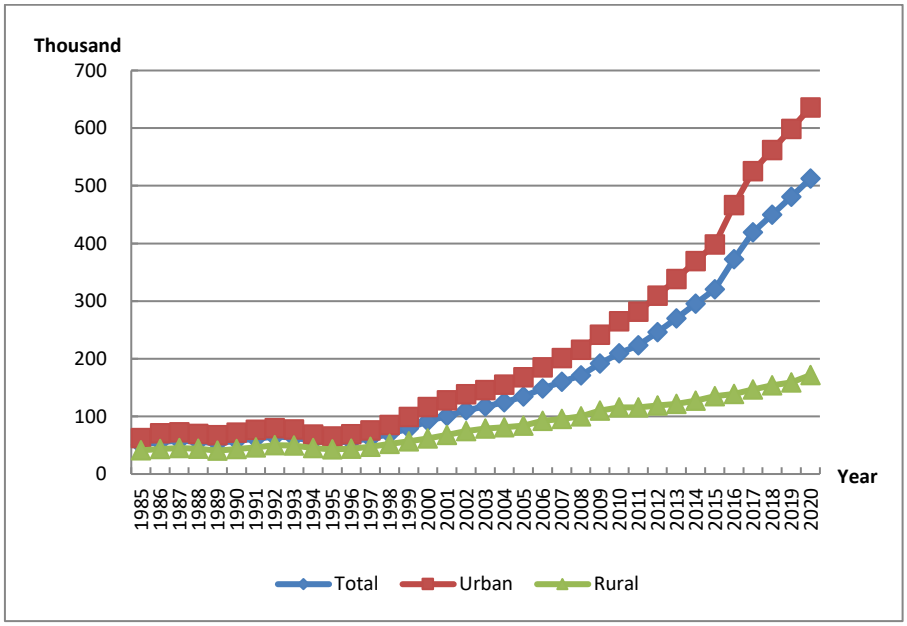

Figure LN-2.2 Real Human Capital Per Capita by Region for Liaoning，1985-2020

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 2020, the nominal labor force human capital increased from 0.8 trillion Yuan to 31.80 trillion Yuan, an increase of more than 38 times; and the real labor force human capital increased from 0.8 trillion Yuan to 5.9 trillion Yuan, an increase of approximately 7 times.

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)
1985	831	831
1986	948	893
1987	1088	949
1988	1270	938
1989	1465	913
1990	1676	1009
1991	1879	1074
1992	2080	1126
1993	2286	1083
1994	2504	958
1995	2753	907
1996	3110	951
1997	3518	1041
1998	3962	1176

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	4380	1309
2000	4853	1446
2001	5290	1574
2002	5772	1733
2003	6267	1834
2004	6778	1902
2005	7340	2017
2006	8550	2318
2007	9825	2526
2008	11060	2713
2009	12339	3021
2010	13994	3317
2011	15845	3563
2012	17677	3860
2013	19381	4127
2014	20817	4353
2015	22464	4628
2016	24275	4920
2017	26114	5219
2018	27957	5449
2019	29836	5677
2020	31796	5904

13.3.2 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. Tables LN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 37.8 thousand Yuan to 1.3 million Yuan, an increase about 35 times; and the real

average labor force human capital increased from 37.8 thousand Yuan to 244.6 thousand Yuan, an increase of approximately 6 times.

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	37.80	44.67	31.50	37.80	44.67	31.50
1986	42.25	50.26	34.75	39.81	46.96	33.11
1987	47.33	56.70	38.35	41.28	48.25	34.59
1988	53.27	63.50	43.00	39.33	45.18	33.46
1989	59.58	70.60	47.98	37.13	42.87	31.08
1990	66.47	78.35	53.29	40.00	46.15	33.18
1991	73.55	86.73	59.20	42.05	48.19	35.37
1992	81.01	95.63	65.23	43.84	49.16	38.10
1993	89.03	105.33	71.49	42.17	46.39	37.63
1994	97.62	115.69	78.25	37.35	40.41	34.08
1995	107.18	127.47	85.38	35.32	38.35	32.06
1996	119.37	142.78	93.92	36.50	39.70	33.02
1997	133.27	160.56	102.91	39.42	43.01	35.43
1998	147.95	178.83	112.56	43.93	48.00	39.26
1999	162.17	196.29	121.86	48.46	53.39	42.63
2000	178.40	216.94	131.07	53.16	59.00	45.99
2001	194.49	234.97	143.00	57.85	63.97	50.08
2002	212.06	255.90	154.16	63.66	70.44	54.70
2003	230.49	275.98	168.11	67.45	74.69	57.51
2004	250.59	298.84	181.32	70.34	78.68	58.36
2005	272.55	324.57	193.93	74.91	84.77	60.01
2006	312.69	373.98	218.82	84.78	96.62	66.65

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
2007	355.31	426.95	243.33	91.34	105.46	69.27
2008	398.22	479.78	268.42	97.67	113.53	72.42
2009	445.29	537.11	296.53	109.03	127.10	79.76
2010	502.70	608.84	324.38	119.16	140.16	83.89
2011	569.67	694.04	351.12	128.10	152.02	86.07
2012	640.39	781.91	380.16	139.83	166.44	90.91
2013	711.03	868.47	409.45	151.40	180.53	95.62
2014	779.20	950.71	437.99	162.93	194.12	100.87
2015	856.04	1040.70	474.86	176.36	209.55	107.85
2016	932.31	1135.08	505.20	188.96	225.16	112.70
2017	1018.37	1240.13	541.49	203.53	242.62	119.47
2018	1116.76	1360.42	582.50	217.65	259.47	125.97
2019	1213.47	1477.16	624.12	230.90	275.33	131.58
2020	1317.16	1598.60	673.95	244.56	291.45	137.40

Chapter 14 Human Capital for Jilin

14.1 Total human capital

Table JL-1.1 presents the estimates of the estimates of nominal and real total human capital and real physical capital for Jilin. Column 1 gives the nominal human capital summed across six-education categories. Column 2 shows the totals real human capital for six-education categories. Column 3 displays the real physical capital of Jilin.

Table JL-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Jilin

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1075	1075	40
1986	1246	1180	44
1987	1395	1237	50
1988	1611	1194	55
1989	1848	1160	59
1990	2101	1248	63
1991	2382	1330	68
1992	2683	1397	73
1993	3000	1400	81
1994	3317	1278	89
1995	3661	1221	98
1996	4118	1282	108
1997	4605	1380	115
1998	5089	1536	125
1999	5727	1758	136

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	6734	2086	149
2001	7776	2371	163
2002	8391	2568	181
2003	9076	2744	201
2004	9745	2833	229
2005	10438	2988	270
2006	11794	3328	336
2007	13542	3641	427
2008	15339	3920	555
2009	16987	4338	693
2010	19440	4788	863
2011	21997	5137	1021
2012	24622	5602	1195
2013	26921	5946	1368
2014	30955	6693	1548
2015	32663	6946	1739
2016	36670	7665	1893
2017	40641	8356	2015
2018	43735	8806	—
2019	46996	9192	—
2020	50435	9652	—

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 2020, the nominal human capital per capita

increased from 49.1 thousand Yuan to 2.5 million Yuan, an increase of more than 50 times; and the real human capital per capita increased from 49.1 thousand Yuan to 475.9 thousand Yuan, an increase of approximately 10 times.

Figure JL-2.1 illustrates the trends of human capital per capita by gender for Jilin. The pattern of growth in real human capital per capita for men is similar to for women in Jilin. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female both accelerated; however, since the male's growth rate was significantly higher than female's and men started out higher, the gender gap continues to expand, especially from 1997.

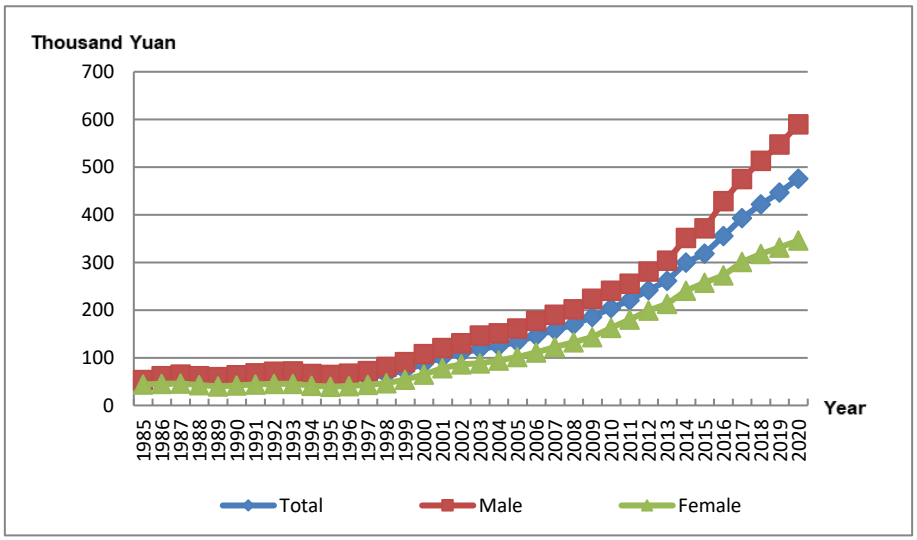

Figure JL-2.1 Human Capital Per Capita by Gender for Jilin，1985-2020

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	49.14	61.01	40.68	49.14	61.01	40.68
1986	56.81	74.15	44.28	53.80	69.95	42.14

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1987	63.08	83.15	48.30	55.94	72.63	43.64
1988	71.17	94.08	53.62	52.74	67.58	41.37
1989	80.11	106.03	59.69	50.30	65.15	38.61
1990	89.85	118.98	66.61	53.37	70.37	39.82
1991	101.05	134.21	73.16	56.44	74.11	41.57
1992	113.46	150.78	80.33	59.10	76.18	43.93
1993	127.15	168.86	88.15	59.32	75.37	44.31
1994	141.65	187.68	96.54	54.58	67.99	41.44
1995	156.72	206.63	105.85	52.29	65.04	39.31
1996	175.18	232.82	115.32	54.52	68.04	40.48
1997	194.86	260.43	125.80	58.38	73.39	42.58
1998	214.25	287.00	137.03	64.67	81.45	46.85
1999	240.33	326.12	148.92	73.77	94.54	51.63
2000	282.40	393.81	163.29	87.48	116.14	56.84
2001	329.12	466.51	177.81	100.35	135.54	61.59
2002	358.69	506.17	192.02	109.79	148.25	66.31
2003	393.04	550.80	211.45	118.83	159.57	71.95
2004	428.06	596.10	232.40	124.44	166.69	75.24
2005	465.42	645.06	253.29	133.22	177.89	80.47
2006	518.88	714.77	283.47	146.41	194.78	88.29
2007	589.20	812.79	316.01	158.42	212.16	92.77
2008	662.57	914.45	351.10	169.33	227.11	97.88
2009	728.20	995.37	392.71	185.95	247.45	108.72
2010	830.19	1140.26	435.40	204.49	274.15	115.80
2011	943.34	1302.39	463.45	220.31	297.66	116.94
2012	1065.42	1473.79	495.70	242.41	328.61	122.15
2013	1183.14	1636.77	530.58	261.33	354.67	127.06

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2014	1386.62	1944.26	572.79	299.80	412.63	135.14
2015	1497.46	2091.72	624.73	318.45	436.51	145.07
2016	1700.83	2384.20	660.95	355.53	490.19	150.62
2017	1913.34	2678.92	705.89	393.40	542.64	158.02
2018	2096.03	2917.59	754.88	422.05	579.40	165.18
2019	2284.04	3158.56	804.64	446.74	610.17	170.28
2020	2486.79	3404.68	864.60	475.93	644.82	177.47

Figure JL-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban regions both accelerated; however, the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

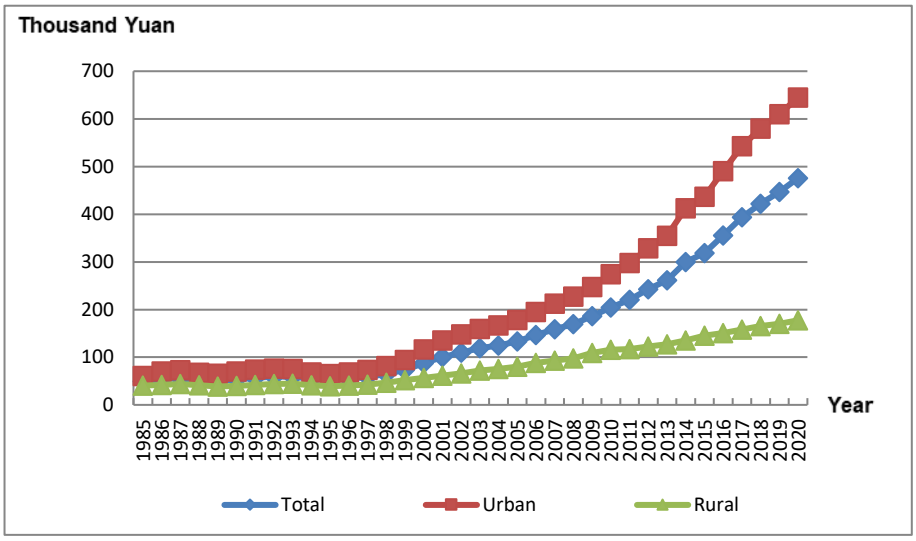

Figure JL-2.2 Real Human Capital Per Capita by Region for Jilin，1985-2020

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 2020, the nominal labor force human capital increased from 0.5 trillion Yuan to 20.0 trillion Yuan, an increase of about 40 times; and the real labor force human capital increased from 0.5 trillion Yuan to 3.7 trillion Yuan, an increase of approximately 8 times.

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)
1985	470	470
1986	534	506
1987	621	552
1988	718	533
1989	824	519
1990	943	561
1991	1081	604
1992	1218	637
1993	1354	636
1994	1498	583
1995	1659	559
1996	1880	592
1997	2120	643
1998	2377	727
1999	2638	822

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	2934	925
2001	3201	997
2002	3478	1086
2003	3742	1154
2004	3987	1180
2005	4257	1241
2006	4935	1416
2007	5646	1540
2008	6357	1648
2009	7191	1860
2010	8097	2019
2011	9077	2145
2012	10110	2327
2013	10942	2446
2014	11691	2564
2015	12442	2685
2016	13647	2894
2017	14931	3113
2018	16212	3308
2019	17557	3477
2020	18973	3671

14.3.2 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. Tables JL-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 35.4 thousand Yuan to 1.2 million Yuan, an increase of more than 32 times; and the real average labor force human capital increased from 35.4 thousand Yuan to 0.2

million Yuan, an increase of approximately 6 times.

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	35.40	42.26	30.49	35.40	42.26	30.49
1986	39.28	47.59	33.42	37.21	44.90	31.80
1987	44.12	54.68	36.65	39.19	47.76	33.12
1988	49.58	61.66	40.64	36.86	44.29	31.36
1989	55.39	68.67	45.31	34.87	42.20	29.30
1990	61.71	75.91	50.78	36.68	44.90	30.36
1991	69.13	85.59	55.62	38.67	47.26	31.60
1992	76.78	95.20	60.76	40.14	48.10	33.23
1993	84.80	104.99	66.37	39.80	46.86	33.36
1994	93.29	114.96	72.79	36.30	41.65	31.24
1995	102.60	125.80	79.89	34.58	39.59	29.67
1996	113.85	140.52	87.62	35.87	41.07	30.75
1997	126.09	156.71	95.74	38.26	44.16	32.40
1998	138.77	172.70	105.00	42.44	49.01	35.90
1999	151.41	188.20	114.96	47.17	54.56	39.86
2000	165.58	205.70	126.09	52.21	60.66	43.90
2001	181.24	225.47	136.64	56.46	65.51	47.33
2002	198.02	247.44	147.15	61.80	72.47	50.82
2003	214.86	266.51	161.28	66.25	77.21	54.88
2004	232.17	285.90	176.29	68.73	79.95	57.07
2005	250.82	306.42	192.94	73.13	84.50	61.30
2006	285.78	351.50	216.39	81.98	95.79	67.40
2007	322.79	399.22	240.99	88.04	104.20	70.75

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**
2008	360.35	446.10	267.70	93.41	110.79	74.63
2009	403.77	499.13	299.40	104.42	124.09	82.89
2010	450.58	556.79	332.50	112.35	133.87	88.43
2011	507.12	639.36	355.03	119.83	146.12	89.58
2012	568.16	724.84	382.27	130.78	161.62	94.20
2013	623.42	798.59	412.71	139.36	173.04	98.83
2014	677.65	868.12	447.28	148.61	184.24	105.53
2015	735.18	936.41	490.58	158.63	195.41	113.92
2016	810.88	1038.85	526.54	171.94	213.59	119.99
2017	897.21	1152.56	570.21	187.06	233.46	127.64
2018	990.13	1274.12	617.44	202.03	253.03	135.11
2019	1085.44	1395.79	668.45	214.95	269.64	141.46
2020	1190.65	1523.52	730.39	230.36	288.54	149.92

Chapter 15 Human Capital for Heilongjiang

15.1 Total human capital

Table HLJ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Heilongjiang. Column 1 shows nominal human capital aggregated across six-education categories. Column 2 gives the human capital in real terms across the same six-education categories. Column 3 displays the real physical capital of Heilongjiang.

Table HLJ-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Heilongjiang

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1451	1451	67
1986	1688	1582	75
1987	1912	1656	84
1988	2178	1605	92
1989	2463	1582	98
1990	2784	1689	104
1991	3153	1787	111
1992	3523	1846	118
1993	3948	1804	127
1994	4419	1658	137
1995	4914	1587	150
1996	5458	1648	164
1997	5987	1733	180
1998	6598	1900	199
1999	7372	2190	218

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	8449	2548	237
2001	9700	2898	259
2002	10576	3177	283
2003	11447	3407	309
2004	12548	3586	339
2005	13426	3788	375
2006	15377	4249	420
2007	17397	4556	477
2008	19121	4739	546
2009	21367	5282	633
2010	24295	5771	731
2011	26639	5972	839
2012	29209	6336	970
2013	31987	6778	1125
2014	34222	7145	1269
2015	36273	7489	1421
2016	38801	7898	1561
2017	41561	8349	1703
2018	43951	8655	—
2019	46499	8877	—
2020	49375	9219	—

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 the non-retired population. Table HLJ-2.1 presents human capital per capita for Heilongjiang by region. From 1985 to 2020, the nominal human capital per

capita increased from 44.8 thousand Yuan to 1.8 million Yuan, an increase of more than 39 times; and the real human capital per capita increased from 44.8 thousand Yuan to 0.3 million Yuan, an increase of more than 6 times.

Figure HLJ-2.1 illustrates the trends of human capital per capita by gender for Heilongjiang. The growth pattern of real human capital per capita of male is similar to that of female for Heilongjiang. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female both accelerated, with the male's growth rate significantly higher than the female's. As a result, the gender gap has been expanding, especially from 1997.

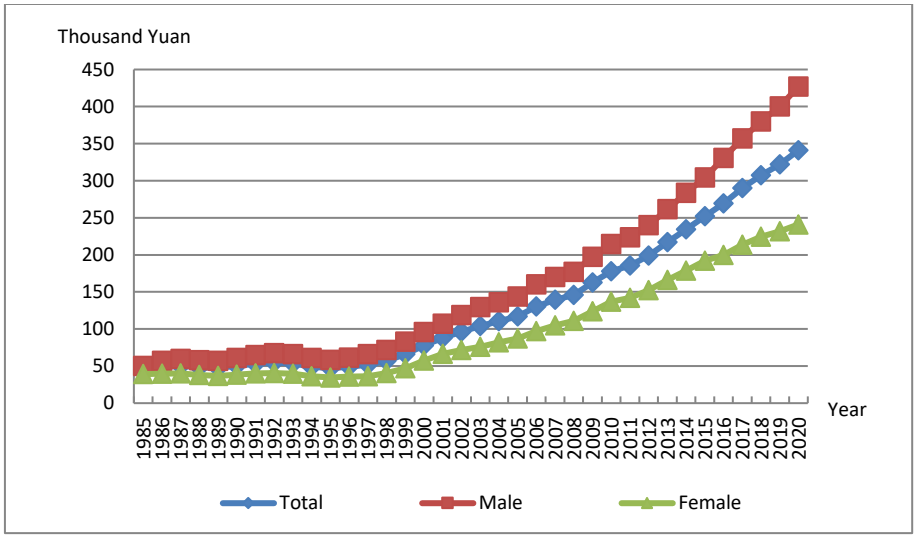

Figure HLJ-2.1 Human Capital Per Capita by Gender for Heilongjiang，1985-2020

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	44.82	51.26	39.99	44.82	51.26	39.99
1986	51.92	62.37	43.75	48.66	58.84	40.70
1987	58.18	70.68	48.03	50.37	60.78	41.91
1988	65.59	79.83	53.46	48.33	57.89	40.18
1989	73.81	89.87	59.51	47.43	56.86	39.03
1990	82.96	100.92	66.36	50.32	60.47	40.95
1991	93.54	115.14	73.20	53.01	63.76	42.89
1992	104.38	128.88	80.85	54.69	65.06	44.73
1993	117.17	145.95	89.13	53.53	63.96	43.37
1994	131.21	164.91	98.26	49.21	59.23	39.42
1995	146.18	184.93	107.97	47.22	57.31	37.28
1996	162.89	208.05	118.01	49.18	59.92	38.51
1997	179.43	229.92	128.57	51.94	63.37	40.42
1998	197.86	253.65	140.96	56.99	69.28	44.45
1999	221.88	287.71	153.34	65.93	81.02	50.21
2000	257.08	341.59	166.96	77.51	97.46	56.24
2001	294.08	396.48	183.08	87.85	112.22	61.43
2002	320.95	432.46	198.20	96.41	123.27	66.84
2003	349.80	467.80	217.84	104.10	132.28	72.59
2004	386.05	516.19	238.14	110.33	141.03	75.43
2005	414.70	548.94	258.17	117.00	148.79	79.93
2006	471.47	624.74	288.37	130.28	166.34	87.19
2007	531.76	704.43	320.00	139.25	177.95	91.80
2008	588.82	778.05	354.06	145.93	187.19	94.75
2009	658.22	865.80	393.27	162.71	208.72	103.99
2010	749.23	989.43	433.52	177.97	230.23	109.28
2011	827.27	1091.97	456.98	185.44	240.61	108.27

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2012	917.44	1210.04	484.18	199.00	258.11	111.48
2013	1023.76	1353.49	511.82	216.94	283.05	114.30
2014	1122.76	1484.97	546.44	234.42	306.26	120.11
2015	1220.35	1607.85	589.86	251.96	328.00	128.24
2016	1323.55	1741.26	619.95	269.42	351.00	132.01
2017	1443.90	1896.29	660.22	290.04	377.78	138.07
2018	1561.50	2045.98	703.27	307.49	399.60	144.33
2019	1687.73	2206.83	748.55	322.20	417.98	148.91
2020	1827.42	2378.51	803.15	341.20	441.23	155.27

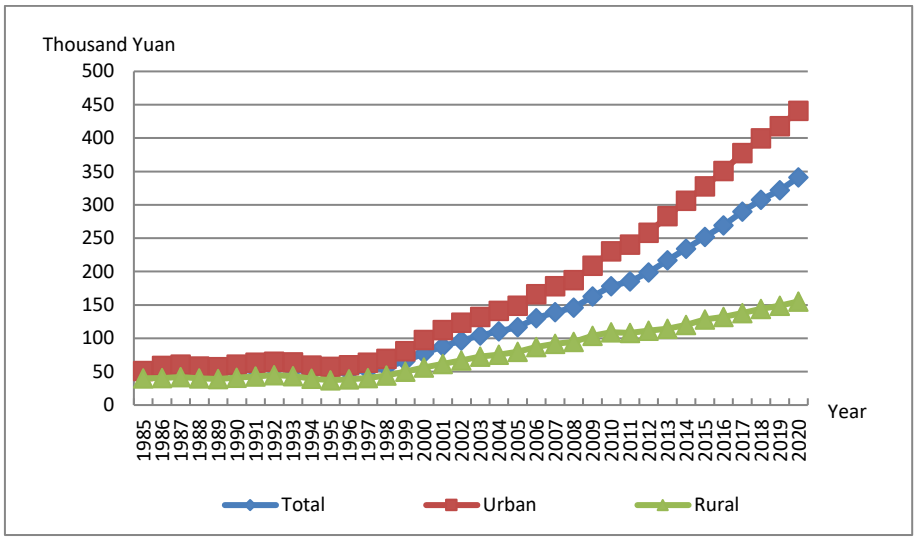

Figure HLJ-2.2 Real Human Capital Per Capita by Region for Heilongjiang, 1985-2020

Figure HLJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban areas both accelerated, and the growth rate

is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions' human capital expanded rapidly.

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 2020, the nominal labor force human capital increased from 0.6 trillion Yuan to 24.1 trillion Yuan, an increase of approximately 38 times; and the real labor force human capital increased from 0.6 trillion Yuan to 4.5 trillion Yuan, an increase of approximately 6 times.

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)
1985	617	617
1986	715	670
1987	832	720
1988	965	712
1989	1117	718
1990	1288	781
1991	1479	839
1992	1680	882
1993	1899	870
1994	2142	806
1995	2399	777

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1996	2653	805
1997	2945	857
1998	3241	939
1999	3529	1057
2000	3864	1180
2001	4322	1310
2002	4787	1458
2003	5212	1573
2004	5607	1623
2005	6034	1723
2006	6951	1942
2007	7912	2095
2008	8671	2170
2009	9749	2429
2010	10973	2625
2011	12260	2766
2012	13530	2955
2013	14683	3131
2014	15648	3288
2015	16785	3488
2016	18245	3734
2017	19742	3984
2018	21150	4185
2019	22579	4331
2020	24119	4521

15.3.2 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. Tables HLJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 32.4 thousand Yuan to 1.1 million Yuan, an increase of more than 32 times; and the real average labor force human capital increased from 32.4 thousand Yuan to 0.2 million Yuan, an increase of more than 5 times.

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	32.42	36.36	29.22	32.42	36.36	29.22
1986	36.45	41.59	32.15	34.16	39.24	29.90
1987	41.04	47.58	35.39	35.54	40.91	30.88
1988	46.40	53.94	39.55	34.19	39.11	29.72
1989	52.31	60.76	44.29	33.62	38.45	29.05
1990	58.84	68.08	49.77	35.70	40.79	30.71
1991	66.08	77.17	55.10	37.48	42.74	32.29
1992	73.82	86.85	60.81	38.74	43.84	33.65
1993	82.37	97.60	67.02	37.71	42.77	32.61
1994	91.66	108.98	74.29	34.48	39.14	29.80
1995	101.57	121.39	81.75	32.92	37.62	28.22
1996	111.61	133.75	89.44	33.86	38.52	29.19
1997	123.08	148.09	97.79	35.81	40.82	30.74
1998	134.70	161.85	107.06	39.03	44.21	33.76
1999	146.37	175.51	116.44	43.85	49.42	38.13
2000	159.91	191.79	126.71	48.82	54.72	42.68
2001	175.79	210.43	139.06	53.30	59.56	46.66

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**
2002	192.36	231.00	150.56	58.60	65.84	50.77
2003	208.57	248.72	164.48	62.93	70.33	54.81
2004	224.88	266.71	178.35	65.12	72.87	56.49
2005	242.18	285.82	192.87	69.14	77.47	59.72
2006	276.27	328.96	215.60	77.18	87.59	65.19
2007	312.42	374.12	240.27	82.72	94.51	68.93
2008	344.62	412.00	265.85	86.22	99.12	71.14
2009	386.73	463.37	295.29	96.37	111.70	78.08
2010	433.76	522.07	325.47	103.77	121.48	82.05
2011	485.57	593.40	348.66	109.54	130.76	82.61
2012	539.68	664.87	375.95	117.88	141.82	86.56
2013	593.75	734.75	405.42	126.63	153.66	90.54
2014	645.59	799.98	436.48	135.66	164.99	95.94
2015	705.20	871.67	474.88	146.53	177.82	103.24
2016	772.40	960.22	506.67	158.08	193.56	107.89
2017	847.31	1056.17	545.47	171.01	210.41	114.07
2018	925.17	1155.80	586.23	183.05	225.74	120.31
2019	1005.86	1257.33	630.75	192.93	238.14	125.48
2020	1094.84	1365.88	682.62	205.22	253.38	131.97

Chapter 16 Human Capital for Shanghai

16.1 Total human capital

Table SH-1.1 presents estimates of nominal and real total human capital and real physical capital stocks for Shanghai. Column 1 shows nominal human capital aggregated across six-education categories. Column 2 shows real human capital in the same six-education categories. Column 3 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)
1985	1308	1308	71
1986	1643	1545	82
1987	1974	1718	94
1988	2439	1767	109
1989	2863	1790	120
1990	3368	1981	132
1991	3991	2124	144
1992	4583	2217	160
1993	5162	2078	179
1994	5756	1870	211
1995	6440	1763	253
1996	7589	1902	302
1997	8938	2179	351
1998	10515	2564	400
1999	12785	3071	448

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	16470	3860	499
2001	18170	4258	553
2002	19773	4611	614
2003	22344	5206	680
2004	26044	5937	758
2005	29906	6750	846
2006	38926	8681	954
2007	47607	10288	1078
2008	54251	11081	1198
2009	63973	13119	1337
2010	70942	14110	1468
2011	76441	14453	1588
2012	82726	15215	1711
2013	87121	15663	1841
2014	94340	16515	1969
2015	95621	16347	2127
2016	101009	16732	2325
2017	111568	18173	2526
2018	115135	18458	—
2019	118096	18471	—
2020	121585	18728	—

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. From 1985 to 2020, the nominal human capital per capita increased

from 121.5 thousand Yuan to 6.88 million Yuan, an increase of more than 57 times; and the real human capital per capita increased from 121.5 thousand Yuan to 1.06 million Yuan, an increase of approximately 8 times.

Figure SH-2.1 also illustrates the trends of human capital per capita for Shanghai by gender. The trend of real human capital per capita of male is similar to that of females for Shanghai. The overall trend of both of them was increasing from 1985 to 2020, with the males' growth rate significantly higher than females'. As a result, the gender gap has been expanding, especially from 1997.

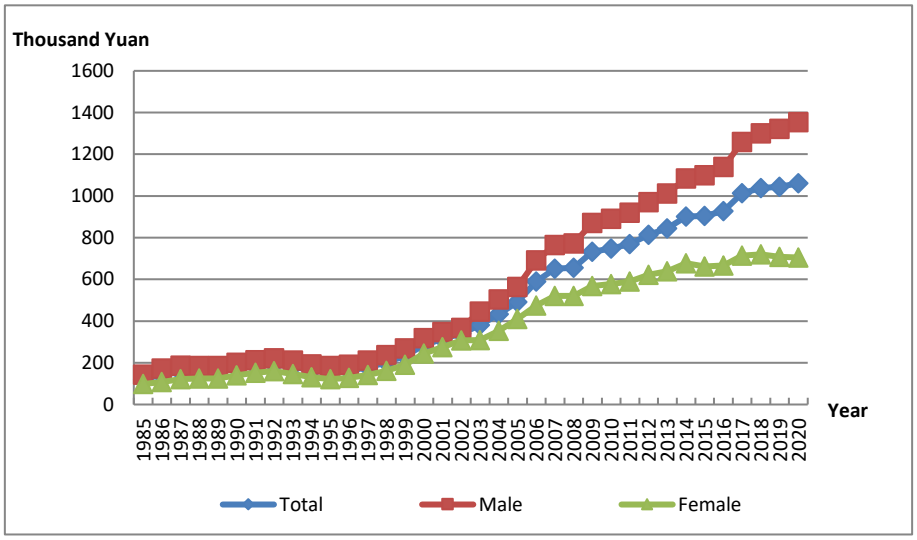

Figure SH-2.1 Human Capital Per Capita by Gender for Shanghai，1985-2020

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

Year	Nominal Human Capital Per Capita (Thousands of Yuan)	Real Human Capital Per Capita (Thousands of 1985 Yuan)
1985	121	121
1986	151	142
1987	179	156
1988	216	157

Year	Nominal Human Capital Per Capita (Thousands of Yuan)	Real Human Capital Per Capita (Thousands of 1985 Yuan)
1989	251	157
1990	294	173
1991	348	185
1992	399	193
1993	449	181
1994	503	163
1995	565	155
1996	643	161
1997	731	178
1998	828	202
1999	971	233
2000	1212	284
2001	1341	314
2002	1456	339
2003	1639	382
2004	1903	434
2005	2178	492
2006	2646	590
2007	3016	652
2008	3214	656
2009	3570	732
2010	3762	748
2011	4073	770
2012	4423	813
2013	4694	844
2014	5151	902
2015	5292	905
2016	5599	927
2017	6224	1014

Year	Nominal Human Capital Per Capita (Thousands of Yuan)	Real Human Capital Per Capita (Thousands of 1985 Yuan)
2018	6479	1039
2019	6679	1045
2020	6884	1060

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 2020 the nominal labor force human capital increased from 0.6 trillion Yuan to 39.7 trillion Yuan, an increase of more than 67 times; and the real labor force human capital increased from 0.6 trillion Yuan to 6.1 trillion Yuan, an increase of approximately 9 times.

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)
1985	580	580
1986	667	627
1987	763	664
1988	900	652
1989	1047	655
1990	1193	701
1991	1351	719
1992	1522	736

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1993	1695	682
1994	1881	611
1995	2091	572
1996	2543	637
1997	3110	758
1998	3731	910
1999	4358	1047
2000	5114	1199
2001	5754	1349
2002	6565	1531
2003	7421	1729
2004	8407	1916
2005	9477	2139
2006	12036	2684
2007	15113	3266
2008	18447	3768
2009	21986	4509
2010	25700	5112
2011	27968	5288
2012	30577	5624
2013	32681	5875
2014	34605	6058
2015	36351	6214
2016	37395	6195
2017	38189	6220
2018	38779	6217
2019	39379	6159
2020	39702	6115

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. Tables SH-3.2 reports the nominal and real average labor force human capital for Shanghai. From 1985 to 2020, the nominal average labor force human capital increased from 75.3 thousand Yuan to 2.8 million Yuan, an increase of more than 37 times; the real average labor force human capital increased from 75.3 thousand Yuan to 438.7 thousand Yuan, an increase of approximately 5 times.

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

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)	Real Average Labor Force Human Capital (Thousands of 1985 Yuan)
1985	75.28	75.28
1986	85.85	80.76
1987	97.48	84.83
1988	112.61	81.60
1989	128.83	80.55
1990	145.31	85.46
1991	164.37	87.49
1992	185.07	89.55
1993	206.82	83.26
1994	230.26	74.81
1995	256.16	70.11
1996	295.03	73.95
1997	340.07	82.92
1998	385.20	93.92
1999	428.09	102.84
2000	478.25	112.09
2001	538.00	126.09

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)	Real Average Labor Force Human Capital (Thousands of 1985 Yuan)
2002	610.88	142.46
2003	687.30	160.12
2004	775.19	176.71
2005	867.93	195.89
2006	1016.66	226.73
2007	1177.61	254.49
2008	1334.29	272.54
2009	1491.34	305.84
2010	1643.74	326.94
2011	1810.69	342.34
2012	2003.22	368.43
2013	2172.82	390.64
2014	2345.15	410.53
2015	2501.89	427.71
2016	2587.68	428.66
2017	2670.23	434.94
2018	2745.70	440.19
2019	2805.48	438.80
2020	2847.97	438.68

Chapter 17 Human Capital for Jiangsu

17.1 Total human capital

Table JS-1.1 presents estimates of nominal and real total human capital and real physical capital for Jiangsu. Column 1 presents estimates of the nominal human capital aggregated across six-education categories. Column 2 shows the real human capital summed across the same six-education categories. Column 3 gives 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 Stocks (Billions of 1985 Yuan)
1985	3273	3273	83
1986	3730	3475	102
1987	4171	3582	123
1988	4853	3421	146
1989	5632	3373	166
1990	6546	3800	186
1991	7605	4237	212
1992	8767	4589	253
1993	9989	4422	303
1994	11261	4033	353
1995	12342	3816	408
1996	14288	4026	470
1997	16557	4556	538
1998	18759	5158	618
1999	21845	6042	704
2000	24646	6784	799

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital Stocks (Billions of 1985 Yuan)
2001	31097	8434	900
2002	32099	8805	1010
2003	35269	9571	1172
2004	38641	10066	1360
2005	41824	10647	1606
2006	48747	12198	1876
2007	57347	13726	2174
2008	65042	14767	2501
2009	75141	17106	2926
2010	84832	18593	3414
2011	97482	20240	3983
2012	113157	22847	4562
2013	130070	25617	5133
2014	149011	28672	5671
2015	169396	32027	6234
2016	196532	36256	6848
2017	233720	42305	7514
2018	254286	44967	—
2019	275600	47277	—
2020	298847	50023	—

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 2020, the nominal human capital per capita increased by more than 80 times; and the real human capital per capita

increased by approximately 14 times.

Figure JS-2.1 illustrates the trends of human capital per capita by gender for Jiangsu. The real human capital per capita of men has followed the same pattern as that of women. Both men and women saw increasing human capital from 1985 to 2020, with the male's growth rate significantly higher than female's. As a result, the gender gap continues to expand, especially from 1997.

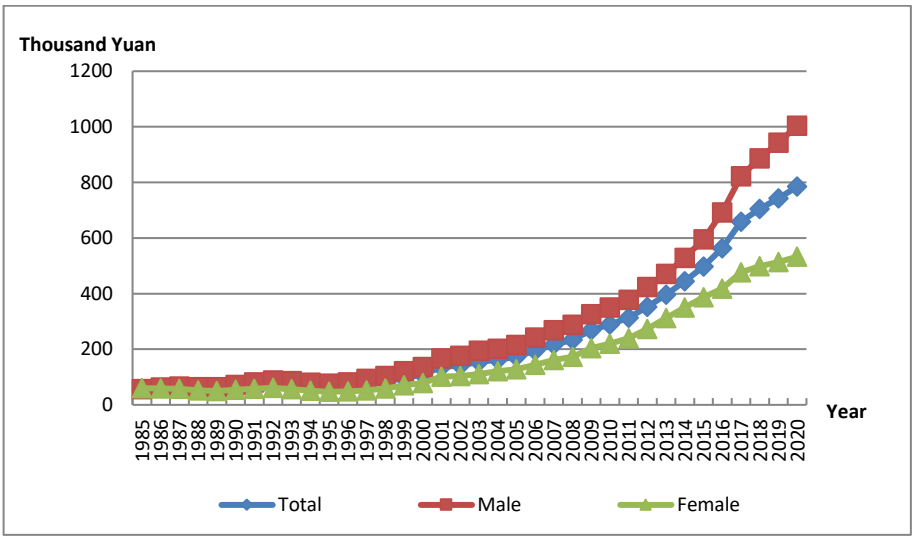

Figure JS-2.1 Real Human Capital Per Capita by Gender for Jiangsu，1985-2020

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	58.13	80.74	53.04	58.13	80.74	53.04
1986	65.74	97.36	58.34	61.25	91.50	54.17
1987	72.84	107.75	64.43	62.55	91.65	55.54
1988	83.15	125.51	71.70	58.61	87.07	50.92
1989	95.21	144.27	80.63	57.02	86.28	48.32
1990	109.25	168.49	90.44	63.43	97.45	52.62

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1991	125.54	198.29	100.23	69.95	106.49	57.23
1992	143.56	230.85	110.57	75.14	113.95	60.47
1993	162.79	262.73	122.09	72.07	109.25	56.92
1994	183.24	295.62	134.60	65.63	98.11	51.57
1995	200.48	317.49	147.30	61.98	90.68	48.95
1996	231.15	361.28	161.82	65.12	93.13	50.20
1997	266.90	409.19	179.49	73.44	104.12	54.59
1998	300.93	448.71	198.27	82.75	114.18	60.92
1999	350.10	521.53	217.19	96.82	134.59	67.54
2000	395.89	575.25	241.13	108.98	148.46	74.91
2001	499.70	750.41	267.41	135.53	193.47	81.85
2002	516.10	739.16	292.49	141.57	193.67	89.34
2003	568.46	791.87	327.73	154.26	205.63	98.92
2004	625.34	846.68	362.07	162.90	212.02	104.48
2005	677.91	889.06	395.39	172.57	218.26	111.42
2006	777.86	1013.58	450.58	194.65	244.91	124.85
2007	906.27	1179.03	502.87	216.91	273.67	132.96
2008	1028.35	1331.54	561.52	233.47	293.79	140.59
2009	1178.00	1514.23	629.79	268.17	335.45	158.48
2010	1318.83	1677.98	700.24	289.06	358.80	168.94
2011	1507.86	1909.69	744.49	313.07	388.62	169.55
2012	1747.04	2201.52	798.89	352.73	436.81	177.33
2013	2013.75	2525.20	858.67	396.61	489.88	185.96
2014	2311.52	2883.22	934.57	444.77	547.20	198.07
2015	2632.38	3264.63	1027.82	497.69	609.23	214.62
2016	3050.86	3784.65	1095.35	562.83	689.72	224.67
2017	3641.20	4524.59	1185.82	659.08	809.98	239.64
2018	3982.92	4915.58	1279.98	704.32	860.19	252.60

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2019	4327.61	5305.42	1370.60	742.37	901.35	261.59
2020	4688.96	5698.62	1475.80	784.86	945.28	274.35

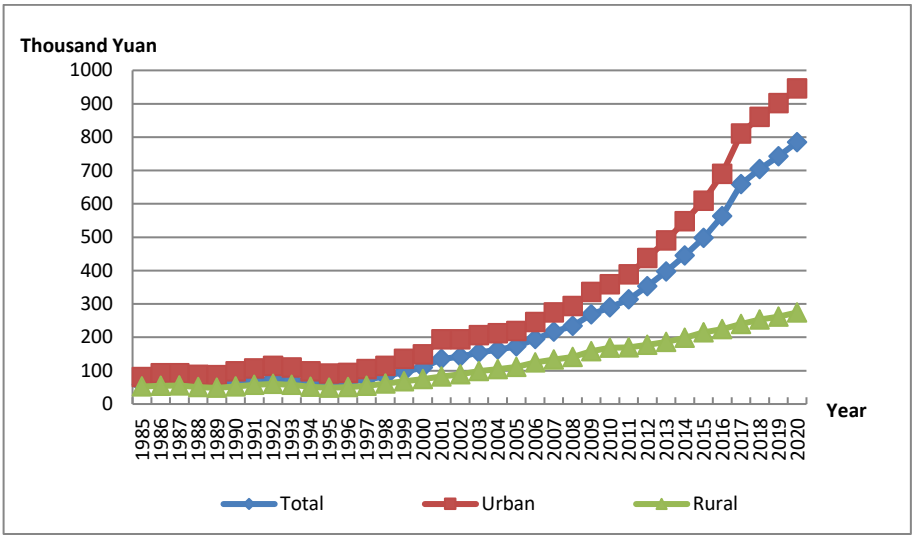

Figure JS-2.2 Real Human Capital Per Capita by Region for Jiangsu，1985-2020

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 2020, the nominal labor force human capital increased by more than 54 times; and the real labor force human capital increased by

approximately 9 times.

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)
1985	1562	1562
1986	1785	1662
1987	2040	1753
1988	2364	1668
1989	2689	1611
1990	3053	1773
1991	3459	1938
1992	3896	2062
1993	4341	1947
1994	4828	1759
1995	5355	1685
1996	6064	1748
1997	6908	1943
1998	7839	2204
1999	8795	2492
2000	9860	2779
2001	10894	3028
2002	12027	3349
2003	13234	3629
2004	14416	3786
2005	15876	4069
2006	18912	4772
2007	22245	5379
2008	25268	5797
2009	29655	6821
2010	34305	7589

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2011	39035	8181
2012	44083	8989
2013	49030	9755
2014	54488	10590
2015	60154	11488
2016	64625	12061
2017	69250	12698
2018	73932	13243
2019	79129	13744
2020	84611	14337

17.3.2 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. Tables JS-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased by more than 45 times; the real average labor force human capital increased by approximately 7 times.

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	41.84	53.19	39.32	41.84	53.19	39.32
1986	46.60	60.37	43.47	43.39	56.74	40.37
1987	51.94	68.42	48.09	44.63	58.19	41.46
1988	58.71	76.44	54.29	41.44	53.03	38.56
1989	65.96	85.61	60.66	39.51	51.20	36.35
1990	74.04	95.38	67.82	43.00	55.17	39.46

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	82.67	108.52	74.56	46.32	58.28	42.57
1992	92.08	122.49	81.87	48.72	60.46	44.77
1993	102.03	136.46	89.79	45.77	56.75	41.87
1994	112.90	151.47	98.52	41.15	50.27	37.75
1995	124.81	168.39	107.73	39.26	48.09	35.80
1996	140.15	187.90	118.35	40.39	48.44	36.72
1997	157.87	210.06	130.29	44.41	53.45	39.63
1998	176.90	231.44	143.86	49.74	58.89	44.20
1999	196.40	251.78	158.35	55.65	64.98	49.24
2000	218.05	273.98	174.84	61.46	70.71	54.32
2001	240.64	301.64	187.58	66.88	77.77	57.41
2002	265.57	333.45	198.99	73.95	87.37	60.78
2003	292.65	364.82	212.69	80.25	94.73	64.20
2004	320.38	394.34	229.36	84.15	98.75	66.18
2005	352.26	427.64	248.79	90.29	104.98	70.11
2006	410.96	493.60	296.39	103.70	119.27	82.13
2007	475.85	568.47	344.55	115.05	131.95	91.10
2008	539.26	641.84	390.16	123.71	141.62	97.69
2009	622.88	740.30	443.84	143.28	164.00	111.69
2010	709.66	841.50	498.10	156.99	179.94	120.17
2011	803.34	955.69	544.31	168.37	194.48	123.96
2012	907.97	1080.65	595.12	185.14	214.41	132.10
2013	1013.91	1203.93	650.06	201.73	233.56	140.79
2014	1131.78	1340.62	707.45	219.97	254.43	149.94
2015	1252.07	1473.33	776.30	239.12	274.94	162.10
2016	1351.97	1586.25	834.09	252.33	289.08	171.09

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**
2017	1465.89	1711.49	906.29	268.80	306.39	183.15
2018	1586.43	1844.15	981.79	284.17	322.71	193.75
2019	1712.34	1982.93	1059.10	297.42	336.88	202.14
2020	1846.42	2126.25	1148.74	312.87	352.70	213.55

Chapter 18 Human Capital for Zhejiang

18.1 Total human capital

Table ZJ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Zhejiang province. Column 1 shows the nominal human capital across six-education categories. Column 2 gives real human capital estimates aggregated for the same six-education categories. Column 3 shows 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)
1985	2609	2609	14.4
1986	2957	2785	16.7
1987	3326	2903	19.4
1988	3810	2747	22.4
1989	4335	2632	25.6
1990	4925	2928	29.9
1991	5644	3244	34.7
1992	6314	3393	39.8
1993	7198	3229	67.7
1994	8141	2914	103.4
1995	8959	2739	146.9
1996	10575	2943	197.0
1997	12478	3327	247.9
1998	14710	3892	303.4
1999	17138	4548	362.1

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	19898	5219	428.8
2001	22338	5840	505.8
2002	24797	6519	600.9
2003	27534	7142	730.0
2004	31130	7810	880.5
2005	34113	8447	1048.6
2006	39799	9731	1232.5
2007	45992	10794	1428.0
2008	52175	11666	1617.4
2009	58908	13363	1845.5
2010	65769	14358	2097.6
2011	74701	15417	2372.2
2012	82998	16724	2655.0
2013	91185	17936	2963.6
2014	99738	19205	3280.4
2015	108660	20622	3624.8
2016	115328	21431	4021.4
2017	126944	23067	4403.8
2018	134666	23913	—
2019	142429	24577	—
2020	150017	25322	—

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 2020, the nominal human capital per capita increased from 72.3 thousand Yuan to 3.4 million Yuan, an increase of more than 46 times; and the real human capital per capita increased from 72.3thousand Yuan to 577.2 thousand Yuan, an increase of approximately 7 times.

Figure ZJ-2.1 illustrates the trends of human capital per capita by gender for Zhejiang. The overall trends in real human capital per capita of males are similar to that of females for Zhejiang. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female both accelerated, however, males' growth rate was significantly higher than that of females. As a result, the gender gap has been expanding, especially from 1997.

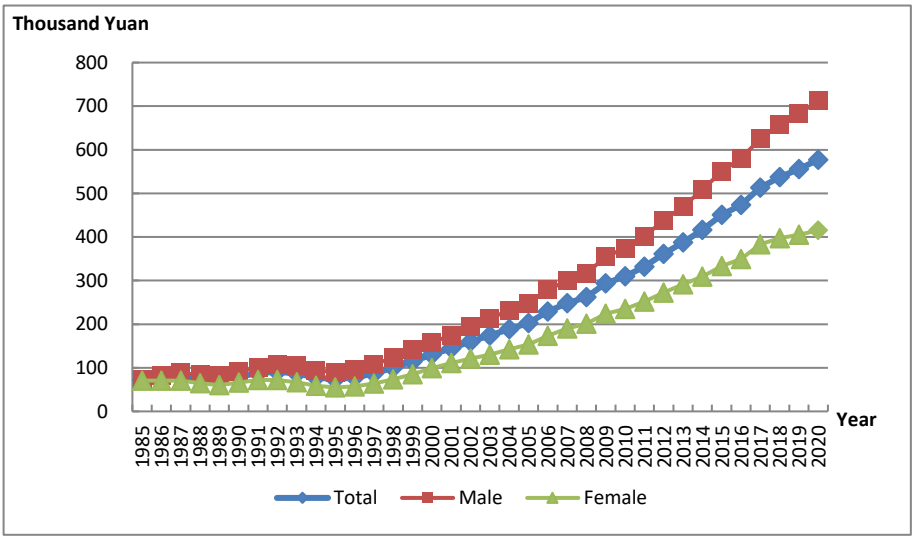

Figure ZJ-2.1 Human Capital Per Capita by Gender for Zhejiang，1985-2020

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	72.30	80.34	69.32	72.30	80.34	69.32
1986	81.80	96.79	75.99	77.05	91.05	71.62
1987	91.35	109.62	83.97	79.73	92.98	74.37
1988	104.03	123.98	95.53	75.01	85.21	70.66
1989	118.17	141.35	107.75	71.75	83.19	66.60
1990	134.10	162.76	120.60	79.73	93.81	73.09
1991	152.41	197.31	129.75	87.60	107.70	77.46
1992	169.90	220.28	141.79	91.30	110.14	80.79
1993	193.12	256.13	154.99	86.63	105.45	75.24
1994	217.91	291.68	170.24	78.00	96.33	66.16
1995	239.46	327.65	180.99	73.21	92.48	60.43
1996	278.59	381.91	195.05	77.53	98.15	60.86
1997	324.13	441.78	212.40	86.43	109.08	64.91
1998	376.54	506.88	237.06	99.62	124.54	72.96
1999	431.37	572.51	265.01	114.48	141.36	82.79
2000	495.27	642.45	307.79	129.91	157.23	95.12
2001	552.15	711.76	329.18	144.36	174.88	101.73
2002	608.85	779.76	348.75	160.07	193.92	108.55
2003	670.89	848.14	382.38	174.03	209.88	115.66
2004	752.52	944.77	426.00	188.81	227.44	123.19
2005	819.71	1016.55	479.92	202.99	241.12	137.16
2006	935.49	1157.08	535.57	228.72	271.49	151.55
2007	1056.96	1301.82	596.26	248.05	294.00	161.63
2008	1173.41	1433.09	667.87	262.36	308.79	171.91
2009	1295.53	1567.53	755.62	293.88	342.18	198.07
2010	1418.12	1701.32	842.99	309.58	357.12	213.09

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2011	1607.86	1944.43	891.39	331.83	387.65	213.35
2012	1793.36	2160.93	953.66	361.37	421.73	223.23
2013	1969.38	2372.83	1025.21	387.37	452.83	234.39
2014	2160.23	2596.53	1110.10	415.96	485.70	248.35
2015	2375.12	2844.50	1208.87	450.77	524.72	266.62
2016	2549.62	3059.05	1253.18	473.79	553.27	271.49
2017	2824.63	3384.59	1346.64	513.27	599.36	285.85
2018	3026.94	3606.45	1445.32	537.50	624.28	300.29
2019	3222.01	3822.84	1542.91	555.98	643.68	310.70
2020	3419.48	4030.07	1662.94	577.19	664.59	325.62

Figure ZJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the trend of real human capital per capita in the urban areas remained larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban areas both accelerated, with the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions within Zhejiang expanded rapidly.

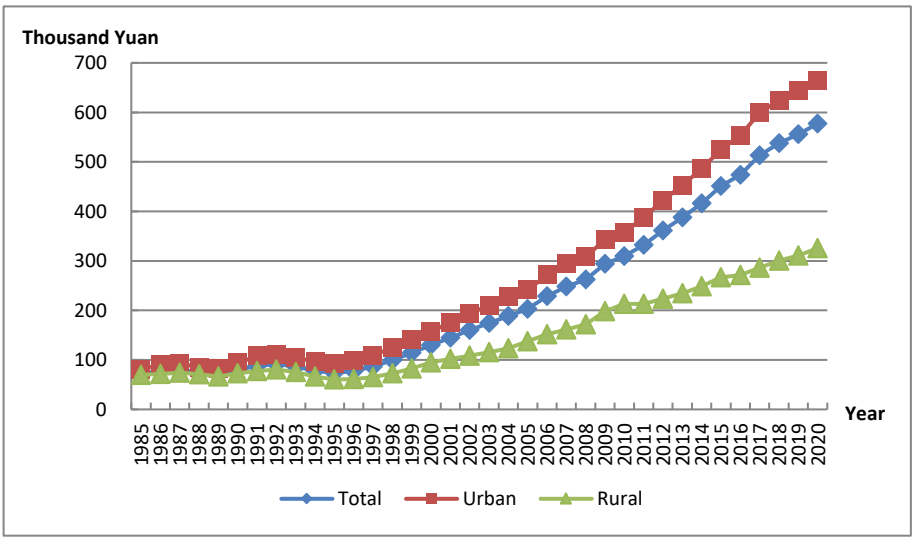

Figure ZJ-2.2 Real Human Capital Per Capita by Region for Zhejiang, 1985-2020

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 2020, the nominal labor force human capital increased from 1.26 trillion Yuan to 76.63 trillion Yuan, an increase of more than 59 times; and the real labor force human capital increased from 1.26 trillion Yuan to 13.0trillion Yuan, an increase of approximately 9 times.

