GENDER GAPS IN LABOR MARKET PARTICIPATION AND EARNINGS IN POST-REFORM CHINA

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GENDER GAPS IN LABOR MARKET PARTICIPATION AND EARNINGS IN POST-REFORM CHINA

ABSTRACT

Ensuring gender equity in the process of economic development is a key Sustainable Development Goal. Many governments have invested heavily in women's education to address gender inequality in the labor market. However, gender gaps in labor force participation and earnings continue to persist even in developing countries that have experienced steady macroeconomic growth and graduated to upper middle income status. A case in point is China, the country with the largest labor force in the world, where gender gaps in labor force participation rates and earnings have widened during the transition from a centrally planned economy to a market-oriented one. This phenomenon has received some attention from researchers in post-reform China. However exactly what is driving these gaps in post-reform China is not fully understood. Therefore, this dissertation contributes to the existing literature by re-examining the determinants of labor force participation and earnings as well gender gaps in these two labor market indicators using data from the Chinese General Social Survey (CGSS) 2010. The dissertation contains two parts. In the first part, Probit regression model of participating in the labor force together with Oaxaca decomposition for non-linear model are employed to to investigate the size and sources of the gender labor force participation gap. The empirical analysis additionally takes into account the role of previously ignored factors – social norms, health human capital and cognitive skills – in explaining this gap. In the second part, the analysis is based on the Mincerian earnings function which is estimated using the Ordinary Least Squares method and also complemented with the Oaxaca decomposition analysis. Moreover, Heckman and Instrumental Variables approaches are used for corrections of problems such as non-random selection into the labor force and endogeneity of schooling attainment in the

earnings function. First part of the analysis found a significant gender gap in labor force participation probability. Detailed decomposition showed that only a small portion of the gender gap in participating in the labor force was explained by endowment differences such as superior health human capital. Instead, gender-related community social norms accounted for around half of the unexplained gap. In the second part, a significant differential of average monthly earnings between females and males was found. Detailed decomposition indicated that only one third of the gender gap in monthly earnings was explained by endowment gaps such as superior health and education capital. While the majority of this gap remains unexplained by difference in returns to these conventional endowments. Moreover, these findings are robust to corrections for problems including sample selection bias and endogeneity of schooling attainment. The findings have important policy implications. Interventions that can narrow gender gap in pre-market health status through improved access to health facilities and medical services would help to narrow the gender gap in Chinese labor market. In addition, policies that improve access to higher English educational opportunity for women and promote supportive attitudes within the community towards women's outside work are also likely to help close the gender gap in labor force participation rate.

Key Words: Gender Inequality, Labor Market, Employment, Earnings, China

JURANG JANTINA DI DALAM PENYERTAAN PASARAN BURUH DAN PENDAPATAN PADA ERA SELEPAS REFORMASI CHINA

ABSTRAK

Memastikan kesaksamaan jantina merupakan matlamat pembangunan mampan di dalam proses perkembangan ekonomi. Banyak kerajaan telah membuat pelaburan yang besar terhadap pendidikan golongan wanita bagi menangani isu ketidaksamaan jantina di dalam pasaran buruh. Walaubagaimanapun, jurang jantina dalam pendapatan dan penyertaan pasaran buruh masih berterusan, bahkan di negara-negara membangun yang telah mengalami pertumbuhan ekonomi yang mantap dimana status ekonominya telah beralih kepada berpendapatan menengah-atas. Perkara ini berlaku di China, sebuah negara yang mempunyai tenaga buruh yang terbesar di dunia. Jurang jantina dalam kadar penyertaan pasaran buruh dan pendapatan dan gaji di negara ini menjadi semakin besar semasa proses peralihan daripada ekonomi perancangan pusat kepada ekonomi berorientasikan pasaran. Fenomena ini telah mendapat perhatian para penyelidik di era selepas reformasi China. Walaubagaimanapun, penyebab utama yang mendorong kewujudan jurang ini masih tidak difahami sepenuhnya. Oleh itu, disertasi ini menyumbang kepada literatur yang sedia ada dengan mengkaji semula penentu-penentu bagi penyertaan tenaga buruh dan pendapatan serta jurang jantina di dalam kedua-dua penunjuk pasaran buruh ini dengan menggunakan data daripada *Chinese General Social Survey (CGSS)* 2010. Disertasi ini terbahagi kepada dua bahagian. Di dalam bahagian pertama, secara metodologinya ia menggunakan model regresi Probit di atas mereka yang mempunyai pekerjaan dengan penguraian *Oaxaca* untuk model yang tidak linear bagi menyiasat saiz dan sumber-sumber yang menyumbang kepada jurang jantina bagi penyertaan pekerjaan. Analisis empirical juga mengambil kira peranan faktor-faktor yang dahulunya diabaikan – norma sosial, kesihatan modal insan dan kemahiran kognitif – untuk menjelaskan jurang ini. Di dalam bahagian kedua, analisis adalah