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)
1985	1262	1262
1986	1450	1366
1987	1665	1452
1988	1900	1369
1989	2165	1314
1990	2456	1461
1991	2747	1586
1992	3072	1667
1993	3440	1569
1994	3862	1409
1995	4321	1350

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1996	5053	1444
1997	5927	1627
1998	6939	1889
1999	8049	2197
2000	9276	2490
2001	10419	2785
2002	11836	3173
2003	13530	3564
2004	15330	3893
2005	17106	4279
2006	20099	4958
2007	23351	5525
2008	26981	6074
2009	31186	7114
2010	35726	7837
2011	39295	8158
2012	43066	8732
2013	47089	9320
2014	51263	9932
2015	55391	10580
2016	59261	11090
2017	63443	11615
2018	67392	12052
2019	71991	12501
2020	76633	13006

18.3.2 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. Tables ZJ-3.2 reports the nominal

and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 52.6 thousand Yuan to 2.34 million Yuan, an increase of more than 43 times; and the real average labor force human capital increased from 52.6 thousand Yuan to 396.8 thousand Yuan, an increase of approximately 6 times.

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	52.64	58.44	48.96	52.64	58.44	48.96
1986	59.15	67.48	53.91	55.71	63.48	50.81
1987	66.40	76.91	59.57	57.91	65.23	52.76
1988	75.24	85.24	68.04	54.20	58.59	50.33
1989	85.02	94.99	77.34	51.61	55.91	47.80
1990	95.88	105.72	87.76	57.04	60.94	53.19
1991	105.88	118.00	96.33	61.14	64.41	57.51
1992	117.49	132.04	106.18	63.75	66.02	60.50
1993	130.99	148.20	117.17	59.75	61.01	56.88
1994	146.48	166.83	129.13	53.45	55.10	50.19
1995	163.35	187.49	141.68	51.03	52.92	47.31
1996	187.02	219.67	154.52	53.43	56.46	48.21
1997	214.22	253.42	169.64	58.79	62.57	51.85
1998	244.61	287.51	187.82	66.58	70.64	57.81
1999	276.94	321.01	208.87	75.58	79.26	65.25
2000	312.82	358.22	231.57	83.97	87.67	71.56
2001	349.82	400.98	248.32	93.50	98.52	76.74
2002	395.94	453.37	264.93	106.15	112.75	82.46
2003	449.39	508.14	289.75	118.36	125.75	87.64
2004	505.20	564.78	317.68	128.31	135.96	91.87

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**
2005	557.80	616.01	351.72	139.54	146.11	100.52
2006	638.29	707.58	389.47	157.46	166.02	110.21
2007	722.69	800.86	433.65	170.98	180.86	117.55
2008	813.15	897.66	485.12	183.05	193.42	124.87
2009	912.72	1003.06	547.05	208.22	218.96	143.39
2010	1016.77	1110.31	612.87	223.05	233.06	154.92
2011	1121.97	1230.58	649.39	232.93	245.33	155.43
2012	1240.29	1356.96	695.97	251.48	264.82	162.91
2013	1356.52	1488.92	750.00	268.50	284.15	171.47
2014	1482.79	1627.78	811.65	287.29	304.49	181.58
2015	1616.19	1763.91	884.68	308.69	325.38	195.12
2016	1730.84	1893.13	936.95	323.91	342.40	202.98
2017	1870.62	2041.07	1002.48	342.46	361.44	212.80
2018	2013.33	2189.09	1068.05	360.05	378.93	221.91
2019	2169.25	2348.12	1133.65	376.69	395.37	228.28
2020	2338.16	2506.69	1212.26	396.83	413.37	237.37

Chapter 19 Human Capital for Anhui

19.1 Total human capital

Table AH-1.1 presents estimates of nominal and real total human capital and real physical capital stocks for Anhui. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Anhui.

Table AH-1.1 Real Physical Capital Wealth Stocks, Nominal and Real Human Capital Stocks for Anhui

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital Stocks (Billions of 1985 Yuan)
1985	1968	1968	46
1986	2237	2105	53
1987	2491	2154	60
1988	2848	2055	67
1989	3271	2004	73
1990	3806	2269	80
1991	4346	2462	86
1992	4908	2566	92
1993	5544	2519	102
1994	6249	2240	113
1995	6982	2184	128
1996	7920	2252	145
1997	9029	2533	162
1998	10286	2878	180
1999	11352	3243	198
2000	12951	3667	218

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital Stocks (Billions of 1985 Yuan)
2001	14898	4184	239
2002	16874	4782	263
2003	18979	5277	291
2004	21214	5635	329
2005	23771	6221	374
2006	27559	7122	427
2007	31355	7691	493
2008	35629	8229	568
2009	40139	9354	658
2010	45417	10259	768
2011	51988	11113	897
2012	59764	12481	1043
2013	68042	13862	1204
2014	76129	15249	1380
2015	84425	16689	1562
2016	94431	18334	1762
2017	105106	20144	1965
2018	115997	21788	-
2019	127901	23381	-
2020	140969	25118	-

Note that human capital is the term applied to human capital stocks throughout this report, accordingly in the text the word "stocks" in human capital stocks is skipped. Similarly, the adjective "wealth" in physical capital wealth stocks is skipped in the text.

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 total human capital per capita

for Anhui. From 1985 to 2020, the nominal human capital per capita increased from 40.5 thousand Yuan to 2.7 million Yuan, an increase of approximately 67 times; and the real human capital per capita increased from 40.5 thousand Yuan to 487.1 thousand Yuan, an increase of approximately 12 times.

Figure AH-2.1 also illustrates the trends of human capital per capita for Anhui by gender. The trend of real human capital per capita of males is similar to that of females for Anhui. Both of them kept increasing at an accelerated rate from 1985 to 2020, with the males' growth rate significantly higher than females'. As a result, the gender gap has been expanding, especially from 1997.

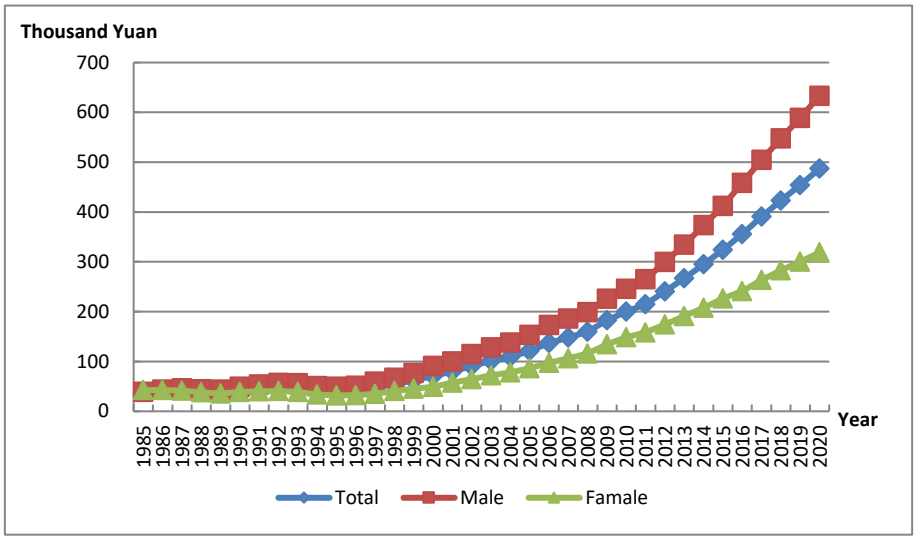

Figure AH-2.1 Human Capital Per Capita by Gender for Anhui, 1985-2020

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	40.50	73.18	34.43	40.50	73.18	34.43

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1986	45.86	88.13	37.70	43.15	83.30	35.40
1987	50.77	97.48	41.45	43.90	83.84	35.93
1988	57.28	109.87	46.36	41.33	77.83	33.74
1989	64.79	124.47	51.92	39.69	76.21	31.82
1990	73.97	144.52	58.28	44.11	86.25	34.74
1991	83.58	165.84	64.87	47.34	92.16	37.15
1992	93.77	185.97	72.15	49.03	94.98	38.25
1993	105.44	209.83	80.31	47.91	93.67	36.90
1994	118.19	237.26	89.01	42.37	83.14	32.38
1995	130.94	264.07	97.79	40.96	79.84	31.29
1996	148.81	300.29	108.28	42.32	82.46	31.58
1997	170.27	342.99	120.40	47.77	92.43	34.87
1998	194.84	392.72	133.57	54.52	105.52	38.72
1999	216.97	426.55	146.94	61.99	117.43	43.47
2000	251.08	493.17	163.24	71.08	134.55	48.05
2001	284.46	533.46	181.80	79.89	145.55	52.83
2002	320.82	579.59	199.03	90.91	159.57	58.59
2003	364.19	631.82	222.21	101.26	170.87	64.32
2004	410.83	684.80	246.16	109.13	177.57	67.99
2005	462.36	740.52	270.94	121.00	190.11	73.44
2006	530.05	839.58	308.09	136.97	212.57	82.77
2007	604.38	947.07	344.87	148.25	227.72	88.07
2008	690.55	1076.14	386.37	159.48	244.10	92.73
2009	783.68	1210.72	434.26	182.63	277.68	104.86
2010	885.45	1354.17	485.07	200.00	301.54	113.27
2011	1005.16	1515.33	526.55	214.87	320.13	116.11
2012	1152.02	1716.18	572.59	240.58	354.77	123.30

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2013	1310.99	1931.70	622.23	267.08	389.96	130.72
2014	1472.98	2149.97	680.05	295.04	426.77	140.76
2015	1639.44	2371.15	747.85	324.07	464.63	152.81
2016	1829.91	2633.51	804.09	355.28	506.91	161.71
2017	2037.96	2908.84	876.34	390.59	552.73	174.32
2018	2252.91	3190.56	952.92	423.18	594.37	185.84
2019	2483.03	3488.34	1030.64	453.91	632.76	195.52
2020	2733.48	3799.85	1122.63	487.05	672.46	206.97

Figure AH-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

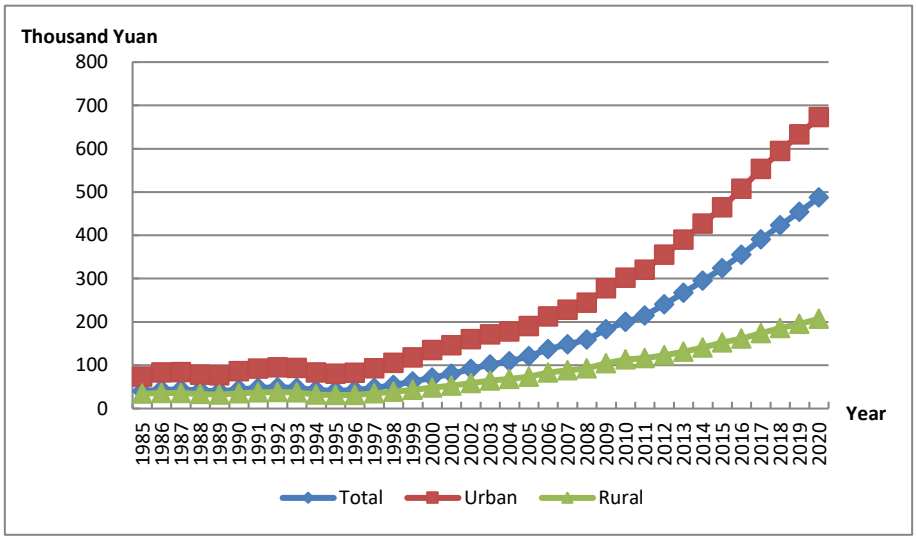

Figure AH-2.2 Real Human Capital Per Capita by Region for Anhui，1985-2020

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 2020, the nominal labor force human capital increased by approximately 65 times; the real labor force human capital increased by approximately 12 times.

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)
1985	793	793
1986	920	866
1987	1068	924
1988	1227	886
1989	1421	871
1990	1645	981
1991	1846	1047
1992	2068	1083
1993	2303	1048
1994	2575	926
1995	2875	903
1996	3219	919
1997	3613	1019
1998	4031	1135
1999	4445	1277

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	4906	1398
2001	5493	1551
2002	6067	1729
2003	6480	1812
2004	6987	1865
2005	7758	2037
2006	9315	2416
2007	10908	2687
2008	12426	2883
2009	13887	3252
2010	15939	3616
2011	18626	3996
2012	21591	4525
2013	24733	5057
2014	27842	5598
2015	30866	6125
2016	34687	6761
2017	38767	7460
2018	42975	8105
2019	47294	8680
2020	52018	9303

19.3.2 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. Tables AH-3.2 reports the nominal and real average labor force human capital for Anhui. From 1985 to 2020, the nominal average labor force human capital increased by approximately 51 times; the real average labor force human capital increased by approximately 9 times.

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	27.90	46.81	24.07	27.90	46.81	24.07
1986	31.24	52.85	26.71	29.39	49.95	25.08
1987	34.99	59.38	29.71	30.27	51.07	25.76
1988	39.30	66.51	33.21	28.37	47.12	24.18
1989	44.29	74.41	37.36	27.13	45.56	22.89
1990	49.88	82.78	42.10	29.74	49.40	25.10
1991	55.17	91.84	46.33	31.29	51.03	26.53
1992	61.02	101.52	51.11	31.96	51.85	27.10
1993	67.36	111.60	56.42	30.66	49.82	25.92
1994	74.51	122.67	62.54	26.78	42.99	22.75
1995	82.53	135.86	69.04	25.92	41.08	22.09
1996	92.37	151.59	76.16	26.38	41.63	22.21
1997	103.65	169.28	84.18	29.24	45.62	24.38
1998	115.79	186.94	92.88	32.60	50.23	26.93
1999	128.29	204.42	101.60	36.86	56.28	30.06
2000	142.55	223.88	111.47	40.63	61.08	32.81
2001	158.19	241.78	122.00	44.67	65.97	35.45
2002	174.67	263.01	131.14	49.77	72.41	38.61
2003	189.50	276.48	141.80	52.99	74.77	41.05
2004	207.28	296.83	151.17	55.32	76.97	41.76
2005	231.13	326.43	162.39	60.69	83.80	44.02
2006	272.48	384.35	190.14	70.68	97.31	51.08
2007	315.75	443.83	219.62	77.79	106.72	56.08
2008	359.13	502.31	249.81	83.33	113.94	59.96

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**
2009	402.37	555.93	283.84	94.22	127.50	68.53
2010	458.30	633.50	317.29	103.96	141.06	74.09
2011	527.91	733.98	349.98	113.26	155.06	77.18
2012	606.48	844.68	387.20	127.11	174.61	83.38
2013	689.53	959.61	426.47	140.97	193.72	89.60
2014	772.96	1069.95	469.96	155.41	212.38	97.27
2015	854.44	1169.98	519.70	169.54	229.26	106.19
2016	952.45	1306.65	563.79	185.65	251.51	113.38
2017	1065.66	1460.17	618.51	205.07	277.46	123.04
2018	1185.46	1622.21	676.62	223.57	302.20	131.96
2019	1305.00	1779.14	739.53	239.52	322.72	140.30
2020	1436.67	1946.29	812.28	256.95	344.43	149.75

Chapter 20 Human Capital for Fujian

20.1 Total human capital

Table FJ-1.1 presents estimates of nominal and real total human capital and real physical capital for Fujian. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 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 Stocks (Billions of 1985 Yuan)
1985	1600	1600	31
1986	1826	1725	35
1987	2045	1777	39
1988	2331	1603	43
1989	2681	1550	46
1990	3098	1808	49
1991	3608	2034	53
1992	4169	2216	59
1993	4735	2174	66
1994	5469	1994	77
1995	6288	1978	92
1996	7265	2139	108
1997	8276	2380	126
1998	9326	2678	147
1999	10426	3018	169
2000	11828	3334	191

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital Stocks (Billions of 1985 Yuan)
2001	13682	3886	213
2002	15156	4311	237
2003	16537	4658	266
2004	18155	4908	303
2005	19892	5255	351
2006	22949	6006	408
2007	26658	6619	481
2008	30434	7220	574
2009	34286	8282	682
2010	39161	9150	796
2011	45523	10056	925
2012	51170	11000	1068
2013	57960	12115	1230
2014	64686	13226	1404
2015	71434	14350	1596
2016	80053	15774	1801
2017	90378	17588	2022
2018	99426	19051	—
2019	108712	20287	—
2020	119681	21844	—

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 2020, the nominal human capital per capita increased by approximately 53 times; and the real human capital per capita

increased by approximately 9 times. Figure FJ-2.1 illustrates the trends of human capital per capita by gender for Fujian. The trend of real human capital per capita of male is similar to that of female. Both of them kept increasing from 1985 to 2020, with the male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially from 1997.

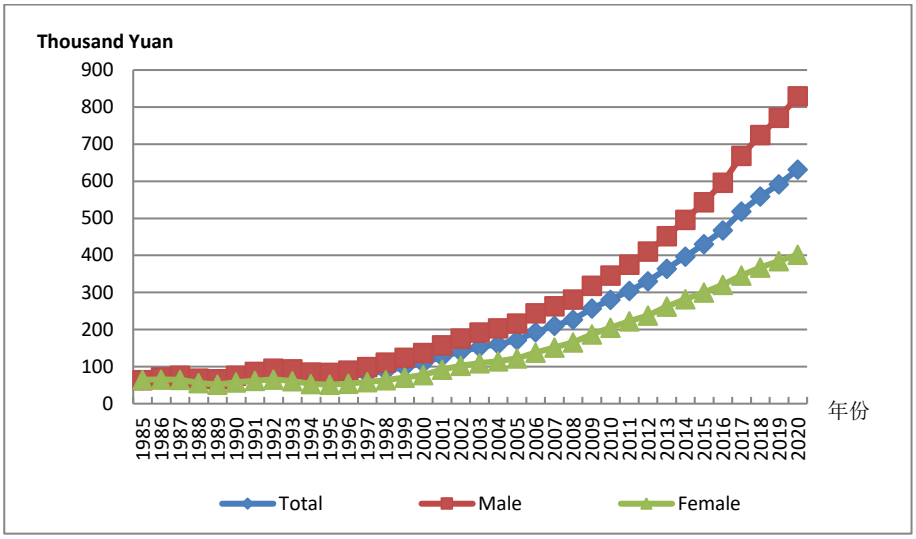

Figure FJ-2.1 Human Capital Per Capita by Gender for Fujian，1985-2020

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	64.06	79.78	59.77	64.06	79.78	59.77
1986	72.59	97.00	65.81	68.59	90.74	62.44
1987	80.61	109.82	72.41	70.07	92.88	63.67
1988	90.53	126.05	80.17	62.27	83.95	55.95
1989	102.42	144.84	89.70	59.23	81.20	52.65
1990	115.68	166.57	100.26	67.50	93.28	59.68
1991	133.20	196.95	110.69	75.07	105.45	64.34

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	151.97	226.15	122.02	80.79	112.11	68.14
1993	170.09	251.21	132.93	78.08	106.62	65.00
1994	192.35	279.97	146.83	70.13	94.99	57.21
1995	216.99	310.50	161.77	68.24	90.50	55.09
1996	247.16	352.61	177.21	72.77	96.14	57.26
1997	277.28	388.94	195.36	79.73	103.46	62.32
1998	309.00	426.61	215.29	88.74	113.48	69.02
1999	342.67	466.36	236.51	99.18	125.69	76.43
2000	386.86	523.32	263.55	109.04	136.67	84.08
2001	445.78	611.50	287.27	126.60	162.46	92.29
2002	495.04	679.32	307.09	140.81	181.93	98.86
2003	541.53	730.60	336.28	152.53	194.31	107.18
2004	594.61	792.29	366.07	160.73	203.00	111.87
2005	647.71	851.47	399.50	171.12	214.10	118.76
2006	737.79	962.37	454.90	193.09	239.35	134.82
2007	846.85	1100.97	512.61	210.26	260.53	144.14
2008	955.78	1233.18	576.55	226.76	279.25	154.99
2009	1063.01	1351.46	651.78	256.76	311.33	178.97
2010	1198.77	1512.63	727.30	280.10	337.98	193.15
2011	1378.04	1746.01	775.77	304.40	370.84	195.65
2012	1536.96	1930.63	836.21	330.39	400.35	205.85
2013	1740.09	2179.42	905.80	363.73	440.49	217.97
2014	1942.09	2418.36	991.05	397.08	478.72	234.04
2015	2141.94	2645.98	1094.66	430.28	515.03	254.19
2016	2374.88	2931.46	1187.00	467.95	559.97	271.56
2017	2663.33	3280.55	1305.09	518.30	619.23	296.21
2018	2917.82	3573.77	1430.24	559.09	664.60	319.82

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2019	3172.24	3864.92	1554.66	591.99	700.53	338.50
2020	3459.65	4186.93	1700.75	631.44	742.56	362.69

Figure FJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

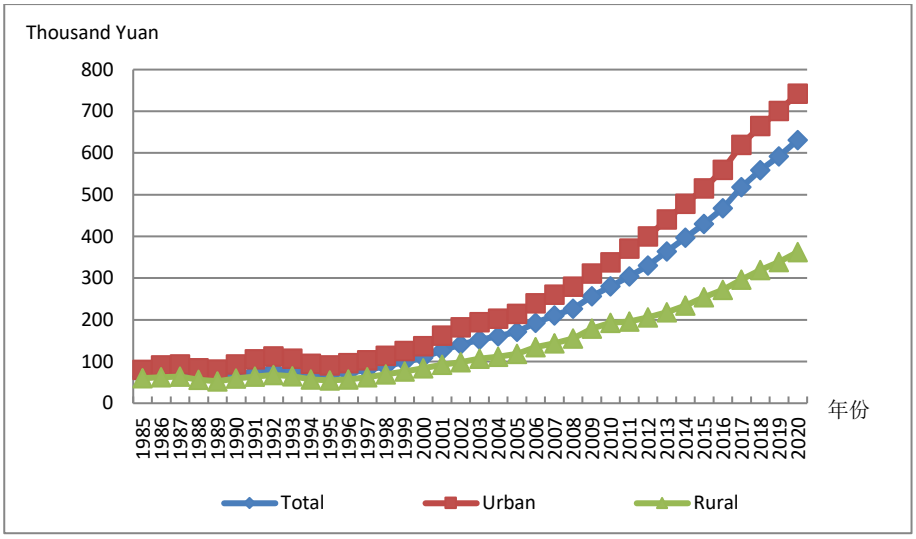

Figure FJ-2.2 Real Human Capital Per Capita by Region for Fujian，1985-2020

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 2020, the nominal labor force human capital increased by approximately 61 times; and the real labor force human capital increased by approximately 10 times.

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)
1985	607	607
1986	691	653
1987	792	688
1988	920	633
1989	1077	624
1990	1268	742
1991	1449	821
1992	1655	887
1993	1893	878
1994	2202	812
1995	2535	809
1996	2893	867
1997	3315	971
1998	3807	1115
1999	4301	1269
2000	4891	1407
2001	5397	1563
2002	5928	1717
2003	6484	1855
2004	7054	1934
2005	7718	2065

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2006	8957	2375
2007	10399	2615
2008	12010	2883
2009	13852	3383
2010	15935	3767
2011	17820	3989
2012	19794	4309
2013	21542	4562
2014	23418	4849
2015	25591	5205
2016	27824	5554
2017	30357	5988
2018	32771	6363
2019	35011	6622
2020	37170	6880

20.3.2 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. Tables FJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased by more than 37 times; the real average labor force human capital increased by more than 6 times.

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	42.35	51.64	39.62	42.35	51.64	39.62
1986	47.02	58.23	43.72	44.44	54.47	41.48
1987	52.32	65.52	48.41	45.51	55.42	42.57
1988	58.95	74.22	54.34	40.59	49.43	37.92
1989	66.60	83.97	61.28	38.57	47.07	35.97
1990	75.35	94.20	69.59	44.08	52.76	41.42
1991	84.56	108.18	76.39	47.88	57.92	44.41
1992	94.84	122.77	84.01	50.81	60.86	46.91
1993	106.46	138.23	92.79	49.37	58.67	45.37
1994	120.14	155.00	103.85	44.33	52.59	40.46
1995	134.77	173.53	114.91	43.01	50.58	39.14
1996	150.45	193.10	126.38	45.10	52.65	40.84
1997	168.33	214.71	139.43	49.33	57.12	44.48
1998	188.04	236.73	154.89	55.05	62.97	49.65
1999	207.73	257.61	170.97	61.27	69.43	55.25
2000	230.14	281.17	189.54	66.21	73.43	60.47
2001	251.10	308.07	202.01	72.74	81.85	64.90
2002	273.32	338.12	212.95	79.16	90.56	68.55
2003	297.08	366.17	227.86	85.02	97.39	72.63
2004	322.12	395.99	243.05	88.33	101.46	74.27
2005	349.67	427.16	261.79	93.54	107.41	77.82
2006	400.51	486.27	299.61	106.17	120.94	88.80
2007	457.81	553.52	340.23	115.14	130.99	95.67
2008	520.53	626.38	383.75	124.97	141.84	103.16
2009	590.68	704.97	436.23	144.28	162.40	119.79
2010	666.51	788.71	494.31	157.57	176.23	131.27

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**
2011	741.60	884.43	529.63	166.00	187.85	133.57
2012	825.09	988.93	566.78	179.63	205.07	139.53
2013	905.51	1086.73	603.71	191.74	219.64	145.28
2014	993.08	1190.11	650.11	205.65	235.59	153.53
2015	1086.99	1292.62	713.15	221.08	251.60	165.60
2016	1176.75	1397.46	766.28	234.90	266.95	175.31
2017	1285.96	1522.68	832.46	253.64	287.42	188.94
2018	1398.20	1649.75	903.07	271.47	306.80	201.94
2019	1502.80	1765.02	976.17	284.23	319.92	212.54
2020	1605.51	1872.54	1056.93	297.17	332.10	225.39

Chapter 21 Human Capital for Jiangxi

21.1 Total human capital

Table JX-1.1 presents the estimates of nominal and real total human capital and real physical capital for Jiangxi. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 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)
1985	1456	1456	42
1986	1667	1558	48
1987	1850	1633	52
1988	2102	1534	54
1989	2379	1460	59
1990	2730	1635	63
1991	3096	1812	67
1992	3523	1963	74
1993	4014	1963	83
1994	4549	1751	93
1995	5093	1672	103
1996	5811	1753	115
1997	6571	1939	130
1998	7499	2185	145
1999	8598	2534	161
2000	9955	2909	178
2001	11573	3378	197

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2002	13103	3801	226
2003	14745	4233	263
2004	16411	4548	309
2005	17797	4844	362
2006	20591	5540	429
2007	23718	6078	507
2008	26878	6498	598
2009	30717	7477	702
2010	35277	8325	815
2011	40434	9020	937
2012	46687	10090	1062
2013	53050	11139	1191
2014	58205	11916	1308
2015	64765	13037	1444
2016	74180	14597	1610
2017	86839	16706	1769
2018	96413	18134	-
2019	107002	19530	-
2020	118501	21076	-

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 2020, the nominal human capital per capita increased from 44.8 thousand Yuan to 3.1 million Yuan, an increase of more

than 68 times; and the real human capital per capita increased from 44.8 thousand Yuan to 545.3 thousand Yuan, an increase of approximately 12 times.

Figure JX-2.1 illustrates the trends of human capital per capita by gender for Jiangxi. The trend of real human capital per capita of male is similar to that of female for Jiangxi. Both of them kept increasing from 1985 to 2020, 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.

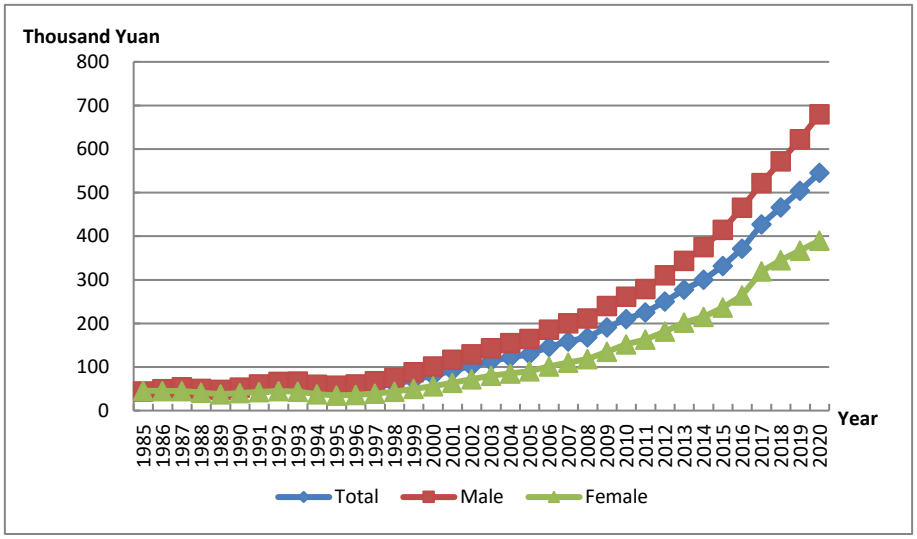

Figure JX-2.1 Human Capital Per Capita by Gender for Jiangxi，1985-2020

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	44.80	65.38	39.98	44.80	65.38	39.98
1986	50.88	80.08	44.01	47.56	75.55	40.98
1987	56.09	88.18	48.45	49.49	77.10	42.92
1988	62.79	98.22	54.20	45.83	69.42	40.12
1989	70.13	108.50	60.57	43.03	65.43	37.45

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	79.05	122.94	67.85	47.36	73.05	40.81
1991	88.88	140.91	74.49	52.02	80.19	44.23
1992	100.63	163.05	82.02	56.07	86.32	47.05
1993	113.99	187.38	90.48	55.73	85.67	46.14
1994	128.14	212.12	99.77	49.31	76.42	40.16
1995	141.97	237.34	108.01	46.61	73.14	37.15
1996	161.98	272.66	118.57	48.88	77.73	37.56
1997	183.37	304.67	132.00	54.11	84.33	41.32
1998	208.49	345.76	146.59	60.76	94.76	45.43
1999	238.47	397.95	162.83	70.29	110.05	51.44
2000	274.41	460.16	182.91	80.19	124.63	58.30
2001	314.15	519.24	200.46	91.70	140.92	64.41
2002	353.08	573.74	216.43	102.42	155.40	69.62
2003	395.86	626.73	240.45	113.64	168.24	76.88
2004	439.62	678.64	266.80	121.84	176.35	82.42
2005	476.59	715.10	293.87	129.71	183.08	88.83
2006	542.84	806.27	337.56	146.05	204.58	100.43
2007	618.30	913.68	384.22	158.45	222.06	108.05
2008	695.38	1020.50	436.50	168.11	234.21	115.47
2009	785.51	1142.76	497.29	191.21	263.85	132.61
2010	891.88	1298.93	557.97	210.48	291.46	144.04
2011	1009.89	1460.49	597.72	225.27	311.80	146.12
2012	1159.81	1668.46	642.66	250.66	347.18	152.53
2013	1322.57	1889.98	689.49	277.70	384.06	159.03
2014	1467.82	2075.43	741.89	300.49	411.86	167.44
2015	1647.88	2312.47	805.35	331.71	452.11	179.07
2016	1888.73	2661.60	851.18	371.67	510.17	185.73

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2017	2220.61	3150.90	910.01	427.20	592.12	194.87
2018	2478.73	3499.35	971.67	466.21	644.07	203.59
2019	2762.51	3878.00	1031.89	504.21	693.64	210.32
2020	3066.19	4269.53	1103.77	545.33	745.78	218.42

Figure JX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

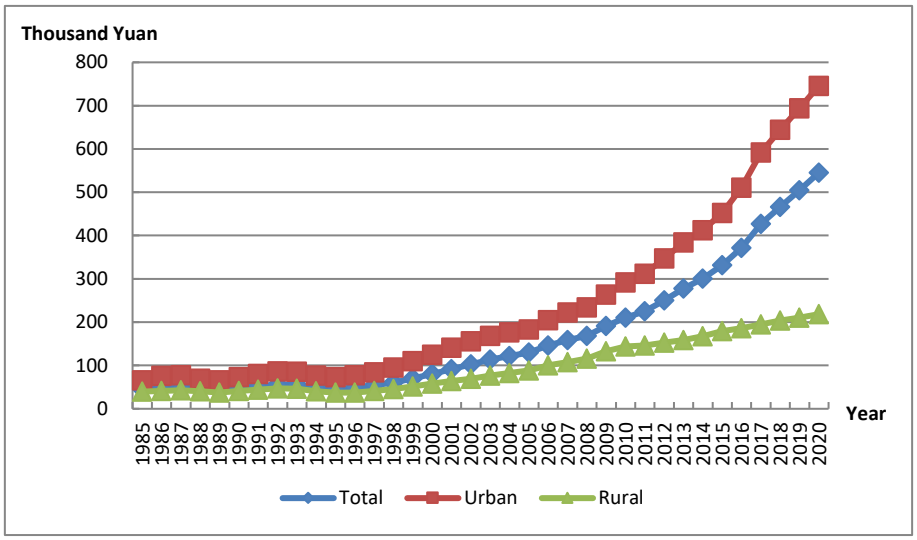

Figure JX-2.2 Real Human Capital Per Capita by Region for Jiangxi，1985-2020

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 2020, the nominal labor force human capital increased from 0.6 trillion Yuan to 35.2 trillion Yuan, an increase of more than 64 times; and the real labor force human capital increased from 0.6 trillion Yuan to 6.4 trillion Yuan, an increase of approximately 12 times.

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)
1985	546	546
1986	628	587
1987	721	636
1988	827	604
1989	966	593
1990	1140	683
1991	1284	752
1992	1438	805
1993	1606	792
1994	1806	703
1995	2009	668
1996	2286	699
1997	2595	778
1998	2937	871

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	3306	995
2000	3721	1118
2001	4092	1231
2002	4425	1324
2003	4771	1411
2004	5110	1455
2005	5531	1539
2006	6647	1822
2007	7825	2037
2008	8995	2207
2009	10328	2551
2010	11864	2841
2011	13560	3065
2012	15290	3350
2013	16906	3600
2014	18519	3845
2015	20165	4118
2016	22692	4535
2017	25650	5017
2018	28775	5500
2019	31919	5922
2020	35145	6351

21.3.2 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. Tables JX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 31.0 thousand Yuan to 1.4 million Yuan, an increase of more than 44 times; and the real

average labor force human capital increased from 31.0 thousand Yuan to 247.1 thousand Yuan, an increase of approximately 8 times.

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	30.99	43.08	27.84	30.99	43.08	27.84
1986	34.51	48.80	30.82	32.26	46.03	28.69
1987	38.43	55.19	34.11	33.91	48.26	30.22
1988	42.87	60.67	38.12	31.30	42.88	28.22
1989	48.20	67.05	43.00	29.58	40.44	26.59
1990	54.41	73.96	48.87	32.61	43.95	29.40
1991	60.00	82.20	53.59	35.17	46.78	31.82
1992	66.04	90.84	58.75	36.97	48.09	33.70
1993	72.64	99.78	64.56	35.83	45.62	32.92
1994	80.15	110.03	71.11	31.18	39.64	28.62
1995	88.01	121.20	77.69	29.24	37.35	26.72
1996	99.10	137.06	86.52	30.31	39.07	27.41
1997	111.34	154.00	96.34	33.40	42.63	30.15
1998	124.53	170.68	107.41	36.93	46.77	33.28
1999	138.31	186.73	119.56	41.64	51.64	37.77
2000	153.76	204.82	133.19	46.20	55.47	42.46
2001	167.55	222.66	142.74	50.39	60.43	45.87
2002	180.90	241.14	150.81	54.11	65.31	48.51
2003	195.50	257.94	161.12	57.81	69.24	51.52
2004	210.89	276.80	170.96	60.03	71.93	52.81
2005	228.54	297.31	183.11	63.61	76.12	55.35
2006	269.65	352.28	212.40	73.91	89.39	63.19

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**
2007	313.08	408.61	244.27	81.51	99.31	68.69
2008	356.51	460.19	280.07	87.47	105.62	74.09
2009	404.97	515.59	321.30	100.05	119.04	85.68
2010	458.15	579.12	363.65	109.70	129.94	93.88
2011	517.77	669.19	388.58	117.03	142.87	94.99
2012	581.35	757.44	419.58	127.37	157.61	99.58
2013	643.98	839.89	452.51	137.14	170.67	104.37
2014	710.01	925.46	486.82	147.41	183.65	109.87
2015	778.81	1007.77	528.82	159.05	197.03	117.59
2016	871.90	1140.87	570.68	174.27	218.68	124.53
2017	985.71	1301.79	620.98	192.79	244.63	132.98
2018	1109.50	1476.45	674.04	212.06	271.75	141.23
2019	1235.02	1651.00	730.32	229.14	295.31	148.86
2020	1367.10	1829.43	794.91	247.05	319.56	157.30

Chapter 22 Human Capital for Shandong

22.1 Total human capital

Table SD-1.1 presents the estimates of nominal and real total human capital and real physical capital for Shandong. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 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)
1985	3723	3723	100
1986	4349	4164	115
1987	5021	4449	132
1988	5776	4322	148
1989	6649	4227	162
1990	7519	4621	176
1991	8577	5023	193
1992	9654	5317	214
1993	10791	5287	237
1994	12181	4832	260
1995	13669	4606	287
1996	15343	4700	319
1997	17110	5088	356
1998	19519	5819	399
1999	22025	6585	450
2000	25126	7454	509
2001	28801	8353	574

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2002	33031	9589	652
2003	36845	10542	749
2004	40810	11262	875
2005	46323	12562	1041
2006	53448	14340	1240
2007	60789	15646	1455
2008	69192	16939	1689
2009	78906	19315	1980
2010	88152	20969	2302
2011	100919	22813	2647
2012	113883	25175	3012
2013	128153	27725	3397
2014	141901	30072	3792
2015	158874	33208	4234
2016	177835	36354	4651
2017	207490	41700	4982
2018	226511	44412	—
2019	246659	46855	—
2020	268671	49704	—

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 2020, the nominal human capital per capita increased from 51.7 thousand Yuan to 3.4 million Yuan, an increase of more than 65 times; and the real human capital per capita increased from 51.7

thousand Yuan to 636.9 thousand Yuan, an increase of more than 11 times.

Figure SD-2.1 illustrates the trends of human capital per capita by gender for Shandong. The trend of real human capital per capita of male is similar to that of female for Shandong. Both of them kept increasing from 1985 to 2020, 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.

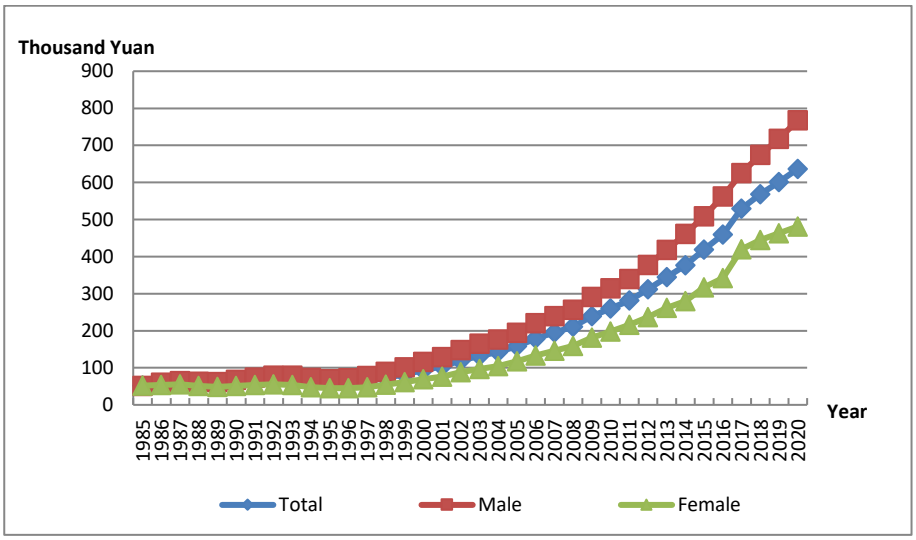

Figure SD-2.1 Human Capital Per Capita by Gender for Shandong，1985-2020

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	51.71	74.92	44.88	51.71	74.92	44.88
1986	59.70	92.71	49.41	57.17	88.30	47.46
1987	67.68	107.36	54.72	59.97	93.72	48.94
1988	76.31	120.71	61.25	57.09	87.38	46.82
1989	86.55	138.28	68.38	55.02	86.51	43.97

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	96.91	153.38	76.30	59.56	93.52	47.17
1991	109.60	176.22	84.96	64.19	101.18	50.50
1992	122.75	196.96	94.44	67.60	104.13	53.67
1993	136.68	217.50	104.68	66.96	100.34	53.74
1994	153.63	245.13	115.76	60.93	90.18	48.83
1995	171.96	277.70	126.31	57.94	87.47	45.19
1996	192.82	313.63	138.04	59.07	89.40	45.31
1997	214.56	346.64	151.30	63.80	95.74	48.50
1998	243.94	397.60	165.92	72.73	110.15	53.72
1999	275.41	448.87	181.45	82.34	124.35	59.59
2000	316.20	512.04	201.66	93.81	140.17	66.69
2001	358.73	568.02	220.03	104.04	153.81	71.06
2002	410.97	644.05	235.09	119.30	176.69	76.00
2003	462.75	707.33	254.48	132.40	192.70	81.05
2004	515.63	771.46	276.45	142.29	204.45	84.18
2005	582.30	856.16	302.38	157.91	224.43	89.91
2006	666.57	974.25	343.33	178.84	252.85	101.08
2007	757.37	1104.04	388.79	194.94	276.05	108.70
2008	860.78	1252.77	438.67	210.73	299.17	115.49
2009	979.12	1417.31	497.40	239.67	338.66	130.85
2010	1092.06	1566.33	559.37	259.77	363.72	143.01
2011	1246.93	1771.89	602.73	281.87	392.99	145.51
2012	1410.17	1976.31	650.53	311.73	429.31	153.97
2013	1594.55	2207.51	702.44	344.97	471.10	161.41
2014	1776.90	2430.92	765.51	376.57	508.06	173.23
2015	2004.49	2718.43	842.68	418.98	560.31	188.99
2016	2245.42	3026.57	901.78	459.03	610.39	198.67

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2017	2634.64	3547.80	977.59	529.50	704.24	212.40
2018	2896.82	3856.18	1059.11	567.98	747.51	224.06
2019	3163.35	4166.44	1141.49	600.90	783.37	233.10
2020	3442.40	4476.18	1236.07	636.85	821.08	243.64

Figure SD-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

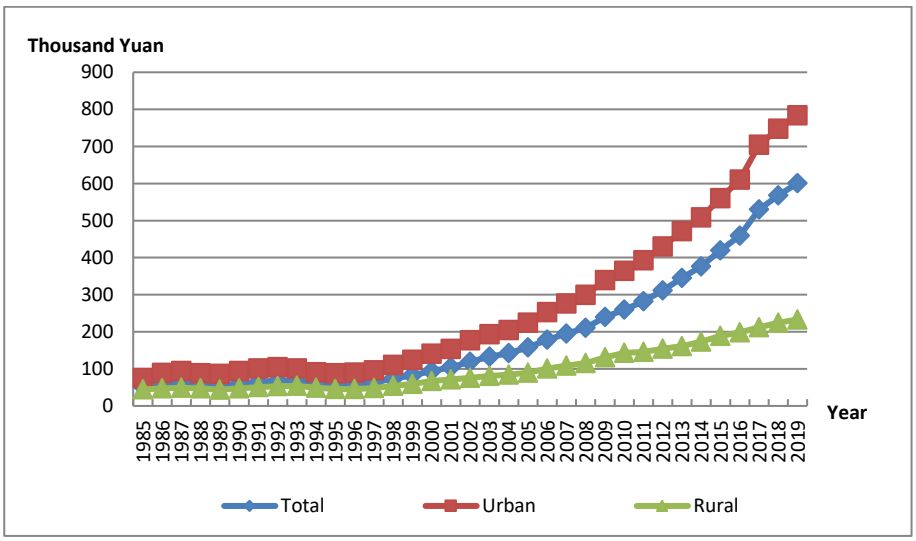

Figure SD-2.2 Real Human Capital Per Capita by Region for Shandong, 1985-2020

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 2020, the nominal labor force human capital increased from 1.57 trillion Yuan to 79.54 trillion Yuan, an increase of more than 49 times; and the real labor force human capital increased from 1.57 trillion Yuan to 14.83 trillion Yuan, an increase of approximately 8 times.

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)
1985	1573	1573
1986	1814	1737
1987	2113	1874
1988	2447	1832
1989	2828	1799
1990	3242	1993
1991	3689	2162
1992	4180	2305
1993	4694	2303
1994	5281	2100
1995	5915	2000
1996	6601	2030
1997	7419	2214
1998	8325	2494
1999	9262	2787

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	10383	3105
2001	11715	3439
2002	13049	3850
2003	14253	4157
2004	15323	4305
2005	17102	4710
2006	20178	5489
2007	23068	6007
2008	26045	6441
2009	29605	7319
2010	33528	8050
2011	37502	8544
2012	41605	9270
2013	45937	10006
2014	49984	10670
2015	54007	11378
2016	58881	12143
2017	64166	13022
2018	69273	13712
2019	74492	14279
2020	79539	14834

22.3.2 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. Tables SD-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from35.8 thousand Yuan to 1481.18 thousand Yuan, an increase of more than 40 times; and the real average labor force human capital increased from 35.8 thousand

Yuan to 276.24 thousand Yuan, an increase of approximately 7 times.

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	35.81	49.41	31.76	35.81	49.41	31.76
1986	40.20	56.57	34.96	38.50	53.88	33.58
1987	45.33	64.69	38.67	40.19	56.47	34.59
1988	51.16	73.31	42.95	38.30	53.06	32.84
1989	57.60	82.08	48.02	36.63	51.35	30.88
1990	64.57	90.77	53.90	39.70	55.35	33.32
1991	72.16	101.72	59.75	42.29	58.40	35.52
1992	80.56	113.88	66.08	44.42	60.21	37.56
1993	89.58	126.56	72.98	43.95	58.38	37.47
1994	99.68	140.82	80.48	39.63	51.81	33.95
1995	110.65	156.56	88.42	37.40	49.31	31.63
1996	122.55	173.87	96.50	37.70	49.56	31.68
1997	136.56	194.57	105.43	40.76	53.74	33.80
1998	151.74	215.99	115.15	45.47	59.84	37.28
1999	167.57	237.81	125.00	50.42	65.88	41.05
2000	186.42	264.08	136.18	55.74	72.29	45.03
2001	205.89	285.36	151.41	60.44	77.27	48.90
2002	226.02	309.04	165.43	66.69	84.78	53.48
2003	246.32	330.22	181.95	71.85	89.96	57.95
2004	265.67	350.08	195.74	74.63	92.78	59.60
2005	294.27	384.96	211.95	81.05	100.91	63.02
2006	344.54	456.26	239.60	93.73	118.42	70.54
2007	394.25	523.79	270.52	102.67	130.97	75.64
2008	445.24	589.87	304.89	110.11	140.87	80.27

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
2009	505.50	667.39	345.00	124.97	159.47	90.76
2010	571.48	752.16	387.59	137.21	174.66	99.09
2011	641.53	848.40	414.60	146.16	188.17	100.09
2012	717.21	947.10	447.25	159.80	205.74	105.85
2013	798.19	1049.79	483.86	173.86	224.03	111.19
2014	878.69	1148.86	524.09	187.56	240.11	118.60
2015	959.52	1238.54	574.64	202.16	255.28	128.88
2016	1049.51	1351.22	620.26	216.43	272.51	136.65
2017	1154.99	1479.80	676.43	234.40	293.74	146.97
2018	1265.19	1611.06	737.71	250.43	312.30	156.07
2019	1373.25	1736.92	800.57	263.23	326.58	163.48
2020	1481.18	1856.05	871.60	276.24	340.46	171.80

Chapter 23 Human Capital for Henan

23.1 Total human capital

Table HeN-1.1 presents the estimates of nominal and real total human capital and real physical capital for Henan. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 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)
1985	2947	2947	97
1986	3355	3197	109
1987	3787	3406	119
1988	4375	3305	134
1989	5065	3186	147
1990	5875	3667	159
1991	6680	4108	173
1992	7522	4433	187
1993	8409	4484	203
1994	9329	3988	226
1995	10300	3776	255
1996	12114	3995	289
1997	14240	4523	328
1998	16287	5295	373
1999	18559	6209	419
2000	20112	6787	469

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	23819	7948	522
2002	26502	8807	583
2003	29478	9640	655
2004	32877	10185	743
2005	36374	11024	870
2006	42918	12823	1042
2007	49717	14074	1265
2008	56793	14995	1528
2009	64959	17227	1874
2010	72003	18428	2279
2011	84222	20339	2722
2012	96527	22680	3224
2013	108705	24776	3778
2014	118948	26574	4359
2015	128857	28395	4956
2016	142783	30840	5571
2017	154796	32963	6126
2018	167892	34936	—
2019	182069	36768	—
2020	197615	38765	—

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 2020, the nominal human capital per capita increased from 41.7 thousand Yuan to 2.4 million Yuan, an increase of more

than 57 times; and the real human capital per capita increased from 41.7 thousand Yuan to 477.5 thousand Yuan, an increase of approximately 11 times.

Figure HeN-2.1 illustrates the trends of human capital per capita by gender for Henan. The trend of real human capital per capita of male is similar to that of female for Henan. Both of them kept increasing from 1985 to 2020, 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.

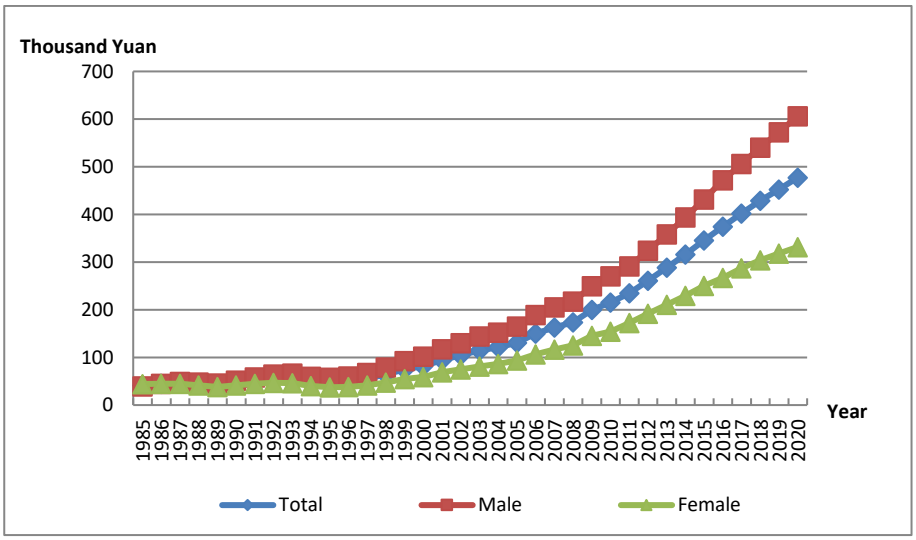

Figure HeN-2.1 Human Capital Per Capita by Gender for Henan，1985-2020

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	41.68	65.18	37.48	41.68	65.18	37.48
1986	46.96	79.25	41.07	44.75	74.20	39.38
1987	52.20	89.86	45.26	46.95	78.05	41.21

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	58.82	101.67	50.64	44.43	72.68	39.04
1989	66.27	115.27	56.68	41.69	71.72	35.82
1990	74.80	131.64	63.50	46.69	81.50	39.77
1991	84.46	152.98	70.62	51.94	90.11	44.23
1992	94.88	175.21	78.47	55.92	95.83	47.76
1993	106.27	199.66	86.89	56.68	98.73	47.95
1994	118.33	225.37	95.90	50.58	87.48	42.85
1995	130.71	252.00	104.95	47.91	83.67	40.32
1996	150.88	293.79	115.55	49.75	89.09	40.03
1997	174.85	338.33	128.94	55.53	100.19	42.99
1998	197.75	377.96	142.81	64.29	114.32	49.04
1999	223.39	421.79	157.53	74.74	132.07	55.71
2000	242.98	434.73	174.68	81.99	137.36	62.27
2001	283.44	510.14	194.94	94.58	160.07	69.01
2002	313.71	547.02	213.89	104.25	172.00	75.27
2003	350.49	592.84	240.20	114.62	183.33	83.35
2004	390.80	641.24	267.13	121.07	188.10	87.96
2005	432.24	688.97	295.35	131.00	198.00	95.28
2006	501.66	785.86	341.46	149.89	223.26	108.53
2007	576.57	887.06	391.74	163.22	239.05	118.08
2008	658.08	994.78	447.52	173.75	251.74	124.98
2009	753.88	1119.31	514.90	199.93	286.64	143.23
2010	841.02	1210.72	582.50	215.24	299.82	156.10
2011	972.03	1396.33	638.38	234.73	328.10	161.31
2012	1110.84	1577.30	701.77	261.00	361.23	173.11
2013	1265.44	1782.89	768.21	288.42	396.97	184.12
2014	1414.06	1969.69	842.95	315.91	429.87	198.77

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2015	1567.54	2153.20	930.05	345.43	463.76	216.63
2016	1733.00	2359.02	1009.22	374.32	498.81	230.39
2017	1887.01	2530.78	1104.44	401.83	527.42	249.16
2018	2059.74	2726.61	1209.93	428.61	554.97	267.58
2019	2240.44	2929.95	1320.61	452.45	579.33	283.20
2020	2434.21	3138.57	1446.07	477.51	604.71	299.06

Figure HeN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

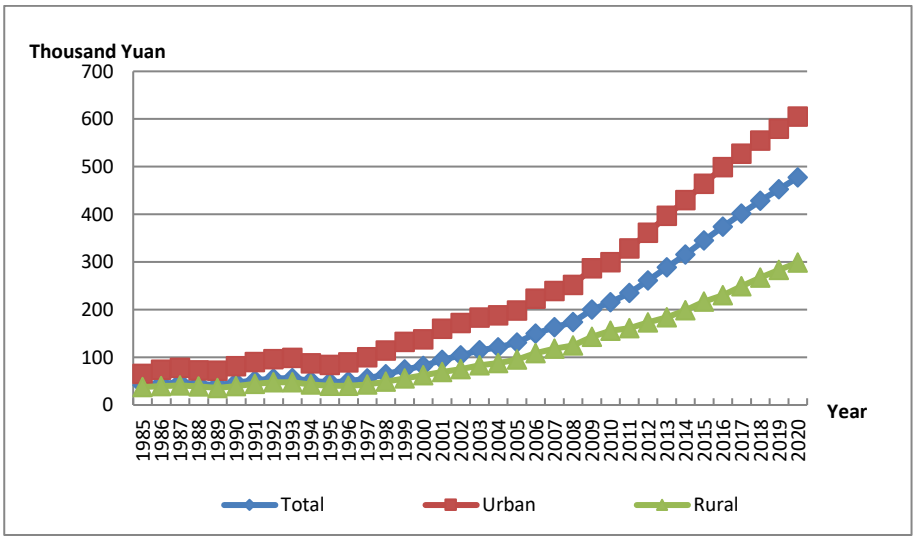

Figure HeN-2.2 Real Human Capital Per Capita by Region for Henan，1985-2020

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 2020, the nominal labor force human capital increased from 1.2 trillion Yuan to 69.1 trillion Yuan, an increase of more than 57 times; and the real labor force human capital increased from 1.2 trillion Yuan to 13.7 trillion Yuan, an increase of approximately 11 times.

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)
1985	1191	1191
1986	1362	1299
1987	1568	1411
1988	1801	1362
1989	2095	1319
1990	2461	1537
1991	2704	1667
1992	2981	1766
1993	3278	1760
1994	3626	1566
1995	4012	1489
1996	4622	1543
1997	5309	1706
1998	5987	1973
1999	6814	2310

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	7697	2625
2001	8721	2943
2002	9676	3248
2003	10598	3502
2004	11671	3654
2005	13054	3998
2006	15392	4640
2007	17697	5052
2008	19960	5309
2009	22166	5916
2010	25137	6465
2011	28809	6991
2012	32411	7656
2013	35712	8188
2014	38117	8576
2015	40836	9070
2016	45638	9938
2017	50789	10906
2018	56231	11804
2019	62129	12655
2020	69058	13649

23.3.2 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. Tables HeN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 28.6 thousand Yuan to 1312.3 thousand Yuan, an increase of more than 44 times; and the real average labor force human capital increased from 28.6 thousand

Yuan to 259.4 thousand Yuan, an increase of approximately 8 times.

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	28.62	43.91	25.79	28.62	43.91	25.79
1986	31.86	50.33	28.40	30.36	47.12	27.23
1987	35.55	57.48	31.38	31.98	49.93	28.57
1988	39.60	63.59	34.92	29.95	45.46	26.92
1989	44.43	70.78	39.17	27.96	44.04	24.76
1990	50.03	78.64	44.27	31.24	48.68	27.73
1991	54.93	87.37	48.40	33.86	51.46	30.31
1992	60.36	96.51	53.18	35.75	52.79	32.37
1993	66.32	106.46	58.47	35.60	52.65	32.26
1994	72.99	116.94	64.61	31.51	45.39	28.87
1995	80.39	128.73	71.35	29.83	42.74	27.41
1996	91.06	149.44	78.49	30.40	45.32	27.19
1997	102.96	169.77	86.69	33.09	50.27	28.90
1998	114.70	185.65	95.90	37.79	56.16	32.93
1999	128.09	204.07	105.78	43.42	63.90	37.41
2000	142.88	223.61	116.81	48.72	70.65	41.64
2001	159.58	246.90	128.07	53.86	77.47	45.34
2002	175.70	268.11	139.08	58.98	84.30	48.94
2003	192.29	284.28	153.60	63.55	87.91	53.30
2004	211.00	304.20	168.48	66.05	89.23	55.48
2005	233.81	328.22	187.16	71.60	94.33	60.37
2006	274.02	386.02	215.10	82.60	109.67	68.37

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**
2007	315.65	441.78	245.70	90.11	119.05	74.06
2008	358.59	494.84	279.51	95.38	125.23	78.06
2009	404.22	546.80	317.73	107.88	140.03	88.38
2010	461.26	617.30	358.91	118.64	152.87	96.18
2011	524.52	706.50	392.87	127.29	166.01	99.28
2012	590.75	792.46	431.23	139.55	181.49	106.37
2013	655.99	871.17	472.76	150.40	193.97	113.31
2014	712.42	927.50	519.35	160.29	202.42	122.47
2015	776.02	985.55	578.79	172.37	212.27	134.81
2016	861.67	1092.35	637.46	187.64	230.97	145.52
2017	960.96	1211.84	709.11	206.35	252.55	159.98
2018	1070.19	1342.38	788.41	224.65	273.23	174.36
2019	1183.73	1474.49	873.58	241.12	291.54	187.33
2020	1312.34	1620.31	972.12	259.38	312.19	201.04

Chapter 24 Human Capital for Hubei

24.1 Total human capital

Table HuB-1.1 presents the estimates of nominal and real total human capital and real physical capital for Hubei. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 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)
1985	1837	1837	69
1986	2130	2035	76
1987	2421	2155	84
1988	2797	2098	92
1989	3207	2064	98
1990	3692	2308	104
1991	4236	2525	112
1992	4778	2605	120
1993	5409	2492	132
1994	6084	2230	150
1995	6795	2073	174
1996	7564	2112	203
1997	8733	2360	235
1998	9905	2716	269
1999	11487	3217	306
2000	12730	3586	344

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	15563	4356	387
2002	16223	4554	431
2003	18295	5022	477
2004	20083	5253	532
2005	21693	5515	598
2006	24471	6122	683
2007	27693	6603	783
2008	31223	7015	897
2009	35338	7976	1041
2010	40199	8813	1214
2011	46083	9546	1427
2012	54663	10996	1656
2013	62133	12154	1913
2014	69571	13337	2194
2015	79523	15019	2496
2016	91208	16861	2824
2017	102869	18707	3167
2018	113436	20226	—
2019	125141	21659	—
2020	138093	23286	—

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 2020, the nominal human capital per capita increased from 39.0 thousand Yuan to 3.0 million Yuan, an increase of

approximately 77 times; and the real human capital per capita increased from 39.0 thousand Yuan to 505.8 thousand Yuan, an increase of approximately 13 times.

Figure HuB-2.1 illustrates the trends of human capital per capita by gender for Hubei. The trend of real human capital per capita of male is similar to that of female for Hubei. Both of them kept increasing from 1985 to 2020, 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 2000.

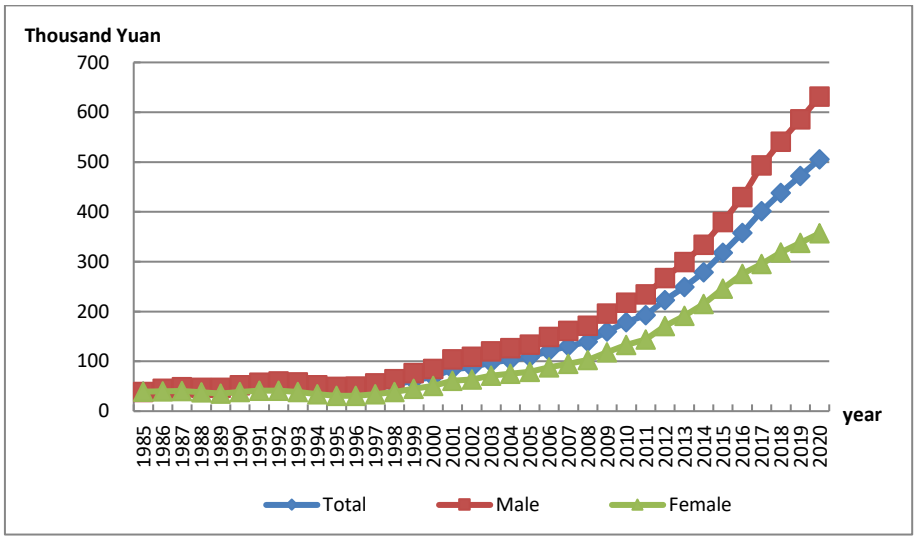

Figure HuB-2.1 Real Human Capital Per Capita by Gender for Hubei，1985-2020

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	39.00	74.10	28.58	39.00	74.10	28.58

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1986	45.58	87.49	32.22	43.51	83.01	30.92
1987	51.68	96.75	36.34	45.90	84.44	32.78
1988	59.69	109.99	41.24	44.60	79.67	31.74
1989	68.46	123.52	46.90	44.01	78.42	30.54
1990	78.77	140.68	53.36	49.20	87.30	33.57
1991	90.39	161.39	60.00	53.78	94.30	36.43
1992	102.09	180.04	67.30	55.52	95.21	37.81
1993	115.68	202.01	75.41	53.16	89.92	36.02
1994	130.57	225.55	84.32	47.72	79.05	32.45
1995	146.32	248.91	93.84	44.51	72.64	30.12
1996	39.04	60.66	32.61	39.04	60.66	32.61
1997	44.60	71.95	35.87	42.61	68.27	34.42
1998	49.90	80.25	39.57	44.41	70.05	35.69
1999	56.82	91.78	44.00	42.61	66.48	33.86
2000	64.47	103.66	49.12	41.50	65.81	31.98
2001	73.47	118.63	54.93	45.92	73.62	34.56
2002	83.48	136.45	60.81	49.76	79.73	36.93
2003	93.67	152.85	67.26	51.06	80.83	37.78
2004	105.48	172.09	74.42	48.60	76.60	35.55
2005	118.48	192.82	82.27	43.43	67.58	31.67
2006	132.27	213.62	90.65	40.35	62.34	29.10
2007	146.13	232.60	99.27	40.80	61.60	29.53
2008	168.59	269.53	110.46	45.55	69.57	31.72
2009	191.34	306.88	121.91	52.46	80.91	35.36
2010	221.00	356.62	134.04	61.89	96.73	39.55
2011	244.41	384.63	147.84	68.86	104.33	44.43
2012	300.34	489.66	162.77	84.06	132.29	49.01

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2013	313.74	489.73	177.02	88.07	133.37	52.88
2014	355.92	552.06	197.95	97.70	146.54	58.37
2015	392.57	599.37	219.88	102.68	152.24	61.28
2016	427.33	642.98	242.71	108.63	159.03	65.48
2017	482.20	716.43	273.43	120.63	174.75	72.40
2018	548.06	806.06	306.84	130.68	187.78	77.30
2019	621.70	904.90	344.92	139.68	199.82	80.91
2020	708.91	1019.78	390.35	160.00	226.77	91.56

Figure HuB-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 2010, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

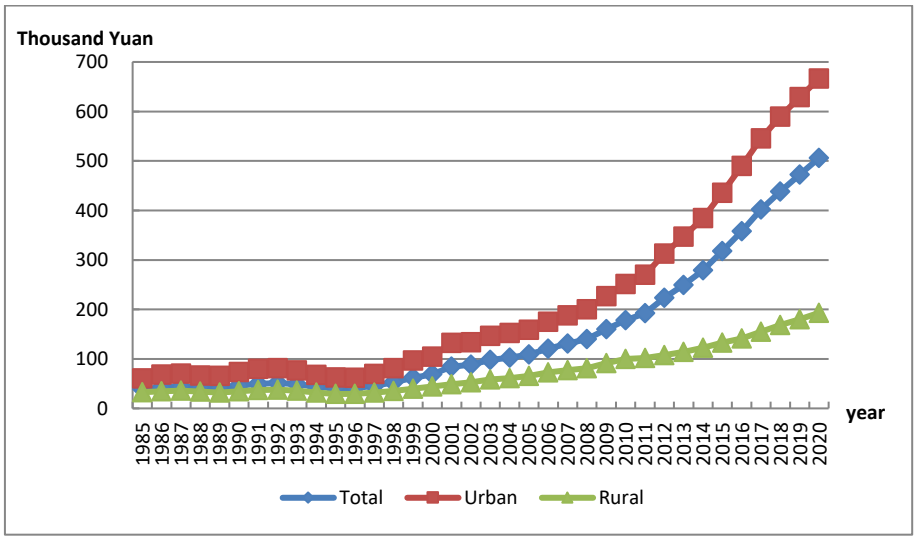

Figure HuB-2.2 Real Human Capital Per Capita by Region for Hubei，1985-2020

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 2020, the nominal labor force human capital increased from 0.8 trillion Yuan to 46.54 trillion Yuan, an increase of more than 58 times; and the real labor force human capital increased from 0.8 trillion Yuan to 7.87 trillion Yuan, an increase of approximately 10 times.

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)
1985	801	801
1986	925	884
1987	1068	952
1988	1223	920
1989	1406	906
1990	1610	1007
1991	1808	1080
1992	2020	1105
1993	2242	1037
1994	2480	915
1995	2731	838
1996	3171	891
1997	3676	1000
1998	4145	1144
1999	4742	1338

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	5448	1548
2001	6064	1720
2002	6768	1919
2003	7431	2066
2004	8174	2162
2005	8939	2295
2006	10053	2538
2007	11282	2714
2008	12591	2848
2009	14237	3232
2010	16042	3536
2011	18539	3857
2012	21314	4305
2013	23987	4710
2014	26343	5069
2015	28950	5486
2016	31991	5935
2017	35175	6423
2018	38427	6882
2019	42007	7303
2020	46543	7874

24.3.2 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. Tables HUB-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 28.5 thousand Yuan to 1.4 million Yuan, an increase of approximately 50 times; and the real average labor force human capital increased from 28.5 thousand

Yuan to 239.9 thousand Yuan, an increase of more than 8 times.

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	28.54	40.83	24.84	28.54	40.83	24.84
1986	31.95	45.91	27.40	30.54	43.56	26.29
1987	35.76	51.45	30.21	31.86	44.90	27.25
1988	40.20	57.59	33.58	30.22	41.72	25.84
1989	45.29	64.44	37.45	29.19	40.91	24.38
1990	50.88	71.49	41.85	31.82	44.36	26.33
1991	56.31	79.22	45.88	33.63	46.29	27.86
1992	62.18	87.42	50.23	34.00	46.23	28.21
1993	68.46	95.75	55.08	31.68	42.62	26.31
1994	75.18	104.39	60.38	27.73	36.59	23.24
1995	82.56	114.43	65.65	25.35	33.40	21.08
1996	93.71	130.20	73.16	26.35	34.48	21.77
1997	106.38	147.94	81.44	28.94	38.19	23.39
1998	118.45	163.03	90.57	32.70	42.98	26.27
1999	132.52	180.92	100.36	37.38	49.07	29.61
2000	148.72	201.43	111.46	42.25	54.64	33.49
2001	164.93	222.07	123.60	46.78	59.99	37.21
2002	183.58	247.66	135.94	52.05	67.45	40.61
2003	202.40	269.87	151.69	56.27	71.63	44.73
2004	223.95	297.22	167.68	59.23	75.50	46.74
2005	246.26	325.29	183.73	63.21	80.45	49.57
2006	277.27	364.14	206.39	70.00	88.82	54.65

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
2007	312.63	408.53	231.33	75.20	95.17	58.28
2008	350.59	454.06	259.40	79.31	100.27	60.85
2009	397.97	511.61	292.64	90.35	113.77	68.64
2010	450.23	575.83	326.82	99.24	124.56	74.36
2011	517.66	670.83	355.16	107.69	137.55	76.02
2012	596.09	776.70	388.88	120.41	154.92	80.81
2013	676.73	882.63	424.22	132.86	171.42	85.58
2014	756.94	984.52	460.56	145.64	187.46	91.18
2015	842.28	1088.03	500.96	159.61	204.31	97.52
2016	933.42	1201.06	551.14	173.16	220.89	104.98
2017	1041.82	1330.35	615.89	190.24	240.58	115.93
2018	1156.66	1467.32	685.25	207.14	260.15	126.70
2019	1279.66	1611.15	761.77	222.46	277.33	136.75
2020	1418.31	1771.03	846.06	239.96	297.41	146.74

Chapter 25 Human Capital for Hunan

25.1 Total human capital

Table HUN-1.1 presents the estimates of nominal and real total human capital and real physical capital for Hunan. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Hunan.

Table HUN-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Hunan

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	2029	2029	48
1986	2309	2192	53
1987	2590	2244	59
1988	2968	2047	66
1989	3375	1965	69
1990	3899	2262	72
1991	4477	2488	76
1992	5040	2542	81
1993	5622	2424	88
1994	6269	2155	94
1995	6926	1999	102
1996	7851	2099	112
1997	8963	2327	123
1998	10150	2623	135
1999	11698	3007	148
2000	13210	3348	163

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	14827	3791	180
2002	16688	4283	199
2003	18557	4652	220
2004	20830	4988	247
2005	23082	5401	280
2006	26173	6036	321
2007	29571	6450	374
2008	33591	6894	440
2009	37733	7783	519
2010	42243	8450	618
2011	48930	9285	726
2012	56023	10424	848
2013	63405	11507	980
2014	71191	12676	1122
2015	79958	14040	1256
2016	88974	15338	1393
2017	99644	16922	1523
2018	108988	18154	—
2019	118960	19267	—
2020	130325	20668	—

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 2020, the nominal human capital per capita increased from 38.9 thousand Yuan to 2.4 million Yuan, an increase of more

than 60 times; and the real human capital per capita increased from 38.9 thousand Yuan to 0.4million Yuan, an increase of approximately 9 times.

Figure HUN-2.1 illustrates the trends of human capital per capita by gender for Hunan. The growth pattern of real human capital per capita of male is similar to that of female for Hunan. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

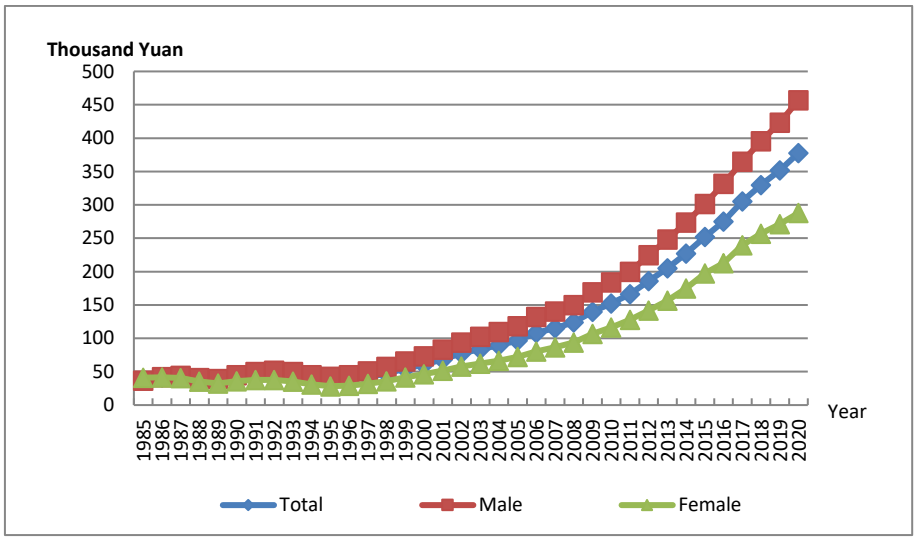

Figure HUN-2.1 Human Capital Per Capita by Gender for Hunan，1985-2020

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	38.91	65.87	33.61	38.91	65.87	33.61
1986	44.02	78.81	36.74	41.79	74.77	34.89
1987	48.90	87.92	40.36	42.36	74.95	35.22
1988	55.34	101.81	44.45	38.16	69.02	30.93

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1989	61.98	114.21	49.26	36.08	66.02	28.79
1990	70.03	130.90	54.86	40.63	75.23	32.01
1991	79.37	149.27	60.39	44.11	81.62	33.93
1992	89.27	168.55	66.54	45.03	81.19	34.66
1993	99.90	187.79	73.10	43.07	77.06	32.71
1994	111.86	209.83	80.42	38.45	69.00	28.65
1995	124.04	232.12	87.27	35.80	64.62	26.00
1996	140.96	263.87	95.05	37.69	68.52	26.17
1997	161.46	301.99	104.24	41.92	76.13	28.00
1998	183.58	344.14	114.68	47.45	86.32	30.77
1999	211.69	400.72	126.17	54.42	100.91	33.39
2000	239.54	451.51	139.38	60.72	112.23	36.37
2001	268.10	491.76	153.79	68.55	123.59	40.42
2002	301.33	543.80	167.96	77.34	137.22	44.41
2003	334.10	584.08	187.76	83.76	145.37	47.69
2004	374.26	640.75	208.78	89.63	153.18	50.16
2005	414.21	693.36	229.93	96.92	162.34	53.73
2006	468.52	769.73	259.22	108.05	177.40	59.87
2007	530.06	853.72	290.62	115.61	187.01	62.78
2008	603.45	956.70	327.37	123.85	198.08	65.84
2009	679.12	1051.56	371.15	140.08	218.85	74.95
2010	762.75	1159.40	418.13	152.58	234.03	81.81
2011	875.99	1317.43	452.31	166.22	252.09	83.81
2012	999.01	1478.44	492.57	185.88	276.81	89.84
2013	1131.58	1650.31	535.64	205.36	301.15	95.31
2014	1275.61	1838.92	585.52	227.13	328.67	102.74
2015	1436.26	2050.21	646.04	252.20	361.02	112.14

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	1596.80	2263.38	697.91	275.26	391.25	118.85
2017	1798.03	2528.62	763.11	305.36	430.18	128.53
2018	1981.35	2753.17	835.78	330.04	459.40	138.03
2019	2172.65	2982.74	910.19	351.89	484.13	145.79
2020	2382.20	3224.09	998.00	377.79	513.06	155.38

Figure HUN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban has both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

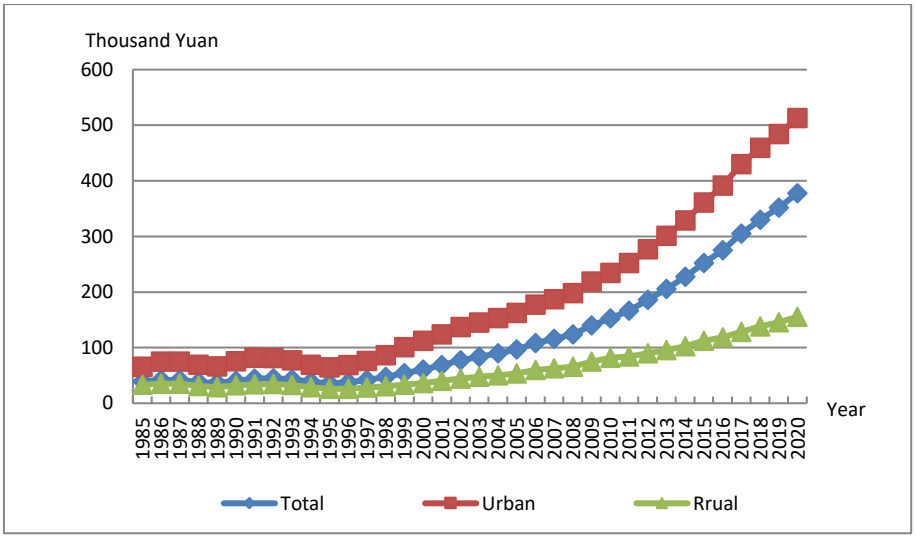

Figure HUN-2.2 Real Human Capital Per Capita by Region for Hunan, 1985-2020

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 2020, the nominal labor force human capital increased from 0.9 trillion Yuan to 43.3 trillion Yuan, an increase of more than 48 times; and the real labor force human capital increased from 0.9 trillion Yuan to 6.9 trillion Yuan, an increase of approximately 7 times.

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)
1985	895	895
1986	1027	975
1987	1178	1021
1988	1339	925
1989	1530	891
1990	1777	1032
1991	2000	1114
1992	2215	1124
1993	2444	1061
1994	2690	931
1995	2951	857
1996	3377	909
1997	3839	1005
1998	4287	1119

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	4825	1250
2000	5425	1386
2001	6055	1560
2002	6707	1735
2003	7521	1892
2004	8444	2024
2005	9467	2215
2006	10797	2491
2007	12097	2634
2008	13476	2756
2009	15004	3084
2010	16630	3315
2011	18901	3574
2012	21315	3955
2013	23679	4286
2014	25901	4603
2015	28251	4953
2016	30988	5333
2017	33893	5749
2018	36764	6116
2019	39888	6449
2020	43338	6852

25.3.2 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. Table HUN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 28.7 thousand Yuan to 1.2 million Yuan, an increase of more than 39 times; and

the real average labor force human capital increased from 28.7 thousand Yuan to 182.7 thousand Yuan, an increase of approximately 5 times.

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	28.72	43.65	25.71	28.72	43.65	25.71
1986	31.96	49.19	28.34	30.35	46.67	26.91
1987	35.61	55.27	31.28	30.87	47.12	27.30
1988	39.79	62.74	34.53	27.48	42.53	24.03
1989	44.40	70.23	38.31	25.87	40.59	22.39
1990	49.93	79.18	42.83	29.00	45.50	24.99
1991	55.51	89.03	46.63	30.91	48.68	26.20
1992	61.05	97.27	50.98	30.97	46.85	26.55
1993	67.17	106.36	55.68	29.16	43.65	24.91
1994	73.75	115.86	60.80	25.53	38.10	21.66
1995	80.76	125.79	66.22	23.46	35.02	19.72
1996	91.17	144.01	73.15	24.53	37.40	20.14
1997	102.44	162.50	80.96	26.81	40.96	21.75
1998	113.45	178.03	89.85	29.61	44.65	24.11
1999	125.91	195.79	99.40	32.63	49.30	26.30
2000	139.78	215.65	109.88	35.72	53.60	28.67
2001	155.57	237.89	120.69	40.07	59.79	31.72
2002	172.12	261.60	131.63	44.53	66.01	34.80
2003	192.27	287.95	145.95	48.36	71.66	37.07
2004	215.13	318.76	161.36	51.56	76.20	38.77
2005	239.75	351.72	177.51	56.09	82.35	41.48
2006	271.55	392.93	199.23	62.64	90.56	46.01

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**
2007	304.71	433.80	222.42	66.34	95.03	48.05
2008	340.54	476.19	247.92	69.63	98.59	49.86
2009	381.38	523.14	277.73	78.38	108.87	56.08
2010	425.14	573.50	308.91	84.74	115.77	60.44
2011	481.07	655.41	331.52	90.97	125.41	61.43
2012	542.75	739.53	359.16	100.72	138.46	65.50
2013	603.79	817.45	389.62	109.30	149.17	69.33
2014	663.36	888.61	424.00	117.89	158.82	74.40
2015	725.02	955.76	466.71	127.11	168.30	81.01
2016	794.16	1042.21	510.67	136.67	180.16	86.97
2017	876.72	1141.96	566.74	148.71	194.28	95.46
2018	964.44	1245.57	629.23	160.44	207.84	103.92
2019	1055.57	1350.39	696.53	170.66	219.18	111.57
2020	1155.80	1461.78	773.97	182.74	232.62	120.50

Chapter 26 Human Capital for Guangdong

26.1 Total human capital

Table GD-1.1 presents the estimates of nominal and real total human capital and real physical capital for Guangdong. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Guangdong.

Table GD-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Guangdong

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	3996	3996	92
1986	4617	4394	104
1987	5069	4343	116
1988	5813	3848	131
1989	6713	3636	143
1990	7688	4270	159
1991	8800	4833	177
1992	10042	5144	205
1993	11534	4863	253
1994	12845	4448	312
1995	14193	4306	378
1996	17142	4855	447
1997	20791	5767	516
1998	25268	7120	597
1999	29899	8565	692
2000	35793	10074	784

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	39888	11295	886
2002	45579	13065	1007
2003	51286	14595	1156
2004	56527	15627	1324
2005	61901	16738	1535
2006	73021	19385	1771
2007	84992	21749	2039
2008	95404	23119	2317
2009	107859	26763	2672
2010	119455	28738	3080
2011	135209	30840	3536
2012	152138	33721	4038
2013	168022	36337	4596
2014	185717	39255	5203
2015	202001	42035	5836
2016	224991	45714	6560
2017	255926	51141	7352
2018	272792	53346	—
2019	290556	55018	—
2020	307572	56743	—

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 2020, the nominal human capital per

capita increased from 72.8 thousand Yuan to 3.2 million Yuan, an increase of more than 42 times; and the real human capital per capita increased from 72.8 thousand Yuan to 0.6 million Yuan, an increase of approximately 7 times.

Figure GD-2.1 illustrates the trends of human capital per capita by gender for Guangdong. The growth pattern of real human capital per capita of male is similar to that of female for Guangdong. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

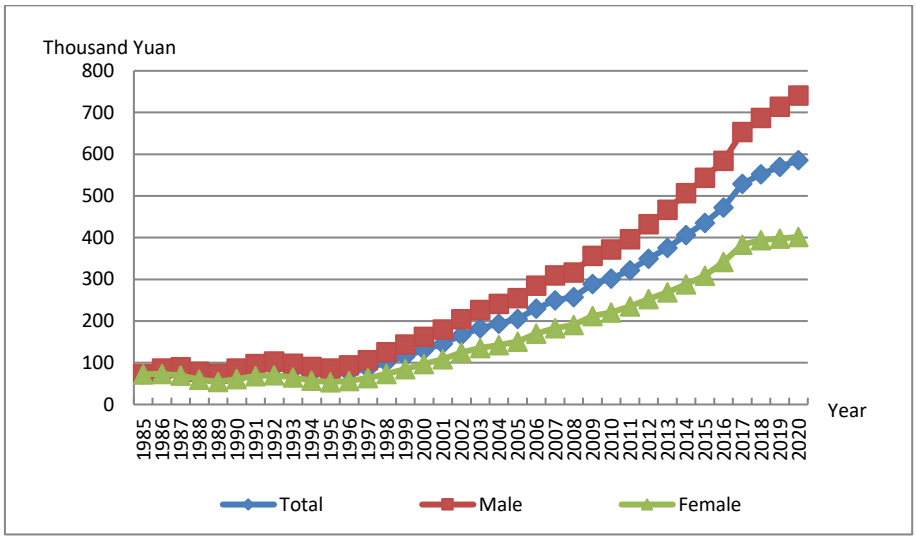

Figure GD-2.1 Human Capital Per Capita by Gender for Guangdong，1985-2020

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	72.83	101.99	61.99	72.83	101.99	61.99

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1986	84.66	122.64	68.75	80.57	117.15	65.24
1987	93.64	130.76	76.21	80.24	110.71	65.93
1988	105.46	148.52	84.64	69.82	97.09	56.63
1989	119.69	170.75	93.75	64.83	91.55	51.26
1990	134.49	191.08	103.90	74.69	105.19	58.21
1991	151.86	218.86	115.16	83.41	117.77	64.58
1992	171.54	249.95	127.39	87.87	124.09	67.48
1993	195.40	289.32	140.76	82.38	117.76	61.80
1994	215.31	313.98	155.34	74.56	105.60	55.69
1995	234.16	334.48	170.18	71.03	99.46	52.90
1996	269.47	381.71	187.05	76.31	105.88	54.60
1997	310.46	433.86	205.90	86.12	117.88	59.21
1998	357.94	494.09	225.78	100.86	136.57	66.19
1999	404.28	548.50	245.66	115.81	154.08	73.72
2000	465.30	620.59	273.07	130.96	170.55	81.94
2001	514.03	680.64	297.85	145.56	188.57	89.74
2002	580.59	768.80	320.20	166.42	216.01	97.82
2003	642.99	837.57	351.19	182.99	233.74	106.88
2004	701.82	900.48	380.80	194.02	244.93	111.75
2005	759.17	958.29	409.42	205.28	255.53	117.01
2006	867.46	1092.58	453.30	230.28	286.16	127.49
2007	977.50	1223.78	497.11	250.13	309.12	135.08
2008	1063.27	1314.19	544.28	257.65	314.63	139.80
2009	1166.32	1426.72	599.53	289.39	350.00	157.47
2010	1255.01	1518.43	655.23	301.92	361.29	166.76
2011	1410.87	1710.11	686.82	321.80	386.39	165.51
2012	1577.45	1910.82	724.88	349.64	419.97	169.77

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2013	1739.09	2104.56	768.75	376.10	451.73	175.30
2014	1922.80	2330.27	820.34	406.42	488.92	183.21
2015	2094.82	2542.50	882.39	435.92	525.05	194.54
2016	2325.99	2823.67	930.19	472.60	569.41	201.06
2017	2648.73	3221.52	991.77	529.29	638.74	212.69
2018	2825.82	3419.95	1053.73	552.60	663.52	221.75
2019	3007.94	3622.11	1115.25	569.56	681.57	224.38
2020	3175.85	3800.29	1186.48	585.90	697.07	231.73

Figure GD-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban has both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

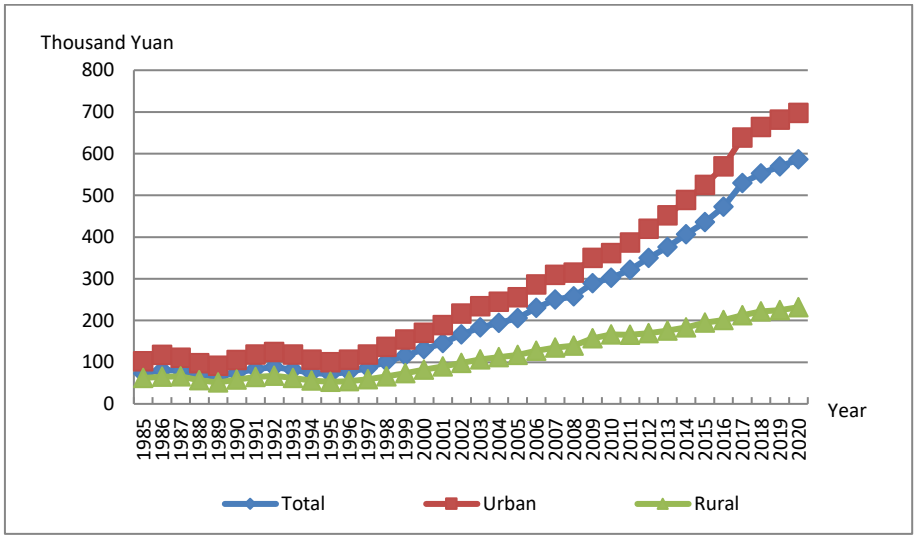

Figure GD-2.2 Real Human Capital Per Capita by Region for Guangdong, 1985-2020

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 2020, the nominal labor force human capital increased from 1.6 trillion Yuan to 109.7 trillion Yuan, an increase of more than 65 times; and the real labor force human capital increased from 1.6 trillion Yuan to 20.3 trillion Yuan, an increase of approximately 11 times.

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)
1985	1648	1648
1986	1860	1770
1987	2103	1801
1988	2440	1614
1989	2844	1540
1990	3315	1840
1991	3693	2027
1992	4088	2092
1993	4493	1894
1994	4963	1718
1995	5599	1698
1996	6956	1969
1997	8717	2415
1998	10824	3046
1999	13101	3749

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	15595	4385
2001	16967	4803
2002	18791	5388
2003	20864	5941
2004	23161	6405
2005	25699	6950
2006	29524	7845
2007	34227	8771
2008	39647	9621
2009	45893	11403
2010	52801	12719
2011	57309	13097
2012	62661	13923
2013	68610	14877
2014	74642	15825
2015	80806	16871
2016	86874	17718
2017	92965	18664
2018	98640	19382
2019	104173	19804
2020	109725	20317

26.3.2 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. Tables GD-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 51.6 thousand Yuan to 1.6 million Yuan, an increase of approximately 30 times;

and the real average labor force human capital increased from 51.6 thousand Yuan to 0.3 million Yuan, an increase of more than 4 times.

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	51.62	67.57	44.64	51.62	67.57	44.64
1986	58.29	76.32	49.24	55.47	72.90	46.73
1987	65.90	85.87	54.38	56.43	72.70	47.05
1988	73.90	96.28	60.48	48.89	62.94	40.46
1989	83.09	108.35	67.06	44.99	58.10	36.67
1990	93.47	121.64	74.41	51.89	66.97	41.69
1991	102.93	134.15	81.53	56.49	72.19	45.72
1992	113.17	147.88	88.84	57.92	73.42	47.06
1993	124.07	162.45	96.38	52.29	66.12	42.31
1994	136.24	178.73	104.74	47.16	60.12	37.55
1995	151.17	198.08	115.50	45.84	58.90	35.91
1996	175.54	228.87	128.25	49.68	63.48	37.44
1997	204.05	263.45	141.89	56.54	71.58	40.80
1998	233.93	296.93	156.72	65.84	82.07	45.94
1999	262.76	327.07	172.70	75.19	91.87	51.82
2000	292.45	357.37	190.00	82.23	98.21	57.02
2001	315.95	384.05	205.32	89.43	106.40	61.86
2002	345.44	419.56	219.24	99.05	117.89	66.98
2003	377.90	456.01	237.47	107.60	127.26	72.27
2004	414.20	497.77	254.22	114.53	135.39	74.60
2005	452.91	541.38	272.97	122.49	144.36	78.01

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
2006	505.18	601.35	305.79	134.23	157.50	86.00
2007	565.11	670.22	340.52	144.82	169.29	92.53
2008	630.59	744.62	377.41	153.02	178.27	96.94
2009	702.82	825.30	421.29	174.63	202.46	110.65
2010	777.80	908.40	467.75	187.36	216.14	119.05
2011	844.14	989.24	494.91	192.92	223.52	119.26
2012	920.61	1081.08	529.44	204.56	237.61	124.00
2013	1004.14	1180.86	569.32	217.74	253.47	129.82
2014	1090.23	1283.36	613.04	231.13	269.27	136.91
2015	1177.78	1386.20	664.38	245.90	286.26	146.47
2016	1257.95	1477.97	701.78	256.56	298.04	151.69
2017	1346.84	1577.69	747.29	270.40	312.81	160.26
2018	1433.78	1674.68	792.20	281.73	324.91	166.72
2019	1518.54	1768.26	839.08	288.68	332.73	168.81
2020	1602.30	1858.25	889.35	296.70	340.85	173.70

Chapter 27 Human Capital for Guangxi

27.1 Total human capital

Table GX-1.1 presents the estimates of nominal and real total human capital and real physical capital for Guangxi. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Guangxi.

Table GX-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Guangxi

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1703	1703	46
1986	1925	1813	49
1987	2134	1878	53
1988	2387	1753	55
1989	2691	1615	57
1990	3051	1786	59
1991	3418	1945	61
1992	3804	2044	66
1993	4262	1899	72
1994	4799	1695	81
1995	5353	1596	89
1996	6060	1694	99
1997	6885	1910	108
1998	7830	2240	120
1999	8850	2591	133
2000	10109	2966	146

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	11144	3253	160
2002	12612	3713	177
2003	14464	4212	197
2004	16401	4574	222
2005	18173	4944	257
2006	20887	5604	301
2007	24158	6113	357
2008	27106	6357	430
2009	30892	7409	543
2010	34088	7934	697
2011	39645	8716	876
2012	45168	9623	1063
2013	51141	10657	1221
2014	57411	11715	1380
2015	63416	12749	1551
2016	70212	13890	1732
2017	77874	15145	1829
2018	85156	16180	—
2019	93249	17097	—
2020	102083	18224	—

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 2020, the nominal human capital per capita increased from 47.5 thousand Yuan to 2.4 million Yuan, an increase of

approximately 50 times; and the real human capital per capita increased from 47.5 thousand Yuan to 0.4 million Yuan, an increase of approximately 8 times.

Figure GX-2.1 illustrates the trends of human capital per capita by gender for Guangxi. The growth pattern of real human capital per capita of male is similar to that of female for Guangxi. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

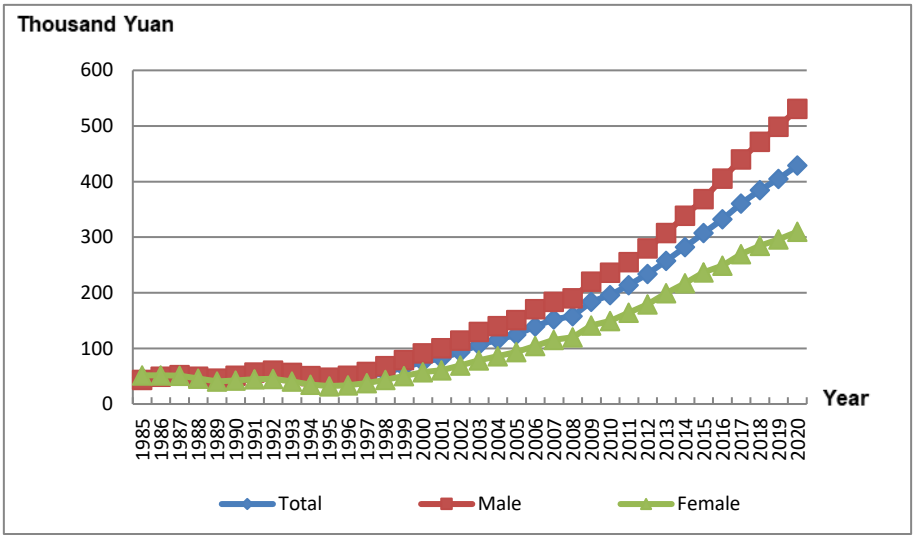

Figure GX-2.1 Human Capital Per Capita by Gender for Guangxi，1985-2020

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	47.46	82.14	42.07	47.46	82.14	47.46
1986	53.24	100.83	45.48	50.14	94.94	53.24
1987	58.70	113.94	49.30	51.65	97.36	58.70
1988	65.25	127.89	54.03	47.91	88.63	65.25

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1989	72.60	142.79	59.51	43.57	82.67	72.60
1990	80.50	158.20	65.59	47.14	93.18	80.50
1991	89.63	178.50	71.67	51.01	102.37	89.63
1992	99.26	198.25	78.51	53.32	106.25	99.26
1993	110.43	221.09	86.26	49.20	96.10	110.43
1994	123.00	246.61	94.88	43.44	85.48	123.00
1995	135.61	272.28	103.23	40.44	79.98	135.61
1996	153.15	305.34	112.70	42.81	85.02	153.15
1997	174.83	348.91	123.92	48.49	96.47	174.83
1998	199.02	392.23	135.94	56.93	111.69	199.02
1999	225.85	437.90	148.92	66.12	128.29	225.85
2000	258.68	488.06	166.29	75.91	142.99	258.68
2001	281.75	502.90	181.58	82.23	145.44	281.75
2002	317.32	558.14	195.78	93.42	163.21	317.32
2003	364.08	630.07	216.25	106.02	182.60	364.08
2004	412.96	705.07	237.73	115.17	196.29	412.96
2005	457.39	765.95	260.77	124.43	207.03	457.39
2006	521.48	853.91	294.11	139.91	227.14	521.48
2007	601.64	973.88	330.19	152.23	245.32	601.64
2008	673.67	1066.68	370.35	157.99	249.71	673.67
2009	767.56	1198.47	420.29	184.09	286.59	767.56
2010	843.48	1285.79	472.93	196.31	298.80	843.48
2011	971.50	1472.18	513.28	213.59	323.67	971.50
2012	1097.79	1638.68	561.46	233.87	349.10	1097.79
2013	1237.50	1825.85	617.62	257.88	381.01	1237.50
2014	1384.71	2022.25	681.23	282.56	412.91	1384.71
2015	1529.46	2211.38	756.67	307.48	444.86	1529.46

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	1680.35	2398.53	824.34	332.43	474.91	1680.35
2017	1854.92	2608.50	909.83	360.75	506.85	1854.92
2018	2025.10	2801.29	1005.47	384.77	531.55	2025.10
2019	2209.76	3009.06	1107.39	405.16	551.67	2209.76
2020	2403.49	3210.03	1226.53	429.07	574.16	2403.49

Figure GX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban has both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

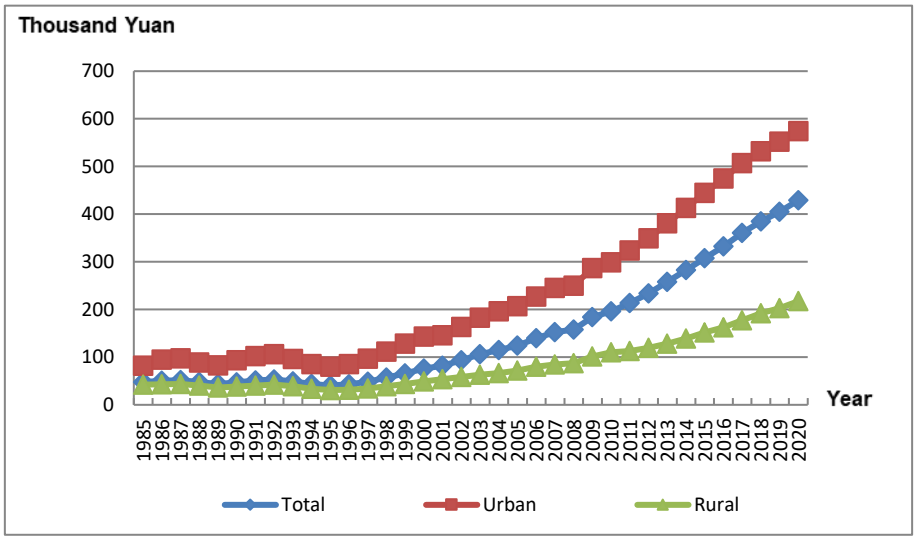

Figure GX-2.2 Real Human Capital Per Capita by Region for Guangxi 1985-2020

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 2020, the nominal labor force human capital increased from 0.6 trillion Yuan to 31.4 trillion Yuan, an increase of more than 51 times; and the real labor force human capital increased from 0.6 trillion Yuan to 5.6 trillion Yuan, an increase of approximately 8 times.

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)
1985	645	645
1986	730	687
1987	829	730
1988	929	683
1989	1056	635
1990	1228	719
1991	1355	771
1992	1487	799
1993	1656	739
1994	1877	664
1995	2136	638
1996	2444	683
1997	2729	757
1998	3102	888
1999	3523	1031

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	4055	1190
2001	4510	1318
2002	4893	1443
2003	5260	1534
2004	5767	1609
2005	6343	1729
2006	7375	1983
2007	8409	2131
2008	9464	2221
2009	10617	2549
2010	11864	2763
2011	13418	2950
2012	14977	3191
2013	16658	3470
2014	18212	3715
2015	19641	3947
2016	21808	4313
2017	24085	4686
2018	26319	5004
2019	28611	5246
2020	31359	5593

27.3.2 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. Tables GX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 32.6 thousand Yuan to 1.2 million Yuan, an increase of more than 34 times; and the real average labor force human capital increased from 32.6 thousand Yuan

to 0.2 million Yuan, an increase of approximately 5 times.

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	32.56	53.45	29.02	32.56	53.45	29.02
1986	35.83	60.77	31.46	33.74	57.22	29.62
1987	39.58	68.93	34.23	34.85	58.90	30.46
1988	43.54	75.59	37.42	32.02	52.39	28.13
1989	48.20	82.99	41.32	28.96	48.05	25.19
1990	53.83	91.65	46.15	31.51	53.98	26.95
1991	59.13	102.56	49.67	33.64	58.82	28.16
1992	64.44	111.12	53.89	34.62	59.55	28.99
1993	70.97	122.20	58.88	31.65	53.12	26.59
1994	78.69	134.55	65.04	27.82	46.64	23.22
1995	87.58	149.39	71.78	26.14	43.89	21.61
1996	99.18	170.05	78.52	27.73	47.35	22.01
1997	110.47	186.27	86.33	30.65	51.50	24.00
1998	124.19	206.01	95.15	35.54	58.66	27.33
1999	139.12	226.00	105.01	40.72	66.21	30.72
2000	157.20	250.20	116.76	46.14	73.30	34.33
2001	172.28	271.12	126.74	50.34	78.41	37.41
2002	186.12	290.37	135.88	54.87	84.91	40.39
2003	200.64	306.01	147.81	58.50	88.69	43.37
2004	220.50	334.99	158.27	61.52	93.26	44.27
2005	241.94	363.34	171.67	65.94	98.21	47.26
2006	279.83	419.59	193.39	75.25	111.61	52.76

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**
2007	318.79	474.20	217.24	80.77	119.45	55.50
2008	359.09	526.35	244.47	84.26	123.22	57.56
2009	403.72	581.02	277.07	96.92	138.94	66.91
2010	450.63	635.91	313.96	104.93	147.78	73.32
2011	506.02	717.84	335.65	111.25	157.82	73.80
2012	563.58	795.92	363.07	120.07	169.56	77.35
2013	625.11	875.16	395.41	130.20	182.63	82.05
2014	681.29	938.93	435.60	138.98	191.71	88.70
2015	733.94	987.85	486.63	147.51	198.72	97.62
2016	808.51	1086.60	528.40	159.89	215.15	104.23
2017	893.70	1193.89	581.29	173.88	231.98	113.42
2018	982.06	1300.64	640.29	186.71	246.80	122.24
2019	1071.15	1403.35	704.96	196.40	257.28	129.29
2020	1171.76	1514.46	780.01	208.98	270.88	138.21

Chapter 28 Human Capital for Hainan

28.1 Total human capital

Table HaN-1.1 presents the estimates of nominal and real total human capital and real physical capital for Hainan. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Hainan.

Table HaN-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Hainan

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	109	109	8
1986	125	119	9
1987	144	125	10
1988	164	112	12
1989	191	103	14
1990	226	116	16
1991	257	128	19
1992	292	137	24
1993	332	130	28
1994	381	117	34
1995	436	118	39
1996	492	128	43
1997	561	145	47
1998	644	171	51
1999	736	199	55
2000	843	225	59

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	927	251	63
2002	1026	279	68
2003	1133	309	74
2004	1264	330	81
2005	1409	363	89
2006	1615	411	98
2007	1845	447	109
2008	2102	476	124
2009	2394	546	140
2010	2722	592	162
2011	3103	638	187
2012	3535	706	221
2013	3973	772	261
2014	4438	843	305
2015	4885	918	342
2016	5434	995	383
2017	5990	1067	425
2018	6511	1133	—
2019	7030	1184	—
2020	7598	1252	—

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 2020, the nominal human capital per capita increased from 36.7 thousand Yuan to 1.4 million Yuan, an increase of more

than 36 times; and the real human capital per capita increased from 36.7 thousand Yuan to 0.2 million Yuan, an increase of approximately 5 times.