berdasarkan fungsi pendapatan *Mincerian* yang dikira menggunakan *Ordinary Least Squares* dan juga analisis *Oaxaca*. Selain daripada itu, *Heckman* dan pembolehubah instrumental digunakan untuk memperbaiki isu-isu seperti pemilihan ke dalam pasaran buruh yang tidak rawak dan endogenesis pencapaian pembelajaran di dalam fungsi pendapatan. Bahagian pertama analisis mendapati bahawa terdapat kewujudan jurang jantina yang signifikan di dalam kebarangkalian menyertai pasaran buruh. Penguraian terperinci menunjukkan hanya sebahagian kecil jurang jantina dalam penyertaan pekerjaan dijelaskan dari perbezaan endowmen seperti kesihatan modal insan yang lebih baik. Sebaliknya, norma sosial komuniti yang berkaitan jantina menyumbang lebih daripada separuh jurang tersebut. Pada bahagian yang kedua, didapati bahawa terdapat perbezaan ketara di antara purata pendapatan bulanan lelaki dan wanita. Penguraian terperinci menunjukkan hanya satu pertiga jurang jantina dalam pendapatan bulanan dapat dijelaskan oleh perbezaan endowmen seperti kesihatan modal insan dan modal pendidikan. Sebaliknya, majoriti daripada jurang ini tidak dapat dijelaskan oleh perbezaan dari pulangan endowmen-endowmen konvensional ini. Tambahan pula, penemuan ini adalah mantap dengan pembetulan isu-isu termasuk kecenderungan pemilihan sampel dan endogenesis pencapaian pembelajaran Dapatan kajian ini memberi impikasi penting terhadap dasar. Campur tangan yang dapat mengecilkan jurang jantina di dalam taraf kesihatan pra-pasaran melalui akses yang lebih baik kepada kemudahan kesihatan dan perkhidmatan perubatan akan dapat membantu mengurangkan jurang jantina di dalam pasaran buruh China. Selain daripada itu, dasar-dasar yang dapat menambah baik akses kepada peluang pendidikan Bahasa Inggeris yang lebih tinggi untuk wanita dan menggalakkan pemberian sokongan dikalangan komuniti terhadap wanita di luar masa bekerja juga mungkin akan dapat membantu mengecilkan jurang jantina di dalam penyertaan pasaran buruh.

Kata Kunci: Ketaksamaan Jantina; Pasaran Buruh; Pekerjaan; Pendapatan; China

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF SYMBOLS AND ABBREVIATIONS

BMI	:	Body-mass Index
CFPS	:	China Family Panel Studies
CGSS		Chinese General Social Survey
CHARLS	:	China Health and Retirement Longitudinal Study
CHFS	:	China Household Finance Survey
CHIP	:	Chinese Household Income Project
CHNS	:	China Health and Nutrition Survey
FDI		Foreign Direct Investment
GDI		Gender Development Indicator
GEM		Gender Empower Measure
HDI		Human Development Indicator
ILO		International Labor Organization
IV		Instrument Variable
LF		Labor Force
OECD		Organization for Economic Co-operation and Development
OLS		Ordinary Least Squares
RIF		Recentered Influence Function
SOE		State Owned Enterprise
UHS		Urban Household Survey
2SLS		Two-Stage least squares

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

1.1 Background of Study

The importance of gender equality in the process of economic growth and development is well recognized in the existing literature (Matthews and Nee, 2000; Seguino, 2000; Hannum, 2005; Klasen and Lamanna, 2009; Eastin and Prakash, 2013; Ferrant, 2015; Kim, Lee and Shin, 2016). Moreover, the significance of access to jobs for women's empowerment has been documented by existing studies (Grown, Guspta and Kes, 2005; Kabeer, 2005; Iversen and Rosenbluth, 2008). Yet there is a sizeable female-male gap in labor force participation and wages throughout the developing world (Brainerd, 2000; Liu, 2004; Weichselbaumer and Winter-Ebmer, 2005; Hausmann, Tyson and Zahidi, 2012; Nopo, Daza and Ramos, 2012; Alfarhan, 2015; Mathew, 2015; Perugini and Selezneva, 2015; Bhalotra, Fernandez and Venkataramani, 2015; Nordman, Sarr and Sharma, 2015). This is also true for China, a country with the largest labor force in the world[1], and its remarkable economic development in the past several decades has helped to lift millions out of poverty by creating jobs and other forms of market opportunities.