Figure HaN-2.1 illustrates the trends of human capital per capita by gender for Hainan. The growth pattern of real human capital per capita of male is similar to that of female for Hainan. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

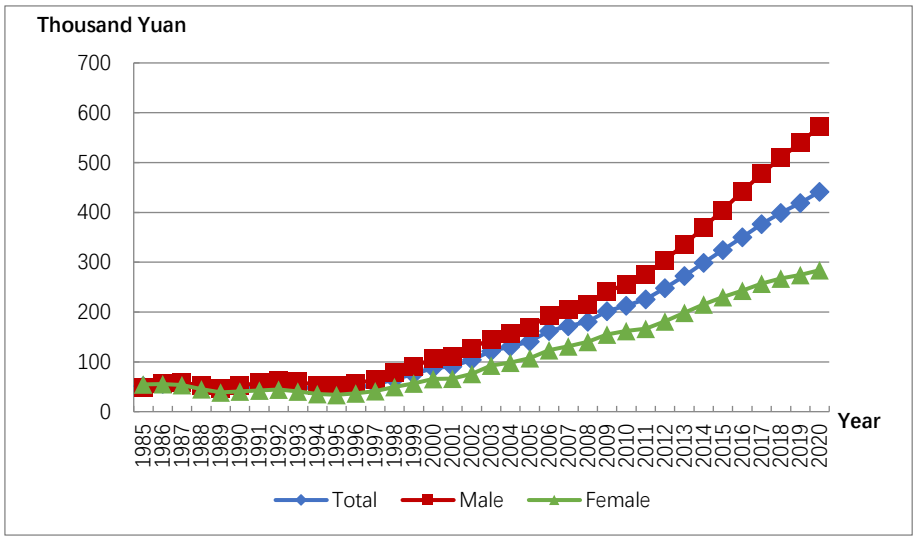

Figure HaN-2.1 Human Capital Per Capita by Gender for Hainan，1985-2020

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	36.72	35.75	37.86	36.72	35.75	37.86
1986	40.59	41.32	39.72	38.75	39.50	37.86
1987	44.98	47.57	41.99	39.12	41.42	36.46

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	50.01	54.22	45.06	34.16	37.02	30.80
1989	56.17	62.27	48.93	30.18	33.47	26.29
1990	63.60	71.88	53.73	32.71	37.12	27.45
1991	71.00	81.94	57.99	35.27	40.84	28.65
1992	79.33	93.14	62.98	37.25	43.77	29.53
1993	88.73	105.69	68.84	34.76	41.37	27.01
1994	99.33	119.56	75.83	30.65	36.88	23.41
1995	111.39	135.44	83.71	30.20	36.75	22.68
1996	123.68	152.06	90.86	32.18	39.57	23.63
1997	138.54	171.94	99.74	35.72	44.34	25.72
1998	154.98	193.90	109.63	41.14	51.46	29.10
1999	172.18	216.25	120.57	46.46	58.35	32.54
2000	192.06	242.33	133.04	51.31	64.75	35.54
2001	207.06	262.49	142.36	56.10	71.12	38.56
2002	224.90	286.83	153.03	61.27	78.14	41.69
2003	244.52	313.23	164.94	66.66	85.37	44.98
2004	268.46	344.78	179.89	70.21	90.12	47.10
2005	294.08	377.64	196.52	75.86	97.37	50.76
2006	331.89	425.29	221.66	84.38	108.06	56.43
2007	372.78	474.44	251.62	90.24	114.77	61.00
2008	417.01	528.19	283.17	94.51	119.62	64.27
2009	466.37	589.02	317.55	106.40	134.33	72.52
2010	519.70	654.49	355.46	113.08	142.40	77.36
2011	584.93	738.18	398.98	120.25	151.80	81.96
2012	657.19	833.09	444.81	131.16	166.39	88.62
2013	729.66	928.07	491.39	141.82	180.60	95.26
2014	805.60	1030.70	538.51	153.10	196.19	101.97
2015	878.21	1133.14	577.40	165.11	213.49	108.01

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	965.16	1249.36	629.44	176.70	229.31	114.55
2017	1062.22	1375.57	688.14	189.16	245.64	121.73
2018	1158.07	1500.13	744.72	201.53	261.93	128.53
2019	1256.58	1626.72	804.51	211.73	275.25	134.14
2020	1354.20	1747.35	867.87	223.19	289.61	141.02

Figure HaN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban has both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

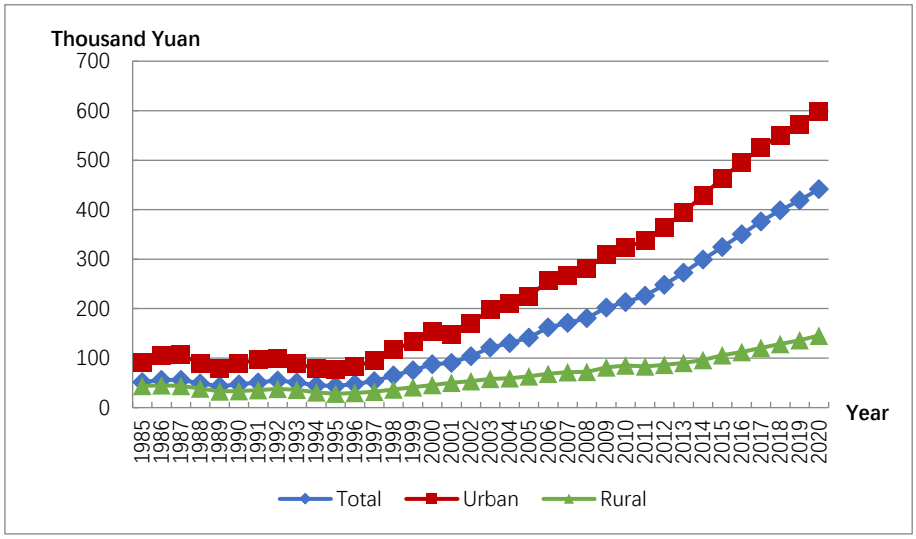

Figure HaN-2.2 Real Human Capital Per Capita by Region for Hainan, 1985-2020

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 2020, the nominal labor force human capital increased from 0.1 trillion Yuan to 7.6 trillion Yuan, an increase of more than 68 times; and the real labor force human capital increased from 0.1 trillion Yuan to 1.3 trillion Yuan, an increase of approximately 10 times.

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)
1985	109	109
1986	125	119
1987	144	125
1988	164	112
1989	191	103
1990	226	116
1991	257	128
1992	292	137
1993	332	130
1994	381	117
1995	436	118
1996	492	128
1997	561	145
1998	644	171
1999	736	199

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	843	225
2001	927	251
2002	1026	279
2003	1133	309
2004	1264	330
2005	1409	363
2006	1615	411
2007	1845	447
2008	2102	476
2009	2394	546
2010	2722	592
2011	3103	638
2012	3535	706
2013	3973	772
2014	4438	843
2015	4885	918
2016	5434	995
2017	5990	1067
2018	6511	1133
2019	7030	1184
2020	7598	1252

28.3.2 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. Tables HaN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 36.7 thousand Yuan to 1.4 million Yuan, an increase of more than 36 times; and

the real average labor force human capital increased from 36.7 thousand Yuan to 223.2 thousand Yuan, an increase of approximately 5 times.

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	36.72	54.74	32.71	36.72	54.74	32.71
1986	40.59	62.24	35.42	38.75	60.03	33.67
1987	44.98	70.34	38.44	39.12	61.77	33.28
1988	50.01	77.21	42.15	34.16	52.45	28.88
1989	56.17	86.11	46.48	30.18	46.30	24.97
1990	63.60	96.71	51.65	32.71	52.21	25.67
1991	71.00	107.82	56.34	35.27	55.97	27.03
1992	79.33	120.09	61.35	37.25	57.19	28.46
1993	88.73	133.35	67.06	34.76	51.34	26.71
1994	99.33	147.62	73.84	30.65	45.26	22.94
1995	111.39	163.82	81.02	30.20	45.66	21.25
1996	123.68	181.74	88.13	32.18	48.33	22.30
1997	138.54	203.37	96.36	35.72	53.27	24.30
1998	154.98	226.15	105.81	41.14	60.69	27.63
1999	172.18	249.00	116.38	46.46	67.43	31.23
2000	192.06	275.37	127.89	51.31	73.47	34.25
2001	207.06	295.02	138.59	56.10	79.68	37.75
2002	224.90	320.59	148.60	61.27	87.45	40.39
2003	244.52	345.54	161.50	66.66	94.82	43.51
2004	268.46	378.47	173.06	70.21	100.64	43.82
2005	294.08	412.45	187.13	75.86	108.27	46.59
2006	331.89	464.85	206.66	84.38	120.56	50.29

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**
2007	372.78	520.59	228.16	90.24	129.07	52.23
2008	417.01	579.17	253.53	94.51	135.33	53.35
2009	466.37	642.93	284.14	106.40	150.98	60.39
2010	519.70	711.09	318.43	113.08	159.79	63.96
2011	584.93	802.21	343.66	120.25	170.87	64.04
2012	657.19	899.40	375.52	131.16	185.64	67.81
2013	729.66	993.06	412.42	141.82	199.37	72.51
2014	805.60	1088.94	454.14	153.10	213.91	77.67
2015	878.21	1175.29	505.60	165.11	228.15	86.04
2016	965.16	1288.86	545.93	176.70	243.15	90.64
2017	1062.22	1412.67	591.27	189.16	258.23	96.33
2018	1158.07	1532.47	635.71	201.53	273.54	101.05
2019	1256.58	1651.98	684.19	211.73	285.74	104.58
2020	1354.20	1764.09	752.16	223.19	299.74	110.76

Chapter 29 Human Capital for Chongqing

29.1 Total human capital

Table CQ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Chongqing. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Chongqing.

Table CQ-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Chongqing

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	997	997	46
1986	1135	1090	49
1987	1263	1104	55
1988	1444	1029	59
1989	1662	1011	59
1990	1959	1175	61
1991	2284	1280	64
1992	2635	1329	69
1993	3020	1283	76
1994	3516	1152	86
1995	3989	1094	96
1996	4569	1142	107
1997	5262	1274	120
1998	5682	1427	138
1999	6577	1663	158
2000	7892	2064	178

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	8348	2146	203
2002	9198	2375	234
2003	10704	2747	274
2004	12369	3061	323
2005	12805	3143	381
2006	14146	3391	446
2007	16686	3821	519
2008	19287	4182	597
2009	22106	4871	692
2010	25002	5339	803
2011	29024	5885	935
2012	33384	6598	1077
2013	37586	7233	1229
2014	41850	7911	1397
2015	45808	8548	1582
2016	50702	9294	1793
2017	54900	9964	2010
2018	59997	10676	—
2019	65538	11355	—
2020	71421	12096	—

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 2020, the nominal human capital per capita increased from 41.5 thousand Yuan to 31.3 million Yuan, an increase

of more than 79 times; and the real human capital per capita increased from 41.5 thousand Yuan to 0.5 million Yuan, an increase of approximately 12 times.

Figure CQ-2.1 illustrates the trends of human capital per capita by gender for Chongqing. The growth pattern of real human capital per capita of male is similar to that of female for Chongqing. Both of them kept increasing from 1985 to 2020, and the growth 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 since 1997.

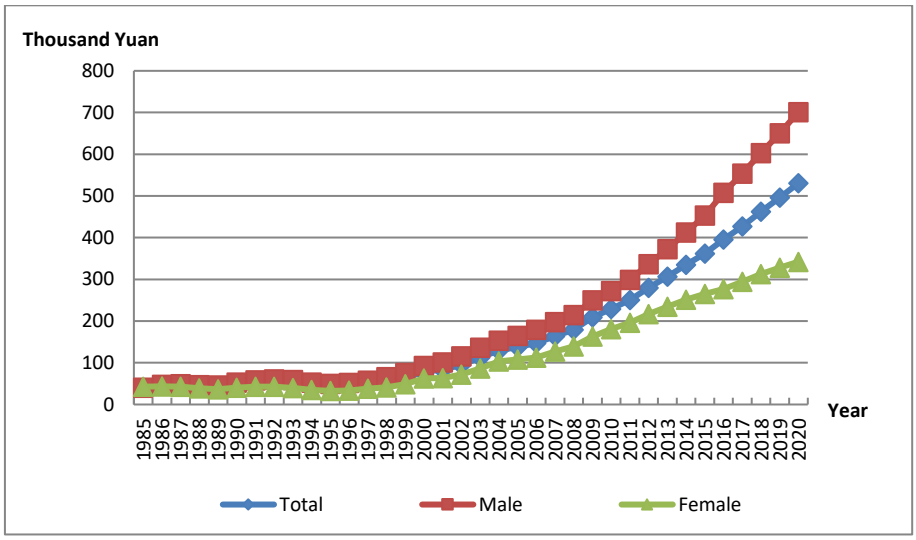

Figure CQ-2.1 Human Capital Per Capita by Gender for Chongqing，1985-2020

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	41.54	76.40	32.99	41.54	76.40	32.99
1986	47.44	91.67	35.95	45.53	87.97	34.50

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1987	52.75	102.63	39.13	46.11	89.70	34.20
1988	60.31	116.74	43.08	42.96	83.16	30.69
1989	68.55	129.64	48.26	41.70	78.86	29.36
1990	78.58	148.71	54.11	47.14	89.21	32.46
1991	90.81	171.40	59.50	50.92	96.10	33.36
1992	103.69	193.94	64.93	52.28	97.79	32.74
1993	117.45	213.69	71.95	49.89	90.77	30.56
1994	135.36	243.05	80.51	44.33	79.60	26.37
1995	151.03	268.84	88.02	41.43	73.74	24.14
1996	172.90	309.56	95.23	43.23	77.40	23.81
1997	199.85	360.16	104.15	48.37	87.17	25.21
1998	215.68	375.66	116.27	54.15	94.32	29.20
1999	250.10	441.51	128.84	63.24	111.64	32.58
2000	301.51	547.75	144.15	78.84	143.23	37.69
2001	325.43	558.75	155.18	83.67	143.66	39.90
2002	367.60	609.56	167.09	94.89	157.36	43.13
2003	438.74	709.15	187.01	112.58	181.97	47.99
2004	523.24	838.81	213.44	129.48	207.56	52.82
2005	560.29	869.84	242.07	137.54	213.54	59.42
2006	615.04	928.90	275.59	147.45	222.69	66.07
2007	717.55	1062.11	312.95	164.30	243.19	71.66
2008	825.38	1196.00	352.52	178.97	259.33	76.44
2009	949.03	1355.83	400.82	209.12	298.77	88.32
2010	1073.53	1506.01	448.63	229.22	321.57	95.79
2011	1236.77	1700.98	476.04	250.79	344.92	96.53
2012	1417.07	1915.15	511.65	280.07	378.50	101.12
2013	1594.56	2120.29	552.12	306.86	408.03	106.25
2014	1774.05	2327.48	600.48	335.36	439.98	113.51

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2015	1940.77	2518.29	663.51	362.17	469.94	123.82
2016	2156.73	2780.58	707.96	395.36	509.72	129.78
2017	2353.97	3005.64	772.00	427.24	545.52	140.12
2018	2600.40	3289.99	840.51	462.71	585.42	149.56
2019	2862.01	3590.98	905.31	495.88	622.18	156.86
2020	3134.07	3898.50	978.55	530.81	660.28	165.74

Figure CQ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban has both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

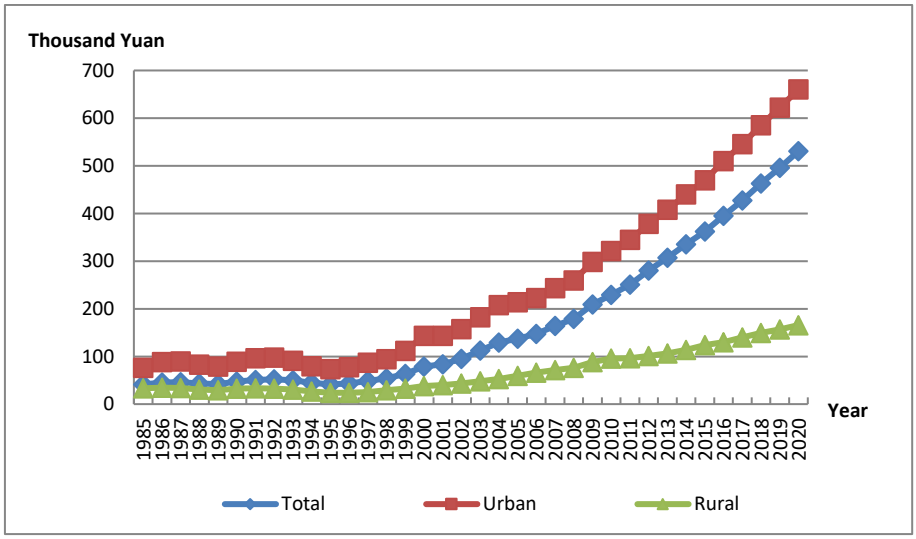

Figure CQ-2.2 Real Human Capital Per Capita by Region for Chongqing, 1985-2020

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 2020, the nominal labor force human capital increased from 0.45 trillion Yuan to 23.8 trillion Yuan, an increase of more than 52 times; and the real labor force human capital increased from 0.45 trillion Yuan to 4.03 trillion Yuan, an increase of approximately 8 times.

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)
1985	451	451
1986	520	499
1987	604	528
1988	692	493
1989	811	493
1990	966	580
1991	1082	606
1992	1214	612
1993	1350	573
1994	1495	490
1995	1653	453
1996	1847	462
1997	2061	499
1998	2292	576

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	2521	637
2000	2778	726
2001	2981	766
2002	3162	816
2003	3330	855
2004	3499	866
2005	3686	905
2006	4421	1060
2007	5266	1206
2008	6096	1322
2009	6985	1539
2010	8099	1729
2011	9382	1902
2012	10663	2107
2013	11918	2293
2014	13222	2499
2015	14526	2711
2016	16238	2977
2017	18053	3277
2018	19925	3545
2019	21787	3775
2020	23807	4032

29.3.2 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. Tables CQ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 29.2

thousand Yuan to 1.48 million Yuan, an increase of more than 49 times; and the real average labor force human capital increased from 29.2 thousand Yuan to 0.25 million Yuan, an increase of approximately 8 times.

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	29.18	48.68	24.51	29.18	48.68	24.51
1986	32.60	54.99	27.11	31.29	52.77	26.01
1987	36.62	62.38	30.08	32.01	54.52	26.29
1988	41.36	69.53	33.47	29.46	49.53	23.84
1989	47.06	77.71	37.71	28.63	47.27	22.94
1990	53.76	86.67	43.06	32.25	52.00	25.84
1991	59.77	96.14	46.78	33.51	53.90	26.23
1992	66.46	106.08	51.10	33.51	53.49	25.77
1993	73.50	115.93	55.86	31.22	49.24	23.73
1994	81.03	126.20	61.02	26.54	41.33	19.98
1995	89.24	137.39	66.46	24.48	37.69	18.23
1996	99.57	155.24	72.26	24.90	38.82	18.07
1997	110.88	173.90	79.04	26.84	42.09	19.13
1998	122.89	192.33	86.96	30.86	48.29	21.84
1999	134.87	209.68	95.60	34.10	53.02	24.17
2000	148.46	229.74	105.16	38.82	60.07	27.50
2001	164.11	250.42	111.82	42.19	64.39	28.75
2002	180.06	270.51	118.24	46.48	69.83	30.52
2003	196.90	288.33	126.52	50.53	73.99	32.46
2004	216.54	310.74	133.36	53.58	76.89	33.00

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
2005	237.89	333.10	142.02	58.40	81.77	34.86
2006	283.75	397.37	161.08	68.03	95.26	38.62
2007	334.07	461.24	191.50	76.49	105.61	43.85
2008	385.46	524.85	221.64	83.58	113.80	48.06
2009	442.66	595.24	252.33	97.54	131.16	55.60
2010	509.76	677.81	287.07	108.85	144.73	61.30
2011	581.68	767.53	312.89	117.95	155.64	63.45
2012	656.07	856.02	343.97	129.66	169.18	67.98
2013	729.76	940.78	378.29	140.44	181.05	72.80
2014	803.29	1021.68	419.03	151.85	193.14	79.21
2015	876.18	1097.89	468.96	163.51	204.88	87.51
2016	976.58	1223.23	508.95	179.02	224.23	93.30
2017	1089.17	1360.76	557.32	197.68	246.98	101.15
2018	1216.65	1514.99	614.40	216.49	269.58	109.32
2019	1341.68	1664.00	673.80	232.46	288.31	116.74
2020	1475.41	1820.70	736.89	249.89	308.37	124.81

Chapter 30 Human Capital for Sichuan

30.1 Total human capital

Table SC-1.1 presents the estimates of nominal and real total human capital and real physical capital for Sichuan. Column 1 contains nominal human capital estimates based on six-education categories. Column 2 presents real human capital estimates based on six-education categories. Column 3 reports the real physical capital of Sichuan.

Table SC-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Sichuan

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	2732	2732	71
1986	3084	2945	79
1987	3417	3053	87
1988	3800	2832	94
1989	4313	2670	100
1990	4981	2968	106
1991	5645	3267	114
1992	6397	3467	122
1993	7221	3343	130
1994	8149	3015	141
1995	9149	2844	157
1996	10381	2941	175
1997	11866	3192	196
1998	13234	3568	222
1999	15132	4129	248

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	17244	4690	278
2001	19227	5105	310
2002	21120	5611	348
2003	23166	6057	392
2004	25382	6321	443
2005	27530	6737	504
2006	32437	7730	580
2007	38317	8589	672
2008	44037	9383	776
2009	49651	10492	899
2010	55947	11441	1039
2011	64885	12557	1193
2012	74080	13939	1362
2013	82485	15074	1541
2014	91462	16432	1722
2015	100105	17726	1911
2016	110938	19245	2122
2017	123237	21031	2331
2018	134827	22602	—
2019	147466	23917	—
2020	160970	25315	—

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 2020, the nominal human capital per capita

increased from 39.4 thousand Yuan to 2.5 million yuan, an increase of approximately 63 times; and the real human capital per capita increased from 39.4 thousand Yuan to 0.4 million Yuan, an increase of approximately 9 times.

Figure SC-2.1 illustrates the trends of human capital per capita by gender for Sichuan. The growth pattern of real human capital per capita of males is similar to that of females for Sichuan. Both of them kept increasing from 1985 to 2020, and the growth of human capital for males and females has both accelerated, with males' growth rate significantly higher than females'. As a result, the gender gap has expanded, especially since 1997.

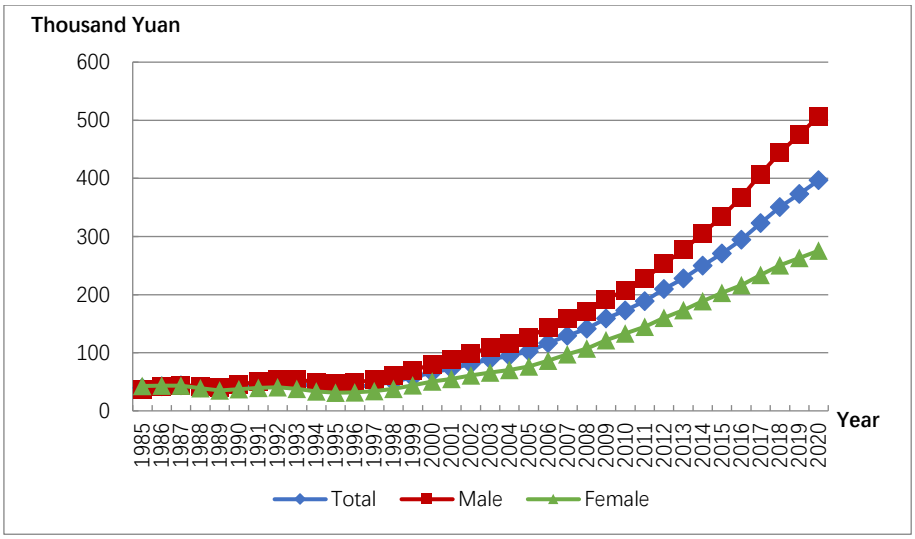

Figure SC-2.1 Human Capital Per Capita by Gender for Sichuan，1985-2020

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	39.38	67.14	34.65	39.38	67.14	34.65
1986	44.36	81.59	37.77	42.36	77.85	36.07
1987	49.00	91.03	41.25	43.78	78.89	37.31

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1988	54.62	100.30	45.35	40.71	70.73	34.62
1989	61.57	112.91	50.18	38.11	67.59	31.58
1990	69.82	128.67	55.82	41.60	75.89	33.45
1991	78.80	146.17	61.25	45.60	82.65	35.95
1992	88.98	166.48	66.82	48.22	85.74	37.49
1993	100.31	185.24	73.45	46.44	81.60	35.32
1994	113.29	206.77	80.96	41.91	71.22	31.78
1995	127.38	230.84	88.66	39.60	66.82	29.42
1996	144.60	265.58	97.68	40.97	70.01	29.71
1997	165.49	308.56	108.29	44.51	77.39	31.37
1998	184.81	343.36	119.86	49.83	86.29	34.89
1999	212.02	403.98	132.16	57.85	103.50	38.86
2000	243.38	468.91	147.39	66.19	120.49	43.08
2001	273.46	519.44	161.68	72.60	131.12	46.01
2002	304.28	569.31	175.23	80.83	144.43	49.87
2003	339.05	617.69	194.71	88.66	153.78	54.92
2004	379.17	678.17	215.17	94.43	161.41	57.69
2005	418.88	732.52	236.89	102.51	171.43	62.51
2006	489.55	832.19	267.70	116.66	190.19	69.06
2007	577.18	959.99	301.04	129.38	207.18	73.26
2008	662.49	1072.46	338.41	141.15	221.06	77.99
2009	752.05	1192.49	384.49	158.91	244.17	87.77
2010	844.67	1308.90	434.07	172.73	259.34	96.13
2011	974.47	1491.05	465.80	188.59	281.10	97.51
2012	1113.17	1678.47	505.66	209.46	307.81	103.77
2013	1245.57	1851.15	549.47	227.63	330.23	109.69
2014	1390.08	2046.14	601.11	249.75	358.91	118.46

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2015	1529.57	2229.27	665.34	270.84	385.64	129.06
2016	1696.50	2454.30	714.49	294.30	416.24	136.27
2017	1893.40	2718.17	774.30	323.12	453.29	146.51
2018	2091.24	2968.24	842.10	350.58	486.71	156.67
2019	2300.90	3232.27	911.03	373.17	513.08	164.40
2020	2522.15	3501.60	990.38	396.64	540.16	172.18

Figure SC-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growth of human capital for rural and urban has both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

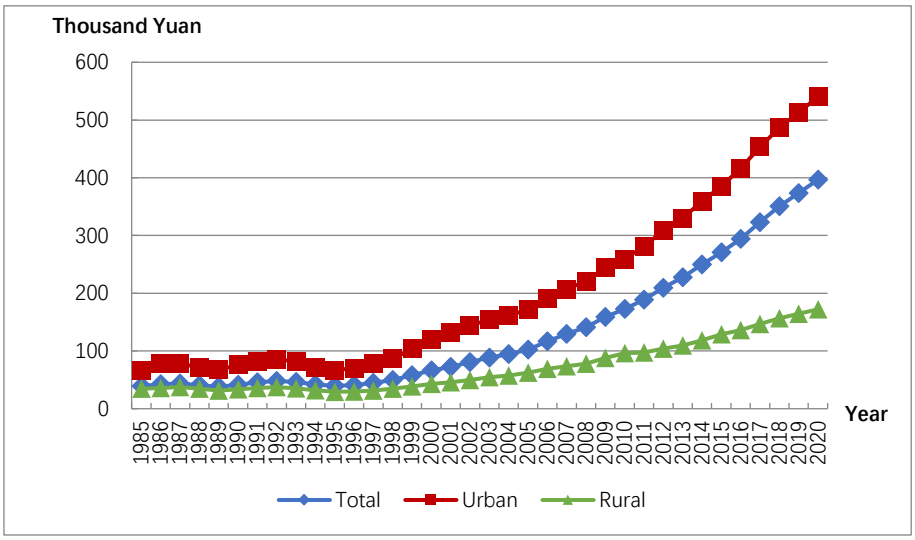

Figure SC-2.2 Real Human Capital Per Capita by Region for Sichuan，1985-2020

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 over 16 years of age, 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 2020, the nominal labor force human capital increased from 1.2 trillion Yuan to 60.3 trillion Yuan, an increase of more than 51 times; and the real labor force human capital increased from 1.2 trillion Yuan to 9.6 trillion Yuan, an increase of approximately 7times.

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)
1985	1163	1163
1986	1330	1270
1987	1540	1378
1988	1771	1322
1989	2076	1287
1990	2470	1473
1991	2754	1597
1992	3084	1680
1993	3414	1591
1994	3767	1409
1995	4117	1296
1996	4593	1318
1997	5133	1400
1998	5705	1560

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	6274	1738
2000	6890	1904
2001	7331	1975
2002	7706	2076
2003	8124	2156
2004	8529	2153
2005	9001	2232
2006	10974	2649
2007	13047	2966
2008	15232	3289
2009	17258	3696
2010	20101	4166
2011	23190	4543
2012	26311	5015
2013	29421	5445
2014	32682	5950
2015	35878	6437
2016	40455	7110
2017	45274	7835
2018	50055	8509
2019	55049	9056
2020	60277	9608

30.3.2 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. Tables SC-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 27.7

thousand Yuan to 1.3 million Yuan, an increase of more than 46 times; and the real average labor force human capital increased from 27.7 thousand Yuan to 0.2 million Yuan, an increase of approximately 7 times.

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	27.69	43.85	24.69	27.69	43.85	24.69
1986	30.78	49.59	27.21	29.40	47.32	25.99
1987	34.45	56.36	30.14	30.81	48.85	27.26
1988	38.64	62.60	33.56	28.86	44.15	25.61
1989	43.71	70.21	37.66	27.10	42.03	23.70
1990	49.72	78.93	42.59	29.65	46.55	25.52
1991	54.96	87.46	46.35	31.86	49.45	27.21
1992	60.84	96.52	50.69	33.15	49.71	28.44
1993	67.05	105.65	55.31	31.25	46.54	26.60
1994	73.73	115.43	60.22	27.58	39.76	23.64
1995	80.71	125.72	65.09	25.41	36.39	21.60
1996	90.28	143.52	71.12	25.92	37.83	21.63
1997	101.07	162.86	78.12	27.56	40.85	22.63
1998	112.47	181.67	86.13	30.75	45.66	25.07
1999	123.98	199.32	94.86	34.35	51.06	27.89
2000	136.88	219.59	104.34	37.82	56.43	30.50
2001	148.35	237.74	110.84	39.96	60.01	31.54
2002	159.45	255.10	117.09	42.96	64.72	33.32
2003	172.26	272.68	125.21	45.71	67.88	35.32

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**
2004	186.28	292.38	133.61	47.03	69.59	35.82
2005	201.70	312.22	143.70	50.02	73.07	37.92
2006	243.32	376.71	167.14	58.74	86.09	43.12
2007	287.88	440.24	194.10	65.44	95.01	47.24
2008	334.66	502.69	223.59	72.26	103.62	51.53
2009	380.71	557.58	258.34	81.54	114.17	58.97
2010	438.02	629.26	296.88	90.77	124.68	65.75
2011	500.96	724.18	320.67	98.13	136.52	67.12
2012	567.37	816.55	350.29	108.14	149.74	71.89
2013	634.13	904.79	383.95	117.36	161.41	76.65
2014	703.79	993.90	423.56	128.12	174.34	83.47
2015	770.75	1069.38	472.01	138.28	184.99	91.55
2016	863.04	1198.73	513.42	151.68	203.30	97.92
2017	965.30	1336.88	563.64	167.06	222.94	106.65
2018	1076.89	1483.54	621.63	183.06	243.26	115.65
2019	1190.13	1629.44	682.47	195.79	258.65	123.15
2020	1309.07	1777.10	751.72	208.66	274.14	130.69

Chapter 31 Human Capital for Guizhou

31.1 Total human capital

Table GZ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Guizhou. Column 1 contains nominal human capital based on six-education categories. Column 2 presents real human capital based on six-education categories. Column 3 reports the real physical capital of Guizhou.

Table GZ-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Guizhou

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1068	1068	28
1986	1215	1154	31
1987	1323	1171	33
1988	1464	1090	36
1989	1641	1030	38
1990	1867	1147	40
1991	2144	1256	42
1992	2423	1316	44
1993	2770	1295	46
1994	3163	1203	49
1995	3541	1104	53
1996	4051	1155	57
1997	4627	1275	62
1998	5174	1424	69
1999	5822	1614	77

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	6684	1859	85
2001	7791	2125	97
2002	8450	2326	110
2003	9383	2549	126
2004	10647	2778	142
2005	11843	3056	161
2006	13561	3441	183
2007	15383	3672	208
2008	17408	3868	238
2009	19879	4477	272
2010	22059	4825	317
2011	26085	5429	364
2012	30120	6107	426
2013	34356	6788	496
2014	39025	7530	570
2015	43367	8212	654
2016	48366	9031	756
2017	53820	9950	863
2018	59184	10739	—
2019	64907	11516	—
2020	70897	12279	—

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 2020, the nominal human capital per capita increased from 37.1 thousand Yuan to 2.2 million Yuan, an increase of more than 59 times; and the real human capital per capita increased from 37.1 thousand Yuan to 0.4 million Yuan, an increase of approximately 9 times.

Figure GZ-2.1 illustrates the trends of human capital per capita by gender for Guizhou. The growth pattern of real human capital per capita of males is similar to that of females for Guizhou. Both of them kept increasing from 1985 to 2020, and the growth of human capital for males and females both accelerated, with males' growth rate significantly higher than females'. As a result, the gender gap has expanded, especially from 1997 onward.

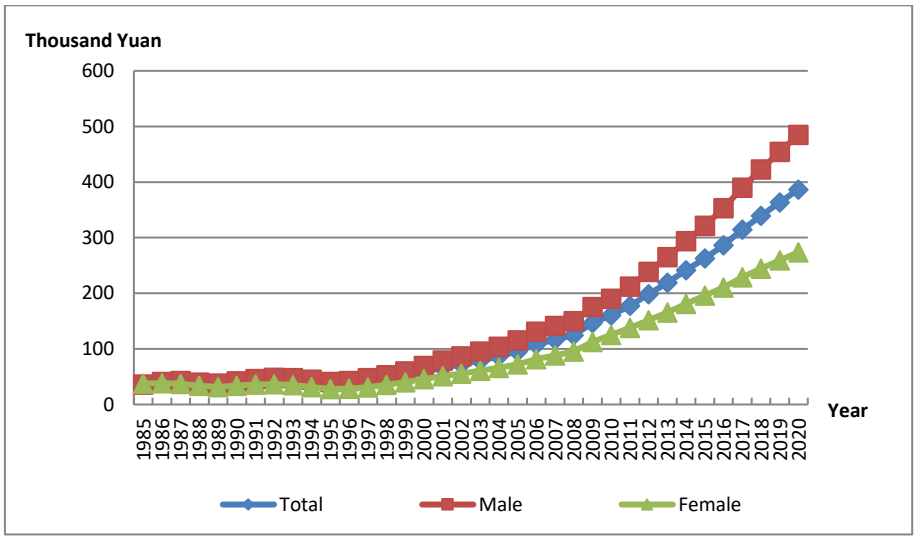

Figure GZ-2.1 Human Capital Per Capita by Gender for Guizhou，1985-2020

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	37.07	75.64	28.92	37.07	75.64	28.92

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1986	41.69	92.50	31.01	39.60	86.94	29.64
1987	45.27	102.02	33.26	40.07	87.40	30.05
1988	49.69	112.53	36.20	37.00	79.35	27.91
1989	55.38	127.93	39.40	34.76	76.51	25.57
1990	61.88	144.74	43.03	38.00	85.62	27.17
1991	70.46	168.80	46.77	41.30	96.11	28.09
1992	79.02	188.12	50.96	42.94	98.54	28.63
1993	89.39	212.56	55.71	41.80	96.15	26.94
1994	100.79	239.33	60.94	38.34	88.73	23.84
1995	111.30	258.21	66.54	34.71	80.11	20.88
1996	126.77	302.93	72.85	36.15	84.98	21.20
1997	145.08	357.49	79.76	39.98	96.99	22.45
1998	162.08	402.98	87.56	44.60	108.79	24.74
1999	182.87	460.57	95.99	50.68	125.71	27.21
2000	210.77	536.29	105.98	58.61	147.56	29.98
2001	242.94	614.03	116.46	66.24	165.00	32.59
2002	262.57	641.81	126.64	72.28	174.38	35.68
2003	291.60	685.67	140.49	79.23	184.63	38.81
2004	331.62	761.00	154.38	86.51	197.99	40.50
2005	369.29	819.23	168.83	95.31	211.86	43.38
2006	425.97	908.10	190.33	108.09	231.15	47.95
2007	489.53	1006.11	214.34	116.85	241.83	50.27
2008	561.38	1113.15	241.56	124.72	250.06	52.08
2009	649.97	1253.36	275.45	146.37	285.55	59.98
2010	732.15	1369.16	312.63	160.14	302.55	66.35
2011	854.49	1550.73	345.29	177.86	325.43	69.93
2012	978.59	1717.08	384.30	198.40	350.86	75.71

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2013	1108.03	1881.60	427.79	218.92	373.64	82.87
2014	1251.79	2071.17	478.95	241.54	401.65	90.52
2015	1388.57	2245.20	539.64	262.93	426.86	100.48
2016	1533.52	2424.47	595.61	286.33	454.13	109.70
2017	1700.88	2625.79	662.97	314.44	486.49	121.37
2018	1870.14	2818.83	739.09	339.32	512.01	133.44
2019	2047.93	3019.67	825.26	363.34	536.69	145.22
2020	2233.47	3215.84	925.48	386.82	558.70	157.96

Figure GZ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remained larger than that in the rural areas. Since 1997, the growth has accelerated for both rural and urban human capital, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural human capital expanded rapidly.

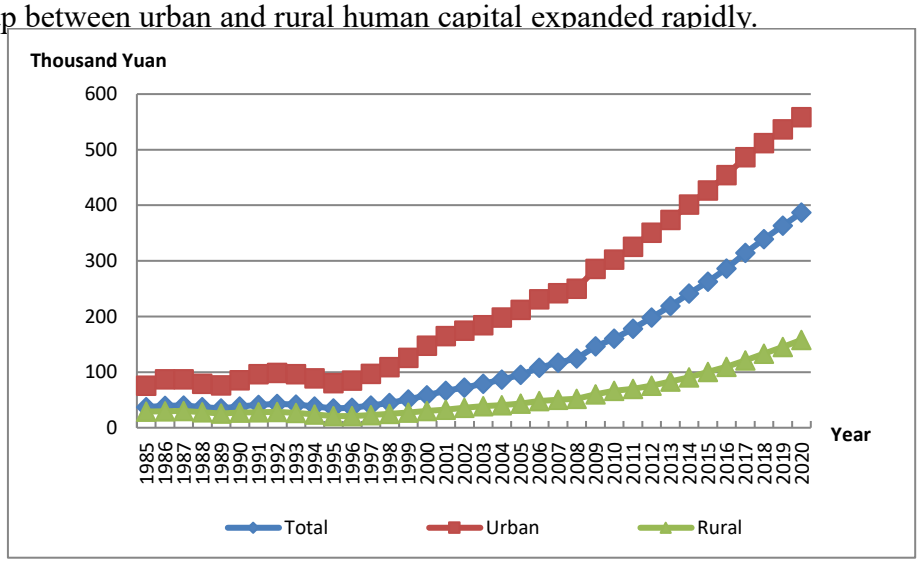

Figure GZ-2.2 Real Human Capital Per Capita by Region for Guizhou1985-2020

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 over 16 years of age, 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 2020, the nominal labor force human capital increased from 0.4 trillion Yuan to 26 trillion Yuan, an increase of more than 66 times; and the real labor force human capital increased from 0.4 trillion Yuan to 4.5 trillion Yuan, an increase of approximately 11 times.

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)
1985	387	387
1986	440	418
1987	506	448
1988	571	426
1989	658	414
1990	774	476
1991	870	511
1992	981	535
1993	1113	522
1994	1274	486
1995	1452	453
1996	1596	456
1997	1734	479
1998	1905	526
1999	2095	582

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	2321	647
2001	2553	699
2002	2762	763
2003	2959	806
2004	3227	843
2005	3582	924
2006	4193	1063
2007	4809	1145
2008	5420	1199
2009	6085	1364
2010	6787	1479
2011	8014	1663
2012	9239	1867
2013	10504	2070
2014	11787	2268
2015	13132	2480
2016	15287	2849
2017	17680	3264
2018	20200	3663
2019	23015	4078
2020	26077	4507

31.3.2 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. Tables GZ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 25.7 thousand Yuan to 1.2 million Yuan, an increase of more than 47 times; and

the real average labor force human capital increased from 25.7 thousand Yuan to 0.2 million Yuan, an increase of approximately 7 times.

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	25.65	46.36	20.61	25.65	46.36	20.61
1986	28.21	52.85	22.25	26.81	49.67	21.27
1987	31.19	60.48	24.18	27.64	51.81	21.85
1988	34.45	67.41	26.30	25.68	47.53	20.28
1989	38.40	75.69	28.86	24.14	45.27	18.73
1990	43.16	85.22	32.10	26.54	50.41	20.26
1991	47.69	94.38	34.65	28.00	53.74	20.81
1992	52.86	104.63	37.57	28.80	54.80	21.11
1993	58.81	116.12	41.03	27.58	52.53	19.84
1994	65.49	128.53	45.21	24.98	47.65	17.69
1995	73.15	143.20	49.32	22.82	44.43	15.47
1996	80.67	160.34	53.30	23.05	44.98	15.51
1997	88.29	176.65	57.97	24.39	47.93	16.32
1998	97.23	195.34	63.36	26.84	52.73	17.91
1999	106.64	214.33	69.48	29.65	58.50	19.69
2000	118.02	237.64	76.22	32.91	65.39	21.56
2001	129.27	259.40	81.91	35.40	69.70	22.92
2002	140.26	280.97	87.44	38.75	76.34	24.64
2003	151.04	297.73	94.89	41.15	80.17	26.22
2004	165.10	322.26	102.72	43.12	83.84	26.95
2005	182.41	353.30	111.57	47.04	91.37	28.67
2006	214.60	411.51	126.59	54.39	104.75	31.89
2007	249.18	469.75	142.88	59.33	112.91	33.51
2008	285.02	524.13	161.04	63.07	117.74	34.72

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**
2009	325.25	581.09	182.85	72.92	132.39	39.82
2010	367.46	637.15	207.77	80.06	140.79	44.10
2011	426.35	726.87	230.82	88.45	152.54	46.75
2012	486.51	810.73	258.94	98.30	165.66	51.01
2013	547.48	889.04	292.18	107.90	176.54	56.60
2014	607.78	960.34	333.43	116.94	186.23	63.02
2015	668.57	1022.02	385.68	126.27	194.31	71.81
2016	760.31	1152.13	434.34	141.67	215.81	79.99
2017	866.24	1296.15	493.25	159.91	240.14	90.30
2018	980.10	1443.78	559.89	177.71	262.25	101.09
2019	1102.29	1595.27	637.18	195.33	283.53	112.13
2020	1234.96	1750.63	723.87	213.45	304.15	123.55

Chapter 32 Human Capital for Yunnan

32.1 Total human capital

Table YN-1.1 presents the estimates of nominal and real total human capital and real physical capital for Yunnan. Column 1 contains nominal human capital estimated based on six-education categories. Column 2 contains real human capital estimated based on six-education categories. Column 3 contains the real physical capital of Yunnan.

Table YN-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Yunnan

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1215	1215	79
1986	1381	1305	81
1987	1561	1380	84
1988	1731	1279	88
1989	1930	1202	91
1990	2188	1328	95
1991	2473	1456	103
1992	2846	1529	113
1993	3285	1458	122
1994	3825	1433	132
1995	4367	1353	143
1996	5008	1433	155
1997	5711	1568	169
1998	7020	1897	187
1999	8197	2230	205

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	8497	2358	223
2001	9745	2738	240
2002	11062	3125	260
2003	12468	3483	286
2004	13768	3628	317
2005	15338	3986	350
2006	17550	4482	388
2007	19895	4804	429
2008	22449	5140	471
2009	24867	5671	543
2010	27677	6085	652
2011	32044	6737	785
2012	35964	7362	940
2013	39762	7889	1116
2014	44278	8580	1320
2015	49205	9348	1544
2016	53465	10012	1785
2017	58543	10865	2030
2018	63141	11535	—
2019	68173	12152	—
2020	73890	12720	—

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 2020, the nominal human capital per capita

increased from 38.1 thousand Yuan to 1.8 million Yuan, an increase of more than 47 times; and the real human capital per capita increased from 38.1 thousand Yuan to 0.3 million Yuan, an increase of approximately 7 times.

Figure YN-2.1 illustrates the trends of human capital per capita by gender for Yunnan. The growth pattern of real human capital per capita of males is similar to that of females for Yunnan. Both of them kept increasing from 1985 to 2020, and the growth of human capital for both males and females accelerated, with males' growth rate significantly higher than females'. As a result, the gender gap has expanded, especially from 1997 onward.

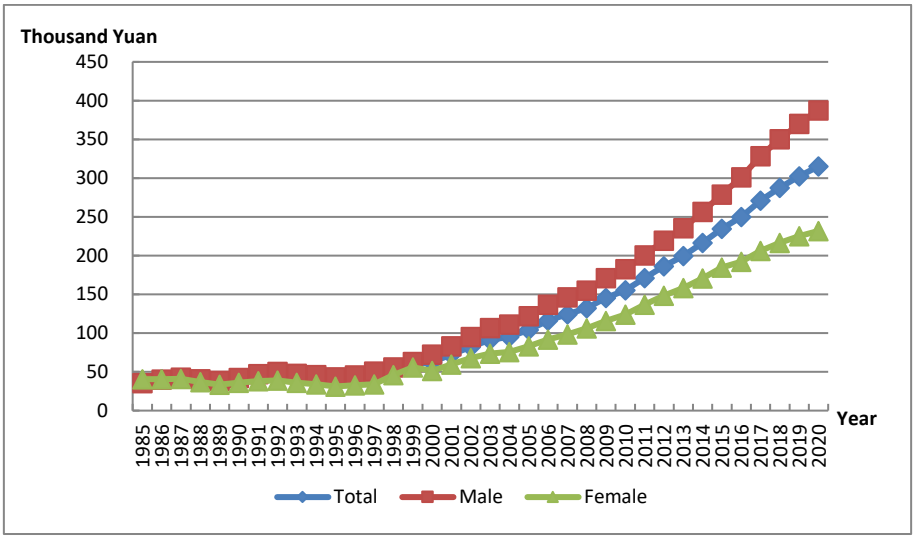

Figure YN-2.1 Real Human Capital Per Capita by Gender for Yunnan, 1985-2020

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	38.09	85.79	30.54	38.09	85.79	30.54
1986	42.81	103.86	32.84	40.44	99.10	30.87
1987	47.46	118.76	35.49	41.96	105.51	31.29

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	52.48	132.42	38.51	38.78	97.15	28.58
1989	58.08	147.37	42.00	36.19	91.70	26.19
1990	64.84	167.68	45.91	39.35	102.70	27.69
1991	73.20	188.74	49.82	43.07	111.37	29.26
1992	83.47	216.25	54.31	44.85	115.58	29.32
1993	95.15	246.30	59.49	42.22	110.81	26.04
1994	108.26	282.11	65.46	40.55	108.20	23.90
1995	121.48	313.90	71.59	37.65	100.08	21.46
1996	137.89	356.52	78.11	39.46	105.05	21.52
1997	155.93	401.85	85.57	42.83	113.20	22.69
1998	189.66	510.54	93.82	51.25	140.45	24.61
1999	219.73	591.54	102.61	59.78	164.70	26.73
2000	225.46	563.48	113.42	62.57	160.75	30.02
2001	257.33	624.85	124.40	72.30	181.71	32.73
2002	291.67	694.71	135.32	82.39	203.45	35.43
2003	327.60	757.12	150.73	91.52	218.88	39.07
2004	360.25	807.07	166.98	94.93	219.91	40.87
2005	400.15	873.74	183.22	104.00	234.09	44.41
2006	454.48	964.95	204.62	116.08	253.71	48.72
2007	514.48	1061.04	227.68	124.23	263.43	51.19
2008	578.39	1156.86	253.60	132.43	272.51	53.79
2009	638.44	1229.66	285.15	145.59	288.21	60.36
2010	707.21	1316.83	319.55	155.49	297.35	65.29
2011	814.17	1483.00	347.66	171.18	319.53	67.71
2012	911.19	1614.27	381.50	186.52	337.68	72.63
2013	1006.36	1735.90	419.69	199.66	351.19	77.80
2014	1116.67	1877.79	464.40	216.37	370.26	84.49
2015	1235.23	2026.47	519.43	234.68	390.98	93.28

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	1334.55	2146.31	570.11	249.91	408.39	100.68
2017	1459.67	2307.08	633.51	270.90	435.49	110.44
2018	1573.95	2439.33	704.88	287.55	453.20	121.18
2019	1697.47	2577.61	784.69	302.57	467.67	131.35
2020	1831.33	2714.58	879.09	315.27	476.33	141.63

Figure YN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remained larger than that in the rural areas. Since 1995, the growth of human capital for rural and urban has both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions human capital expanded rapidly.

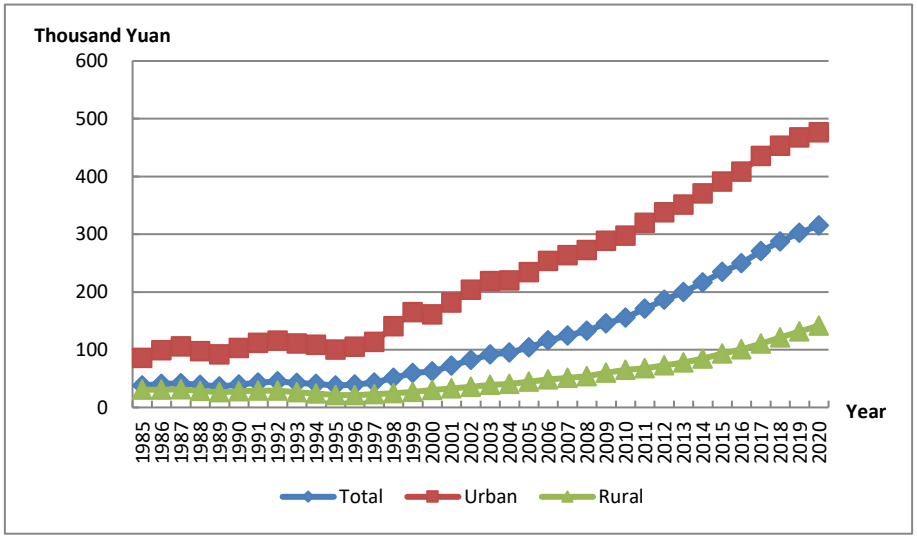

Figure YN-2.2 Real Human Capital Per Capita by Region for Yunnan，1985-2020

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 over 16 years of age, 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 2020, the nominal labor force human capital increased from 0.5 trillion Yuan to 28.4 trillion Yuan, an increase of more than 59 times. The real labor force human capital increased from 0.5 trillion Yuan to 4.9 trillion Yuan, an increase of approximately 9 times.

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)
1985	470	470
1986	535	505
1987	616	545
1988	700	517
1989	805	502
1990	939	569
1991	1070	630
1992	1225	659
1993	1400	620
1994	1634	610
1995	1881	580
1996	2142	609
1997	2422	662
1998	2734	734
1999	3068	827

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	3451	950
2001	3830	1064
2002	4184	1165
2003	4664	1285
2004	5228	1361
2005	5834	1500
2006	6586	1664
2007	7355	1757
2008	8211	1858
2009	9211	2078
2010	10340	2251
2011	11742	2445
2012	13251	2689
2013	14815	2917
2014	16358	3146
2015	17983	3393
2016	19850	3690
2017	21848	4023
2018	23833	4321
2019	26044	4605
2020	28435	4853

32.3.2 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. Tables YN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 26.8 thousand Yuan to 1.0 million Yuan, an increase of more than 37 times. The

real average labor force human capital increased from 26.8 thousand Yuan to 0.2 million Yuan, an increase of approximately 6 times.

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	26.83	53.57	22.07	26.83	53.57	22.07
1986	29.64	61.17	23.90	27.99	58.37	22.46
1987	32.85	69.60	26.02	29.04	61.84	22.94
1988	36.46	77.94	28.45	26.95	57.18	21.12
1989	40.60	87.23	31.34	25.30	54.28	19.54
1990	45.35	97.36	34.86	27.51	59.63	21.02
1991	50.83	110.89	37.85	29.90	65.43	22.23
1992	56.98	125.25	41.33	30.63	66.94	22.31
1993	63.73	140.17	45.31	28.23	63.06	19.84
1994	71.66	157.16	50.28	26.74	60.28	18.36
1995	80.24	175.52	55.27	24.75	55.96	16.57
1996	89.46	194.37	60.53	25.45	57.27	16.68
1997	99.54	214.27	66.39	27.19	60.36	17.61
1998	110.30	233.38	72.95	29.63	64.20	19.13
1999	121.67	252.63	79.70	32.79	70.34	20.76
2000	134.51	274.32	87.26	37.03	78.26	23.10
2001	148.69	298.83	95.14	41.30	86.90	25.03
2002	162.54	322.63	103.26	45.26	94.48	27.03
2003	180.30	350.96	113.84	49.68	101.46	29.51
2004	201.16	386.28	124.67	52.37	105.25	30.52
2005	223.22	423.01	135.95	57.39	113.33	32.95
2006	250.26	465.78	150.93	63.23	122.46	35.93
2007	279.08	509.68	167.19	66.65	126.54	37.59

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	310.60	554.85	185.36	70.29	130.70	39.31
2009	347.59	606.44	207.08	78.42	142.14	43.83
2010	388.37	662.33	230.92	84.54	149.56	47.18
2011	437.13	735.65	250.03	91.00	158.50	48.70
2012	490.27	810.59	273.19	99.50	169.56	52.01
2013	544.23	880.96	300.52	107.15	178.23	55.71
2014	596.41	940.07	333.53	114.72	185.36	60.68
2015	651.09	994.21	375.62	122.84	191.82	67.46
2016	712.54	1074.52	415.20	132.46	204.45	73.32
2017	783.59	1164.60	463.44	144.28	219.83	80.79
2018	856.56	1253.03	516.53	155.28	232.80	88.80
2019	935.56	1343.65	577.20	165.43	243.79	96.62
2020	1020.39	1433.13	647.51	174.16	251.47	104.32

Chapter 33 Human Capital for Tibet

33.1 Total human capital

Table XZ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Tibet. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Tibet.

Table XZ-1.1 Real Physical Wealth Capital Stocks, 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)
1985	71	71	8
1986	85	80	8
1987	98	86	9
1988	110	83	10
1989	120	78	10
1990	130	80	10
1991	149	84	11
1992	174	91	12
1993	199	91	12
1994	225	81	14
1995	255	76	15
1996	298	82	17
1997	356	93	17
1998	388	101	18
1999	463	121	19
2000	500	130	20

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	606	158	21
2002	723	187	24
2003	810	208	27
2004	911	228	33
2005	1100	271	40
2006	1339	322	47
2007	1406	328	56
2008	1598	353	65
2009	1697	370	76
2010	1888	402	93
2011	2153	436	108
2012	2328	456	126
2013	2661	502	150
2014	3039	556	176
2015	3452	618	202
2016	3671	641	232
2017	3904	671	264
2018	4285	726	—
2019	4693	776	—
2020	5080	823	—

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 2020, the nominal human capital per capita increased from 39.4 thousand Yuan to 1.7 million Yuan, an increase of

approximately 43 times; and the real human capital per capita increased from 39.4 thousand Yuan to 281.3 thousand Yuan, an increase of approximately 6 times.

Figure XZ-2.1 illustrates the trends of human capital per capita by gender for Tibet. The growth pattern of real human capital per capita of male is similar to that of female for Tibet. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

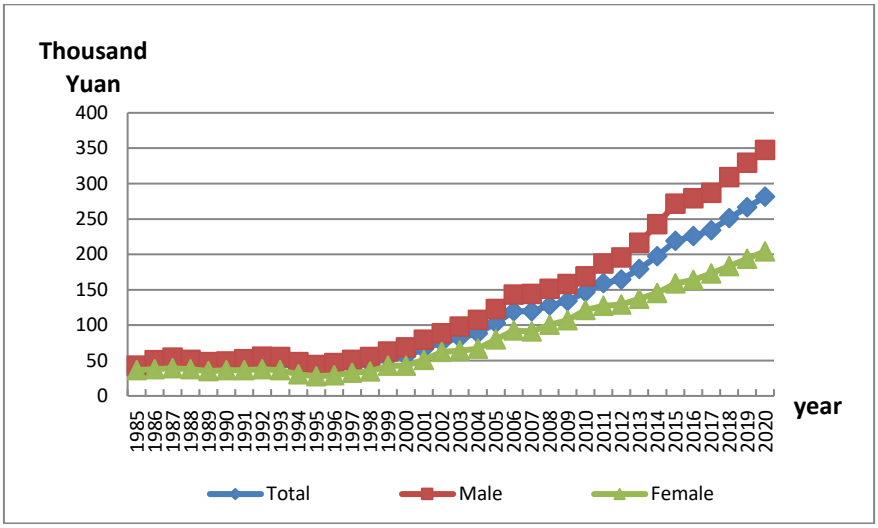

Figure XZ-2.1 Human Capital Per Capita by Gender for Tibet，1985-2018

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	39.35	118.08	26.34	39.35	118.08	26.34
1986	46.57	150.00	28.27	43.68	140.19	26.61
1987	52.65	167.93	30.60	46.31	144.85	27.47
1988	58.29	186.59	33.36	44.24	136.62	26.29

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1989	63.96	203.76	36.65	41.49	128.73	24.45
1990	68.98	224.46	39.70	42.65	134.80	25.29
1991	78.94	249.31	43.76	44.64	136.85	25.60
1992	90.37	281.90	48.10	46.91	141.97	25.93
1993	101.01	306.37	53.31	46.15	133.93	25.76
1994	110.45	326.91	59.13	39.51	113.88	21.88
1995	120.94	353.90	65.35	36.19	101.63	20.57
1996	137.96	402.25	71.61	38.15	105.49	21.25
1997	161.24	473.05	79.13	42.28	118.38	22.24
1998	173.53	486.30	86.88	45.29	121.94	24.05
1999	204.05	581.55	95.87	53.20	146.70	26.41
2000	216.20	585.85	105.33	56.33	147.20	29.07
2001	253.61	680.07	115.95	66.01	172.25	31.72
2002	294.08	779.99	126.55	75.92	195.60	34.66
2003	320.13	812.89	141.46	81.99	202.23	38.39
2004	353.13	871.54	155.51	88.22	212.57	40.82
2005	417.72	1027.96	170.91	102.79	247.02	44.46
2006	496.20	1221.49	191.61	119.47	288.05	48.68
2007	511.50	1199.25	213.93	119.41	274.84	52.16
2008	578.79	1349.46	237.45	127.77	292.58	54.77
2009	615.36	1399.47	264.44	134.06	299.01	60.24
2010	689.10	1574.82	293.17	146.86	329.23	65.34
2011	785.91	1779.20	317.57	159.23	353.57	67.60
2012	840.19	1857.50	342.96	164.40	356.30	70.61
2013	950.38	2087.40	370.98	179.43	386.86	73.72
2014	1079.28	2332.07	400.85	197.40	418.40	77.72
2015	1224.63	2608.64	435.86	219.28	458.39	83.01

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	1293.07	2664.93	475.03	225.79	456.42	88.26
2017	1361.64	2707.49	525.70	234.11	456.40	96.05
2018	1482.60	2871.81	582.70	251.09	477.89	104.17
2019	1611.43	3043.65	649.75	266.63	494.61	113.54
2020	1735.96	3193.44	732.02	281.30	507.78	125.29

Figure XZ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

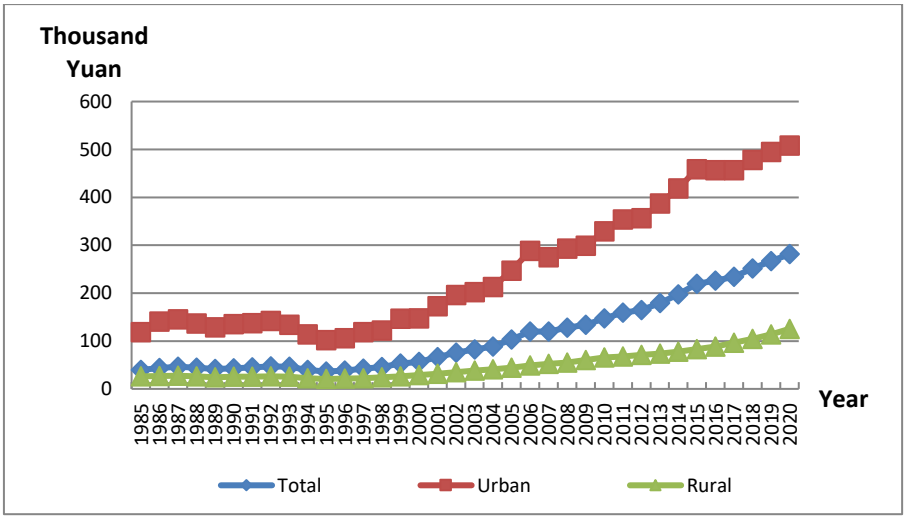

Figure XZ-2.2 Real Human Capital Per Capita by Region for Tibet，1985-2020

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 2020, the nominal labor force human capital increased from 28 billion Yuan[34] to 2.2 trillion Yuan, an increase of more than 73 times; and the real labor force human capital increased from 0.03 trillion Yuan to 0.4 trillion Yuan, an increase of approximately 11 times.

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)
1985	28	28
1986	32	30
1987	35	31
1988	40	31
1989	46	30
1990	53	33
1991	60	34
1992	67	35
1993	75	35
1994	85	31
1995	95	29
1996	111	31

[34] In 1985, both the nominal and actual labor force human capital stocks of the Tibet were 0.02820 trillion yuan, which are 0.03 trillion yuan and 0.028 trillion yuan after rounding.

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1997	130	34
1998	150	39
1999	173	45
2000	200	52
2001	221	58
2002	244	64
2003	277	72
2004	319	80
2005	373	93
2006	442	107
2007	511	120
2008	570	127
2009	623	137
2010	682	146
2011	826	169
2012	972	191
2013	1126	214
2014	1258	231
2015	1408	253
2016	1554	272
2017	1730	298
2018	1895	321
2019	2071	343
2020	2247	364

33.3.2 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. Tables XZ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to

2020, the nominal average labor force human capital increased from 27.4 thousand Yuan to 1131.0 thousand Yuan, an increase of more than 40 times; and the real average labor force human capital increased from 27.4 thousand Yuan to 183.0 thousand Yuan, an increase of more than 5 times.

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	27.36	72.98	20.87	27.36	72.98	20.87
1986	29.83	82.17	22.14	28.01	76.79	20.84
1987	32.54	91.52	23.59	28.79	78.94	21.18
1988	36.38	103.97	25.67	27.87	76.13	20.23
1989	40.61	117.37	27.94	26.50	74.15	18.64
1990	45.65	132.67	30.65	28.37	79.68	19.52
1991	50.76	143.88	33.23	28.87	78.98	19.44
1992	56.51	156.16	36.16	29.53	78.64	19.50
1993	62.31	167.59	39.24	28.72	73.26	18.96
1994	68.99	179.92	43.28	24.79	62.67	16.01
1995	75.55	191.12	47.69	22.76	54.88	15.01
1996	85.40	214.03	52.35	23.83	56.13	15.54
1997	96.79	239.45	57.96	25.62	59.92	16.29
1998	108.74	264.14	64.05	28.57	66.23	17.73
1999	120.75	286.55	71.63	31.74	72.29	19.73
2000	133.85	310.55	80.37	35.16	78.03	22.18
2001	147.69	341.44	86.66	38.74	86.48	23.71
2002	162.79	376.18	93.42	42.45	94.34	25.58
2003	182.55	418.13	102.96	47.16	104.03	27.94
2004	204.84	466.94	113.31	51.52	113.89	29.74
2005	233.09	526.69	126.38	57.85	126.56	32.87

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**
2006	267.30	599.15	142.20	64.92	141.29	36.12
2007	300.70	667.55	159.08	70.59	152.99	38.78
2008	329.70	722.82	177.81	73.26	156.72	41.01
2009	356.88	773.25	199.31	78.29	165.21	45.40
2010	386.17	822.65	222.94	82.98	171.98	49.69
2011	449.45	962.02	241.43	91.75	191.18	51.40
2012	515.55	1098.92	258.51	101.41	210.79	53.22
2013	585.44	1236.79	275.94	111.01	229.22	54.84
2014	650.67	1362.67	291.71	119.54	244.48	56.56
2015	723.62	1493.94	312.09	130.15	262.51	59.44
2016	791.73	1611.96	329.63	138.66	276.08	61.25
2017	873.85	1746.98	353.26	150.43	294.49	64.54
2018	954.98	1874.38	377.08	161.78	311.91	67.41
2019	1042.01	2005.57	406.74	172.34	325.92	71.08
2020	1130.95	2131.35	443.10	183.02	338.90	75.84

Chapter 34 Human Capital for Shaanxi

34.1 Total human capital

Table SaX-1.1 presents the estimates of nominal and real total human capital and real physical capital for Shaanxi. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Shaanxi.

Table SaX-1.1 Real Physical Wealth Capital Stocks, 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)
1985	1014	1014	33
1986	1175	1110	39
1987	1345	1181	44
1988	1547	1149	49
1989	1771	1100	54
1990	2017	1224	57
1991	2362	1346	61
1992	2755	1433	65
1993	3159	1445	69
1994	3590	1292	74
1995	4045	1224	79
1996	4749	1301	85
1997	5571	1451	91
1998	6109	1618	99
1999	7042	1906	108
2000	8232	2225	120

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	9589	2562	132
2002	10274	2777	146
2003	11231	2988	163
2004	12301	3176	184
2005	13197	3369	211
2006	15247	3830	245
2007	17658	4215	292
2008	20442	4587	349
2009	23492	5246	420
2010	26577	5709	507
2011	30275	6151	600
2012	34864	6894	707
2013	39806	7645	819
2014	44635	8435	939
2015	49056	9185	1049
2016	56974	10532	1169
2017	63906	11614	1289
2018	69880	12446	—
2019	76110	13174	—
2020	82542	13939	—

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 2020, the nominal human capital per capita increased from 36.2 thousand Yuan to 2.8 million Yuan, an increase of

approximately 77 times; and the real human capital per capita increased from 36.2 thousand Yuan to 479.2 thousand Yuan, an increase of more than 12 times.

Figure SaX-2.1 illustrates the trends of human capital per capita by gender for Shaanxi. The growth pattern of real human capital per capita of male is similar to that of female for Shaanxi. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

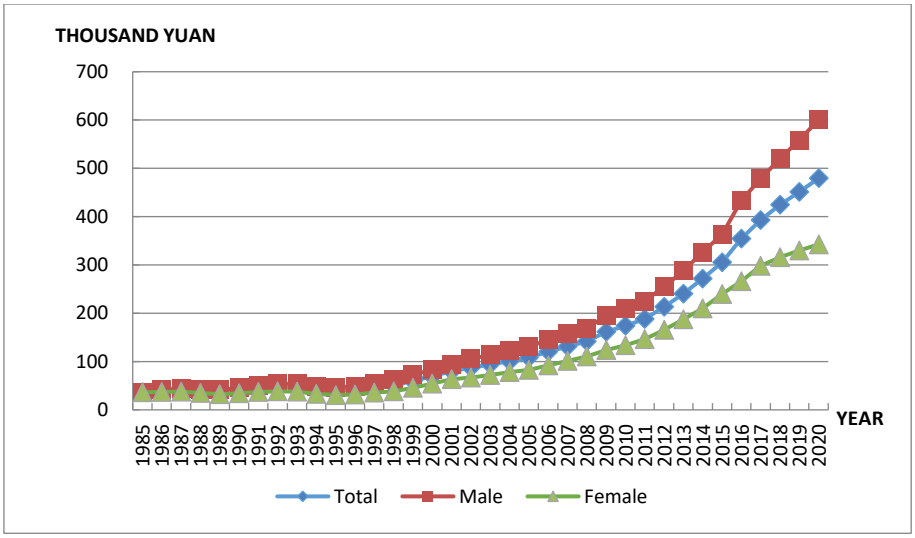

Figure SaX-2.1 Human Capital Per Capita by Gender for Shaanxi，1985-2020

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	36.21	66.22	28.19	36.21	66.22	28.19
1986	41.61	82.00	30.83	39.32	76.92	29.28
1987	46.87	94.87	33.83	41.18	81.50	30.22
1988	52.68	106.03	37.26	39.11	75.84	28.50

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1989	59.58	119.06	41.54	37.00	72.42	26.26
1990	66.57	131.66	46.16	40.39	78.05	28.58
1991	77.07	153.84	50.76	43.92	85.00	29.85
1992	89.01	177.31	56.15	46.32	88.09	30.77
1993	101.55	201.26	62.23	46.45	87.71	30.18
1994	114.90	225.33	68.96	41.37	76.60	26.71
1995	128.66	249.60	76.09	38.92	71.91	24.58
1996	149.92	290.86	83.47	41.06	75.97	24.60
1997	175.23	339.81	91.91	45.65	84.37	26.05
1998	192.34	363.18	101.19	50.94	92.30	28.88
1999	221.06	415.27	111.18	59.83	108.57	32.25
2000	258.12	485.89	122.54	69.77	126.66	35.90
2001	300.23	565.07	135.06	80.21	147.15	38.45
2002	322.71	591.36	146.84	87.21	156.82	41.64
2003	354.29	635.48	163.39	94.27	167.18	44.77
2004	390.82	692.45	181.03	100.90	176.86	48.06
2005	421.91	735.16	199.59	107.70	186.10	52.05
2006	479.43	822.54	228.88	120.43	203.93	59.45
2007	548.70	923.08	258.58	130.99	217.55	63.91
2008	630.48	1044.69	292.60	141.48	231.83	67.78
2009	723.88	1184.58	331.14	161.65	262.88	75.35
2010	812.29	1295.51	371.43	174.48	277.24	80.72
2011	927.09	1439.11	400.40	188.36	291.36	82.40
2012	1078.99	1636.21	431.46	213.37	322.87	86.13
2013	1251.79	1857.24	465.98	240.43	356.50	89.78
2014	1438.14	2099.38	509.74	271.78	396.64	96.48
2015	1629.26	2343.37	564.19	305.06	438.79	105.63

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	1917.39	2748.18	601.83	354.45	507.98	111.34
2017	2162.70	3063.04	665.42	393.04	556.17	121.76
2018	2382.17	3328.30	737.90	424.29	592.48	131.99
2019	2606.00	3588.07	816.25	451.07	620.72	141.89
2020	2838.30	3845.85	908.57	479.29	649.09	154.08

Figure SaX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020 the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

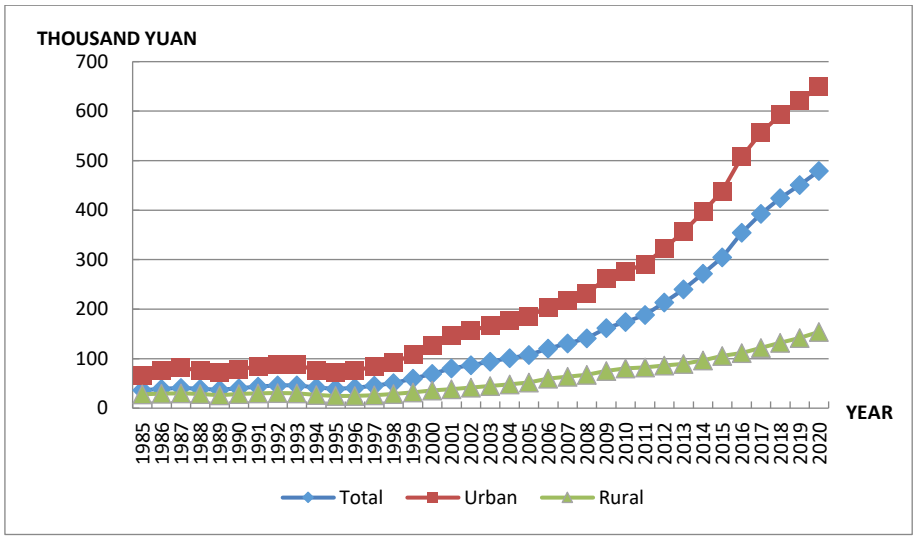

Figure SaX-2.2 Real Human Capital Per Capita by Region for Shaanxi，1985-2020

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 2020, the nominal labor force human capital increased from 0.4 trillion Yuan to 42.2 trillion Yuan, an increase of approximately 91 times; and the real labor force human capital increased from 0.4 trillion Yuan to 7.1 trillion Yuan, an increase of approximately 15 times.

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)
1985	456	456
1986	514	486
1987	590	519
1988	704	523
1989	831	516
1990	977	593
1991	1113	635
1992	1251	653
1993	1403	644
1994	1590	575
1995	1810	549
1996	2094	576
1997	2422	634
1998	2736	727

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	3166	860
2000	3734	1014
2001	4254	1141
2002	4853	1313
2003	5502	1464
2004	6200	1600
2005	6994	1784
2006	8538	2142
2007	10215	2436
2008	11926	2674
2009	13740	3067
2010	16065	3450
2011	18251	3708
2012	20420	4039
2013	22558	4333
2014	24515	4633
2015	26255	4916
2016	29072	5374
2017	32146	5844
2018	35212	6273
2019	38658	6692
2020	42230	7133

34.3.2 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. Tables SaX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 27.5 thousand Yuan to 2030.5 thousand Yuan, an increase of approximately 73

times; and the real average labor force human capital increased from 27.5 thousand Yuan to 343.0 thousand Yuan, an increase of more than 11 times.

Table SaX-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	27.47	47.26	20.89	27.47	47.26	20.89
1986	30.54	53.88	22.82	28.86	50.55	21.67
1987	34.23	61.95	25.07	30.11	53.22	22.40
1988	39.26	71.22	27.89	29.18	50.94	21.33
1989	44.58	80.43	31.08	27.70	48.92	19.65
1990	50.41	90.09	34.75	30.59	53.41	21.51
1991	56.60	100.56	38.10	32.29	55.56	22.40
1992	63.33	111.95	41.56	33.05	55.62	22.78
1993	70.70	123.85	45.58	32.46	53.98	22.10
1994	79.48	138.21	50.17	28.74	46.99	19.43
1995	89.83	155.02	55.07	27.25	44.66	17.79
1996	103.30	178.59	60.23	28.40	46.65	17.75
1997	118.74	205.20	66.09	31.09	50.95	18.73
1998	133.87	230.76	72.83	35.59	58.64	20.79
1999	152.90	261.61	80.46	41.54	68.40	23.34
2000	177.24	300.54	89.51	48.14	78.34	26.22
2001	201.96	336.05	96.97	54.14	87.51	27.61
2002	230.81	376.60	104.32	62.45	99.87	29.58
2003	261.70	415.40	114.24	69.64	109.28	31.30
2004	295.78	457.43	125.43	76.34	116.83	33.30
2005	332.19	501.93	138.51	84.75	127.06	36.12
2006	394.45	585.65	161.00	98.95	145.20	41.82

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2007	461.31	672.16	186.28	109.99	158.41	46.04
2008	530.92	759.58	213.17	119.03	168.56	49.38
2009	608.03	855.02	243.79	135.73	189.74	55.47
2010	696.60	959.81	276.24	149.59	205.40	60.04
2011	793.15	1074.72	302.46	161.13	217.59	62.25
2012	898.15	1194.45	331.41	177.63	235.70	66.16
2013	1008.08	1320.79	361.79	193.64	253.53	69.71
2014	1122.18	1454.36	394.06	212.08	274.77	74.59
2015	1234.54	1581.86	434.54	231.15	296.20	81.35
2016	1359.02	1741.46	477.12	251.24	321.90	88.26
2017	1510.19	1921.74	529.82	274.54	348.94	96.95
2018	1668.84	2103.57	588.77	297.29	374.46	105.31
2019	1844.84	2287.80	654.82	319.38	395.78	113.83
2020	2030.59	2470.85	732.04	342.96	417.02	124.14

Chapter 35 Human Capital for Gansu

35.1 Total human capital

Table GS-1.1 presents the estimates of nominal and real total human capital and real physical capital for Gansu. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Gansu.

Table GS-1.1 Real Physical Wealth Capital Stocks, 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)
1985	622	622	34
1986	715	672	37
1987	806	706	41
1988	919	682	44
1989	1050	660	47
1990	1207	733	50
1991	1359	785	53
1992	1530	827	56
1993	1718	803	58
1994	1920	724	60
1995	2156	679	63
1996	2443	699	67
1997	2774	771	71
1998	3111	873	76
1999	3538	1016	83

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	3947	1139	91
2001	4510	1250	101
2002	5087	1411	113
2003	5800	1591	127
2004	6469	1734	143
2005	7182	1891	161
2006	8362	2176	181
2007	9518	2349	204
2008	10729	2449	230
2009	11904	2682	262
2010	13264	2870	300
2011	15113	3092	344
2012	16839	3359	394
2013	18634	3609	450
2014	20328	3855	512
2015	21898	4092	579
2016	24013	4433	653
2017	26416	4813	694
2018	28464	5085	—
2019	30767	5376	—
2020	33230	5695	—

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 2020, the nominal human capital per capita

increased from 31.8 thousand Yuan to 1.5 million Yuan, an increase of approximately 46 times; and the real human capital per capita increased from 31.8 thousand Yuan to 259.7 thousand Yuan, an increase of approximately 7 times.

Figure GS-2.1 illustrates the trends of human capital per capita by gender for Gansu. The growth pattern of real human capital per capita of male is similar to that of female for Gansu. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

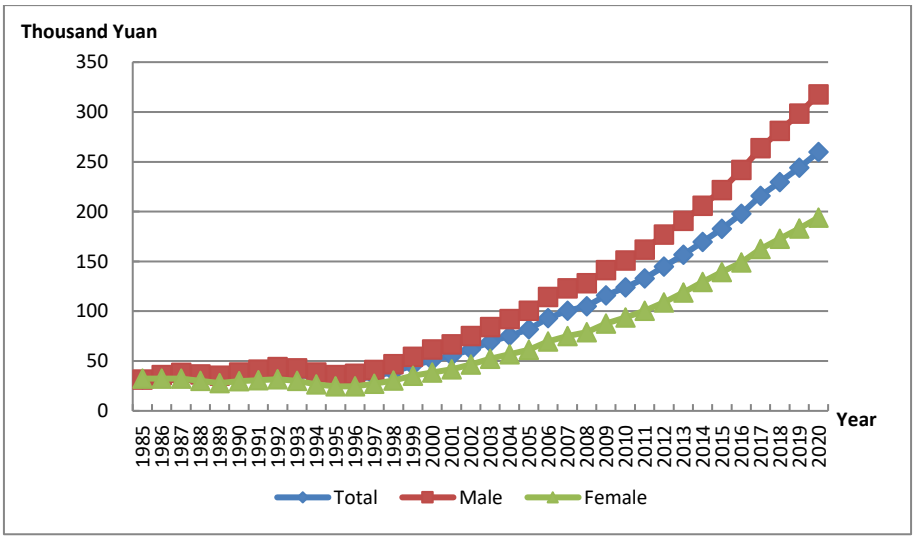

Figure GS-2.1 Human Capital Per Capita by Gender for Gansu，1985-2020

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	29.30	68.70	20.52	29.30	68.70	20.52
1986	33.90	81.27	22.67	31.85	75.97	21.39

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1987	38.12	90.63	25.02	33.36	78.17	22.17
1988	31.82	67.14	23.96	31.82	67.14	23.96
1989	36.32	80.03	25.96	34.14	74.81	24.49
1990	40.51	89.96	28.16	35.47	77.59	24.96
1991	45.15	98.96	30.86	33.49	70.78	23.58
1992	50.55	109.57	34.06	31.77	66.30	22.13
1993	56.69	122.28	37.59	34.44	72.60	23.33
1994	63.28	137.66	41.18	36.56	77.32	24.45
1995	70.65	154.73	45.20	38.19	80.99	25.22
1996	78.73	172.72	49.77	36.82	78.49	23.98
1997	87.47	192.11	54.72	32.97	70.07	21.35
1998	97.29	214.53	60.08	30.65	65.80	19.49
1999	109.70	244.97	66.10	31.39	68.13	19.55
2000	124.52	283.34	72.92	34.61	76.66	20.95
2001	139.23	318.30	80.41	39.09	86.97	23.36
2002	158.13	367.24	88.48	45.44	103.25	26.18
2003	176.20	406.00	98.21	50.83	115.07	29.03
2004	198.56	442.84	108.52	55.03	121.85	30.40
2005	222.21	480.76	118.59	61.62	133.21	32.92
2006	251.80	527.95	132.09	69.07	144.98	36.17
2007	281.06	575.53	146.25	75.33	156.01	38.39
2008	310.37	612.87	160.97	81.73	164.15	41.03
2009	357.75	688.22	182.19	93.11	182.17	45.80
2010	406.80	761.37	204.80	100.41	191.56	48.48
2011	459.70	838.85	230.00	104.91	195.42	50.08
2012	514.07	919.28	260.14	115.83	212.23	55.42
2013	572.16	994.17	293.52	123.79	219.86	60.36

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2014	649.52	1106.23	320.65	132.89	230.80	62.38
2015	725.78	1208.15	351.22	144.79	245.92	66.27
2016	809.77	1324.99	384.61	156.83	261.84	70.18
2017	894.04	1439.20	422.80	169.56	278.31	75.57
2018	976.96	1546.00	469.12	182.57	294.84	82.37
2019	1070.73	1667.79	513.44	197.68	314.32	88.81
2020	1183.78	1815.45	568.07	215.68	337.45	96.99

Figure GS-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

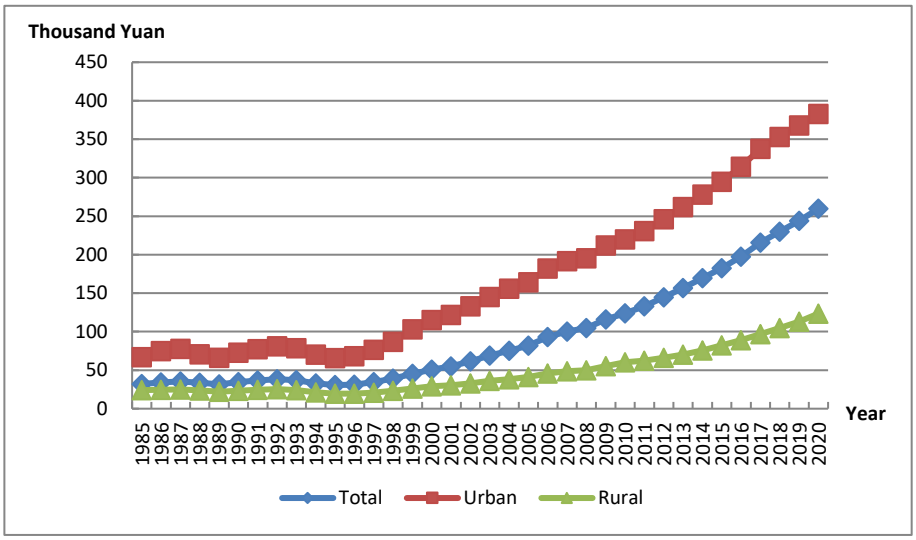

Figure GS-2.2 Real Human Capital Per Capita by Region for Gansu，1985-2020

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 2020, the nominal labor force human capital increased from 268.0 billion Yuan to 15.2 trillion Yuan, an increase of more than 55 times; and the real labor force human capital increased from 268.0 billion Yuan to 2.6 trillion Yuan, an increase of approximately 8 times.

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)
1985	268	268
1986	311	293
1987	365	320
1988	423	314
1989	494	311
1990	575	349
1991	648	375
1992	723	391
1993	800	375
1994	886	334
1995	980	309
1996	1092	313
1997	1207	336
1998	1336	376
1999	1476	425

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	1642	475
2001	1811	503
2002	1982	550
2003	2183	599
2004	2348	627
2005	2645	693
2006	3127	810
2007	3627	890
2008	4153	942
2009	4648	1039
2010	5404	1161
2011	6221	1265
2012	7033	1394
2013	7822	1504
2014	8577	1615
2015	9274	1720
2016	10397	1904
2017	11565	2090
2018	12735	2255
2019	13950	2415
2020	15201	2579

35.3.2 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. Tables GS-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 23.7

thousand Yuan to 948.6 thousand Yuan, an increase of approximately 39 times; and the real average labor force human capital increased from 23.7 thousand Yuan to 160.9 thousand Yuan, an increase of approximately 5 times.

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	23.69	48.71	17.88	23.69	48.71	17.88
1986	26.53	54.94	19.54	24.94	51.36	18.44
1987	29.83	62.05	21.44	26.13	53.52	19.00
1988	33.33	68.11	23.69	24.74	48.71	18.10
1989	37.35	74.95	26.28	23.50	45.35	17.07
1990	41.81	82.33	29.23	25.42	48.88	18.14
1991	46.32	91.78	31.81	26.79	51.55	18.89
1992	51.03	101.43	34.59	27.61	53.10	19.30
1993	56.05	111.64	37.61	26.25	50.73	18.12
1994	61.52	122.51	41.06	23.22	44.69	16.02
1995	67.60	134.78	44.65	21.32	41.34	14.48
1996	74.97	150.70	49.02	21.49	41.91	14.50
1997	82.70	166.73	53.93	23.05	45.11	15.49
1998	91.19	183.49	59.47	25.68	50.14	17.28
1999	100.10	200.37	65.54	28.86	56.34	19.39
2000	110.50	220.06	72.64	31.97	62.37	21.47
2001	121.46	236.55	78.77	33.70	65.09	22.06
2002	132.71	253.54	85.06	36.80	70.25	23.61
2003	145.42	269.94	93.45	39.88	74.13	25.59
2004	156.57	281.88	102.87	41.82	76.41	27.01
2005	173.92	305.76	113.73	45.57	81.90	28.99

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
2006	203.71	357.39	129.34	52.76	94.60	32.51
2007	234.84	407.91	146.86	57.63	102.63	34.76
2008	267.40	456.97	166.57	60.64	106.46	36.27
2009	299.14	500.01	190.88	66.85	115.44	40.67
2010	343.36	563.74	217.10	73.79	124.67	44.64
2011	390.51	636.40	238.49	79.40	132.78	46.39
2012	438.78	705.94	263.01	86.95	143.69	49.62
2013	486.96	771.93	289.78	93.64	152.55	52.87
2014	535.01	833.65	319.38	100.74	161.21	57.08
2015	582.19	885.92	355.35	107.95	168.96	62.39
2016	645.34	969.82	394.43	118.18	182.77	68.22
2017	716.78	1060.23	442.52	129.51	197.07	75.56
2018	790.52	1149.70	495.88	139.98	209.72	82.77
2019	866.91	1236.37	555.68	150.06	220.67	90.57
2020	948.62	1320.37	626.40	160.95	231.27	100.00

Chapter 36 Human Capital for Qinghai

36.1 Total human capital

Table QH-1.1 presents the estimates of nominal and real total human capital and real physical capital for Qinghai. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Qinghai.

Table QH-1.1 Real Physical Wealth Capital Stocks, 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)
1985	138	138	11
1986	158	149	12
1987	177	157	13
1988	200	151	14
1989	226	144	15
1990	254	153	16
1991	291	164	17
1992	332	173	17
1993	377	175	19
1994	433	164	20
1995	491	158	21
1996	551	161	24
1997	627	174	27
1998	704	194	30
1999	793	219	34
2000	889	246	39

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	1015	274	46
2002	1131	298	53
2003	1257	324	62
2004	1390	347	71
2005	1534	379	81
2006	1744	424	92
2007	1961	447	104
2008	2192	453	117
2009	2497	503	137
2010	2807	536	163
2011	3220	578	195
2012	3610	627	239
2013	4025	672	298
2014	4444	720	367
2015	4876	769	442
2016	5313	823	519
2017	5754	877	597
2018	6245	928	—
2019	6785	984	—
2020	7379	1048	—

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 2020, the nominal human capital per capita increased from 34.3 thousand Yuan to 1.42 million Yuan, an increase of

approximately 40 times; and the real human capital per capita increased from 34.3 thousand Yuan to 201 thousand Yuan, an increase of approximately 5 times.

Figure QH-2.1 illustrates the trends of human capital per capita by gender for Qinghai. The growth pattern of real human capital per capita of male is similar to that of female for Qinghai. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1997.

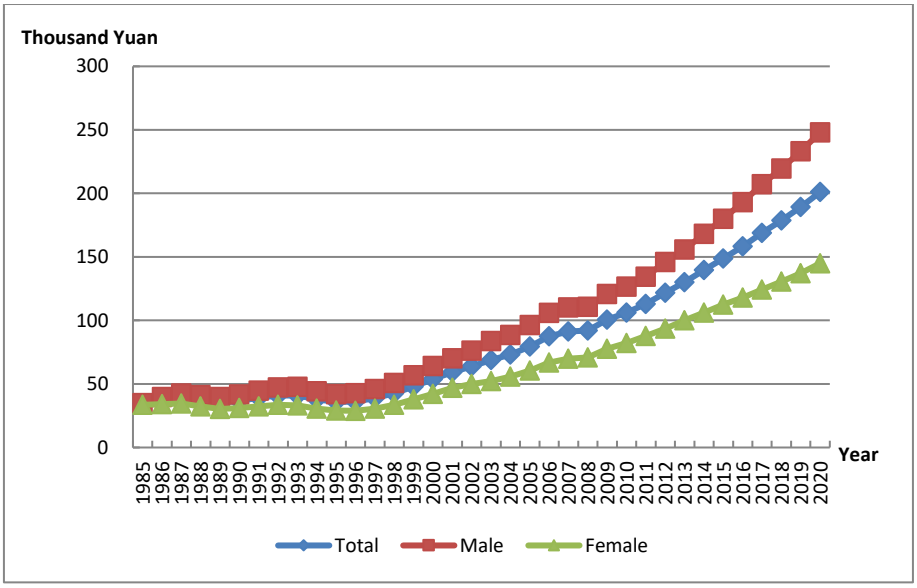

Figure QH-2.1 Human Capital Per Capita by Gender for Qinghai，1985-2020

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	34.32	59.69	25.75	34.32	59.69	25.75
1986	39.31	71.19	28.16	37.07	66.91	26.64
1987	43.79	79.16	30.74	38.79	69.02	27.65

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	49.25	88.40	33.61	37.13	64.98	26.01
1989	55.06	98.18	37.11	35.27	61.53	24.34
1990	60.86	108.08	40.88	36.74	64.69	24.92
1991	69.26	122.86	45.05	39.03	67.66	26.10
1992	78.30	138.56	49.56	40.93	70.26	26.94
1993	88.17	155.46	54.61	40.93	69.15	26.86
1994	99.99	177.44	60.42	37.96	64.06	24.62
1995	111.97	198.31	66.90	36.00	59.81	23.56
1996	124.49	219.81	73.70	36.25	59.51	23.86
1997	139.78	246.91	81.64	38.82	63.61	25.36
1998	155.33	273.21	89.99	42.76	69.96	27.68
1999	174.04	305.83	98.98	48.04	78.71	30.57
2000	194.14	338.26	110.11	53.80	87.40	34.21
2001	219.67	382.04	120.88	59.33	95.84	37.12
2002	242.66	418.45	131.26	63.85	102.81	39.17
2003	267.26	453.35	145.31	68.87	109.42	42.30
2004	293.30	491.04	159.72	73.10	116.08	44.07
2005	321.35	532.47	175.57	79.37	126.25	46.99
2006	360.25	582.54	197.36	87.53	135.68	52.24
2007	400.81	633.33	221.08	91.26	138.77	54.54
2008	445.21	690.63	245.68	92.08	138.96	53.97
2009	500.32	763.02	275.88	100.68	148.76	59.59
2010	555.44	830.95	308.11	106.07	154.14	62.91
2011	629.00	933.35	329.84	112.89	163.34	63.29
2012	700.51	1025.07	353.60	121.76	174.11	65.81
2013	780.12	1129.78	379.34	130.20	184.40	68.09
2014	861.13	1235.56	407.76	139.60	195.98	71.33

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2015	942.69	1337.74	444.01	148.76	206.40	76.00
2016	1022.31	1440.67	473.24	158.34	218.35	79.57
2017	1108.08	1547.07	509.94	168.87	230.56	84.81
2018	1201.81	1664.65	550.66	178.60	242.03	89.35
2019	1304.98	1792.69	594.02	189.23	254.54	94.03
2020	1415.03	1923.65	645.47	201.01	265.94	102.76

Figure QH-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

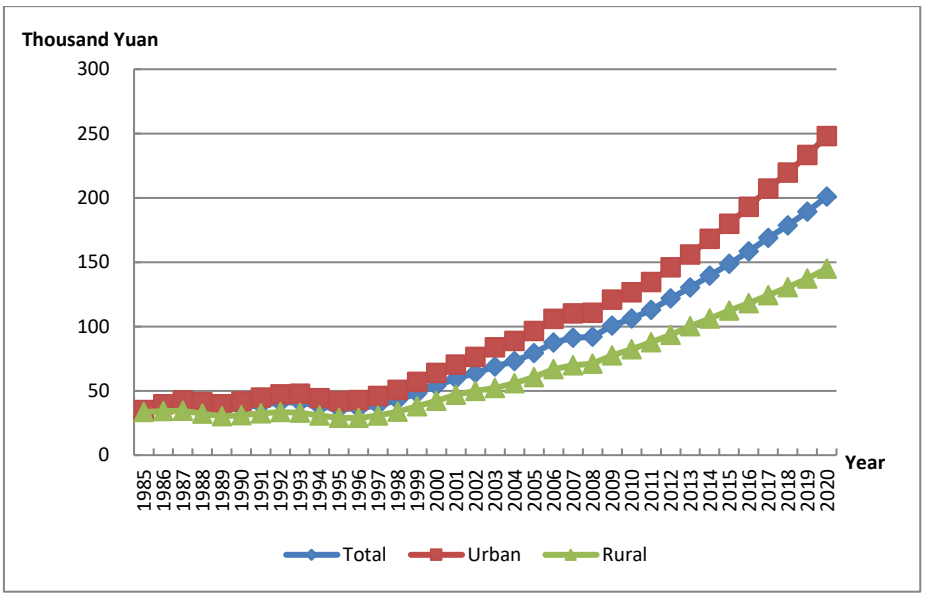

Figure QH-2.2 Real Human Capital Per Capita by Region for Qinghai, 1985-2020

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 2020, the nominal labor force human capital increased from 58.0 billion Yuan to 3.38 trillion Yuan, an increase of approximately 57 times; and the real labor force human capital increased from 58.0 billion Yuan to 483.0 billion Yuan, an increase of more than 7 times.

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)
1985	58	58
1986	65	61
1987	75	67
1988	88	67
1989	104	67
1990	121	73
1991	141	80
1992	162	85
1993	186	87
1994	212	81
1995	239	77
1996	268	79
1997	301	84
1998	336	93

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	373	104
2000	415	116
2001	456	125
2002	498	133
2003	548	143
2004	604	152
2005	663	165
2006	764	187
2007	871	199
2008	983	204
2009	1130	228
2010	1304	250
2011	1478	266
2012	1653	289
2013	1813	304
2014	1974	322
2015	2166	344
2016	2376	370
2017	2593	397
2018	2826	422
2019	3084	450
2020	3377	483

36.3.2 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. Tables QH-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 26.1 thousand Yuan to 915.3 thousand Yuan, an increase of approximately 34 times;

and the real average labor force human capital increased from 26.1 thousand Yuan to 130.9 thousand Yuan, an increase of approximately 4 times.

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	26.07	44.70	19.96	26.07	44.70	19.96
1986	28.70	48.93	21.85	27.08	45.98	20.67
1987	32.39	55.50	23.99	28.72	48.39	21.57
1988	36.63	62.69	26.55	27.67	46.09	20.55
1989	41.33	70.48	29.47	26.52	44.17	19.33
1990	46.28	78.24	32.93	27.96	46.83	20.07
1991	52.26	88.60	36.19	29.50	48.79	20.97
1992	58.66	99.41	39.82	30.74	50.40	21.65
1993	65.80	111.26	43.93	30.66	49.49	21.61
1994	73.38	123.47	48.67	28.01	44.58	19.84
1995	81.55	136.72	53.67	26.40	41.24	18.91
1996	90.11	149.89	59.01	26.45	40.58	19.10
1997	99.60	164.24	65.04	27.91	42.31	20.21
1998	109.62	178.65	71.82	30.46	45.75	22.09
1999	119.89	193.04	78.83	33.45	49.68	24.35
2000	131.63	209.81	86.60	36.89	54.21	26.91
2001	144.24	229.52	93.64	39.49	57.58	28.75
2002	157.52	250.63	100.81	42.00	61.58	30.08
2003	172.27	271.41	110.49	44.97	65.51	32.16
2004	188.32	294.10	121.06	47.44	69.52	33.40
2005	204.71	316.39	132.32	50.99	75.02	35.41
2006	233.14	356.34	147.40	57.07	83.00	39.02

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**
2007	263.36	397.34	163.86	60.30	87.06	40.43
2008	294.11	436.86	183.19	61.08	87.90	40.24
2009	331.63	485.09	207.10	67.06	94.58	44.74
2010	374.01	539.29	232.58	71.72	100.04	47.49
2011	417.28	600.35	247.35	75.19	105.06	47.46
2012	462.09	661.09	264.58	80.65	112.29	49.24
2013	504.20	715.76	283.74	84.55	116.82	50.93
2014	547.40	771.01	304.74	89.21	122.29	53.31
2015	595.59	828.00	331.30	94.51	127.75	56.71
2016	647.26	899.76	352.40	100.80	136.37	59.25
2017	705.71	978.30	379.26	108.15	145.80	63.08
2018	769.03	1063.48	407.70	114.90	154.63	66.15
2019	838.56	1155.56	438.60	122.23	164.08	69.43
2020	915.33	1254.12	474.69	130.87	173.38	75.57

Chapter 37 Human Capital for Ningxia

37.1 Total human capital

Table NX-1.1 presents the estimates of nominal and real total human capital and real physical capital for Ningxia. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Ningxia.

Table NX-1.1 Real Physical Wealth Capital Stocks, 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)
1985	186	186	10.7
1986	214	203	11.8
1987	244	215	12.9
1988	277	210	13.8
1989	318	205	14.3
1990	367	220	14.9
1991	418	236	15.7
1992	477	250	16.5
1993	540	246	17.4
1994	609	225	18.3
1995	683	216	19.3
1996	783	232	20.2
1997	915	261	21.3
1998	1046	298	22.8
1999	1198	345	24.9
2000	1367	395	27.4

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2001	1608	456	30.6
2002	1828	520	34.4
2003	2077	581	39.7
2004	2331	628	46.2
2005	2651	703	54.4
2006	3131	813	64.2
2007	3622	892	75.0
2008	4143	939	90.1
2009	4760	1072	109.7
2010	5357	1160	132.9
2011	6170	1258	154.8
2012	7036	1404	181.1
2013	7949	1533	210.8
2014	8884	1681	252.3
2015	9800	1833	302.1
2016	10969	2019	355.8
2017	12004	2173	477.8
2018	13109	2320	—
2019	14320	2484	—
2020	15657	2672	

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 2020, the nominal human capital per capita increased from 45.4 thousand Yuan to 2.6 million Yuan, an increase of

approximately 57 times; and the real human capital per capita increased from 45.4 thousand Yuan to 447.4 thousand Yuan, an increase of approximately 9 times.

Figure NX-2.1 illustrates the trends of human capital per capita by gender for Ningxia. The growth pattern of real human capital per capita of male is similar to that of female for Ningxia. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 2000.

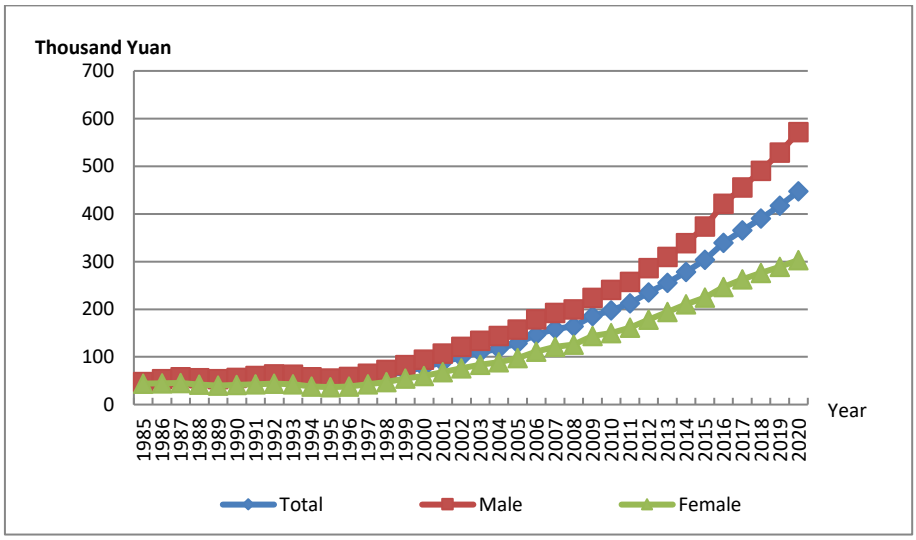

Figure NX-2.1 Human Capital Per Capita by Gender for Ningxia，1985-2020

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	45.44	82.57	33.36	45.44	82.57	33.36
1986	52.10	98.70	36.56	49.38	93.11	34.78
1987	58.29	109.67	40.27	51.38	94.13	36.38

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	64.78	120.62	44.59	48.95	87.98	34.84
1989	72.92	135.88	49.54	46.91	85.30	32.65
1990	82.29	153.40	55.15	49.34	91.26	33.34
1991	92.22	170.79	61.30	52.09	95.04	35.19
1992	103.63	189.99	68.18	54.21	96.74	36.76
1993	116.27	212.94	76.00	53.09	94.10	36.00
1994	130.31	237.94	84.40	48.24	84.26	32.88
1995	145.66	267.25	93.27	46.11	80.69	31.21
1996	164.55	303.25	102.63	48.72	85.88	32.13
1997	190.13	355.25	113.69	54.16	96.85	34.40
1998	213.54	396.82	125.78	60.81	108.18	38.13
1999	240.85	446.58	138.82	69.41	122.86	42.90
2000	269.95	492.34	155.74	78.05	135.85	48.37
2001	312.68	562.19	173.02	88.65	153.10	52.57
2002	350.14	616.90	189.63	99.65	169.01	57.92
2003	393.16	673.63	212.15	109.94	181.87	63.52
2004	435.59	722.78	234.96	117.31	188.86	67.32
2005	484.43	786.86	258.44	128.43	202.38	73.17
2006	564.08	898.27	290.11	146.47	227.18	80.30
2007	643.47	1004.79	322.25	158.40	241.83	84.23
2008	725.15	1111.17	356.63	164.42	247.81	84.81
2009	824.47	1246.78	399.68	185.72	277.25	93.65
2010	913.16	1352.50	444.86	197.77	289.86	99.61
2011	1040.88	1511.51	479.34	212.21	306.22	100.03
2012	1179.12	1685.65	518.27	235.28	334.12	106.33
2013	1323.88	1867.20	562.30	255.41	358.32	111.15
2014	1471.65	2054.51	614.54	278.44	386.48	119.56

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2015	1623.44	2248.45	673.90	303.61	418.00	129.82
2016	1845.04	2528.44	727.48	339.59	462.58	138.46
2017	2019.20	2740.61	787.68	365.56	493.00	148.00
2018	2205.70	2969.67	851.48	390.39	522.74	155.78
2019	2406.94	3214.50	920.75	417.50	554.70	165.01
2020	2621.33	3467.72	1004.69	447.43	588.35	178.26

Figure NX-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

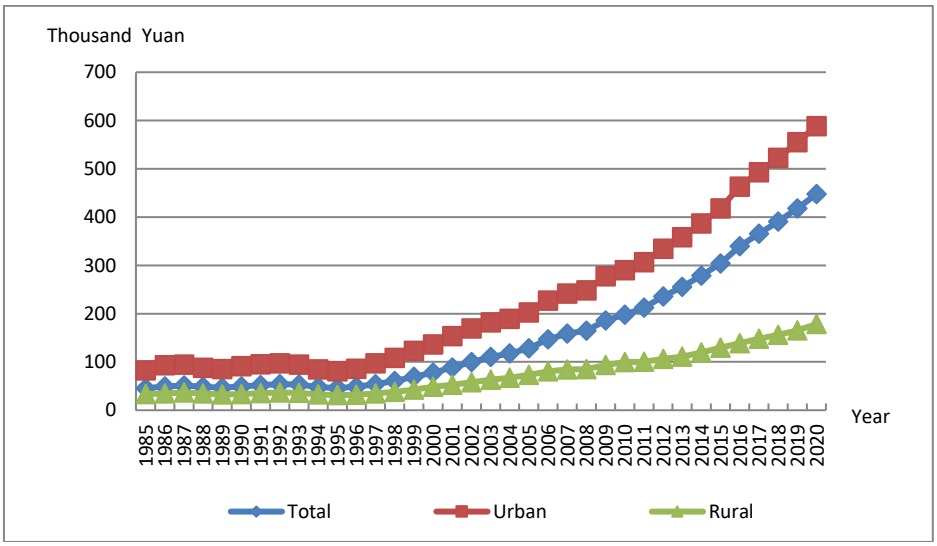

Figure NX-2.2 Real Human Capital Per Capita by Region for Ningxia，1985-2020

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 2020, the nominal labor force human capital increased from 66.0 billion Yuan to 5.6 trillion Yuan, an increase of approximately 83 times; and the real labor force human capital increased from 66.0 billion Yuan to 950.0 billion Yuan, an increase of approximately 13 times.

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)
1985	66	66
1986	73	70
1987	86	76
1988	102	77
1989	121	78
1990	143	86
1991	165	94
1992	191	100
1993	213	98
1994	241	89
1995	271	86
1996	314	93
1997	362	104
1998	413	118

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1999	469	136
2000	532	155
2001	598	171
2002	662	190
2003	733	206
2004	822	223
2005	928	248
2006	1093	286
2007	1279	317
2008	1476	337
2009	1675	379
2010	1952	424
2011	2229	456
2012	2514	503
2013	2824	546
2014	3187	605
2015	3519	660
2016	3835	708
2017	4277	777
2018	4706	836
2019	5106	889
2020	5546	950

37.3.2 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. Tables NX-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 30.8 thousand Yuan to 1372.2 thousand Yuan, an increase of more than 43 times;

and the real average labor force human capital increased from 30.8 thousand Yuan to 235.1 thousand Yuan, an increase of approximately 7 times.

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	30.80	51.34	23.85	30.80	51.34	23.85
1986	33.43	54.77	26.15	31.69	51.67	24.88
1987	37.51	61.68	28.76	33.15	52.94	25.98
1988	42.70	70.85	31.86	32.34	51.68	24.89
1989	48.60	80.96	35.50	31.30	50.82	23.40
1990	55.16	91.71	39.87	33.09	54.56	24.11
1991	61.87	102.90	44.08	34.97	57.26	25.30
1992	69.47	115.29	48.80	36.38	58.70	26.31
1993	76.48	125.69	54.03	34.98	55.54	25.60
1994	84.83	138.24	59.94	31.49	48.95	23.35
1995	93.88	152.02	66.17	29.81	45.90	22.15
1996	105.82	171.99	73.32	31.44	48.71	22.96
1997	119.06	193.47	81.33	34.07	52.75	24.61
1998	132.72	214.20	90.40	38.00	58.40	27.40
1999	147.02	234.86	100.16	42.66	64.61	30.95
2000	163.35	258.69	110.94	47.55	71.38	34.45
2001	181.31	283.25	120.72	51.76	77.14	36.68
2002	199.17	307.52	130.42	57.08	84.25	39.83
2003	218.26	329.55	143.66	61.46	88.97	43.01
2004	240.55	356.17	158.57	65.20	93.07	45.44
2005	265.22	385.57	175.29	70.82	99.17	49.63
2006	306.78	443.66	197.31	80.20	112.20	54.61

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**
2007	350.77	503.50	221.47	86.90	121.18	57.89
2008	395.98	561.88	249.40	90.27	125.31	59.31
2009	442.60	618.95	282.95	100.19	137.64	66.30
2010	502.10	695.01	317.19	109.16	148.95	71.02
2011	566.74	781.60	341.67	115.83	158.35	71.30
2012	633.75	868.12	370.35	126.83	172.08	75.98
2013	705.22	958.29	403.14	136.39	183.90	79.69
2014	783.61	1055.67	446.99	148.69	198.58	86.96
2015	856.23	1138.81	493.37	160.63	211.71	95.04
2016	950.77	1256.74	528.31	175.58	229.92	100.55
2017	1055.68	1390.66	577.12	191.81	250.16	108.44
2018	1161.11	1524.20	628.08	206.15	268.30	114.91
2019	1262.63	1648.33	683.45	219.70	284.44	122.48
2020	1372.17	1777.71	747.42	235.09	301.61	132.61

Chapter 38 Human Capital for Xinjiang

38.1 Total human capital

Table XJ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Xinjiang. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Xinjiang.