Before the economic reforms, State-owned and collectively owned firms dominated the Chinese economy. Since jobs were allocated by the government, men as well as women had access to similar employment opportunities and wages during the 1950s to 1970s. After the dissolution of the welfare system and economic transition from a planned one to a market-oriented one, the Chinese central government reduced its intervention in the labor market. Consequently, the wage level adjusted to the market demands and the supply of labor, giving rise to considerable inequality in the income distribution (Meng, Shen and Sen, 2013). Reforms in the 1990s also included greater

[1] The total number of working population has reached 897 million by the end of 2018.

efforts on protecting women and their equal opportunities at the workplace by enforcing current labor laws and agreements according to the existing international conventions and improving female workers' welfare (Lee, 2012; Meng, 2012). Female schooling and literacy also improved considerably over the past decades (Wu and Zhang, 2010; Treiman, 2013).

In this context, how have the previously equal labor force participation and wage level for women and men has changed in China over the post-reform decades?

In contrast sharply to recent patterns observed in OECD countries where the labor force participation rate of female working-age group experienced a significant rise over the last few decades as shown in **Figure 1.1**, during the process of transforming to a market economy, China saw a steady decline in the participation rate of female in the formal labor market. In the 1980s, nearly half of the overall labor force comprised women, the female labor force participation rate in China was more than 75 percent in 1982 (Wang, 2014), then it increased to 83.7 percent in 1990 (Liu, 1995)[2]. However, in recent years, the participation rate declined to less than 70 percent as presented in **Figure 1.1**. Along with the significant increase in income inequality during this reform phase, the female-male difference in labor force participation rate has also increased (see e.g. Wang and Cai, 2008; Song and Xia, 2013; Tang and Long, 2013)[3].

[2] The rate of female participation based on population census data for urban China was even high – 89.4 per cent in 1990 (Wu and Zhou, 2015).

[3] During the same time, East and South Asian countries also experienced an expansion in the female-male difference in terms of labor force participation rate (ILO, 2016).

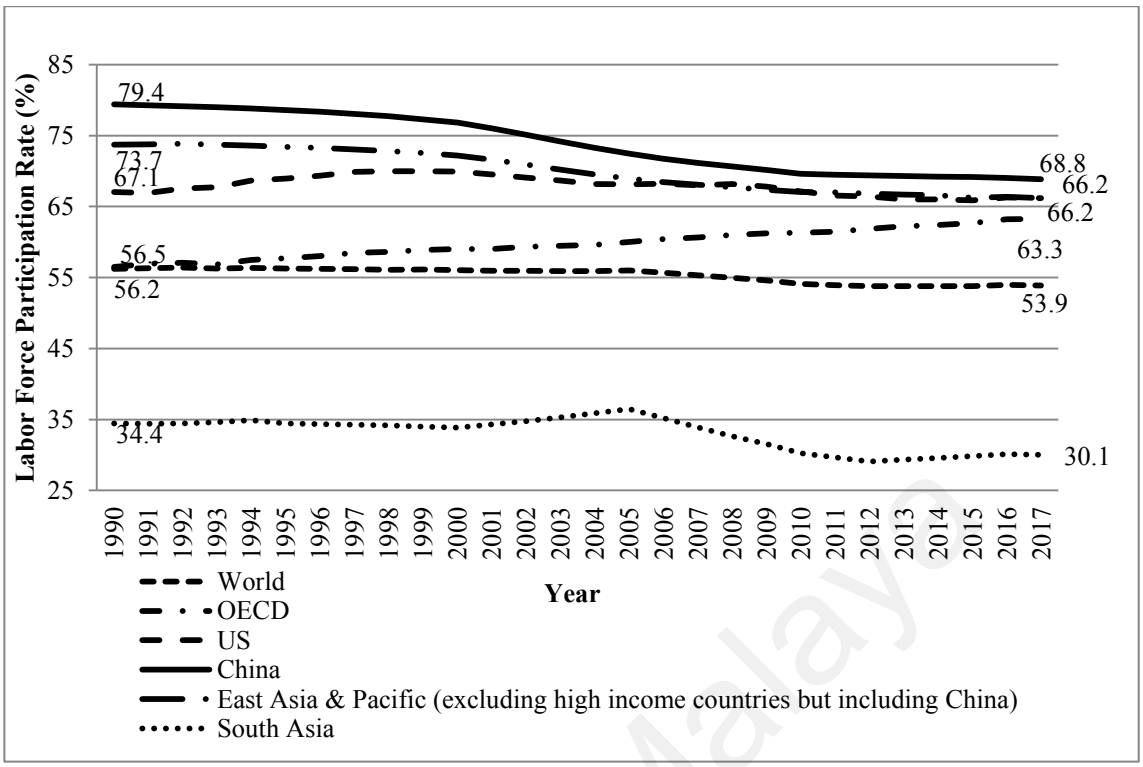

Figure 1.1: Female Labor Force Participation Rate (% of Female Population ages 15-65) in China and other Regions

Data Source: International Labor Organization, ILOSTAT Database.

1.2 Research Questions and Research Objectives

Why there is a gender labor force participation gap? Many earlier studies have looked into the reasons for the puzzle of declining female labor supply and the resurgent of gender labor force participation gap in post-reform China (see e.g. Appleton et al., 2002; Kilburn and Datar, 2002; Giles et al., 2006; Du, Yang and Dong, 2006; Knight and Li, 2006; Du, 2008; Du and Dong, 2010; Maurer-Fazio et al., 2011; Dong and Pandey, 2012; Shen et al., 2016; Fu, Liao and Zhang, 2016). Findings from these existing studies shows that women's comparative disadvantage in human capital and political capital over the post-reform decades explain little of the differences in both the rate of labor force participation and as well as the rate of employment between women and men, while related to family status strongly (see s.g. Zhang, Hannum and Wang, 2008). However, research on the role of social norms/attitude on gender roles is limited,

which has been documented by studies from other developing countries (Fernandez, Fogli and Olivetti, 2004; Munshi and Rosenzweig, 2006; Alesina, Giuliano and Nunn, 2013; Cerise et al., 2013; Farre and Vella, 2013; Fotin, 2015; De Giusti and Kambhampati, 2016; Chen and Ge, 2018). The unsupportive atmosphere in the community can cause women's withdrawal from the workforce (Croll, 1995; Maurer-Fazio et al., 2007). In the context of China, along with this dramatic decline in female labor market participation as well as the expansion in female-male differentials in labor force participation, social norms/attitudes towards gender roles (i.e. social and gender identity norms) have also changed paradoxically. There is a resurgence of attitudes supportive of traditional gender roles since 2007 (i.e. including patriarchal gender attitudes) partly resulting from a state-sponsored media campaign regarding the "leftover" women (*sheng nǚ*) conducted by the central government (Fincher, 2014; Chi and Li, 2014).

Therefore, in the first part of this thesis, we will try to measure the contribution of social norms in explaining Chinese women's labor force participation along with the rapid changing economic transformation years. In the meanwhile, we will take health capital and cognitive skill as the factor that could affect the labor force participation of women into consideration, which has not been simultaneously considered by previous studies (e.g. Mammen and Pasxon, 2000; Klasen and Pieters, 2012; Cunningham, 2001; Priebe, 2010).

Besides the increased gender gap in labor force participation, China also saw a widening gender wage gap since the early years of 1990s (e.g. Chi and Li 2008; Chi and Li 2014). Moreover, the difference in wages between female and male labor has also increased in rural China between the late 1980s and mid-1990s (Rozelle et al., 2002). This is contrast to the pattern in other economies where the gender wage gap is

narrowing (e.g. Glinskaya and Mroz, 2000; Orazem and Vodopiverc, 2000; Adamchik and Bedi, 2003; Jolliffe and Campos, 2005; Madheswaran and Khasnobis, 2007; Ahmed and Mcgillivray, 2015).