Table XJ-1.1 Real Physical Wealth Capital Stocks, 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)
1985	550	550	31
1986	650	606	35
1987	748	653	38
1988	853	650	42
1989	964	631	46
1990	1096	683	51
1991	1256	719	58
1992	1457	768	66
1993	1668	781	76
1994	1930	712	88
1995	2204	677	101
1996	2555	710	112
1997	2968	794	124
1998	3364	898	138
1999	3838	1051	152
2000	4392	1211	167
2001	4979	1319	184

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital(Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2002	5386	1434	205
2003	5904	1565	231
2004	6495	1673	260
2005	7099	1814	290
2006	8373	2111	325
2007	9679	2315	365
2008	11190	2479	409
2009	12718	2799	456
2010	14395	3040	518
2011	16275	3248	589
2012	18326	3528	694
2013	20677	3831	826
2014	23163	4205	981
2015	25911	4680	1144
2016	28630	5102	1284
2017	31395	5470	1446
2018	34347	5869	—
2019	37861	6339	—
2020	41706	6879	—

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 2020, the nominal human capital per capita increased from 40.5 thousand Yuan to 1819.5 thousand Yuan, an increase of approximately 44 times; and the real human capital per capita increased from

40.5 thousand Yuan to 300.1 thousand Yuan, an increase of more than 6 times.

Figure XJ-2.1 illustrates the trends of human capital per capita by gender for Xinjiang. The growth pattern of real human capital per capita of male is similar to that of female for Xinjiang. Both of them kept increasing from 1985 to 2020, and the growth of human capital for male and female has both accelerated, with male's growth rate significantly higher than female's. As a result, the gender gap has been expanding, especially since 1999.

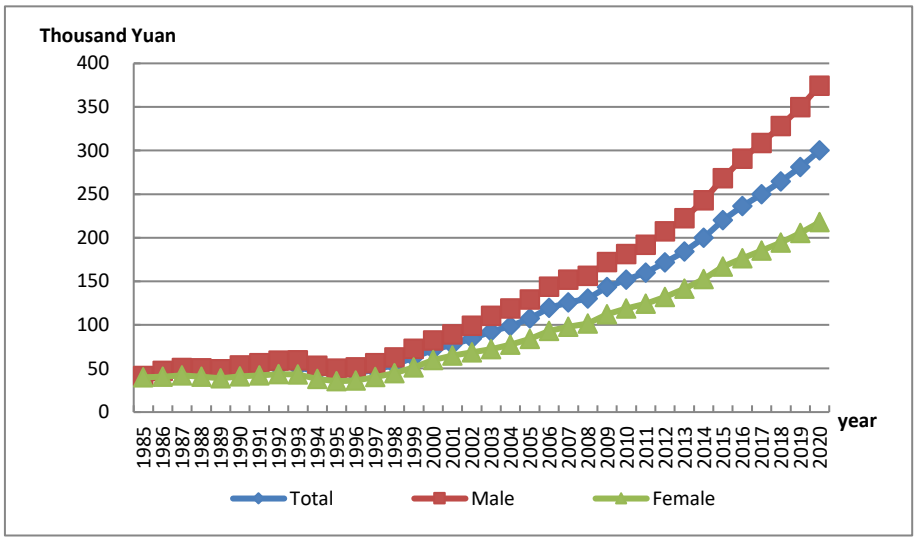

Figure XJ-2.1 Human Capital Per Capita by Gender for Xinjiang，1985-2020

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	40.51	64.54	30.33	40.51	64.54	30.33
1986	47.10	79.05	33.08	43.94	73.47	30.97
1987	53.15	90.43	36.26	46.42	77.18	32.49
1988	59.81	103.11	39.71	45.62	75.21	31.88

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1989	67.41	117.07	43.71	44.18	74.58	29.66
1990	76.30	133.00	48.55	47.53	81.08	31.11
1991	86.28	152.45	53.23	49.41	85.03	31.61
1992	98.21	175.66	58.82	51.74	89.64	32.47
1993	110.39	199.60	65.06	51.70	89.66	32.41
1994	124.83	229.77	72.13	46.07	80.82	28.61
1995	139.91	258.60	79.97	42.98	76.83	25.89
1996	159.10	299.88	87.68	44.19	80.70	25.67
1997	181.72	348.68	96.23	48.63	90.66	27.12
1998	202.75	391.56	105.67	54.11	101.91	29.54
1999	228.18	443.23	116.10	62.49	118.07	33.53
2000	258.92	504.32	128.48	71.40	134.21	38.01
2001	292.40	564.62	141.91	77.49	144.48	40.45
2002	317.13	601.69	155.20	84.41	155.68	43.85
2003	347.67	643.96	173.36	92.18	165.79	48.88
2004	383.22	697.13	191.81	98.73	175.78	51.75
2005	419.98	748.58	212.25	107.34	187.63	56.59
2006	473.38	825.82	237.97	119.36	204.94	62.20
2007	526.33	897.76	265.79	125.90	213.00	64.80
2008	586.89	982.91	296.59	130.03	217.33	66.04
2009	652.00	1075.78	331.59	143.47	237.49	72.39
2010	718.60	1161.99	369.14	151.73	247.61	76.17
2011	800.98	1291.38	399.44	159.85	260.83	77.17
2012	890.97	1432.45	434.03	171.53	279.88	80.10
2013	993.30	1592.57	473.32	184.06	299.49	83.91
2014	1101.19	1760.26	517.95	199.92	323.81	90.28
2015	1217.75	1934.11	569.97	219.97	354.02	98.75

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2016	1325.73	2087.92	623.16	236.24	376.90	106.58
2017	1433.82	2234.83	687.01	249.82	393.97	115.43
2018	1548.32	2388.78	759.07	264.56	413.66	124.54
2019	1679.40	2562.57	840.68	281.17	434.67	135.40
2020	1819.50	2733.06	939.53	300.10	457.64	148.36

Figure XJ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

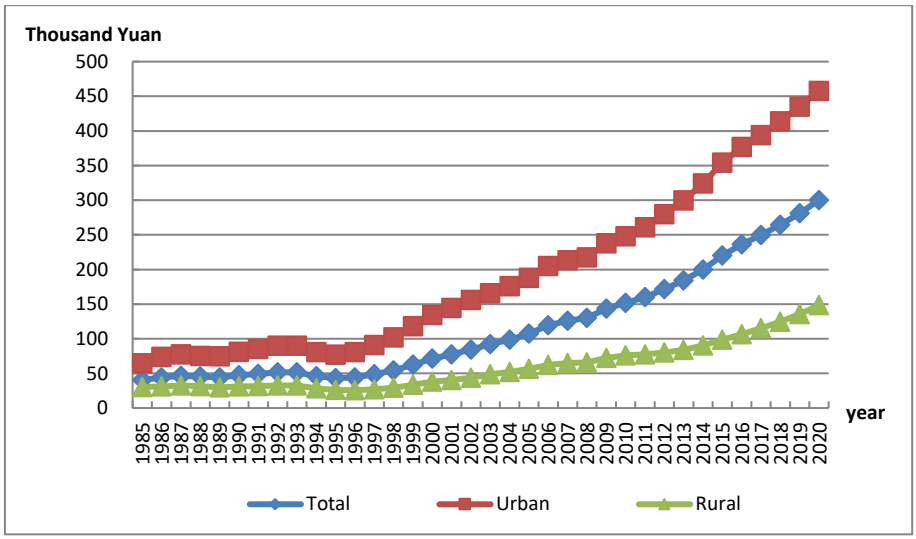

Figure XJ-2.2 Real Human Capital Per Capita by Region for Xinjiang 1985-2020

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 2020, the nominal labor force human capital increased from 209 billion Yuan to 16.4 trillion Yuan, an increase of more than 77 times; and the real labor force human capital increased from 209 billion Yuan to 2.7 trillion Yuan, an increase of approximately 12 times.

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)
1985	209	209
1986	244	227
1987	288	252
1988	336	256
1989	393	257
1990	458	285
1991	535	306
1992	622	328
1993	705	331
1994	810	300
1995	928	286
1996	1060	296
1997	1204	324
1998	1361	365
1999	1529	421

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	1722	479
2001	1904	510
2002	2066	554
2003	2283	611
2004	2517	653
2005	2776	714
2006	3397	861
2007	4038	968
2008	4746	1052
2009	5417	1191
2010	6279	1323
2011	7053	1402
2012	7867	1507
2013	8758	1614
2014	9683	1750
2015	10669	1919
2016	11629	2063
2017	12682	2202
2018	13777	2346
2019	14972	2499
2020	16392	2695

38.3.2 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. Tables XJ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 29.5 thousand Yuan to 1093.7 thousand Yuan, an increase of more than 36 times; and the

real average labor force human capital increased from 29.5 thousand Yuan to 179.8 thousand Yuan, an increase of more than 5 times.

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	29.52	43.23	22.72	29.52	43.23	22.72
1986	33.13	49.52	24.65	30.90	46.02	23.08
1987	37.75	57.23	27.11	32.96	48.84	24.29
1988	42.56	65.03	30.00	32.45	47.43	24.08
1989	48.20	74.17	33.23	31.58	47.25	22.55
1990	54.85	84.28	37.26	34.17	51.38	23.88
1991	61.72	96.21	41.02	35.35	53.66	24.36
1992	69.62	110.25	45.08	36.70	56.26	24.89
1993	77.02	123.07	49.85	36.13	55.28	24.84
1994	85.65	138.38	55.56	31.72	48.68	22.04
1995	95.69	155.65	61.84	29.48	46.24	20.02
1996	106.09	174.14	68.08	29.58	46.86	19.93
1997	117.61	194.18	74.97	31.63	50.49	21.12
1998	129.63	214.28	82.63	34.76	55.77	23.10
1999	142.44	235.16	90.75	39.25	62.64	26.21
2000	157.50	258.96	100.42	43.83	68.92	29.71
2001	173.59	283.74	110.19	46.46	72.61	31.41
2002	189.07	307.82	120.51	50.74	79.64	34.05
2003	208.16	334.66	134.24	55.66	86.16	37.85
2004	228.63	363.36	148.93	59.30	91.62	40.18
2005	251.62	393.02	165.63	64.71	98.51	44.16
2006	290.13	450.70	186.76	73.50	111.85	48.81
2007	327.82	503.61	209.33	78.60	119.48	51.04

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2008	367.47	556.91	234.08	81.46	123.14	52.12
2009	406.00	605.49	261.59	89.26	133.67	57.11
2010	452.79	665.24	290.36	95.38	141.76	59.91
2011	499.09	736.62	314.73	99.25	148.78	60.81
2012	548.69	812.43	341.94	105.13	158.74	63.10
2013	603.49	895.86	372.03	111.25	168.47	65.95
2014	662.49	985.26	402.02	119.72	181.25	70.07
2015	726.56	1079.10	436.25	130.65	197.52	75.58
2016	786.12	1161.10	470.49	139.49	209.60	80.47
2017	853.80	1252.74	511.03	148.24	220.84	85.86
2018	925.94	1348.34	556.17	157.65	233.49	91.25
2019	1003.53	1446.85	607.79	167.47	245.42	97.89
2020	1093.66	1555.56	669.81	179.80	260.47	105.77

Chapter 39 Human Capital for Hong Kong

39.1 Total human capital

Table HK-1.1 presents the estimates of nominal and real total human capital and real physical capital for Hongkong. Column 1 is nominal human capital in five-education category[35]. Column 2 is real human capital in five-education category.

Table HK-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital for Hong Kong

Year	Nominal Human Capital (Billions of HKD)	Real Human Capital (Billions of 1985 HKD)
1997	17202	7175
1998	15452	6089
1999	14953	5729
2000	14667	5855
2001	14346	5947
2002	14101	5943
2003	13887	6038
2004	13764	6138
2005	13630	6105
2006	13709	6086
2007	14044	6106
2008	14435	6156
2009	15335	6272
2010	15761	6407
2011	16261	6459
2012	16967	6403
2013	17998	6527
2014	19145	6653
2015	20386	6784
2016	21629	6991

[35] Hong Kong's census data does not have population data with undergraduate education, so only five types of education can be calculated for human capital. The actual value is obtained by dividing the nominal value by the CPI calculated based on 1985.

Year	Nominal Human Capital (Billions of HKD)	Real Human Capital (Billions of 1985 HKD)
2017	23179	7316
2018	24993	7774
2019	27117	8238
2020	28081	8505

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. Table HK-2.1 presents human capital per capita for Hongkong.

Table HK-2.1 Nominal and Real Human Capital Per Capita for Hong Kong

Year	Nominal Human Capital Per Capita (Thousands of HKD)	Nominal Human Capital Per Capita (Thousands of 1985 HKD)
1997	2965	1237
1998	2628	1036
1999	2522	966
2000	2450	978
2001	2368	982
2002	2311	974
2003	2261	983
2004	2240	999
2005	2214	992
2006	2226	988
2007	2258	982
2008	2304	982
2009	2438	997
2010	2508	1020
2011	2604	1034
2012	2665	1006

Year	Nominal Human Capital Per Capita (Thousands of HKD)	Nominal Human Capital Per Capita (Thousands of 1985 HKD)
2013	2807	1018
2014	2980	1036
2015	3171	1055
2016	3376	1091
2017	3620	1143
2018	3909	1216
2019	4245	1290
2020	4417	1338

Figure HK-2.1 illustrates the trends of human capital per capita by gender for Hongkong. Overall，the growth pattern of real human capital per capita of male is more than that of female for Hongkong. Both trends are similar, downward sloping from 1997 to 1999 and slowly increasing thereafter, with male's growth rate higher than female's in recent years.

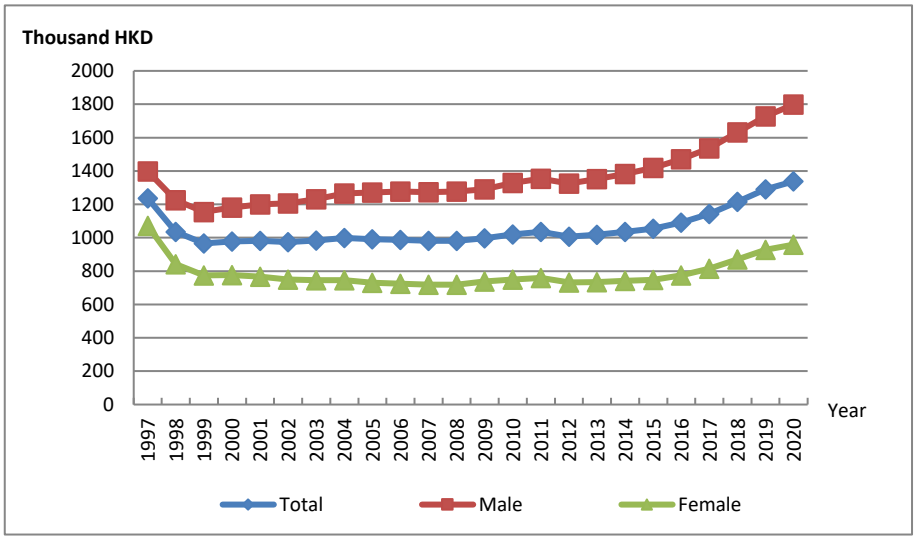

Figure HK-2.1 Human Capital Per Capita by Gender for Hong Kong, 1997-2020

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 15 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 1997 to 2020, the nominal labor force human capital increased from 10.58 trillion HKD to18.58 trillion HKD; and the real labor force human capital increased from 4.41 trillion HKD to 5.63 trillion 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)
1997	10584	4414
1998	9531	3756
1999	9292	3560
2000	9021	3601
2001	8863	3674
2002	8739	3684
2003	8693	3780
2004	8612	3840
2005	8528	3820
2006	8621	3827
2007	8856	3850
2008	9132	3894
2009	9441	3861
2010	9778	3975
2011	10238	4067
2012	10690	4034
2013	11423	4143
2014	12207	4242
2015	13038	4339
2016	13984	4520
2017	15043	4748
2018	16331	5080
2019	17845	5421
2020	18583	5628

39.3.2 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. Tables HK-3.2 reports the nominal and real average labor force human capital. From 1997 to 2020, the nominal average labor force human capital increased from 2.6 million HKD to 4.0 million HKD, the real per capita labor force human capital stock increased from 1.1 million HKD to 1.2 million HKD between 1997 and 2020.

Table HK-3.2 Nominal and Real Average Labor Force Human Capital for Hong Kong

Year	Nominal Labor Force Human Capital Per Capita (Thousands of HKD)	Real Labor Force Human Capital Per Capita (Thousands of 1985 HKD)
1997	2636	1100
1998	2329	918
1999	2241	859
2000	2142	855
2001	2072	859
2002	2003	844
2003	1964	854
2004	1943	866
2005	1917	859
2006	1931	857
2007	1958	851
2008	2000	853
2009	2059	842
2010	2135	868
2011	2236	888
2012	2295	866
2013	2434	883
2014	2596	902
2015	2783	926
2016	2999	969
2017	3236	1021

Year	Nominal Labor Force Human Capital Per Capita (Thousands of HKD)	Real Labor Force Human Capital Per Capita (Thousands of 1985 HKD)
2018	3517	1094
2019	3845	1168
2020	4022	1218

Chapter 40 Human Capital for Taiwan

40.1 Total human capital

Table TW-1.1 presents the estimates of nominal and real total human capital and real physical capital for Taiwan. Column 1 is nominal human capital in five-education categories. Column 2 is real human capital in six-education categories.

Table TW-1.1 Nominal and Real Human Capital for Taiwan

Year	Nominal Human Capital (Billions of NTD)	Real Human Capital (Billions of 1985 NTD)
1997	149451	107210
1998	151890	107146
1999	156615	110292
2000	156129	108597
2001	148583	103347
2002	142740	99477
2003	147287	102940
2004	148649	102241
2005	149528	100537
2006	149371	99833
2007	151272	99312
2008	141652	89835
2009	139973	89542
2010	139844	88610
2011	137722	86039
2012	137734	84422
2013	138416	84174
2014	141650	84286

Year	Nominal Human Capital (Billions of NTD)	Real Human Capital (Billions of 1985 NTD)
2015	143269	85503
2016	141270	83154
2017	138909	81262
2018	139443	80486
2019	138136	79288
2020	137265	78973

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. Table TW-2.1 presents human capital per capita for Taiwan. From 1997 to 2020, the nominal human capital per capita increased from 7.4 million NTD to 7.5 million NTD; and the real human capital per capita decreased from 5.3 million NTD to 4.3 million NTD, a 18% reduction.

Table TW-2.1 Nominal and Real Human Capital Per Capita for Taiwan

Year	Nominal Human Capital Per Capita(Thousands of NTD)	Real Human Capital Per Capita (Thousands of 1985 NTD)
1997	7351.94	5273.99
1998	7389.27	5212.52
1999	7611.44	5360.17
2000	7604.05	5289.03
2001	7285.13	5067.21
2002	7039.22	4905.72
2003	7271.98	5082.45
2004	7337.84	5047.00
2005	7362.74	4950.41

Year	Nominal Human Capital Per Capita(Thousands of NTD)	Real Human Capital Per Capita (Thousands of 1985 NTD)
2006	7321.77	4893.58
2007	7393.06	4853.64
2008	6975.78	4424.01
2009	6924.39	4429.62
2010	6965.79	4413.76
2011	6921.16	4323.84
2012	6957.62	4264.55
2013	7049.62	4287.05
2014	7263.05	4321.70
2015	7392.64	4411.94
2016	7367.22	4336.47
2017	7314.25	4278.84
2018	7451.24	4300.86
2019	7455.88	4279.58
2020	7486.42	4307.19

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 1997 to 2000, and the growths of human capital for male and female both accelerated. But from 2000 to 2020, the real human capital per capita of male and female tend to be flat or even declining.

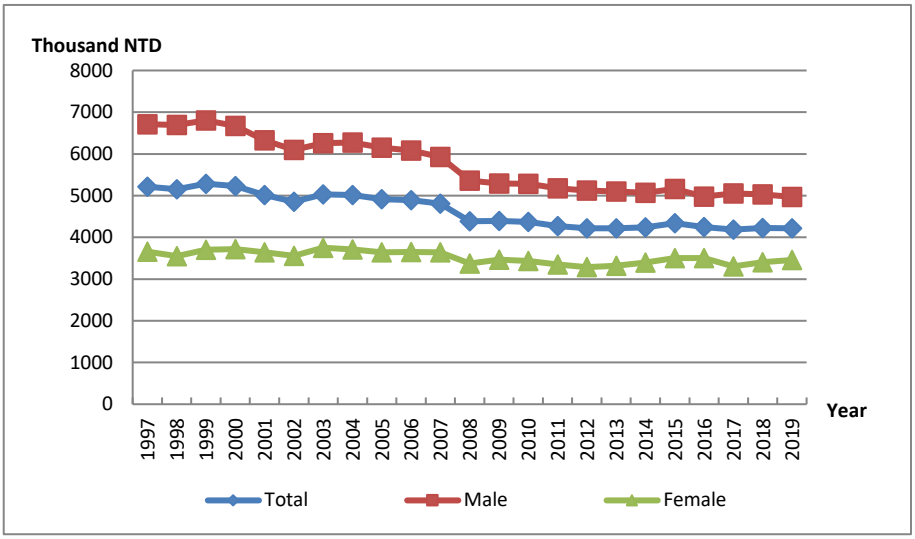

Figure TW-2.1 Human Capital Per Capita by Gender for Taiwan, 1997-2020

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 15 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 1997 to 2020, the nominal labor force human capital increased from 86.3 trillion NTD to 92.0 trillion NTD; and the real labor force human capital increased from 61.9 trillion NTD to 52.9 trillion NTD, a 14% reduction.

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)
1997	86267	61885

Year	Nominal Labor Force Human Capital (Billions of NTD)	Real Labor Force Human Capital (Billions of 1985 NTD)
1998	88689	62563
1999	91671	64557
2000	91519	63656
2001	86654	60273
2002	83903	58473
2003	88521	61868
2004	90579	62301
2005	91565	61565
2006	91898	61421
2007	93006	61060
2008	88327	56017
2009	87680	56090
2010	88730	56222
2011	88155	55073
2012	88657	54341
2013	89601	54489
2014	92044	54769
2015	93111	55569
2016	92365	54367
2017	92557	54146
2018	92647	53476
2019	92256	52954
2020	92006	52934

40.3.2 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. Table TW-3.2 presents average labor force human capital for Taiwan. From 1997 to 2020, the nominal

average labor force human capital increased from 6.6 million NTD to 6.8 million NTD; and the real average labor force human capital decreased from 4.8 million NTD to 3.9 million NTD, a 18% decrease.

Table TW-3.2 Nominal and Real Average Labor Force Human Capital for Taiwan

Year	Nominal Average Labor Force Human Capital (Thousands of NTD)	Real Average Labor Force Human Capital (Thousands of 1985 NTD)
1997	6628.42	4754.96
1998	6642.74	4685.91
1999	6825.47	4806.67
2000	6814.84	4740.10
2001	6468.62	4499.29
2002	6263.75	4365.28
2003	6575.94	4595.99
2004	6658.00	4579.41
2005	6653.01	4473.22
2006	6614.04	4420.56
2007	6651.06	4366.50
2008	6271.45	3977.33
2009	6205.94	3970.02
2010	6268.36	3971.84
2011	6260.06	3910.82
2012	6306.70	3865.58
2013	6399.92	3891.95
2014	6597.10	3925.44
2015	6687.56	3991.14
2016	6668.57	3925.23
2017	6703.94	3921.81
2018	6754.89	3898.93
2019	6774.29	3888.35
2020	6808.32	3917.05

Chapter 41 The Seventh Population Census and Human Capital

41.1 The seventh national population Census and human capital[36]

41.1.1 Trends in human capital

Discussions of human capital categorized by gender and by region are important in our report. Table CHN.1.1 shows real human capital for the country as a whole based on 6 education categories, gender, and region. From 1985 to 2020, human capital increased 11 times from 47.74 trillion yuan to 572.47 trillion yuan.

Both urban real human capital and rural real human capital have trended upward between 1985-2020. Rural real human capital increased from 29.77 trillion yuan to 72.34 trillion yuan – just more than doubling the level of human capital over this time period; urban real human capital grew from 17.97 trillion yuan to 500.13 trillion yuan which is a 26-fold rise – or human capital rose over 26 times over this period in urban areas. The corresponding annual growth rates are 2.70% for rural areas and 10.17% for urban areas. Before 1994, urban real human capital was smaller than rural real human capital, while after 1994 urban human capital exceeds that in rural areas.

[36] This chapter is based on the data of the seventh national census and the seventh census data of Liaoning, Guizhou and Inner Mongolia.

Table CHN.1.1 National Real Human Capital by Gender and Region

Billions of 1985 Yuan

Year	National	Male	Female	Urban	Rural
1985	47742	25442	22300	17969	29773
1986	51755	29211	22545	21146	30609
1987	54400	31394	23006	22717	31683
1988	52543	30928	21615	22490	30054
1989	51131	30660	20472	23022	28109
1990	57284	34724	22560	27053	30231
1991	63159	38738	24422	30440	32719
1992	67260	41655	25606	32853	34408
1993	66096	41315	24781	32901	33195
1994	59750	37573	22177	30256	29494
1995	56659	35778	20881	29356	27303
1996	60008	38240	21768	32856	27152
1997	67198	43076	24123	38543	28655
1998	77599	49955	27644	46222	31377
1999	90245	58008	32237	55874	34371
2000	102506	65988	36519	65194	37312
2001	114811	73603	41208	75135	39676
2002	128335	82537	45798	86536	41799
2003	140690	90906	49784	96703	43987
2004	150305	96756	53550	105695	44611
2005	162149	104106	58043	115838	46311
2006	184984	119369	65616	133879	51105
2007	202614	130620	71994	149106	53508
2008	217314	139925	77389	161953	55361
2009	248966	160381	88585	187382	61584
2010	271561	174783	96778	206262	65298
2011	295527	190233	105294	231819	63708
2012	325660	209851	115808	261344	64316
2013	364479	235691	128788	299773	64706
2014	395273	257481	137793	328657	66617
2015	417596	277071	140525	347640	69956
2016	460189	306781	153408	391317	68872

Year	National	Male	Female	Urban	Rural
2017	505168	338793	166374	435639	69529
2018	537410	365140	172270	467458	69952
2019	562568	386921	175646	492217	70350
2020	572466	398206	174260	500127	72339

Note: Some discrepancy may exist when summing up male and female, urban and rural to get the national amount. This is caused by rounding.

Figure CHN.1.1 shows the trend of urban and rural real human capital. We can see that in the figure the real human capital changes in urban are basically the same as the pattern that is observed in the whole country. To some extent, it can be concluded that the trend of national human capital is being driven by the trend of urban human capital.

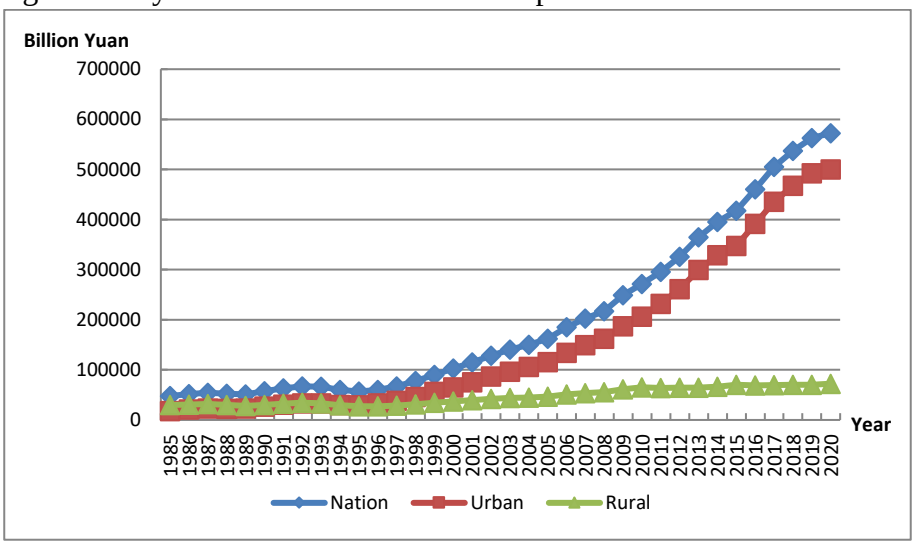

Figure CHN.1.1 National Real Human Capital by Region,1985-2020

Table CHN.1.2 shows the real human capital index of China from 1985 to 2020 and the real human capital index by gender and region based on 1985 as the base year. It intuitively shows the trend of human capital.

Table CHN.1.2 National Real Human Capital Index (1985=100)

Year	National	Male	Female	Urban	Rural
1985	100	100	100	100	100
1986	108.41	114.81	101.10	117.69	102.81
1987	113.95	123.40	103.17	126.42	106.42
1988	110.06	121.56	96.93	125.16	100.94
1989	107.10	120.51	91.80	128.12	94.41
1990	119.99	136.49	101.17	150.56	101.54
1991	132.29	152.26	109.51	169.41	109.90
1992	140.88	163.73	114.82	182.83	115.57
1993	138.45	162.39	111.13	183.10	111.49
1994	125.15	147.68	99.45	168.38	99.06
1995	118.68	140.63	93.64	163.37	91.70
1996	125.69	150.30	97.62	182.85	91.20
1997	140.75	169.31	108.17	214.50	96.25
1998	162.54	196.35	123.96	257.24	105.39
1999	189.03	228.00	144.56	310.95	115.44
2000	214.71	259.37	163.76	362.82	125.32
2001	240.48	289.30	184.79	418.15	133.26
2002	268.81	324.42	205.37	481.60	140.39
2003	294.69	357.31	223.25	538.18	147.74
2004	314.83	380.30	240.13	588.22	149.84
2005	339.64	409.19	260.29	644.67	155.55
2006	387.47	469.19	294.24	745.07	171.65
2007	424.40	513.41	322.85	829.81	179.72
2008	455.19	549.99	347.04	901.31	185.95
2009	521.49	630.39	397.24	1042.83	206.85
2010	568.81	687.00	433.98	1147.90	219.32
2011	619.01	747.72	472.17	1290.13	213.98
2012	682.13	824.84	519.32	1454.45	216.02
2013	763.44	926.40	577.53	1668.32	217.33
2014	827.94	1012.05	617.91	1829.06	223.75
2015	874.70	1089.04	630.16	1934.71	234.96
2016	963.92	1205.82	687.93	2177.78	231.32
2017	1058.13	1331.65	746.08	2424.44	233.53

Year	National	Male	Female	Urban	Rural
2018	1125.66	1435.21	772.51	2601.53	234.95
2019	1178.36	1520.82	787.66	2739.32	236.29
2020	1199.09	1565.18	781.44	2783.33	242.97

41.1.2 Human capital per capita

Table CHN.2.1 shows real human capital per capita for the country as a whole based on 6 education categories, gender, and region. From 1985 to 2020, the real human capital per capita in the country showed a growth trend, of which the real human capital per capita increased from 49.1 thousand yuan to 521.1 thousand yuan, an increase of about 10 times. China's average annual growth rate of real human capital per capita from 1985 to 2020 was about 7.15%. Judging from the calculation results of human capital per capita by region, from 1985 to 2020, the human capital per capita of urban has been higher than that of rural areas.

Table CHN.2.1 National Real Human Capital Per Capita by Gender and Region

Thousands of 1985 Yuan

Year	National	Male	Female	Urban	Rural
1985	49.14	49.48	48.76	81.51	39.64
1986	52.88	56.16	49.15	91.85	40.89
1987	55.02	59.76	49.64	94.79	42.29
1988	52.32	57.71	46.16	88.81	40.02
1989	50.23	56.33	43.22	86.52	37.39
1990	55.35	62.78	46.82	97.22	39.95
1991	60.38	69.37	50.08	105.64	43.17
1992	63.82	74.20	51.99	110.21	45.52
1993	62.38	73.40	49.89	106.95	44.14
1994	56.17	66.76	44.27	95.86	39.43
1995	52.97	63.50	41.25	90.59	36.62

Year	National	Male	Female	Urban	Rural
1996	55.82	67.38	42.90	95.08	37.22
1997	62.19	75.40	47.37	105.01	40.16
1998	71.26	86.69	53.92	119.03	44.78
1999	82.35	99.88	62.58	136.78	50.00
2000	93.36	113.29	70.84	152.70	55.61
2001	104.09	126.17	79.31	167.80	60.56
2002	116.24	141.71	87.79	184.49	65.82
2003	127.51	156.59	95.23	197.64	71.63
2004	136.45	167.31	102.34	208.13	75.14
2005	147.14	180.37	110.59	219.93	80.50
2006	165.57	203.09	123.92	244.68	89.64
2007	180.06	219.68	135.66	264.16	95.41
2008	192.29	233.45	145.80	279.94	100.36
2009	218.48	264.53	166.12	314.02	113.45
2010	236.45	285.28	180.62	335.62	122.30
2011	255.49	307.96	195.35	360.28	124.12
2012	280.82	338.62	214.48	391.40	130.73
2013	315.76	382.90	239.06	439.05	137.23
2014	344.23	420.28	257.25	474.11	146.39
2015	365.44	455.17	263.16	496.16	158.26
2016	402.72	505.49	286.32	538.48	165.56
2017	444.12	560.44	312.19	584.17	177.50
2018	477.96	606.56	329.78	618.72	189.65
2019	505.50	645.84	341.86	644.75	201.31
2020	521.14	669.44	346.00	652.87	217.60

Figure CHN.2.1 shows the trend of urban and rural real human capital per capita. From the figure, not only can we see that between 1985 and 2020, urban real human capital per capita is significantly higher than that of rural, but the real human capital per capita gap between urban and rural regions continues to widen. 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.

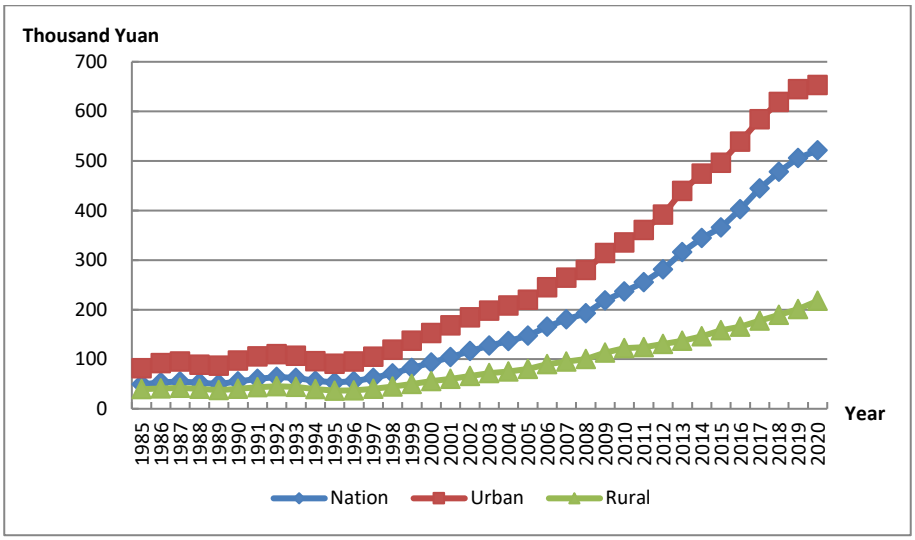

Figure CHN.2.1 National Real Human Capital Per Capita by Region, 1985-2020

41.1.3 Labor force human capital

Labor force human capital is estimated in the same way as national human capital, using the J-F method. Labor force human capital refers to human capital of people who are capable of working. Labor force human capital refers to the human capital of those non-retired people over 16 years old and out-of-school.

CHN.3.1 National labor force human capital

Table CHN.3.1 and CHN.3.2 show the labor force human capital by gender and region respectively, comparing the national human capital development status from gender and region. These results are based on the six education levels, the first three columns are nominal labor force human capital, and the last three columns are real labor force human capital.

Table CHN.3.1 National Nominal and Real Labor Force Human Capital by Gender

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	20256	11053	9203	20256	11053	9203
1986	23239	13074	10165	21831	12272	9559
1987	26769	15454	11314	23450	13502	9948
1988	30666	18125	12541	22608	13307	9302
1989	35374	21297	14076	22078	13265	8813
1990	41040	25086	15954	24833	15177	9656
1991	46123	28665	17458	26961	16735	10226
1992	51451	32349	19102	28268	17735	10533
1993	57084	36200	20883	27327	17295	10033
1994	63367	40426	22941	24443	15570	8873
1995	70431	45127	25304	23168	14831	8336
1996	80379	52388	27991	24350	15862	8489
1997	92064	60752	31312	27061	17854	9208
1998	105250	70150	35100	31112	20740	10372
1999	119322	80062	39259	35702	23969	11733
2000	135378	91342	44037	40269	27194	13075
2001	148520	100211	48309	43777	29571	14206
2002	162412	109622	52790	48123	32518	15605
2003	178209	120240	57969	52097	35193	16904
2004	195534	131743	63791	54913	37037	17876
2005	216238	145212	71026	59543	40024	19520
2006	255525	172402	83123	69235	46753	22482
2007	294600	198914	95686	76100	51417	24683
2008	334482	225773	108710	81546	55069	26477
2009	385783	260680	125103	94624	63958	30666
2010	443189	299316	143872	105126	71007	34120

Year	Nominal labor force human capital (Billions of Yuan)			Real labor force human capital (Billions of 1985 Yuan)		
	National	Male	Female	National	Male	Female
2011	502195	339104	163091	112813	76173	36640
2012	563881	381818	182063	123279	83458	39821
2013	619032	418238	200794	134384	90779	43605
2014	680877	464927	215950	144303	98496	45807
2015	744904	511042	233862	155586	106679	48907
2016	813567	559224	254343	166393	114298	52095
2017	882077	609221	272856	177440	122450	54990
2018	951003	662797	288206	187271	130388	56883
2019	1015566	713151	302415	194321	136312	58008
2020	1076571	761983	314588	197750	139742	58008

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

Table CHN.3.2 shows the nominal and real labor force human capital for urban and rural regions respectively. As shown in the table, both nominal and real labor force human capital have upward trend between 1985-2020. The national nominal and real labor force human capital both were increasing during 1985-2020. 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 1998. The regional gap increased from almost -0.875 trillion yuan in 1997 to over 120. 10trillion yuan in 2020. In 2020, the national real labor force human capital was 4.09 times than that of the rural stock.

Table CHN.3.2 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	20256	7563	12692	20256	7563	12692
1986	23239	9020	14218	21831	8430	13401
1987	26769	10777	15992	23450	9257	14192
1988	30666	12696	17970	22608	9035	13573
1989	35374	14994	20380	22078	9175	12903
1990	41040	17680	23360	24833	10680	14153
1991	46123	20262	25861	26961	11646	15316
1992	51451	22938	28514	28268	12140	16129
1993	57084	25723	31361	27327	11726	15602
1994	63367	28681	34686	24443	10459	13984
1995	70431	32309	38121	23168	10088	13080
1996	80379	38983	41396	24350	11187	13163
1997	92064	47038	45026	27061	13093	13969
1998	105250	56064	49186	31112	15699	15413
1999	119322	65628	53693	35702	18620	17082
2000	135378	76839	58539	40269	21627	18642
2001	148520	86356	62165	43777	24137	19640
2002	162412	97336	65076	48123	27481	20642
2003	178209	109306	68903	52097	30585	21511
2004	195534	123471	72063	54913	33445	21468
2005	216238	140159	76078	59543	37367	22176
2006	255525	169185	86340	69235	44439	24795
2007	294600	197470	97130	76100	49635	26465
2008	334482	226086	108396	81546	53814	27732
2009	385783	264658	121125	94624	63538	31086
2010	443189	308905	134284	105126	71861	33265
2011	502195	361371	140824	112813	79835	32978
2012	563881	415599	148282	123279	89401	33877
2013	619032	462928	156104	134384	99687	34697
2014	680877	515612	165265	144303	108219	36084
2015	744904	567604	177300	155586	117371	38215
2016	813567	633213	180354	166393	128244	38148
2017	882077	697877	184200	177440	138978	38462
2018	951003	762894	188109	187271	148801	38470
2019	1015566	822079	193487	194321	155978	38343

Year	Nominal labor force human capital			Real labor force human capital (Billions of 1985 Yuan)		
	National	Urban	Rural	National	Urban	Rural
2020	1076571	874796	201775	197750	158925	38825

Figure CHN.3.1 shows the trends of real labor force human capital for urban and rural, respectively. The figure shows that the trend of the real labor force human capital in urban is basically the same as that in the whole country. It can be considered that the trend of the national real labor force human capital depends on the trend of urban labor force human capital.

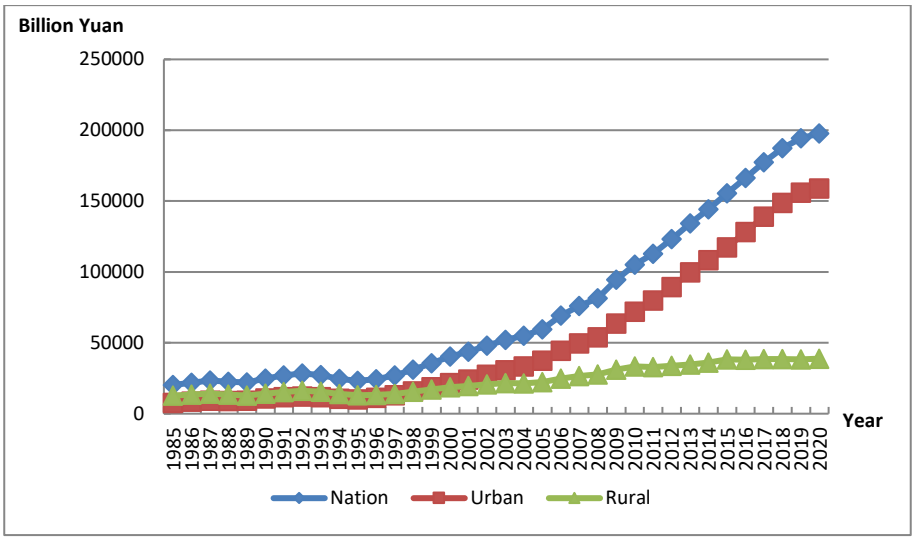

Figure CHN.3.1 National Real Labor Force Human Capital by Region, 1985-2020

CHN3.2 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.

Table CHN.3.3 shows that the average labor force human capital in nominal and real terms. The first column is the nominal labor force human capital per capita calculated at six education levels, and the second column is the real labor force human capital per capita under the six education levels.

The real values in this table are calculated by deflating the nominal values with the CPI using 1985 as the base year. The nominal results based on both education categories are increasing year by year.

Table CHN.3.3 National Nominal and Real Average Labor Force Human Capital

Year	Nominal average labor force human capital （Thousands of Yuan）	Real average labor force human capital （Thousands of 1985 Yuan）
1985	34.75	34.75
1986	38.79	36.44
1987	43.37	38.00
1988	48.60	35.83
1989	54.60	34.08
1990	61.47	37.20
1991	67.99	39.74
1992	74.93	41.17
1993	82.41	39.45
1994	90.54	34.93
1995	99.64	32.77
1996	112.37	34.04
1997	127.00	37.33
1998	142.84	42.23
1999	159.26	47.65
2000	177.94	52.93
2001	194.42	57.30
2002	212.23	62.88
2003	232.46	67.96
2004	255.18	71.66
2005	281.07	77.40
2006	326.85	88.56
2007	373.49	96.48
2008	421.50	102.76
2009	480.58	117.87
2010	544.70	129.21
2011	613.45	137.81
2012	687.89	150.39
2013	758.29	164.62

Year	Nominal average labor force human capital （Thousands of Yuan）	Real average labor force human capital （Thousands of 1985 Yuan）
2014	836.86	177.36
2015	916.90	191.51
2016	1006.97	205.95
2017	1106.81	222.65
2018	1215.50	239.36
2019	1318.56	252.30
2020	1422.31	261.26

Tables CHN.3.4 and CHN.3.5 report the average labor force human capital by gender and by region separately at the six educational level. The first 3 columns are nominal labor force human capital per capita, the last 3 columns are real labor force human capital per capita. From 1985-2020, the nominal and real labor force human capital per capita exhibit upward trends.

Table CHN.3.4 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	34.75	35.89	33.48	34.75	35.89	33.48
1986	38.79	41.42	35.86	36.44	38.88	33.73
1987	43.37	47.65	38.64	38.00	41.63	33.97
1988	48.60	54.34	42.17	35.83	39.89	31.28
1989	54.60	61.93	46.31	34.08	38.57	29.00
1990	61.47	70.63	51.07	37.20	42.73	30.91
1991	67.99	79.52	54.92	39.74	46.43	32.17
1992	74.93	88.94	59.14	41.17	48.76	32.61
1993	82.41	99.13	63.77	39.45	47.36	30.64
1994	90.54	110.16	68.92	34.93	42.43	26.66
1995	99.64	122.43	74.80	32.77	40.24	24.64

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
1996	112.37	139.77	82.21	34.04	42.32	24.93
1997	127.00	159.41	91.07	37.33	46.85	26.78
1998	142.84	180.76	100.65	42.23	53.44	29.74
1999	159.26	202.36	111.03	47.65	60.58	33.18
2000	177.94	227.06	122.82	52.93	67.60	36.47
2001	194.42	249.19	133.54	57.30	73.53	39.27
2002	212.23	273.22	145.02	62.88	81.05	42.87
2003	232.46	300.27	158.31	67.96	87.89	46.16
2004	255.18	330.20	173.68	71.66	92.83	48.67
2005	281.07	363.61	191.98	77.40	100.22	52.76
2006	326.85	421.74	222.85	88.56	114.37	60.27
2007	373.49	478.60	256.42	96.48	123.71	66.15
2008	421.50	536.46	291.69	102.76	130.85	71.04
2009	480.58	609.07	333.83	117.87	149.43	81.83
2010	544.70	687.11	380.59	129.21	163.00	90.26
2011	613.45	772.32	429.68	137.81	173.48	96.53
2012	687.89	867.05	479.92	150.39	189.52	104.97
2013	758.29	955.65	530.22	164.62	207.43	115.14
2014	836.86	1064.45	573.06	177.36	225.51	121.56
2015	916.90	1173.79	620.26	191.51	245.03	129.71
2016	1006.97	1295.33	676.06	205.95	264.75	138.47
2017	1106.81	1427.50	737.09	222.65	286.92	148.55
2018	1215.50	1566.38	802.22	239.36	308.15	158.33
2019	1318.56	1698.73	863.07	252.30	324.70	165.55
2020	1422.31	1831.20	923.07	261.26	335.83	170.21

Table CHN.3.5 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 1985-2020.

Table CHN.3.5 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	34.75	53.65	28.72	34.75	53.65	28.72
1986	38.79	60.63	31.57	36.44	56.67	29.76
1987	43.37	68.36	34.80	38.00	58.72	30.89
1988	48.60	76.05	38.73	35.83	54.13	29.25
1989	54.60	84.70	43.29	34.08	51.83	27.41
1990	61.47	94.28	48.66	37.20	56.95	29.48
1991	67.99	104.59	53.36	39.74	60.11	31.60
1992	74.93	115.28	58.46	41.17	61.01	33.07
1993	82.41	126.61	64.07	39.45	57.71	31.87
1994	90.54	138.59	70.37	34.93	50.54	28.37
1995	99.64	152.45	77.02	32.77	47.60	26.43
1996	112.37	172.08	84.70	34.04	49.38	26.93
1997	127.00	193.90	93.35	37.33	53.97	28.96
1998	142.84	215.74	103.13	42.23	60.41	32.32
1999	159.26	236.99	113.68	47.65	67.24	36.17
2000	177.94	261.13	125.47	52.93	73.50	39.95
2001	194.42	281.53	135.97	57.30	78.69	42.96
2002	212.23	304.94	145.89	62.88	86.09	46.28
2003	232.46	328.87	158.67	67.96	92.02	49.54
2004	255.18	357.00	171.41	71.66	96.70	51.06
2005	281.07	388.46	186.23	77.40	103.56	54.28
2006	326.85	451.05	212.30	88.56	118.48	60.97
2007	373.49	512.54	240.72	96.48	128.83	65.59
2008	421.50	573.60	271.40	102.76	136.53	69.44
2009	480.58	648.54	306.91	117.87	155.70	78.76
2010	544.70	729.20	344.31	129.21	169.63	85.29
2011	613.45	823.35	370.85	137.81	181.90	86.85
2012	687.89	921.23	402.30	150.39	198.17	91.91
2013	758.29	1009.96	436.06	164.62	217.49	96.92
2014	836.86	1108.41	474.31	177.36	232.64	103.56

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
2015	916.90	1201.84	521.26	191.51	248.52	112.35
2016	1006.97	1307.58	557.21	205.95	264.82	117.86
2017	1106.81	1419.29	603.45	222.65	282.64	126.00
2018	1215.50	1539.22	655.98	239.36	300.22	134.15
2019	1318.56	1644.74	715.60	252.30	312.06	141.81
2020	1422.31	1742.20	791.91	261.26	316.51	152.38

41.2 Human Capital for Inner Mongolia

41.2.1 Total human capital

Table NMG-1.1 presents the estimates of nominal and real total human capital and real physical capital for Inner Mongolia. Column 1 is nominal human capital in six education categories. Column 2 is real human capital in six education categories. Column 3 is the real physical capital of Inner Mongolia.

Table NMG-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Inner Mongolia

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	912	912	31
1986	1069	1018	34
1987	1205	1069	37
1988	1377	1052	42
1989	1558	1023	45
1990	1770	1134	49
1991	1998	1224	54
1992	2256	1296	62
1993	2532	1277	71
1994	2831	1160	81
1995	3150	1097	90
1996	3596	1162	99
1997	4148	1280	109
1998	4728	1466	121
1999	5282	1638	133

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2000	6114	1868	146
2001	6908	2092	162
2002	7898	2336	186
2003	8616	2496	229
2004	9675	2722	291
2005	10736	2951	380
2006	12611	3415	487
2007	14384	3727	619
2008	16303	4001	776
2009	18327	4510	993
2010	21213	5063	1239
2011	24403	5518	1514
2012	26951	5905	1835
2013	30164	6395	2222
2014	33767	7042	2534
2015	36789	7590	2840
2016	40507	8261	3079
2017	44055	8834	3235
2018	46910	9238	—
2019	50047	9628	—
2020	52735	9975	—

41.2.2 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 2020, the nominal human capital per

capita increased from 47.0 thousand yuan to 2.9 million yuan, an increase of more than 60 times; and the real human capital per capita increased from 47.0 thousand yuan to 548.2 thousand yuan, an increase of more than 11 times.

Figure NMG-2.1 illustrates the trends of human capital per capita by gender for Inner Mongolia. The trend of real human capital per capita of male is similar to that of female for Inner Mongolia. Both of them kept increasing from 1985 to 2020, 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.

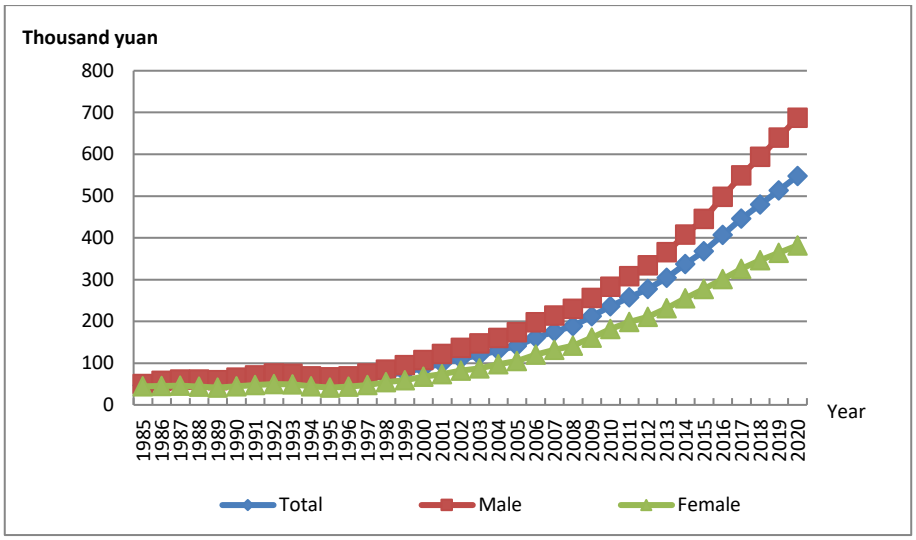

Figure NMG-2.1 Human Capital Per Capita by Gender for Inner Mongolia, 1985-2020

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	46.95	65.81	37.50	46.95	65.81	37.50
1986	54.58	80.24	40.98	51.98	76.05	39.22
1987	60.67	89.26	45.06	53.85	77.98	40.68

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	68.69	102.53	49.52	52.50	76.56	38.87
1989	77.28	116.48	54.39	50.74	75.82	36.09
1990	87.07	132.32	60.03	55.77	84.62	38.52
1991	97.84	150.04	66.09	59.96	90.52	41.38
1992	110.47	171.60	72.78	63.45	95.24	43.86
1993	124.30	195.01	80.22	62.71	94.36	42.97
1994	139.59	221.81	88.26	57.18	86.34	38.97
1995	155.85	249.74	96.69	54.29	83.02	36.19
1996	175.99	283.10	105.73	56.86	87.54	36.74
1997	201.29	326.75	115.63	62.09	96.60	38.52
1998	227.22	369.32	126.56	70.47	109.95	42.50
1999	251.83	406.51	138.42	78.11	120.66	46.91
2000	289.52	467.49	152.49	88.44	136.98	51.06
2001	326.91	520.12	165.60	99.00	151.50	55.18
2002	374.15	591.28	177.67	110.65	170.86	56.17
2003	410.60	632.42	193.94	118.93	180.04	59.24
2004	462.20	700.81	211.10	130.04	194.64	62.06
2005	512.95	765.06	230.43	141.01	208.33	65.58
2006	595.19	875.83	256.63	161.18	235.43	71.60
2007	677.32	983.68	285.48	175.50	253.51	75.71
2008	768.84	1105.18	316.29	188.67	270.24	78.91
2009	861.70	1219.69	357.46	212.04	299.13	89.36
2010	989.82	1388.49	403.53	236.25	330.62	97.47
2011	1140.07	1583.87	431.14	257.78	357.47	98.52
2012	1266.66	1733.59	466.12	277.51	378.77	103.92
2013	1433.44	1945.49	508.26	303.90	411.09	110.23
2014	1616.16	2174.26	563.57	337.06	451.75	120.77

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2015	1781.33	2374.57	635.61	367.48	488.00	134.73
2016	1995.28	2618.53	680.06	406.94	532.28	142.44
2017	2223.32	2871.24	741.83	445.81	573.89	152.93
2018	2436.46	3096.37	817.28	479.79	607.95	165.34
2019	2669.95	3340.15	911.91	513.66	641.07	179.46
2020	2898.04	3563.79	1043.10	548.20	673.22	199.89

Figure NMG-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the trend of real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban regions both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural regions expanded rapidly.

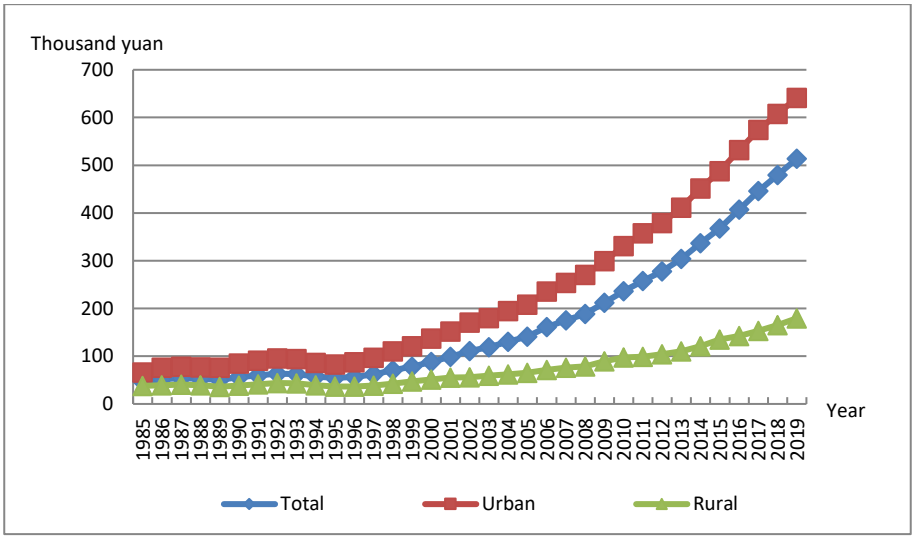

Figure NMG-2.2 Real Human Capital Per Capita by Region for Inner Mongolia，1985-2020

41.2.3 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.

41.2.3.1 Total labor force human capital

The total labor force human capital for Inner Mongolia is reported in Table NMG-3.1 From 1985 to 2020, the nominal labor force human capital increased from 0.36 trillion yuan to 19.93 trillion yuan, an increase about 55 times; and the real labor force human capital increased from 0.36 trillion yuan to 3.78 trillion yuan, an increase of approximately 10 times.

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)
1985	361	361
1986	416	397
1987	485	431
1988	561	429
1989	651	428
1990	754	483
1991	853	524
1992	958	552
1993	1067	541
1994	1184	489
1995	1306	459
1996	1504	490
1997	1725	537

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1998	1970	617
1999	2235	701
2000	2543	786
2001	2842	872
2002	3153	942
2003	3476	1014
2004	3803	1077
2005	4200	1160
2006	4946	1345
2007	5683	1477
2008	6427	1581
2009	7292	1798
2010	8372	2002
2011	9510	2153
2012	10785	2368
2013	11967	2544
2014	13495	2823
2015	15039	3111
2016	16222	3317
2017	17330	3484
2018	18265	3606
2019	19114	3685
2020	19927	3774

41.2.3.2 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. Tables NMG-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 32.04

thousand yuan to 1.47 million Yuan, an increase of more than 45 times, and the real average labor force human capital increased from 32.04 thousand yuan to 278.12 thousand Yuan, an increase of more than 8 times.

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	32.04	41.05	27.33	32.04	41.05	27.33
1986	35.90	46.59	30.00	34.21	44.16	28.71
1987	40.46	53.11	33.02	35.95	46.40	29.81
1988	45.73	61.29	36.34	35.02	45.76	28.53
1989	51.68	70.34	40.20	33.96	45.79	26.68
1990	58.29	80.13	44.69	37.34	51.24	28.68
1991	65.02	90.41	49.04	39.91	54.54	30.70
1992	72.34	101.52	53.83	41.72	56.34	32.44
1993	80.21	113.40	59.05	40.68	54.87	31.63
1994	88.65	126.03	64.94	36.59	49.06	28.68
1995	97.52	139.30	71.16	34.24	46.31	26.63
1996	109.74	158.10	78.01	35.74	48.89	27.11
1997	122.95	177.69	85.82	38.27	52.53	28.59
1998	137.07	197.69	94.58	42.93	58.86	31.76
1999	151.91	218.17	104.09	47.63	64.76	35.28
2000	168.91	242.04	114.47	52.24	70.92	38.33
2001	186.81	266.09	124.65	57.34	77.50	41.53
2002	205.79	292.15	134.33	61.46	84.42	42.47
2003	225.99	317.29	146.43	65.96	90.33	44.72
2004	246.97	342.72	158.35	69.93	95.19	46.55
2005	272.40	375.55	171.68	75.24	102.26	48.86

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**
2006	314.83	431.69	194.06	85.60	116.04	54.14
2007	358.64	488.16	218.70	93.22	125.81	58.00
2008	403.04	542.82	246.49	99.13	132.73	61.50
2009	455.52	606.99	279.55	112.33	148.87	69.89
2010	517.48	682.70	316.62	123.71	162.56	76.48
2011	588.57	779.70	340.17	133.26	175.98	77.73
2012	669.72	886.25	370.82	147.02	193.63	82.67
2013	750.21	988.23	407.23	159.45	208.82	88.32
2014	850.80	1115.86	452.79	177.95	231.84	97.03
2015	952.75	1235.98	512.07	197.09	254.01	108.54
2016	1047.89	1344.21	550.81	214.28	273.24	115.37
2017	1151.00	1455.34	601.57	231.40	290.89	124.02
2018	1254.25	1561.60	660.18	247.60	306.61	133.56
2019	1358.11	1662.10	730.36	261.82	319.00	143.74
2020	1468.56	1760.06	825.49	278.12	332.48	158.19

41.3 Human Capital for Liaoning

41.3.1 Total human capital

Table LN-1.1 presents the estimates of nominal and real total human capital and real physical capital for Liaoning. Column 1 is nominal human capital in six-education categories. Column 2 is real human capital in six-education categories. Column 3 is the real physical capital of Liaoning.

Table LN-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Liaoning

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1739	1739	79
1986	2045	1926	89
1987	2320	2022	100
1988	2720	2006	112
1989	3134	1950	122
1990	3532	2123	132
1991	3979	2271	144
1992	4449	2397	156
1993	4972	2338	174
1994	5498	2082	192
1995	6012	1960	207
1996	6844	2066	221
1997	7737	2256	236
1998	8666	2534	252
1999	9834	2890	268
2000	11399	3333	289
2001	12555	3665	313

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2002	13594	4007	340
2003	14706	4234	378
2004	16142	4468	433
2005	17597	4782	522
2006	19912	5344	626
2007	22726	5792	742
2008	25479	6200	884
2009	28363	6892	1,036
2010	31968	7528	1,220
2011	35758	7987	1,427
2012	40237	8719	1,655
2013	44762	9453	1,887
2014	49013	10159	2,103
2015	52809	10785	2,199
2016	62749	12585	2,224
2017	71429	14110	2,261
2018	76679	14760	——
2019	81867	15388	——
2020	86349	15867	——

41.3.2 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 2020, the nominal human capital per capita increased from 50.8 thousand Yuan to 2.9 million Yuan, an increase of more than 56 times; and the real human capital per capita increased from 50.8 thousand Yuan to 523.9 thousand Yuan, an increase of approximately10 times.

Figure LN-2.1 illustrates the trends of human capital per capita by gender for Liaoning. The trend of real human capital per capita of male is similar to that of female for Liaoning. Both of them kept increasing from 1985 to 2020, 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.

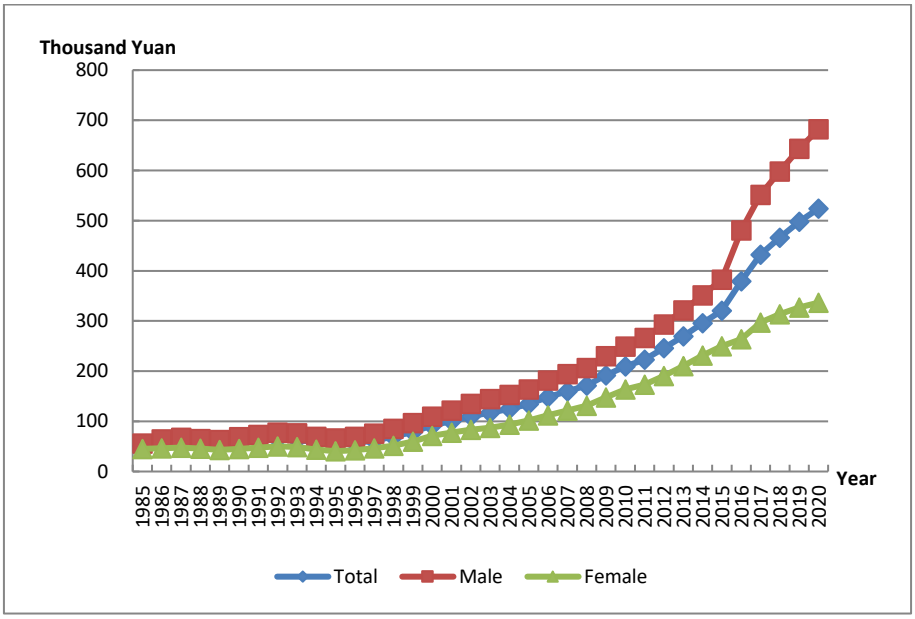

Figure LN-2.1 Real Human Capital Per Capita by Gender for Liaoning，1985-2020

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	50.76	62.50	41.15	50.76	62.50	41.15
1986	59.21	75.55	45.39	55.77	70.59	43.24
1987	66.35	85.04	50.16	57.84	72.37	45.24
1988	75.82	97.62	56.18	55.93	69.46	43.73
1989	85.84	110.38	62.58	53.43	67.02	40.54

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1990	95.79	121.99	69.49	57.58	71.85	43.26
1991	107.48	137.84	77.14	61.33	76.60	46.09
1992	120.16	154.88	85.39	64.75	79.61	49.87
1993	134.94	175.18	94.32	63.46	77.15	49.65
1994	150.55	196.45	103.73	57.01	68.61	45.17
1995	165.68	215.80	113.72	54.01	64.92	42.70
1996	188.03	248.17	124.79	56.76	69.01	43.87
1997	212.19	282.46	136.63	61.87	75.67	47.04
1998	237.20	316.58	149.37	69.37	84.98	52.10
1999	269.22	362.64	162.53	79.13	98.63	56.86
2000	313.02	427.59	176.95	91.51	116.29	62.09
2001	345.43	468.45	194.14	100.83	127.53	67.98
2002	374.51	502.31	210.01	110.40	138.27	74.52
2003	407.25	537.96	230.90	117.24	145.60	78.99
2004	449.84	589.22	251.58	124.52	155.14	80.98
2005	493.76	641.58	271.31	134.19	167.57	83.96
2006	553.40	716.78	303.26	148.52	185.18	92.37
2007	627.47	813.51	336.01	159.92	200.94	95.66
2008	703.29	911.57	370.24	171.15	215.71	99.89
2009	788.09	1020.44	408.82	191.51	241.47	109.96
2010	889.93	1151.41	446.74	209.57	265.06	115.53
2011	999.23	1286.26	470.71	223.19	281.74	115.38
2012	1133.99	1452.31	496.36	245.73	309.14	118.69
2013	1278.09	1627.27	521.26	269.90	338.25	121.73
2014	1426.35	1808.20	553.04	295.63	369.21	127.37
2015	1569.73	1978.18	593.16	320.58	398.32	134.72
2016	1891.23	2383.18	606.68	379.31	472.75	135.34
2017	2189.94	2741.08	635.15	432.59	536.26	140.14

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
2018	2420.22	2998.94	673.07	465.88	571.98	145.55
2019	2648.31	3248.15	716.68	497.78	605.43	151.10
2020	2851.19	3469.04	817.89	523.92	632.46	166.75

Figure LN-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remains larger than that in the rural areas. Since 1997, the growths of human capital for rural and urban regions both accelerated, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural expanded rapidly.

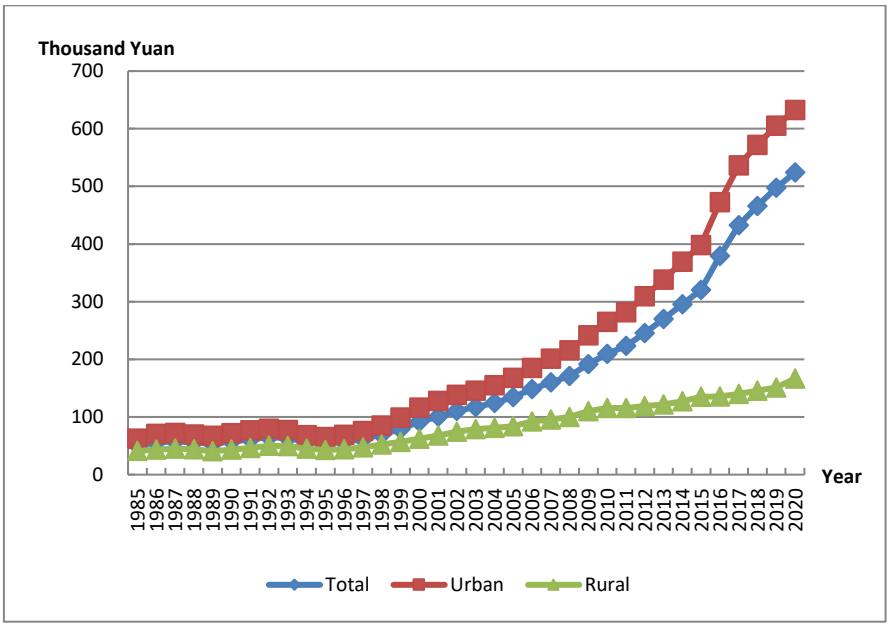

Figure LN-2.2 Real Human Capital Per Capita by Region for Liaoning，1985-2020

41.3.3 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.

41.3.3.1 Total labor force human capital

The total labor force human capital for Liaoning is reported in Table LN-3.1 From 1985 to 2020, the nominal labor force human capital increased from 0.8 trillion Yuan to 29.02 trillion Yuan, an increase of more than 35 times; and the real labor force human capital increased from 0.8 trillion Yuan to 5.4 trillion Yuan, an increase of approximately 6 times.

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)
1985	831	831
1986	948	893
1987	1088	949
1988	1270	938
1989	1465	913
1990	1676	1009
1991	1879	1074
1992	2080	1126
1993	2286	1083
1994	2504	958
1995	2753	907
1996	3110	951
1997	3519	1041
1998	3964	1177
1999	4384	1310

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2000	4858	1448
2001	5289	1573
2002	5771	1732
2003	6266	1833
2004	6777	1902
2005	7340	2017
2006	8550	2318
2007	9825	2526
2008	11060	2713
2009	12339	3021
2010	13994	3317
2011	15845	3563
2012	17677	3860
2013	19381	4127
2014	20817	4353
2015	22464	4628
2016	24073	4874
2017	25886	5162
2018	27291	5303
2019	28302	5367
2020	29018	5371

41.3.3.2 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. Tables LN-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 37.8 thousand Yuan to 1.3 million Yuan, an increase about 34 times; and the real

average labor force human capital increased from 37.8 thousand Yuan to 236.1thousand Yuan, an increase of approximately 6 times.

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	37.80	44.67	31.50	37.80	44.67	31.50
1986	42.25	50.26	34.75	39.81	46.96	33.11
1987	47.33	56.70	38.35	41.28	48.25	34.59
1988	53.27	63.50	43.00	39.33	45.18	33.46
1989	59.58	70.60	47.98	37.13	42.87	31.08
1990	66.47	78.35	53.29	39.99	46.15	33.17
1991	73.54	86.73	59.20	42.05	48.19	35.37
1992	81.01	95.63	65.23	43.84	49.16	38.09
1993	89.03	105.33	71.49	42.17	46.39	37.63
1994	97.62	115.69	78.24	37.35	40.41	34.07
1995	107.18	127.47	85.37	35.31	38.35	32.05
1996	119.38	142.78	93.96	36.51	39.70	33.03
1997	133.31	160.56	103.01	39.44	43.01	35.47
1998	148.04	178.83	112.74	43.96	48.00	39.32
1999	162.30	196.29	122.14	48.50	53.39	42.73
2000	178.59	216.94	131.50	53.23	59.00	46.14
2001	194.44	234.97	142.87	57.83	63.97	50.03
2002	212.01	255.90	154.05	63.64	70.44	54.66
2003	230.46	275.98	168.04	67.44	74.69	57.49
2004	250.57	298.84	181.28	70.33	78.68	58.35
2005	272.55	324.57	193.93	74.91	84.77	60.01
2006	312.69	373.98	218.82	84.78	96.62	66.65

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
2007	355.31	426.95	243.33	91.34	105.46	69.27
2008	398.22	479.78	268.42	97.67	113.53	72.42
2009	445.29	537.11	296.53	109.03	127.10	79.76
2010	502.70	608.84	324.38	119.16	140.16	83.89
2011	569.67	694.04	351.12	128.10	152.02	86.07
2012	640.39	781.91	380.16	139.83	166.44	90.91
2013	711.03	868.47	409.45	151.40	180.53	95.62
2014	779.20	950.71	437.99	162.93	194.12	100.87
2015	856.04	1040.70	474.86	176.36	209.55	107.85
2016	932.32	1132.75	492.35	188.75	224.70	109.84
2017	1023.60	1239.77	516.07	204.11	242.55	113.86
2018	1117.34	1346.16	546.65	217.10	256.75	118.22
2019	1197.43	1431.32	579.09	227.08	266.79	122.09
2020	1275.46	1507.33	626.02	236.09	274.81	127.63

41.4 Human Capital for Guizhou

41.4.1 Total human capital

Table GZ-1.1 presents the estimates of nominal and real total human capital and real physical capital for Guizhou. Column 1 contains nominal human capital based on six education categories. Column 2 presents real human capital based on six education categories. Column 3 reports the real physical capital of Guizhou.

Table GZ-1.1 Real Physical Wealth Capital Stocks, Nominal and Real Human Capital Stocks for Guizhou

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
1985	1068	1068	28
1986	1215	1154	31
1987	1323	1171	33
1988	1464	1090	36
1989	1641	1030	38
1990	1867	1147	40
1991	2144	1256	42
1992	2423	1316	44
1993	2770	1295	46
1994	3163	1203	49
1995	3541	1104	53
1996	4051	1155	57
1997	4627	1275	62
1998	5174	1424	69
1999	5822	1614	77
2000	6684	1859	85
2001	7791	2125	97

Year	Nominal Human Capital (Billions of Yuan)	Real Human Capital (Billions of 1985 Yuan)	Real Physical Capital (Billions of 1985 Yuan)
2002	8450	2326	110
2003	9383	2549	126
2004	10647	2778	142
2005	11843	3056	161
2006	13561	3441	183
2007	15383	3672	208
2008	17408	3868	238
2009	19879	4477	272
2010	22059	4825	317
2011	26085	5429	364
2012	30120	6107	426
2013	34356	6788	496
2014	39025	7530	570
2015	43367	8212	654
2016	50153	9366	756
2017	57397	10613	863
2018	63704	11560	—
2019	69611	12353	—
2020	74997	12993	—

41.4.2 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 2020, the nominal human capital per capita increased from 37.1 thousand yuan to 2.4 million yuan, an increase of more than 62 times; and the real human capital per capita increased from 37.1

thousand yuan to 0.4 million Yuan, an increase of approximately 10 times.

Figure GZ-2.1 illustrates the trends of human capital per capita by gender for Guizhou. The growth pattern of real human capital per capita of males is similar to that of females for Guizhou. Both of them kept increasing from 1985 to 2020, and the growth of human capital for males and females both accelerated, with males' growth rate significantly higher than females'. As a result, the gender gap has expanded, especially from 1997 onward.

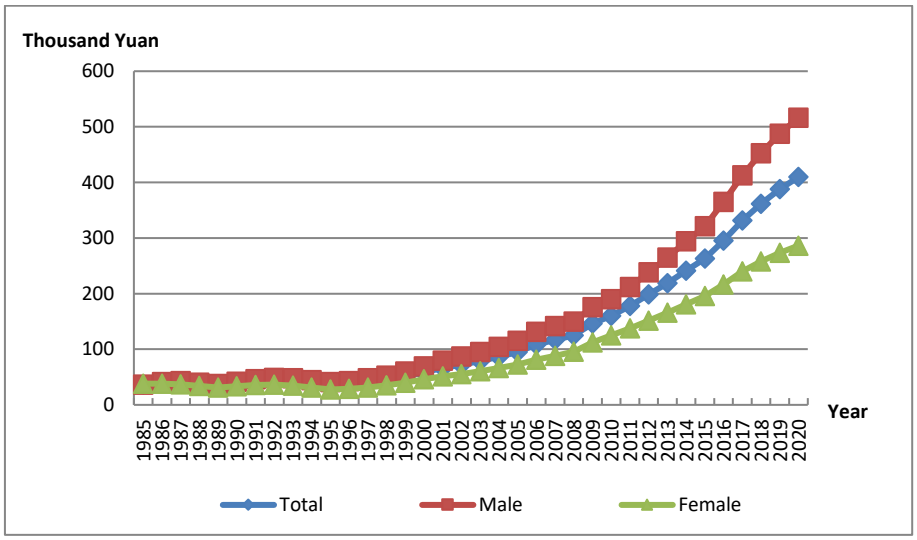

Figure GZ-2.1 Human Capital Per Capita by Gender for Guizhou，1985-2020

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	37.07	75.64	28.92	37.07	75.64	28.92
1986	41.69	92.50	31.01	39.60	86.94	29.64
1987	45.27	102.02	33.26	40.07	87.40	30.05
1988	49.69	112.53	36.20	37.00	79.35	27.91
1989	55.38	127.93	39.40	34.76	76.51	25.57
1990	61.88	144.74	43.03	38.00	85.62	27.17

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1991	70.46	168.80	46.77	41.30	96.11	28.09
1992	79.02	188.12	50.96	42.94	98.54	28.63
1993	89.39	212.56	55.71	41.80	96.15	26.94
1994	100.79	239.33	60.94	38.34	88.73	23.84
1995	111.30	258.21	66.54	34.71	80.11	20.88
1996	126.77	302.93	72.85	36.15	84.98	21.20
1997	145.08	357.49	79.76	39.98	96.99	22.45
1998	162.08	402.98	87.56	44.60	108.79	24.74
1999	182.87	460.57	95.99	50.68	125.71	27.21
2000	210.77	536.29	105.98	58.61	147.56	29.98
2001	242.94	614.03	116.46	66.24	165.00	32.59
2002	262.57	641.81	126.64	72.28	174.38	35.68
2003	291.60	685.67	140.49	79.23	184.63	38.81
2004	331.62	761.00	154.38	86.51	197.99	40.50
2005	369.29	819.23	168.83	95.31	211.86	43.38
2006	425.97	908.10	190.33	108.09	231.15	47.95
2007	489.53	1006.11	214.34	116.85	241.83	50.27
2008	561.38	1113.15	241.56	124.72	250.06	52.08
2009	649.97	1253.36	275.45	146.37	285.55	59.98
2010	732.15	1369.16	312.63	160.14	302.55	66.35
2011	854.49	1550.73	345.29	177.86	325.43	69.93
2012	978.59	1717.08	384.30	198.40	350.86	75.71
2013	1108.03	1881.60	427.79	218.92	373.64	82.87
2014	1251.79	2071.17	478.95	241.54	401.65	90.52
2015	1388.57	2245.20	539.64	262.93	426.86	100.48
2016	1581.02	2458.88	593.30	295.27	460.58	109.27
2017	1793.90	2690.32	662.04	331.72	498.44	121.20

Year	Nominal Human Capital Per Capita (Thousands of Yuan)			Real Human Capital Per Capita (Thousands of 1985 Yuan)		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
2018	1992.33	2893.27	744.23	361.55	525.53	134.37
2019	2185.93	3087.69	844.69	387.91	548.78	148.64
2020	2364.95	3250.86	975.82	409.71	564.79	166.55

Figure GZ-2.2 shows the trend of real human capital per capita by region. From 1985 to 2020, the real human capital per capita in the urban areas remained larger than that in the rural areas. Since 1997, the growth has accelerated for both rural and urban human capital, and the growth rate is significantly higher in the urban areas than in the rural areas. Therefore, the gap between urban and rural human capital expanded rapidly.

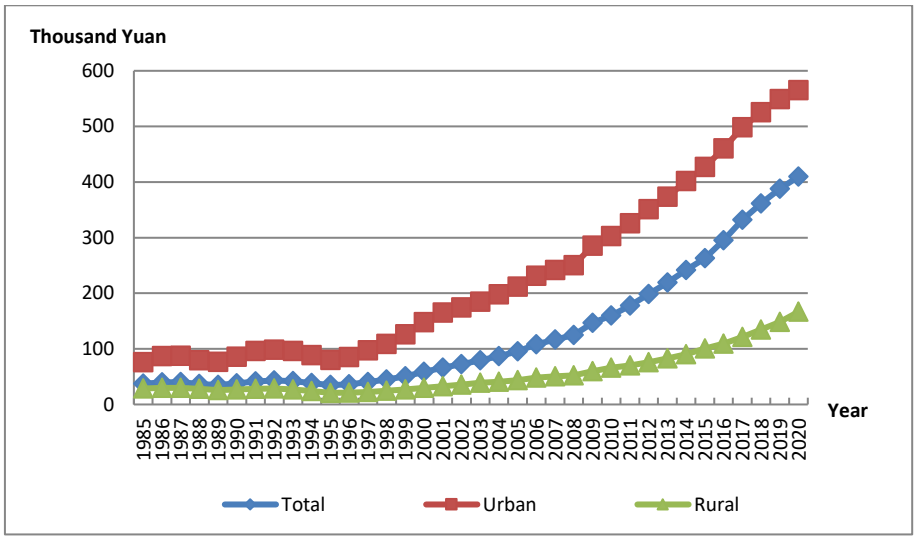

Figure GZ-2.2 Real Human Capital Per Capita by Region for Guizhou，1985-2020

41.4.3 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 over 16 years of age, non-retired and out of school.

41.4.3.1 Total labor force human capital

The total labor force human capital for Guizhou is reported in Table GZ-3.1. From 1985 to 2020, the nominal labor force human capital increased from 0.4 trillion yuan to 22 trillion yuan, an increase of more than 56 times; and the real labor force human capital increased from 0.4 trillion yuan to 3.9 trillion yuan, an increase of approximately 9 times.

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)
1985	387	387
1986	440	418
1987	506	448

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
1988	571	426
1989	658	414
1990	774	476
1991	870	511
1992	981	535
1993	1113	522
1994	1274	486
1995	1452	453
1996	1596	456
1997	1734	479
1998	1905	526
1999	2095	582
2000	2321	647
2001	2553	699
2002	2762	763
2003	2959	806
2004	3227	843
2005	3582	924
2006	4193	1063
2007	4809	1145
2008	5420	1199
2009	6085	1364
2010	6787	1479
2011	8014	1663
2012	9239	1867
2013	10504	2070
2014	11787	2268
2015	13132	2480
2016	15279	2848

Year	Nominal Labor Force Human Capital (Billions of Yuan)	Real Labor Force Human Capital (Billions of 1985 Yuan)
2017	17315	3197
2018	19032	3451
2019	20625	3656
2020	22425	3878

41.4.3.2 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. Tables GZ-3.2 reports the nominal and real average labor force human capital by region. From 1985 to 2020, the nominal average labor force human capital increased from 25.7 thousand yuan to 1.2 million yuan, an increase of more than 43 times; and the real average labor force human capital increased from 25.7 thousand yuan to 0.2 million yuan, an increase of approximately 7 times.

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	25.65	46.36	20.61	25.65	46.36	20.61
1986	28.21	52.85	22.25	26.81	49.67	21.27
1987	31.19	60.48	24.18	27.64	51.81	21.85
1988	34.45	67.41	26.30	25.68	47.53	20.28
1989	38.40	75.69	28.86	24.14	45.27	18.73
1990	43.16	85.22	32.10	26.54	50.41	20.26
1991	47.69	94.38	34.65	28.00	53.74	20.81
1992	52.86	104.63	37.57	28.80	54.80	21.11
1993	58.81	116.12	41.03	27.58	52.53	19.84
1994	65.49	128.53	45.21	24.98	47.65	17.69

Year	Nominal Average Labor Force Human Capital (Thousands of Yuan)			Real Average Labor Force Human Capital (Thousands of 1985 Yuan)		
	Total	Urban	Rural	Total	Urban	Rural
1995	73.15	143.20	49.32	22.82	44.43	15.47
1996	80.67	160.34	53.30	23.05	44.98	15.51
1997	88.29	176.65	57.97	24.39	47.93	16.32
1998	97.23	195.34	63.36	26.84	52.73	17.91
1999	106.64	214.33	69.48	29.65	58.50	19.69
2000	118.02	237.64	76.22	32.91	65.39	21.56
2001	129.27	259.40	81.91	35.40	69.70	22.92
2002	140.26	280.97	87.44	38.75	76.34	24.64
2003	151.04	297.73	94.89	41.15	80.17	26.22
2004	165.10	322.26	102.72	43.12	83.84	26.95
2005	182.41	353.30	111.57	47.04	91.37	28.67
2006	214.60	411.51	126.59	54.39	104.75	31.89
2007	249.18	469.75	142.88	59.33	112.91	33.51
2008	285.02	524.13	161.04	63.07	117.74	34.72
2009	325.25	581.09	182.85	72.92	132.39	39.82
2010	367.46	637.15	207.77	80.06	140.79	44.10
2011	426.35	726.87	230.82	88.45	152.54	46.75
2012	486.51	810.73	258.94	98.30	165.66	51.01
2013	547.48	889.04	292.18	107.90	176.54	56.60
2014	607.78	960.34	333.43	116.94	186.23	63.02
2015	668.57	1022.02	385.68	126.27	194.31	71.81
2016	764.59	1144.65	426.03	142.51	214.41	78.46
2017	863.46	1258.28	475.35	159.45	233.13	87.03
2018	957.44	1354.50	531.96	173.63	246.03	96.04
2019	1049.15	1437.35	600.26	185.98	255.46	105.63
2020	1150.16	1519.04	690.48	198.88	263.91	117.85

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 above, by age, sex and education level: 1982,1987, 1990,1995, 2000,2005, 2010,2015	• 1982, *China Population Statistics Yearbook* 1988 edited by the Department of Demographic Statistics of the National Bureau of Statistics • 1987, *China 1987 1% Demographic Sampling* Survey edited by the Department of Demographic Statistics of the National Bureau of Statistics • 1990, *China 1990 Census* edited by Census Office of State Council, and the Department of Demographic Statistics of the National Bureau of Statistics • 1995, *China Population Statistics Yearbook.* 1998 edited by the Department of Demographic and Employment Statistics of the National Bureau of Statistics • 2000, http://www.stats.gov.cn/tjsj/ndsj/renkoupucha /2000pucha/pucha.htm • 2005,	

Data	Sources	Notes
	http://www.stats.gov.cn/tjsj/ndsj/renkou/2005 /renkou.htm • 2010, *China 2010 Census* • 2015, *China 2015 1% Demographic Sampling* Survey edited by the Department of Demographic Statistics of the National Bureau of Statistics	
National, urban and rural population aged 0-5 years, by age and sex: 1982,1987, 1990,1995, 2000,2005, 2010,2015	• 1982, *China 1982 Census* edited by State Department Census Office, the Department of Demographic Statistics of the National Bureau of Statistics • 1987, *China Population Statistics Yearbook. 1989* edited by the Department of Demographic Statistics of the National Bureau of Statistics • 1990, *China 1990 Census* edited by State Department Census Office, the Department of Demographic Statistics of the National Bureau of Statistics • 1995, *China Population Statistics Yearbook. 1996* edited by the Department of Demographic and Employment Statistics of the 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*	We assume that the population aged 0-6 years receive no schooling

Data	Sources	Notes
	Population Statistics Yearbook 2012 • 2015, *China 2015 1% Demographic Sampling* Survey edited by the Department of Demographic Statistics of the National Bureau of Statistics	
National, urban and rural population by age and sex: 1982-2015	• *China Population Statistics Yearbook. 1988-1993* edited by the Department of Demographic Statistics of the National Bureau of Statistics • *China Population Statistics Yearbook. 1994-1998*, 2006 edited by the Department of Demographic and Employment Statistics of the National Bureau of Statistics • *China Population Statistics Yearbook. 1999-2005* edited by the Department of Demographic and Social Science Statistics of the National Bureau of Statistics • *China Demographic and Employment Statistics Yearbook 2007-2021,* edited by the Department of Demographic and Employment Statistics of the National Bureau of Statistics	
Mortality rate by age and sex: 1986, 1989-1990, 1994-2020	• *China Population Statistics Yearbook：1988-2021*	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

Data	Sources	Notes
		separated by age and sex.
Enrollment by education level: 1980-2020	• *Education Statistics Yearbook of China.1987* edited by the Plan and Finance Bureau of National Educational Committee • *Education Statistics Yearbook of China. 1989-1992,* edited by the Plan and Development Department of National Educational Committee • *Education Statistics Yearbook of China 1993-1996,* edited by the Plan and Development Department of National Educational Committee • *Education Statistics Yearbook of China 1997,* edited by the Plan and Development Department of National Educational Ministry • *Education Statistics Yearbook of China. 1998-2020* edited by the Plan and Development Department of the National Educational Ministry	*Part of Education Statistics Yearbook of China.* are downloaded fromhttp://www.cnki.net/.
National, urban and rural population and birth rate for each year	• *China Statistics Yearbook 2021.* • *Statistics Summary for 56 years in China.* China Statistics Press	

Data	Sources	Notes
Students by age, grade of primary and junior school: 2003-2020	• *Education Statistics Yearbook of China.2003-2021,* edited by the Plan and Development Department of the 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 • 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 • 2016, Hong Kong 2016 Population Census Thematic Report • 1985-2020 Census and Statistics Department of Hong Kong	
Total population	• 1980-2020, Hong Kong *Statistics Yearbook*	It is the resident population.
Enrollment by education level	• 1985-2020, Hong Kong Education Bureau	
Mortality rate by age and sex	• Hong Kong Mortality Table	
Birth by sex	• 1985-2020, Hong Kong *Statistics Yearbook*	

Data	Sources	Notes
Employment rate by age, sex and education level	• 1985-2020, Hong Kong Census and Statistics Department	
Consumer Price Index (CPI)	• 1981-2020, 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*	
Average discount rate（based on the basic loan interest of Central Bank）	• Monetary Policy Bureau of PBC • http://www.pbc.gov.cn/publish/zhengcehuobisi/631/2012/20120706181352694274852/20120706181352694274852_.html	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 above, 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 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.

Data	Sources	Notes
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 industrial Classification (the eighth edition)"; In 2012-2020, 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, census data do not take into account the left-out population.[37] The total populations from the 1982, 1990, 2000 and 2010 census data published at that time is slightly

[37] See Zhang, Weimin and Hongyan Cui (2003),"The estimation accuracy of China Census 2000", *Population Research*, Vol.27, No.4 (July), pp.25-35.

different from the population released in *China Statistics Yearbook 2011*. Thus, some adjustments to the population data by age, sex and educational attainment is required. The adjustments are 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 in the census data multiplied by the ratio of the total urban population released in *China Statistics Yearbook 2010* to the total urban population in the census data. A similar formula is applied to the rural population.

2.1.2 1%-Sample data

We adjust the sample data to match the total rural and urban data. The urban population by age, sex and educational attainment is divided by the urban sampling ratio, which is the ratio of the urban sample population to the total urban population released in *China Statistics Yearbook 2008*. The same method is applied to the rural data.

2.2 New enrollment

2.2.1 Educational categories 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 into “college and above” before 2000.

2.2.2 National enrollment data

The new elementary school enrollments by gender from 1985 to 1990 are not available, so it is assumed that females make up the same proportion

of new enrollments as they do in Grade 1.

From 1980 to 1983, we have no information on the share of females in new enrollments, so we use female share in new enrollment of the closest year.

From 1983 to 2003, we have only the total new enrollments in colleges and universities and the total number of females in colleges and universities. To obtain female enrollments in colleges and universities, we assume that the same proportion of females as in college and university enrollments.

From 2004 to 2019, female enrollment data for universities and colleges is available in the statistic yearbooks.

2.2.3 New enrollment data of urban and rural areas

The number of new enrollments per education level by gender in urban and rural areas is not available. We assume that the proportion of female enrollment in urban and rural areas equals the corresponding proportion at the national level.

New enrollments of specialized middle school are not separated by urban and rural. Therefore, we assume that the proportion of new students in professional secondary schools is the same for urban and rural areas as for regular senior middle school.

From 2003 to 2019, new enrollments of vocational high school are not separated by urban and rural, thus the same treatment is applied as above.

3. Imputation method

We use the perpetual inventory method to impute the population data. This method is a modified version of that used by Laroche and Merette (2000).

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

A simplified method is used to estimate the age distribution ratio λ. We assume that the enrollment age of primary school, junior high school, senior high school, junior college and above are 7, 13, 16 and 19 years old, respectively:

Table A1.3.2 Enrollment age distribution ratio λ

Age	Primary school	Junior middle school	senior middle school	university
5				

6																		
7			1															
8																		
9																		
10																		
11																		
12																		
13									1									
14																		
15																		
16															1			
17																		
18																		
19																		1

3.3 Method of imputing population data: 1985-2019

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 obtain the 1990 population estimates by gender, education and age using the perpetual inventory method. The actual 1990 population by gender, education and age subtracting the estimated 1990 population by gender, education and age gives the net migrants between urban and rural China during these eight years. We assume the same number of migrants for each year and then add the average difference to the estimated

population data.

4. Some specific problems

4.1 National, rural and urban population at age zero: 1985-2020

4.1.1 National population at age zero

The total population at the end of the year and the birth rate 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 newborn population. Multiplying the newborn population by the survival rate of those aged zero in the corresponding year gives the population at age zero at the end of the year.

(Definition: birth rate, also called the gross birth rate, refers to the ratio of the newborn 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 the annual birth rate, which is calculated by the following equation: Birth rate = (newborn population / average population)* 1000‰, where newborn population is the number of the newborn 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 the total national population for each year from 1983 to 2020, the birth rate for each year from 1983 to 2020, and the national, rural, and urban populations by age and gender from the population sampling surveys for 1987 and each year from 1989 to 2020.

The share of urban population at age zero in the national population at age zero can be calculated from these sample 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 sample data is also assumed to be true, thus we can divide the urban population at age zero into 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 number of those aged 1, 3, 4, 5, 6 in 1989 equals the newborn population for 1988, 1986, 1985, 1984 and 1983, respectively, after adjusting for sampling weights. Migration between urban and rural regions is neglected here.

4.2 The death rate of those aged 65 and above

When imputing the population by age, gender and education level with perpetual inventory method, the number of those aged 65 and above should be multiplied by the mortality rate. The mortality rate is calculated in the following way. With the population and the mortality rate, both by age and gender, from the population sampling data for each year, the number of deaths of those aged 65 and above for each year can be calculated. Dividing it by the corresponding total population gives the mortality rate of those aged 65 and above. Since there is no population sampling data for 1983-1986, 1988 and 1991-1993, the mortality 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.

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; and 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);

(6) China Labor-force Dynamics Survey (CLDS).

1.2 Components of income

(1) Main job and secondary job salaries;

(2) Other cash income from work;

(3) Pension;

(4) The estimated market value of received items;

(5) Various subsidies;

(6) The income of rural population includes working income and 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, CFPS, and CLDS 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, 2007 and 2013, and urban parameters for 1999.

(4) We use CHNS to obtain urban parameters for 2000, 2004, 2006, 2009, 2011 and 2015, and rural parameters for 1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009, 2011 and 2015[38].

[38] We have urban datasets of UHS for 1989, 1991, 1993 and 1997, so we do not use

(5) We use CHFS to obtain urban and rural parameters for 2010, 2012, 2014, 2016, and 2018.

(6) We use CFPS to obtain urban and rural parameters for 2010, 2012, 2014, 2016 and 2018.

(7) We use CLDS to obtain urban and rural parameters for 2014.

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 $\hat{m}_i = e^{\hat{\ln y}}$.

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the CHNS datasets of those years for urban parameter estimation.

(3) Regress y_i on $\hat{m}_i$ without the intercept: $\hat{y} = \alpha \times \hat{m}_i$ and keep α.

(4) For the given values *Sch*, *Exp*, *Exp*^2, obtain $\widehat{\ln y}$.

(5) $\hat{y} = \alpha \times e^{\widehat{\ln y}}$.

2. Data

We use six well-known household surveys in China, namely UHS, CFPS, CHNS, CHIP, CHFS, CLDS.

Table B.1 shows the distribution of the six 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) Other employment income;

5) Other working income;

6) Household avocation production income.

3.1.2 Years of schooling

(1)1986-1991

LEVEL	Sch
College	16
Professional school	11
Senior middle school	12
Junior middle school	9
Primary school	6
Others	0

(2)1992-1997

LEVEL	Sch
College	16
Community college	15
Professional school	11
Senior middle school	12
Junior middle school	9
Primary school	6
Others	0

3.1.3 Selection of 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 a job assignment, students waiting to enter school, re-employers after retirement, etc.

(4) Discard individuals whose incomes are 15 times greater than the average income or 0.05 times less than the average income.

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 income of urban residents in 1999 includes eight parts: wages of employees (excluding living expenses for laid-off workers), income of individual employed persons, income of retired and re-employed persons, income of other employees, income of other workers, price subsidies, net income from family sideline production, and the currency (converted) amount of real income.

The same principle is applied in CHIP 2002, CHIP 2007 and 2013.

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-agricultural income and agricultural income.

In 2013, the income of rural households includes family non-wage income distributed according to working hours and personal wage 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&1999&2002

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)2007&2013

LEVEL	Sch
Graduate school	18
College and above	16
Professional school	15
Middle level professional, technical or vocational school	11

LEVEL	Sch
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;

(4) Discard individuals who are self-employed, private enterprise owners or managers;

(5) Discard individuals who participate in agriculture but settle down in urban areas;

(6) Discard individuals whose reported income is 0 or below;

(7) Discard individuals whose incomes are 15 times greater than the average income or 0.05 times less than the average income.

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) and INDSUB (Individual 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 recorded in the wage file.

Generally, annual wage income is the months of work 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, the average number of pieces completed/work, 1989

I19, the value of bonuses received last year (job level), 1989-2011

I101, other cash income (job level), 2006-2011

I103, the 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 the household that the individual participates in.

Source:

The 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:

The 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 the sale of the 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 the government (crop level), 1991-1997

E15, government price for the crop (crop level), 1991-1997

E16, kg of crop sold to the free market (crop level), 1991-1997

E17, the free-market price for the crop (crop level), 1991-1997

E12, expenses to raise all crops (household level), 1991-2011

E14A, receipts from the sale of all crops (household level), 1991-2011

E16A, the value of all crops consumed (household level), 1991-2011

e) Fishing Income

Variable: INDFISH - Individual income from fishing.

Source:

The 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, the market value of fish received in-kind from the collective (individual)

G11, revenue from fish sales (household)

G13, the value of fish consumed at home (household)

G15, the value of fish given as a gift (household)

G16, expenses of fishing business (household)

f) Gardening Income

Variable: INDGARD - Total individual net income from gardening

Source:

The 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 the sale of home garden produce, 1989 - 2011

D6, the 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:

The 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 the collective

(individual)

F14, expenses to raise livestock (livestock level)

F15, expenses from using home-grown feed (livestock level)

F17, revenue from the sale of livestock products (livestock level)

F19, the value of livestock products consumed at home (livestock level)

F21, the value of livestock products given as gifts (livestock level)

3.3.1.2 Subsidies

The subsidies include INDSUB (individual subsidies). Since the family subsidies in this database are transfer payments, they are not included in income.

INDSUB=(I9+I11+I12+I13+I13A+I14+I14A+I14B)*12

Source:

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 subsidies, 1989 - 1997

I14A, the average monthly subsidy from job 1, 2000 - 2011

I14B, the 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 students, unemployed persons, persons with disabilities, scholars to be promoted, housewives, or retirees;

(3) Discard individuals whose value of years of schooling, age and sex is missing;

(4) Drop individual whose wage is negative or zero;

(5) First Occupation: We delete samples whose nature of the work is self-employed, unpaid family workers, and in the urban sample, we discard individuals, who are private business owner;

(6) Income range: Keep individuals whose incomes are between 1/5 and 15 times the average income.

3.4 CHFS

3.4.1 Definition of income

(1) The income divides into urban income and rural incomes. Urban income mainly refers to wage income; rural income mainly includes wage income and household income from agriculture. The income of freelancers should be computed separately in CHFS 2018.

(2) Wage income mainly includes three components: wages, bonuses， and allowances.

3.4.2 Personal income distribution of agricultural production

In rural income, wage income is 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 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

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.

(4) First Occupation:

In the urban samples of 2010, we discard individuals who are self-employed, involved in agriculture, work for private companies or other samples (volunteers), and we delete samples without income data. In the rural sample of 2010, we also discard individuals who are self-employed, work for private companies or other samples (volunteers), and we delete samples without income data. We keep individuals with missing data of subsidies in agriculture income but treat the subsidies as 0.

In the urban sample of 2012, we discard individuals, who work for private companies; self-employed individuals at home and other samples (volunteers); and seasonal jobs, and we delete samples without income data

sample. In the rural sample of 2012, we delete the samples without income data.

In the urban and rural sample of 2014, we discard individuals, who work for private companies; self-employed individuals at home and other samples (volunteers); and open online shops, and we delete samples without income data. At the same time, in the urban sample of 2014, we delete the samples whose jobs are of agricultural nature.

In the urban and rural sample of 2016, we discard individuals who work for private companies; self-employed individuals at home and other samples (volunteers); and individuals who open online stores. At the same time, in the urban sample of 2016, we delete the samples whose jobs are of agricultural nature.

In the urban and rural sample of 2018, we discard individuals, who work for private companies; self-employed individuals; samples with jobs but without income data. In the urban sample of 2018, we discard individuals who are involved in agriculture.

(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.

Attention: Some units of income are ten thousand Yuan.

(7) Family agricultural production and management: Urban sample households engaged in agricultural production were deleted in samples.

(8) Keep individuals whose income are between 1/20 and 15 times the average income.

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; rural income mainly includes wage income and household income from agriculture.

(2) Wage income mainly includes six components: wages, bonuses, subsidies, cash in kind, income from a second occupation and other labor income.

(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 is considered as personal income, but the income of agricultural production is classified as 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 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

Level	Sch
No school	0
Primary school	6

Level	Sch
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, discard individuals whose current status is retired.

(4) First Occupation: For the urban sample, those who were self-employed and farmed at home were deleted and those whose income data were missing were deleted. For the rural sample, the sample without income data was deleted.

(5) Second Occupation: Urban and rural sample without income data were deleted.

(6) Family agricultural production and management: In the rural sample, the sample engaged in household agriculture but whose income data were missing was deleted.

(7) Income range: 1/20 to 15 times of the mean income.

3.6 CLDS

3.6.1 Definition of income

(1) The income divides into urban income and rural incomes. Urban income mainly includes wage income; rural income mainly includes agriculture income and agricultural government subsidies.

(2) Wage income mainly includes three components: wages, bonuses and allowances.

(3) Agriculture income refers to the net income from farming, gardening, livestock, fishing, and side-line occupation.

3.6.2 Personal income distribution of agricultural production

In rural income, agriculture income and agricultural government subsidies are 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: Calculation of the whole hours for farm work of each family members according to the days of agricultural production in this year for the individual, the average number of hours a day to do farm work in the busy season, and the number of hours a day to do farm work in the slack season.

Step 2: Calculation of the ratio of each family practitioner farm work hours to the whole farm work hours for the family. We could obtain personal rural income by calculating family rural income times each person's ratio of farm work.

3.6.3 Years of schooling

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

3.6.4 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) Drop individuals whose current status is farming, employers, or self-employed in the urban area.

(4) Drop students.

(5) Drop individual whose wage is zero.

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, and CFPS.

4.1.2 General idea about imputation

We use UHS, CHIP, CHNS, CHFS, CFPS and CLDS 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 1985-2017. 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.

Figures B.1- 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 2018.