Why there is a gender wage gap? This phenomenon of growing gender earnings gap has received some attention from researchers (e.g. Liu et al., 2000; Ng, 2007; Wang and Cai, 2008; Dong and Zhang, 2009; Qi and Liu, 2009; Wang, 2010; Chi and Li, 2014; Heshmati and Su, 2015; Jun, 2015; Xiu and Gunderson, 2015). However, the nature and causes of the gender earnings gap in post-reform China remains not fully understood. It is possible that reforms have increased returns to observed and unobserved human capital characteristics. This changing pattern of returns may have combined with the gender gap in pre-market characteristics to cause the gender earnings gap. Moreover, two important aspects of workers' endowments -- cognitive skills (e.g. language proficiency skills) and health capital (e.g. height) -- have not been investigated in the existing studies focused on the gender earnings differentials in the context of China. This is despite the fact that the returns to cognitive skills and good health status in the labor market have been confirmed by a large number of studies not only in developed countries but also in those developing economies (see e.g. Schultz, 2002, 2003; Bleakley and Chin, 2004; Case et al., 2009; Dercon and Sanchez, 2013; Sohn, 2015).

Therefore, in the second part of this thesis, we will incorporate these two previously ignored endowment factors, cognitive skill and health capital in the analysis on the female-male wage differentials in the labor market of China during the post-reform period.

In summary, in this thesis we will explore some of the reasons for the observed differences both in labor force participation and wages between women and men with a more updated cross-sectional survey data – Chinese General Social Survey (CGSS)

2010 round, which is representative of both urban and rural locations of China for post-reform period, to answer four research questions listed as below:

Question No.1: How large is the average gender labor force participation gap in post-reform China?

Question No.2: What explains the gap in labor force participation between women and men? Do social norms and the gender gap in human capital (i.e. health human capital and cognitive skill) matter?

Question No.3: How large is the average gender earnings gap in post-reform China?

Question No.4: What explains the gap in earnings between women and men? What is the role of the gender gap in human capital, especially in health and cognitive skill and other factors?

Again these four research questions, four research objectives have been formulated accordingly as below:

Objective No.1: Estimate the mean gender gap in labor force participation in post-reform China;

Objective No.2: Examine the sources of observed gender labor force participation gap and specifically test the role of community social norms, gender health and cognitive skills gap and other productive characteristics;

Objective No.3: Estimate the mean gender wage gap in post-reform China;

Objective No.4: Examine the role of gender differences in characteristics, particularly that in health human capital as well as that in cognitive skill in explaining for the gender wage differences.

1.3 Structure of Study

Objectives No.1 and No.2 will become the first part of our analysis on gender labor force participation gap. For this part, we will use the individual-level response to three questions in the CGSS dataset to construct three community-level variables and investigate the influence of gender norms in making labor force participation decision. Since the status of labor force participation of women is determined by a combination factors both from the demand side and supply side, we will investigate the role of social norms towards gender roles in a Probit regression model of labor force participation with control for conventional socio-demographic factors, additionally including a rich set of health and education human capital covariates. Then, we will decompose the gender labor force participation gap into two parts, one explained by gender difference in the social demographics and human capital (i.e. endowment effect), and the other one explained by gender-specific rewards to these personal characteristics (i.e. discrimination effect). The discrimination component is further explained in terms of community norms on gender roles that have been ignored in the existing studies as we mentioned earlier on.

Objectives No.3 and No.4 will become the second part of our analysis on gender earnings gap. For this part, we will first re-examine the determinants of monthly wage based on the standard Mincerian earnings function with the OLS estimates, which is subsequently augmented in a step-wise manner by adding proxies for health capital and cognitive skill which have been ignored in earlier studies. Then, we use gender specific estimates of the earnings function to implement Oaxaca decomposition analysis, and break down the observed gender gap into the part that will be explained by female-male endowment differentials while the residual which is unexplained by observed characteristics.

The rest of the thesis proceeds as follows. Chapter 2 gives a summary on the background of this study, which emphasizes on the trends in labor force participation rate and wages for men and women, improvement in human capital level, changes in the labor market which are related to labor laws or policies and social norms in the post-reform China. Chapter 3 reviews the relevant previous literatures on differences in the labor force participation and earnings between women and men. The data and methods are provided in Chapter 4. Chapter 5 presents the main findings and followed with related discussion, and Chapter 6 concludes.

CHAPTER 2: STUDY CONTEXT

Over the past few decades, both the labor market and society in China has experienced significant transformation along with the reforms. In this chapter, the context of changes in Chinese labor market in terms of labor force participation, wages, occupational levels, laws and policies that related to labor, and social norms on labor market participation by gender during last few decades will be discussed.