Tables and figures of appendix B

Table B.1 Micro Datasets

Year	UHS	CHIP	CHNS	CHFS	CFPS	CLDS
1985	U					
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						

Year	UHS	CHIP	CHNS	CHFS	CFPS	CLDS
2006			U/R			
2007		U/R				
2008						
2009			U/R			
2010				U/R	U/R	
2011			U/R			
2012				U/R	U/R	
2013		U/R				
2014				U/R	U/R	U/R
2015			U/R			
2016				U/R	U/R	
2017						
2018				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

CLDS: China Labor-force Dynamic Survey

Table B.1.1 Summary Statistics: UHS Samples

Year	Variables	Male		Female	
		Mean	S.D.	Mean	S.D.
1986	inc	1486.53	548.38	1243.42	446.76
	Sch	10.48	2.92	9.76	2.79
	Exp	20.48	11.06	17.80	9.50
1987	inc	1543.90	611.65	1293.86	495.03
	Sch	10.61	2.91	9.84	2.71
	Exp	21.04	10.89	18.43	9.46
1988	inc	1865.58	835.96	1535.21	688.90
	Sch	10.79	2.92	9.96	2.75
	Exp	20.48	10.78	17.86	9.27
1989	inc	2109.11	983.79	1747.85	834.78
	Sch	10.95	2.95	10.12	2.68
	Exp	20.67	10.84	18.20	9.26
1990	inc	2337.88	1061.91	1947.86	894.64
	Sch	11.11	2.92	10.30	2.69
	Exp	21.06	10.73	18.36	9.21
1991	inc	2575.29	1140.29	2176.67	977.99
	Sch	11.28	2.94	10.52	2.64
	Exp	20.58	10.44	18.11	8.93
1992	inc	3186.62	1515.94	2686.11	1309.00
	Sch	11.42	2.75	10.73	2.55
	Exp	20.92	10.49	18.54	8.94
1993	inc	4255.02	2792.68	3576.67	2315.92
	Sch	11.40	2.71	10.76	2.54
	Exp	21.24	10.49	18.92	8.99

1994	inc	5895.90	4054.22	4890.06	3414.88
	Sch	11.52	2.76	10.95	2.48
	Exp	21.06	10.44	18.74	8.98
1995	inc	7130.71	4717.53	5957.11	4059.89
	Sch	11.61	2.71	10.98	2.48
	Exp	21.32	10.20	19.02	8.85
1996	inc	7898.75	5468.63	6604.49	4923.47
	Sch	11.64	2.69	11.09	2.42
	Exp	21.67	10.24	19.34	8.89
1997	inc	8487.01	6055.01	7009.53	5339.46
	Sch	11.65	2.67	11.13	2.41
	Exp	21.83	10.06	19.58	8.89

Table B.1.2Summary Statistics: CHNS samples

Year	**Variables**	**Urban**				**Rural**			
		Male		**Female**		**Male**		**Female**	
		Mean	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
1989	inc					1401.09	1221.19	1223.11	1085.
	Sch					6.29	4.05	4.57	4.33
	Exp					17.95	11.49	16.48	10.34
1991	inc					1508.19	1325.64	1292.31	1151.
	Sch					6.72	3.92	4.87	4.32
	Exp					18.42	11.51	17.07	10.46
1993	inc					2170.13	1944.12	1796.61	1522.
	Sch					7.11	3.72	5.25	4.29
	Exp					19.28	11.55	17.99	10.33
1997	inc					4542.06	3834.68	3605.56	2984.
	Sch					7.38	3.51	5.52	4.19
	Exp					20.53	11.54	19.36	10.57
2000	inc	10471.30	11306.11	8389.83	8468.93	5405.17	4649.93	4195.83	3416.
	Sch	11.42	2.94	11.25	2.91	8.00	3.23	6.42	4.11
	Exp	20.83	10.11	18.24	9.15	21.27	11.58	20.42	10.51

2004	inc	14974.19	11108.93	13525.45	10701.29	7480.41	6884.81	5901.61	5368.46
	Sch	11.50	2.82	11.54	2.58	8.29	3.17	6.67	4.09
	Exp	22.98	9.88	20.26	8.69	25.05	10.89	23.17	9.71
2006	inc	19558.14	21149.96	16259.75	15867.34	10351.60	8649.16	7575.34	7027.76
	Sch	11.91	2.82	12.09	2.86	8.43	3.58	6.78	4.36
	Exp	24.57	9.42	20.63	8.61	25.59	10.79	23.56	9.50
2009	inc	26656.37	27652.65	21103.61	20378.03	14560.55	11646.48	11947.33	9486.12
	Sch	11.72	2.88	12.05	2.79	8.32	3.33	7.32	4.10
	Exp	25.47	9.92	20.72	9.16	26.24	10.90	23.86	9.70
2011	inc	39600.17	38611.76	36847.06	37203.00	21793.84	17295.74	16840.83	12759.42
	Sch	12.76	3.16	13.35	3.12	8.75	3.49	7.64	4.14
	Exp	23.74	11.04	18.11	9.38	26.98	10.71	24.50	9.43
2015	inc	59823.29	78122.45	56276.27	92366.41	34241.57	23947.75	28811.17	21853.81
	Sch	13.35	3.15	13.73	3.12	9.69	3.39	9.40	3.99
	Exp	24.10	10.74	19.69	9.21	25.22	11.59	22.13	10.53

Table B.1.3 Summary Statistics: CHIP samples

Year	**Variables**	**Urban**				**Rural**			
		Male		**Female**		**Male**		**Female**	
		Mean	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**	**Mean**	**S.D.**
1988	inc	1932.24	945.48	1630.31	830.52	947.23	865.03	851.14	759.26
	Sch	10.71	2.92	10.01	2.74	7.17	3.28	5.02	3.88
	Exp	20.93	10.96	18.20	9.40	18.29	12.37	15.42	10.88
1995	inc	6705.56	3791.85	5560.36	3109.52	4367.38	3428.62	4206.60	3054.98
	Sch	11.70	2.78	11.08	2.59	7.70	2.99	5.80	3.60
	Exp	21.43	10.22	19.13	8.88	20.02	11.96	18.05	10.83
1999	inc	9308.80	5415.55	7781.78	4684.49				
	Sch	12.12	2.70	11.92	2.52				
	Exp	22.08	9.79	19.54	8.75				
2002	inc	12747.63	7930.79	10479.88	7364.85	5179.86	4951.55	3844.38	3969.00
	Sch	12.30	2.77	12.16	2.55	8.49	2.78	6.87	3.67
	Exp	23.18	9.83	20.15	8.87	21.74	12.18	19.78	11.12

Year	Variables	Urban				Rural			
		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
2007	inc	31112.46	23341.46	23730.85	18092.49	13466.62	9922.49	9938.73	7635.37
	Sch	12.88	2.85	13.00	2.74	8.48	2.06	8.08	2.00
	Exp	21.96	10.97	16.86	9.28	22.46	12.75	20.09	11.48
2013	inc	46295.06	33151.53	36254.61	25870.30	29174.43	19539.03	22756.42	16816.31
	Sch	12.20	3.17	12.47	3.21	8.16	2.71	7.46	3.12
	Exp	21.96	10.90	18.61	9.54	23.68	12.50	22.13	10.94

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.
2010	inc	31038.67	31425.47	22915.69	20231.31	11732.15	12420.34	7249.59	7876.14
	Sch	11.09	3.77	11.29	3.99	6.79	4.13	5.00	4.42
	Exp	21.81	11.29	18.12	9.94	25.60	11.11	23.63	9.55
2012	inc	33444.61	34193.13	24117.61	22537.22	18792.00	16663.51	11144.86	11650.79
	Sch	10.27	4.12	10.61	4.33	7.10	4.22	5.44	4.61
	Exp	21.60	11.72	18.46	10.27	24.04	11.94	22.61	10.32
2014	inc	37417.55	29138.52	28332.40	26574.04	19652.79	19297.32	11819.05	13162.73
	Sch	10.52	4.03	10.70	4.32	6.97	4.16	5.46	4.57
	Exp	21.75	11.81	19.07	10.36	25.20	11.79	23.87	10.19
2016	inc	47364.95	42670.65	35517.38	35458.94	30790.79	24215.67	21224.25	18868.54
	Sch	10.95	3.80	11.17	4.14	8.55	3.81	8.02	4.66
	Exp	22.96	11.06	21.13	9.63	22.67	11.68	19.93	10.50
2018	inc	53106.09	43160.83	40110.48	33731.38	25289.38	23886.43	14051.05	18505.55

Year	Variables	Urban				Rural			
		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
	Sch	11.29	3.82	11.71	4.15	7.66	3.97	6.18	4.73
	Exp	20.45	11.94	18.11	10.75	26.18	11.56	24.90	10.70

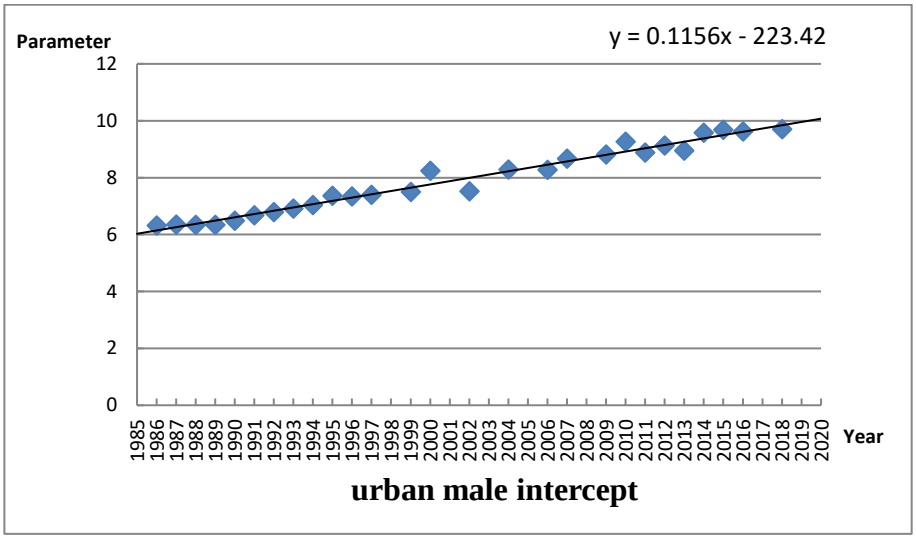
Table B.1.5 Summary Statistics: CHFS samples

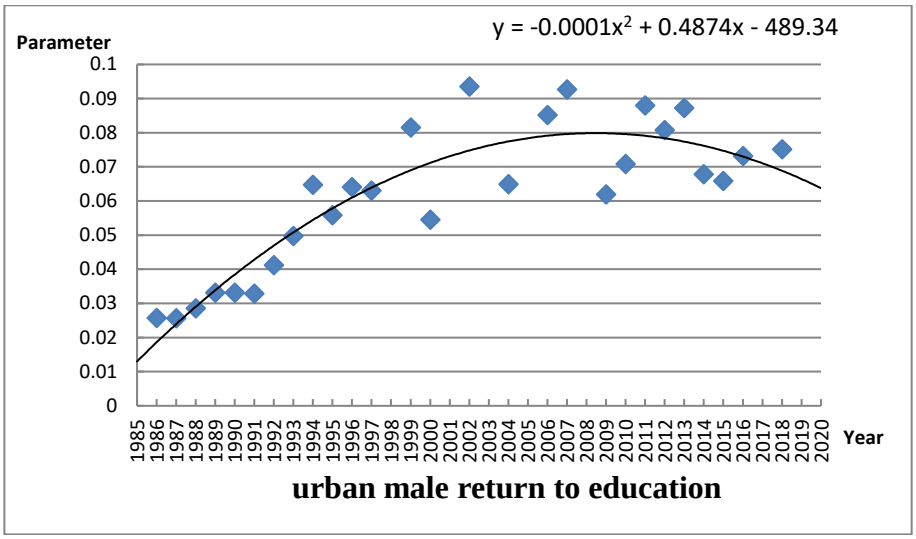
Year	Variables	Urban				Rural			
		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
2010	inc	38500.43	50585.82	30609.07	31871.49	9917.72	12468.58	6499.53	9471.95
	Sch	11.85	3.50	11.96	3.57	7.98	3.04	6.63	3.56
	Exp	21.70	10.25	18.50	8.91	28.07	10.31	25.09	9.46
2012	inc	45633.43	50026.94	36170.26	37650.93	17607.20	16560.41	12355.58	12564.79
	Sch	12.40	3.39	12.64	3.50	8.60	3.10	7.59	3.72
	Exp	19.54	11.33	16.04	10.06	22.70	12.39	20.81	11.26
2014	inc	55535.96	41949.48	47665.27	35812.39	26090.12	19912.01	20990.36	15822.95
	Sch	12.41	3.42	12.88	3.46	9.16	3.00	8.58	3.63
	Exp	20.13	11.14	16.58	9.81	21.84	12.45	19.82	11.60
2016	inc	63496.43	58962.88	54200.99	48026.93	27729.69	21725.19	21977.34	18586.98
	Sch	12.22	3.45	12.71	3.60	8.93	3.00	8.21	3.77
	Exp	21.18	11.35	17.83	10.05	23.42	12.28	22.13	11.49
2018	inc	71909.21	67225.11	62722.85	56596.55	31360.25	23784.38	24599.68	20308.36
	Sch	12.24	3.34	13.10	3.44	8.97	3.06	8.40	3.77
	Exp	21.55	11.25	17.58	9.99	24.71	12.26	23.15	11.48

Table B.1.6 Summary Statistics: CLDS samples

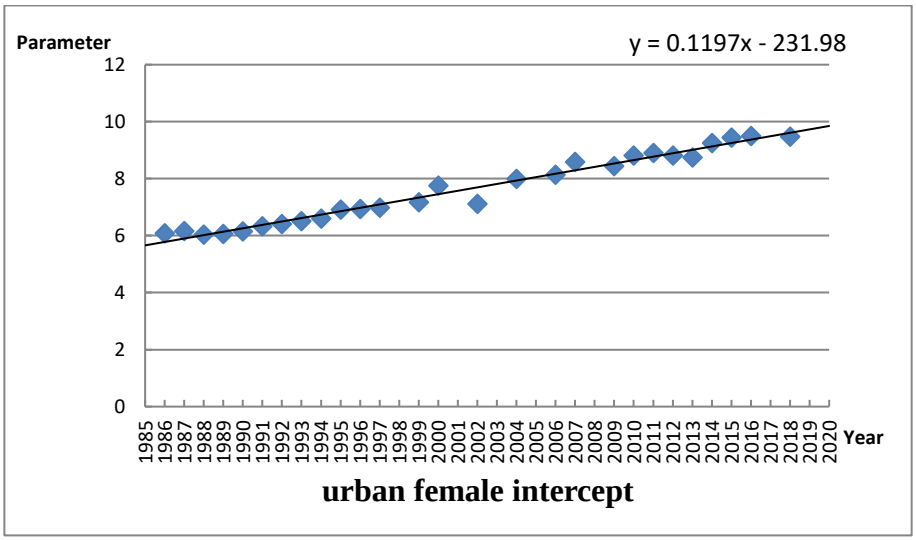
Year	Variables	Urban				Rural			
		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
2014	inc	49140.2	46818.3	39476.19	41543.86	26174.77	33250.29	18752.97	31854.30
	Sch	13.04	2.93	13.35	2.94	8.98	2.46	8.56	2.58
	Exp	21.87	11.30	17.72	9.88	24.78	11.85	21.70	10.48

Figures B.1-B.4 Parameter Estimates Against Time: Urban sample

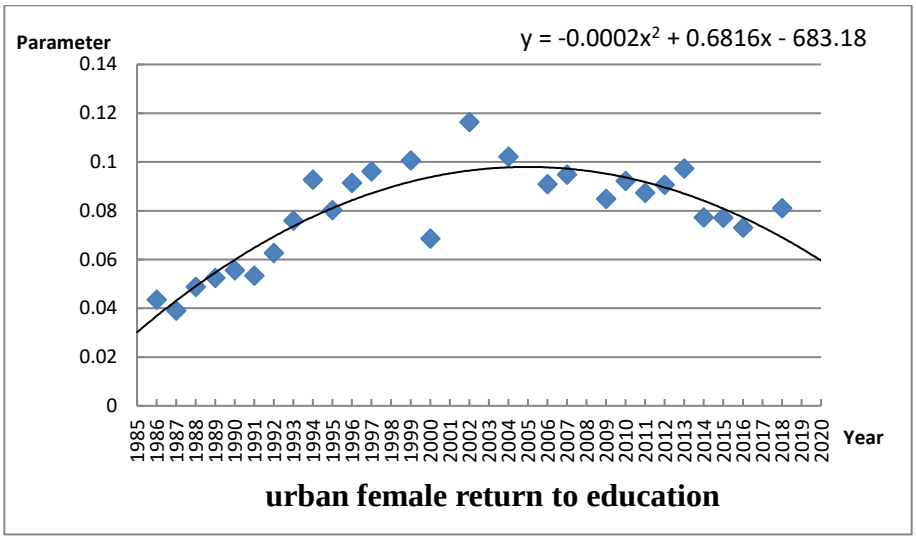




urban male return to education

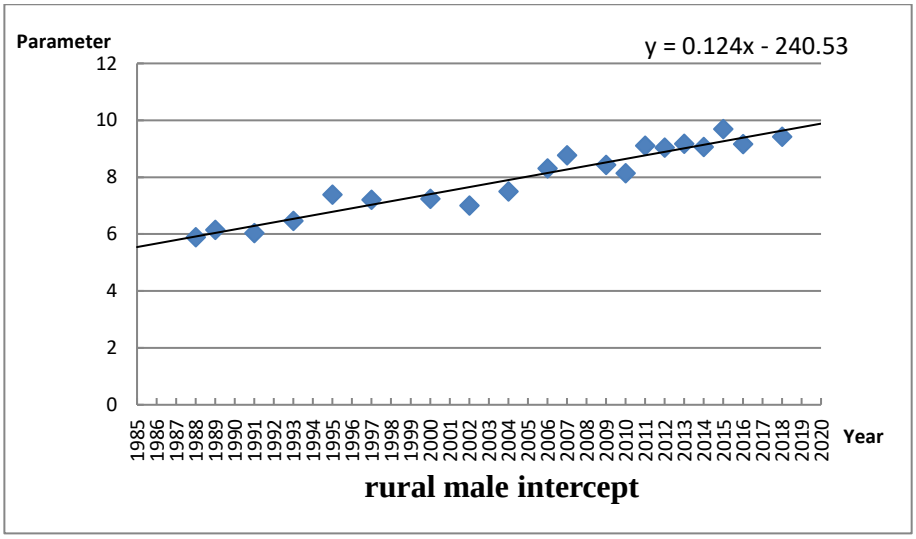


urban female intercept

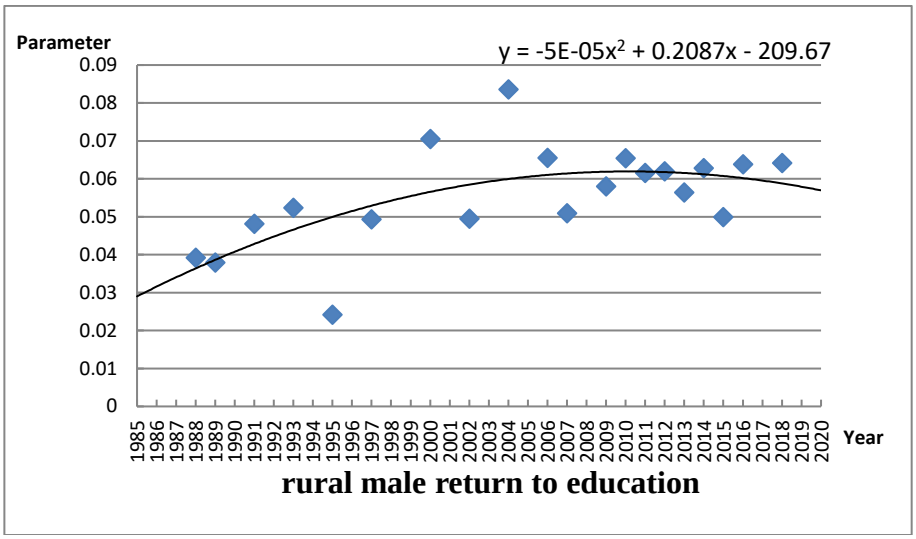


urban female return to education

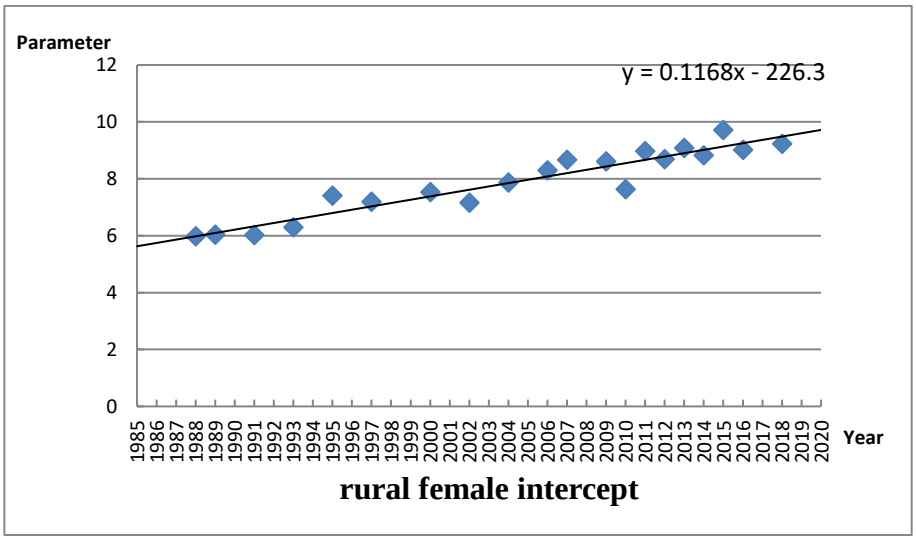
Figures B.5-B.8 Parameter Estimates Against Time: Rural Samples



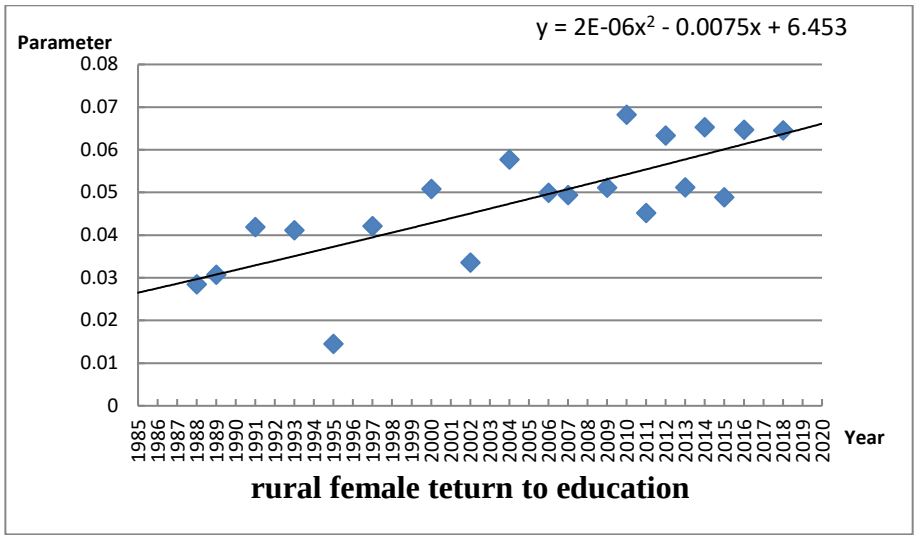
rural male intercept



rural male return to education



rural female intercept



rural female teturn 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 2020 based on the J-F approach. In particular, it explains estimations on some of the variables necessary for the J-F approach based on China's data. We use the following notations:

y indicates calendar years from 1980 to 2020. s indicates sex equaling to one and two for males and females, respectively. a indicates age ranging from 0 to 60 years. e indicates the levels of education as five categories for the years 1985-2000 including no schooling (ns), primary school (pri), junior middle school (jm), senior middle school (sm), and college (col). For the years 2000-2020, the levels of education (e) are classified as 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;

where e-n represents students in grade n+1 of education level e

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): cumulative 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	0-6
school only	7-15
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, or harmful

conditions, the legal retirement age is 55 for males and 45 for females. For people who become disabled due to illnesses approved by the Labor Ability Appraisal Committee, 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 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 *sch*, work experience *exp* and work experience squared exp^2 by OLS.

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

We use the fitted value of ln yinc from the equation above to obtain $m_i = e^{\ln yinc}$. We regress the annual income observed in the survey data on m_i

using the OLS (without the intercept) to obtain the coefficient on m_i, α.[39] Finally, we estimate the annual income of the employed as yinc=$\alpha \times e^{\ln yinc}$.

Note that the annual income used for estimating the Mincer equation is in real terms with 1985 as the base year.

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	16
2000-2020	0	6	9	12	15	16

(2) Coding of work experience:

For people younger than age 16, work experience is *exp*=0;

For people older than age 16, if s<10, work experience is *exp=age*-6;

For people older than age 16, if s≥10, work experience is *exp=age-sch*-6

2.2 Estimation of annual market income

After estimating the annual income of the employed using the Mincer equation, we obtain $yinc_{y,s,a,e} = whrs_{y,s,a,e} \times com_{y,s,a,e}$.

Given that

$mhrs_{y,s,a,e}=whrs_{y,s,a,e} \times empr_{y,s,a,e}$, $ymi_{y,s,a,e}=whrs_{y,s,a,e} \times empr_{y,s,a,e} \times com_{y,s,a,e}$

the annual market income is given by:

[39] Jeffrey M. Wooldridge (2005), Introductory Econometrics: A Modern Approach, 3rd edition.

$$ymi_{y,s,a,e} = yinc_{y,s,a,e} \times empr_{y,s,a,e}.$$

2.2.1 Calculation of employment rate empr(y,s,a,e)

To calculate the employment rate, empr(y,s,a,e), by age, sex and educational for individuals older than 16, we use the data from census years of 1987, 1995, 2000, 2005 and 2010 and replace middle years' employment rates by the average of these years.

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 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"
The employed by age, sex and group in 2005	"China Population Census 2005"
The employed by age, sex and education level in 2005	"China Population Census 2005"
Population by age, sex and education level in 2005	"China Population Census 2005"
The employed by age group, sex and education in 2005	"China Population and Employment Statistics Yearbook 2006"
The employed by age group, sex in 2010	"China Population and Employment Statistics Yearbook 2010"
The employed by age group, sex and education in 2010	"China Population and Employment Statistics Yearbook 2010"

Population by age, sex and education in 2010	"China Population Census 2010"
The employed by age group, sex and education in 2010	"China Population and Employment Statistics Yearbook 2011"
The employed by age group, sex in 2015	"China Population and Employment Statistics Yearbook 2015"
The employed by age group, sex and education in 2015	"China Population and Employment Statistics Yearbook 2015"
Population by age, sex and education in 2015	"China Population Census 2015"
The employed by age group, sex and education in 2015	"China Population and Employment Statistics Yearbook 2016"

Note: The 1% sample population in 1995 is converted to the total population by the actual sampling percentage of 1.03%.

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 9.5%. To divide the age group data in 2005 and 2010 we assume that the employment rate in each age in the same age group has the same increasing rate. For example, the employment rate of a 25-year-old individual in 2005 equals to the employment rate of a 25-year-old individual in 2000 times the growth rate of the employment rate of the individual's corresponding age group (25-29) between 2000 and 2005.

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 in 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 λ(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 assigned 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 as 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 of the enrollment rate from no schooling to primary school is:

$$senr(y,s,a,pri\text{-}ns) = Newenroll(y+1,s, pri)/ pop(y,s,ns)$$

The upper(lower) bound of people out of school in year y and enrolled into primary school in year y+1 is determined by the upper(lower) bound of the age distribution for enrollment of primary school in year y+1.

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:

$$senr(y,s,a,jm\text{-}pri) = newEnroll (y+6, s, jm)/ newEnroll (y, s, pri)$$

(2) The population of the second grade of primary school in year y by age and sex is the 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:

$$senr(y,s,a,jm\text{-}pri\text{-}1) = newEnroll (y+5,s,jm)/ newEnroll (y-1,s,pri)$$

(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 are worth noting:

(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 suspends for a year or more within a certain education category.

(2) We could only calculate the enrollment rate of primary school till 2007 for lack of data. We use 2007 enrollment rates for years after 2007. Likewise, for enrollment rates of junior middle school and high school, we fix the enrollment rates for 2012 and 2013 at the 2011 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 periods 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 the 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 periods divided by urban real wage in T-1 period. Results show that, for the 32-year period, 1985-2019, annual growth rates on average are 6.19% and 8.17% 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 final educational attainment is junior middle school. We discount that income by 6 years to reflect the fact that it takes 6 years for him to reach junior middle school: $senr(y,s,a,jm\text{-}pri)*mi(y,s,a+6,jm)*R^6$

(2) If an individual in the second grade of primary school can advance to the next higher level of education, his human capital is calculated as: $senr(y,s,a,jm\text{-}pri\text{-}1)*mi(y,s,a+5,jm)*R^5$, discounted by 5 years as it takes him 5 years to reach junior middle school.

(3) Similarly, we can calculate the human capital of the group in each grade of primary school.

6.1.2 Human capital of the group in junior middle school and above by age and sex

Take junior middle school as an example.

(1) If an individual in the first grade of junior middle school can advance to the next higher level of education, he could get human capital equal to that of someone who is currently three years older and whose final educational attainment is senior middle school. We discount that income by 3 years as it takes 3 years for him to reach senior middle school: $senr(y,s,a,sm-jm)*mi(y,s,a+3,sm)*R^3$

(2) If an individual in the second grade of junior middle school can advance to the next higher level of education, his human capital is calculated as:

$senr(y,s,a,sm-jm-1)*mi(y,s,a+2,sm)*R^2$, 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 observe separate enrollments for university and college (there are five categories for education level, and the last level is college and above), we get the human capital of the group in the first grade of senior middle school as:

$senr(y,s,a,col-sm)*mi(y,s,a+3,col)*R^3$

For grade 2 and 3 students, the human capital is given by:

$$senr(y,s,a,col-sm-1)*mi(y,s,a+2,col)*R^2$$

and

$$senr(y,s,a,col-sm-1)*mi(y,s,a+2,col)*R,$$

respectively.

For the years that separate university and college enrollments are available (there are six categories for education level, and the last level is university and above), we should use the human capital equation:

$$senr(y,s,a,col\text{-}sm)*mi(y,s,a+3,col)*R^3+senr(y,s,a,uni\text{-}sm)*mi(y,s,a+3,uni)*R^3,$$

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:

$$senr(y,s,a,col\text{-}sm\text{-}1)*mi(y,s,a+2,col)*R^2+senr(y,s,a,uni\text{-}sm\text{-}1)*mi(y,s,a+2,uni)*R^2.$$

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:

$$pop\_inschool(y,s,a,e) = \sum_{n=0}^{y(e)} pop\_inschool(y,s,a,e)$$

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:

$$pop\_noschool(y,s,a,e) = pop(y,s,a,e) - pop\_inschool(y,s,a,e)$$

Note that following adjustment is made for negative values in the out-of-school population.

(1) Rewrite the negative numbers of the out-of-school population for certain gender, age and education level as 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 only consists of people who are working. For people below the age of 60, the formula for human capital is:

$$mi(y,s,a,e) = ymi(y,s,a,e) + sr(y,s)*mi((y,s,a+1,e)*R$$

For those who are over 60, human capital is zero, i.e. ymi = 0.

7. Human capital stock in China: 1985-2020

The income estimated by the Mincer equation is the real yearly income (using 1985 as the base). We use CPI and real income to obtain the nominal yearly income.

Tables C.1- C.2 report the real human capital in China with 1985 as the baseline year. Tables C.3-C.4 show the labor force human capital.

In all these tables, we report the results based on six education categories from 1985-2020. Due to data limits, initially when we do the imputation, we do not differentiate college and university before 2000; when we do human capital calculation, we separate college and university before 2000 by using China Population Census 1990 and 2000. China Population Census 1990 record the population of university by age, sex and region. It is convenient for us to use China Population Census 1990 and 2000 to separate “university and

above" from "college and above" before 2000. We use data from the China Educational Statistical Yearbook before 2000 to calculate the national university share in college and university enrollment. Then we assume that the ratio of university to college enrollment is the same in all provinces. We also assume that the ratio of university to college enrollment is the same across gender.

In the abstract, the average annual growth rates of total human capital and human capital per capita are obtained by averaging the growth rates between the adjacent years. In the period 1985-2020, the average annual growth rate of total human capital is 7.5%. In the period 2010-2020, the average annual growth rate is 7.8%. In the period 2010-2020, the average annual growth rate of total human capital in rural areas is 2.4%, while in urban areas it is 9.2%. According to the data, it can be observed that the growth rate of total human capital is higher in the last decade, but the total human capital by urban and rural areas is lower than in all years. The explanation for this situation is as follows:

According to Equation 1, the total human capital is influenced by both human capital per capita and population. Figure 1 shows the proportion of population in urban and rural areas in the period 1982- 2020, it shows that the rural population has decreased significantly and the urban population has increased significantly. It is reasonable to assume that the phenomenon that the growth rate of total human capital has increased in recent years but the rural proportion of population decreased is due to the significant changes in the structure of urban and rural population.

$$\left(1 + S_{per\ capita}\right) * \left(1 + S_{population}\right) = \left(1 + S_{total}\right) \quad (1)$$

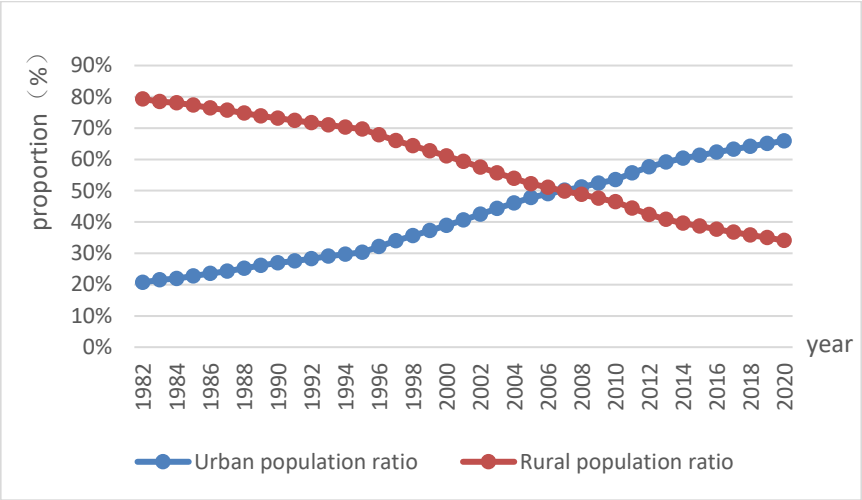


Figure 1 Urban and rural population structure (1985-2020)

In addition to this, there may be cases where the value of the national human capital per capita growth rate is higher than both the urban and rural human capital per capita growth rates. It can be deduced as below:

Total national human capital:

$$\mathrm{H} = H_U + H_R$$

National human capital per capita:

$$\overline{H} = \frac{H_U + H_R}{P_U + P_R} = \frac{P_U * \overline{H_U} + P_R * \overline{H_R}}{P_U + P_R} = \frac{P_U}{P_U + P_R} * \overline{H_U} + \frac{P_R}{P_U + P_R} * \overline{H_R}$$
$$= S_U * \overline{H_U} + S_R * \overline{H_R} = (1 - S_R) * \overline{H_U} + S_R * \overline{H_R}$$

Takes it to logarithmic form:

$$\log\overline{H} = \log\left((1 - S_R) * \overline{H_U} + S_R * \overline{H_R}\right)$$

Growth rate of national human capital per capita:

$$\dot{\overline{H}} = \frac{d\log\overline{H}}{dt} = \frac{1}{(1-S_R)*\overline{H_U}+S_R*\overline{H_R}}\left[\frac{dS_R}{dt} * \overline{H_R} + \frac{d\overline{H_R}}{dt} * S_R + (1 - S_R) * \frac{d\overline{H_U}}{dt} - \frac{dS_R}{dt} * \overline{H_U}\right] = \frac{1}{\overline{H}}\left[\frac{dS_R}{dt} * (\overline{H_R} - \overline{H_U}) + \frac{d\overline{H_R}}{dt} * S_R + (1 - S_R) * \frac{d\overline{H_U}}{dt}\right] \quad (2)$$

Growth rate of rural human capital per capita:

$$\frac{dlog\overline{H_R}}{dt} = \frac{dlog\overline{H_R}}{d\overline{H_R}} * \frac{d\overline{H_R}}{dt} = \frac{1}{\overline{H_R}} * \frac{d\overline{H_R}}{dt}$$
$$\frac{d\overline{H_R}}{dt} = \frac{dlog\overline{H_R}}{dt} * \overline{H_R} \quad (3)$$

Growth rate of urban human capital per capita:

$$\frac{d\overline{H_U}}{dt} = \frac{dlog\overline{H_U}}{dt} * \overline{H_U} \quad (4)$$

Take(2),(3)into (1):

$$\dot{\bar{H}} = \frac{1}{\bar{H}}\left[\frac{dS_R}{dt} * (\overline{H_R} - \overline{H_U}) + \frac{d\overline{H_R}}{dt} * S_R + (1 - S_R) * \frac{d\overline{H_U}}{dt}\right]$$
$$= \frac{1}{\bar{H}}\left[\frac{dS_R}{dt} * (\overline{H_R} - \overline{H_U}) + \frac{dlog\overline{H_R}}{dt} * \overline{H_R} * S_R + (1 - S_R) * \frac{dlog\overline{H_U}}{dt} * \overline{H_U}\right]$$

Simplify to obtain:

$$\dot{\bar{H}} = \frac{1}{\bar{H}}\left[S_R * \overline{H_R} * \dot{\overline{H_R}} + (1 - S_R) * \overline{H_U} * \dot{\overline{H_U}} + \frac{dS_R}{dt} * (\overline{H_R} - \overline{H_U})\right]$$

Sum the growth rate of urban human capital per capita and the growth rate of rural human capital per capita:

$$\frac{1}{\bar{H}} * S_R * \overline{H_R} + \frac{1}{\bar{H}} * [(1 - S_R) * \overline{H_U}] = \frac{1}{\bar{H}}\left[S_R * \frac{H_R}{P_R} + (1 - S_R) * \frac{H_U}{P_U}\right]$$
$$= \frac{1}{\bar{H}}\left[\frac{P_R}{P_R + P_U} * \frac{H_R}{P_R} + \frac{P_U}{P_R + P_U} * \frac{H_U}{P_U}\right] = \frac{1}{\bar{H}}\left[\frac{H_R}{P_R + P_U} + \frac{H_U}{P_R + P_U}\right]$$
$$= \frac{1}{\bar{H}}\left[\frac{H_R + H_U}{P_R + P_U}\right] = \frac{1}{\bar{H}} * \bar{H} = 1$$

Analysis of the intercept term:

$$\frac{1}{\bar{H}} * \frac{dS_R}{dt} * (\overline{H_R} - \overline{H_U})$$

As the proportion of rural population decreases over time, $\frac{dS_R}{dt}$ is negative.Since human capital per capita is higher in urban than in rural areas, $\overline{H_R} - \overline{H_U}$ is negative.

In summary, the intercept term is positive. The growth rate of national human capital per capita may be higher than both growth rate of urban human capital per capita and growth rate of rural human capital per capita.

Tables and figures of appendix C

Table C.1 Real Human Capital by Region and Gender, 1985-2020

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	11733	6235	13708	16065
1986	14286	6861	14925	15684
1987	15251	7466	16143	15540
1988	15020	7470	15908	14145
1989	15297	7725	15363	12747
1990	17744	9309	16980	13252
1991	19765	10675	18972	13747
1992	21142	11710	20512	13895
1993	21047	11853	20267	12928
1994	19217	11040	18356	11137
1995	18570	10786	17207	10095
1996	20808	12048	17431	9721
1997	24351	14191	18724	9931
1998	29140	17082	20815	10562
1999	34890	20984	23118	11253
2000	40428	24766	25559	11753
2001	46256	28879	27347	12329
2002	53681	32855	28856	12943
2003	60285	36418	30621	13366
2004	65648	40047	31108	13503
2005	71855	43983	32251	14060
2006	83734	50145	35635	15471
2007	93464	55642	37156	16353
2008	101801	60152	38124	17237
2009	118210	69171	42171	19413
2010	130482	75780	44301	20998

Year	Urban Male	Urban Female	Rural Male	Rural Female
2011	147324	84495	42909	20799
2012	166834	94510	43017	21299
2013	192768	107005	42923	21783
2014	213687	114969	43794	22823
2015	231610	116030	45461	24495
2016	254790	124157	45788	25777
2017	280621	132608	46748	27595
2018	305270	137251	47096	29448
2019	328904	140613	46646	31139
2020	347959	141536	46566	33171

Note: The results are based on six education categories.

Table C.2 Per Capita Real Human Capital by Region and Gender, 1985-2020

Unit: Thousand Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	98.33	61.66	34.72	45.10
1986	114.01	65.39	37.80	44.34
1987	116.50	68.66	40.93	43.81
1988	108.57	65.01	40.01	40.03
1989	105.44	63.84	38.48	36.15
1990	117.38	73.24	42.24	37.36
1991	126.90	80.62	47.12	38.69
1992	131.99	84.90	51.12	39.18
1993	128.13	82.68	50.84	36.59
1994	114.84	74.44	46.42	31.59
1995	108.91	70.25	43.80	28.63
1996	114.08	73.83	45.26	28.23
1997	125.53	82.01	49.63	29.54

Year	Urban Male	Urban Female	Rural Male	Rural Female
1998	141.95	93.33	56.11	32.04
1999	161.49	109.03	63.38	34.88
2000	179.05	123.13	71.66	37.39
2001	196.04	136.34	78.71	40.06
2002	217.89	147.54	85.87	43.29
2003	235.37	156.19	94.39	46.15
2004	247.67	164.96	99.31	48.14
2005	262.15	174.13	106.42	51.64
2006	292.49	192.21	118.19	57.60
2007	314.99	207.82	124.73	62.19
2008	333.54	220.08	129.60	66.95
2009	374.49	246.11	145.10	76.98
2010	400.52	262.40	154.42	85.01
2011	431.41	279.83	155.34	87.74
2012	470.38	301.91	162.30	93.86
2013	533.11	333.16	169.02	100.13
2014	580.52	353.63	179.08	108.41
2015	623.34	352.56	191.69	119.55
2016	675.83	370.04	198.95	128.70
2017	735.53	391.22	209.02	141.97
2018	789.55	404.11	216.02	157.06
2019	840.20	411.87	218.96	172.00
2020	876.67	411.45	223.69	189.79

Note: The results are based on six education categories.

Table C.3 Real Labor Force Human Capital by Region and Gender, 1985-2020

Unit: Billion Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	5320	2243	5733	6960
1986	5901	2529	6371	7030
1987	6440	2817	7062	7131
1988	6253	2782	7054	6519
1989	6313	2862	6952	5951
1990	7311	3369	7866	6286
1991	7922	3723	8813	6503
1992	8183	3957	9552	6576
1993	7823	3903	9471	6130
1994	6901	3558	8668	5315
1995	6592	3496	8240	4840
1996	7375	3812	8487	4676
1997	8672	4421	9182	4787
1998	10435	5265	10306	5107
1999	12381	6238	11587	5495
2000	14409	7218	12785	5857
2001	16031	8106	13539	6100
2002	18252	9229	14266	6376
2003	20269	10316	14924	6588
2004	22141	11304	14896	6572
2005	24684	12683	15340	6836
2006	29551	14888	17202	7594
2007	33105	16531	18312	8152
2008	35978	17836	19091	8641
2009	42661	20877	21297	9789
2010	48416	23445	22591	10674
2011	53968	25867	22204	10774
2012	60812	28590	22646	11231
2013	67818	31868	22961	11737
2014	74872	33347	23624	12460

Year	Urban Male	Urban Female	Rural Male	Rural Female
2015	81960	35410	24719	13496
2016	89280	37668	25446	14527
2017	97310	39766	26333	15788
2018	105473	41802	26785	17048
2019	112800	43255	26920	18306
2020	118263	43800	27175	19731

Note: The results are based on six education categories.

Table C.4 Per Capita Real Labor Force Human Capital by Region and Gender, 1985-2020

Unit: Thousand Yuan

Year	Urban Male	Urban Female	Rural Male	Rural Female
1985	69.46	34.83	24.78	33.07
1986	73.05	37.20	27.12	32.63
1987	75.24	39.10	29.58	32.30
1988	69.09	36.41	29.02	29.51
1989	65.90	35.23	28.02	26.72
1990	72.22	39.05	30.97	27.80
1991	76.13	41.52	34.37	28.49
1992	77.16	42.58	37.07	28.59
1993	72.92	40.70	36.73	26.47
1994	63.80	36.02	33.49	22.71
1995	60.06	34.21	31.83	20.50
1996	62.40	35.18	33.07	20.14
1997	68.22	38.29	36.15	20.96
1998	76.51	42.64	40.95	22.67
1999	85.08	47.47	46.33	24.73

Year	Urban Male	Urban Female	Rural Male	Rural Female
2000	93.17	51.71	51.63	26.75
2001	99.96	55.38	56.00	28.32
2002	109.87	60.29	60.68	30.22
2003	117.65	64.44	65.41	31.96
2004	123.84	67.66	67.65	32.82
2005	132.65	72.59	71.92	35.01
2006	151.36	82.78	80.55	39.32
2007	163.59	90.37	85.87	42.85
2008	172.50	96.11	89.93	46.18
2009	196.48	109.33	100.99	53.26
2010	214.01	118.78	107.89	59.10
2011	229.85	126.73	108.70	61.41
2012	251.49	136.58	114.06	66.05
2013	276.94	149.28	119.11	71.03
2014	299.82	154.77	126.29	77.21
2015	323.74	161.61	135.66	85.46
2016	349.41	169.30	142.07	92.81
2017	378.43	178.23	150.04	103.23
2018	406.59	187.94	155.42	115.22
2019	431.07	194.45	158.32	127.48
2020	448.11	196.82	162.11	141.75

Note: The results are based on six education categories.

Appendix D Physical Capital Estimation

1. Two measurements of physical capital

For each province, two variations of two measures of physical capital stock are calculated:

(1) Wealth capital stock (or: net capital stock): It is the stock of physical assets existing at a point of time and is used to compare physical capital with human capital.

(2) Productive capital stock: It is the stock of a particular, homogenous, asset expressed in 'efficiency' units. The importance of the productive stock derives from the fact that it offers a practical tool to estimate capital services.

Note that when geometric depreciation is adopted, the wealth capital and productive capital stocks are identical.

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. The quantity of capital input is called 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 quantity 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 capital input chapter in the OECD Manual (2001) on *Measuring Productivity*. Both geometric and a hyperbolic measure are discussed in this manual.

The two measures of physical capital stock are calculated in five ways, with two geometric depreciation rate variations: double declining

depreciation rate and U.S. Bureau of Economic Analysis depreciation rate:

(1) Wealth capital stock at the end of the year in (mid-year) 1985 prices, based on geometric depreciation.

(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 depreciation and with the 1985 value set equal to one.

(5) An index of real growth in capital services, based on hyperbolic depreciation using parameters adopted by the U.S. Bureau of Labor Statistics and the Australian Bureau of Statistics and with the 1985 value set equal to one.

The first four variations of capital stock (and services) measures are derived using a modified version 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 the 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 the 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). We use the data of 2003-2017 to calculate the proportion of "construction and installation engineering, equipment and appliances purchase, others" in the total investment in fixed assets of the whole society in each year, and split the total fixed capital formation in 2003-2017 according to the proportion of each year.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 are 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 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

$$W_{1952} = \frac{GFCF_{1953}}{\delta+\theta} - GFCF_{1953} \qquad (2)$$

$GFCF_{1953}$ 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 1953 value.

4. Methodology

We follow the method outlined in the OECD Manual (2009) on *Measuring Capital* and the capital input 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 Tornqvist 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

$$g_n = (1 - \delta)^n \qquad (3)$$

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 and alternatively by the method used by the U.S. Bureau of Economic Analysis (BEA) (Fraumeni, 1997). The rate of efficiency decline is equal to the declining balance rate divided by the average service life. With a double declining balance depreciation rate method, the declining balance rate is equal to 2. With the BEA method, for structures the declining balance rate for structures is set to the BEA default rate, .91; the declining balance rate for equipment is set to the BEA default rate, 1.65; the declining balance rate for others is set to 1.3725. The declining balance rate for others is determined by an interpolation between .91 and 1.65 based on the service life of 40 for structures, 25 for others, and 16 for equipment. Starting at twice the average service life, efficiency (as well as the price) is set equal to zero, even though with a geometric rate of depreciation, efficiency is positive to infinity, but very small.

4.2 Hyperbolic age-efficiency profile, single 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

$$g_n = \frac{(T-n)}{(T-b*n)} \qquad (4)$$

In this report, parameters for the hyperbolic function are set to those used by the U.S. Bureau of Labor Statistics and the Australian Bureau of Statistics. Specifically, 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 U.S. Bureau of Labor Statistics 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:

$$T_t = \prod_{i=1}^{3} Z_{it}^{(Share_{it}+Share_{it-1})/2} \qquad (5)$$

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:

$$. \quad Share_{it} = U_{it} / \sum_{i=1}^{3} U_{it} \qquad (6)$$

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 ($q*K^P$), with the rental rate covering depreciation and a rate of return, less appreciation of the asset during the period:

$$. \quad U_{it} = \left(\delta_{it} + r_t - \frac{q_{it}-q_{it-1}}{q_{it}}\right) * q_{it} K_{it}^{P} \qquad (7)$$

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:

$$U_t = \sum_{i=1}^{3} U_{it} = \sum_{i=1}^{3} \left(\delta_{it} + r_t - \frac{q_{it} - q_{it-1}}{q_{it}}\right) * q_{it} K_{it}^{P} \qquad (8)$$

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 discount rate 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 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, 1985-2017（hyperbolic）

Unit: 1 billion of 1985 Yuan

Province	1985	1990	1995	2000	2005	2017
Beijing	50.8	115.8	227.8	436	862	3181.8
Tianjin	37.9	67.4	115.3	202.3	376.4	2573.9
Hebei	95.3	146.7	243.9	482.6	869.8	4238.8
Shanxi	53.8	80.2	109.3	166.8	308.1	1590
Inner Mongolia	30.9	49.8	91.8	149.6	389.8	3421.7
Liaoning	101.6	162.6	253	358.3	628	2809.8
Jilin	39.9	63.3	98.6	150.5	275.2	2147.5
Heilongjiang	67.6	105.5	151.5	240	381.1	1764.4

Province	1985	1990	1995	2000	2005	2017
Shanghai	70.8	132.1	253.3	501.7	850	2486.5
Jiangsu	98.7	220	481.2	954.1	1913.8	9169.1
Zhejiang	14.7	30.7	150.9	447.6	1097.1	4622.2
Anhui	45.6	80.3	130	221.7	382	2041.8
Fujian	31.1	50.2	93.3	196.2	363.3	2114.6
Jiangxi	43	63.8	104.3	180.2	370.8	1849.8
Shandong	121.6	213.4	351	618.4	1243.4	6071.1
Henan	98.9	161.9	259.1	478.3	891.6	6429.1
Hubei	70.4	105.8	176	351.8	615.2	3285.3
Hunan	48.5	73.2	103.4	164.8	284.3	1586.9
Guangdong	94.3	162.6	388.1	811.3	1591.9	7652.2
Guangxi	44.9	56.8	86.8	144.4	258.3	1918.3
Hainan	7.7	16.8	40.6	61.4	91.7	437.8
Chongqing	46.7	61.3	96.3	179.7	388.7	2080.3
Sichuan	73	109.4	160.1	283	516.8	2416.5
Guizhou	29	40.3	53	86	163.8	891.5
Yunnan	75.5	89.2	134.8	215.1	345	2078.1
Tibet	7.9	10.3	15.3	20.1	39.6	270.3
Shaanxi	40.6	70.4	99.2	148.8	256.8	1547.3
Gansu	34.3	50.6	63.2	90.2	161.1	711.8
Qinghai	14	19.7	26.9	47.6	96.8	699.8
Ningxia	13.5	18.9	24.6	34.5	65.5	553.7
Xinjiang	31.6	52	103	171.7	298.3	1504
National	**2081.6**	**3237.4**	**5219.9**	**8624.8**	**15223**	**65936.3**

Table D.2 Wealth Capital Stock at Constant Prices, 1985-2017（geometric）

Province	1985	1990	1995	2000	2005	2017
Beijing	42.6	98.3	191.9	363	719.7	2595.5
Tianjin	31.5	55.4	94.6	166	311.8	2135.9
Hebei	76	118	199.5	401.1	721	3480.2

Province	1985	1990	1995	2000	2005	2017
Shanxi	43.2	64	86.6	134.4	255.5	1300
Inner Mongolia	25.2	40.5	75.9	122.2	336.3	2811.2
Liaoning	79	131.5	205.9	287.8	519.7	2251.6
Jilin	32.1	51.2	80	121.6	227.8	1753.3
Heilongjiang	55.7	85.5	121.5	194	308.9	1452.2
Shanghai	59	109.3	212.3	417.4	697.5	2003
Jiangsu	82.7	186	407.3	797	1602	7485.9
Zhejiang	12.4	25.9	136	388.3	939.7	3773.8
Anhui	37.4	66	106.8	181.9	314.8	1696.8
Fujian	25.3	40.7	77.7	164.5	302.3	1761.3
Jiangxi	34.2	50.9	84.9	147.7	311.1	1518.4
Shandong	100.2	175	286.2	507.7	1038.2	4963.7
Henan	80.1	131.4	211.1	395.2	742.4	5339.3
Hubei	56.2	84.6	144.2	293.2	507.8	2743.1
Hunan	38.7	58.2	82.2	133	233.1	1312.2
Guangdong	78.2	133.7	331.5	683.8	1333.3	6332.6
Guangxi	34.6	44	70.3	118.5	214.6	1582.9
Hainan	6.3	14.2	34.6	49.9	73.9	365.4
Chongqing	36.5	47.3	77.5	149	328.9	1734.6
Sichuan	60.1	87.9	128.4	232.1	427	1993.3
Guizhou	23.1	31.8	41.5	69.5	135.4	752.7
Yunnan	56.4	68.3	108.7	176.3	283.2	1764.3
Tibet	6.3	8.1	12.2	15.7	33.1	228.3
Shaanxi	32.7	57.3	79.1	119.4	210.1	1285.9
Gansu	26.7	40	48.9	71.5	132.3	587.6
Qinghai	11	15.5	21.3	39.1	80.9	595.8
Ningxia	10.6	14.9	19.2	27.3	54.2	476.7
Xinjiang	25.9	42.5	86	140.8	244.9	1255.1
National	**1672.2**	**2604.3**	**4245**	**7028.5**	**12530.2**	**54086.7**

Table D.3 Wealth Capital Stock at Constant Prices, 1985-2017（geometric BEA）

Province	1985	1990	1995	2000	2005	2017
Beijing	50.6	113.7	221.7	421.2	830.7	3047.5
Tianjin	37	65.5	112.2	196.5	365	2450.1
Hebei	93.9	145	240.9	471.8	843.7	4054.9
Shanxi	53.4	79.4	108.7	166	303.9	1525.5
Inner Mongolia	30.6	49.1	90.3	146.3	380.5	3234.8
Liaoning	104.9	166.5	256	359.4	624.2	2686.3
Jilin	39.9	63.1	97.9	148.7	270.2	2015
Heilongjiang	67.1	104	149.6	236.9	374.8	1702.6
Shanghai	71	132	253	498.7	846.4	2526.3
Jiangsu	99.2	216.5	467.5	917.5	1834.7	8642.5
Zhejiang	14.4	29.9	146.9	428.8	1048.6	4403.8
Anhui	45.8	79.6	128.4	217.7	373.8	1965.1
Fujian	30.6	49.3	91.7	190.7	350.7	2022
Jiangxi	42.4	63.2	103.4	177.5	362.4	1768.8
Shandong	100.5	175.5	287	509.2	1041	4982
Henan	97.1	159	254.8	468.9	870.4	6126.1
Hubei	69.2	104.3	173.9	344.4	597.9	3167.4
Hunan	47.5	72	102.3	163	279.8	1522.5
Guangdong	92.2	158.5	378.3	784.2	1534.9	7352.3
Guangxi	45.9	58.6	89.4	146.1	257.1	1829.1
Hainan	7.6	16.4	39.3	59	88.6	425.1
Chongqing	45.8	60.6	96.1	178.3	381.1	2010
Sichuan	71	106.5	156.9	277.7	503.9	2331.5
Guizhou	28.4	39.7	52.6	85.4	160.6	863.3
Yunnan	78.9	95.3	142.6	222.5	349.8	2030.5
Tibet	7.8	10.3	15.3	20.2	39.8	264.4
Shaanxi	32.8	57.4	79.3	119.7	210.7	1289
Gansu	33.7	50.1	63.1	90.8	160.9	693.9
Qinghai	11.1	15.6	21.4	39.2	81.1	596.9

Province	1985	1990	1995	2000	2005	2017
Ningxia	10.7	14.9	19.3	27.4	54.4	477.8
Xinjiang	31.2	51.2	101.1	167.3	290.1	1446.4
National	**2045.4**	**3186.4**	**5143.4**	**8464.2**	**14871.4**	**63358.3**

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