2.1 Changes in Chinese Labor Market Indicators

As we mentioned in the first chapter that in the post 'iron rice bowl' era, state owned and collectively owned enterprises are no longer the sources of guaranteed jobs for all. Consequently, both the female and male labor force participation rate (for individuals aged 15-year-old and above) declined since the mid-1990s. According ILOSTAT database[4], the labor force participation rate of women aged 15 and above in China has declined from 73.24 percent in 1990 to 60.45 percent in 2019, and that for men aged 15 and above has declined from 84.76 percent in 1990 to 75.27 per cent in 2019. If we look into the size of the reduction, the fall among women (12.79 per cent) is comparatively larger than that among men (9.48 per cent) during the same period. Additionally, the figures also shows that the gender gap in labor force participation rate in China has grew from 11.52 per cent in 1990 to 14.82 per cent in 2019.As shown in Table 2.1, breaking down of the three rounds of national census data by age cohorts confirms that the overall decrease in Chinese female labor force participation rate was mainly resulted from the remarkable decrease among the cohort of young people aged below 24 year-old due to the rise in senior high school participation and expansion of higher education (Dasgupta, Matsumoto and Xia, 2015). The second-largest reduction in participation

[4] Data Source: ILOSTATA database of International Labour Organization at https://ilostat.ilo.org

rate belongs to the female aged between 25 and 34 year-old groups, who are usually responsible for child-bearing activities which often compel them to leave the labor market (Dasgupta, Matsumoto and Xia, 2015). This fall in labor force participation coincidence with the decline in institutional support to married women for childcare facilities (Liu, Zhang and Li, 2009) and the prevailing beliefs about women's social roles and their place in the community (Fincher, 2014).

Table 2.1: Changes in Female Labor Force Participation Rate in China by Age Cohorts, 1990-2010

Age Cohorts (years)	4th National Census (1990)	5th National Census (2000)	6th National Census (2010)	Changes between 1990 and 2010
15-19	68.3%	51.7%	32.0%	-36.3%
20-24	89.6%	85.4%	69.3%	-20.3%
25-29	90.8%	86.7%	82.1%	-8.7%
30-34	91.0%	87.9%	83.2%	-7.8%
35-39	91.1%	88.3%	84.4%	-6.7%
40-44	88.3%	86.2%	84.8%	-3.5%
45-49	81.1%	79.9%	80.1%	-1.0%
50-54	62.0%	67.1%	62.4%	+0.4%
55-59	45.1%	54.5%	53.8%	+8.7%
60-64	27.3%	38.8%	40.6%	+13.3%

Data Source: 4th, 5th and 6th National Census from National Bureau of Statistics, Government of China.

Similar to the pattern of labor force participation in post-reform China, the both the employment rate of women and men has deceased during and same period, also the gender difference in employment rate has also widened. Moreover, much of the decline

in the female and male employment rate is mainly driven by the decrease in the labor force participation rate as stated earlier (ILO, 2015).

According to results of Surveys on Women's Social Status in China which were initiated by the National Bureau of Statistics of Chinese Government and the All-China Women's Federation jointly in year of 1990, 2000 and 2010 respectively as shown in **Table 2.2**, the reduction of employment rate for women is always larger than that for men by different locations from 1990 to 2010. Meanwhile, the overall female-male gap in employment rate has continuously increased from 5.6 per cent in 1990 to 6.6 per cent in 2000 to 16.1 per cent in 2010.

Table 2.2: Changes in Employment Rate by Gender and Location, 1990-2010

	Overall (%)		Urban (%)		Rural (%)	
Year	male	female	male	female	male	female
1990	96.1	90.5	90.0	76.3	97.4	93.9
2000	93.6	87.0	81.5	63,7	97.3	94.8
2010	87.2	71.1	80.5	60.8	93.6	82.0
Change between 1990 and 2010	-8.9	-19.4	-9.5	-15.5	-3.8	-11.9

Data Source: 1st, 2nd and 3rd Surveys on Women's Social Status in China from National Bureau of Statistics, Government of China.

Additionally, among those employed, female workers are more concentrated in jobs that required less skill and human capital (Li and Xie, 2015). More precisely, the 2010 Census data shows that only 25.1 percent of high-level white-collar occupations (i.e. administrative staff) are taken up by womenBy comparing the findings from 6th National Census (in the year of 2010) with that from 4th National Census (in the year of 1990) and 5th National Census (in the year of 2000), we found that the employment rate within those traditional low-income industries of women such as agriculture, forestry,

animal husbandry, fishing, water conservancy, wholesale, and retail has increased by 0.7 and 5.5 percentage points respectively from the year of 1990 and 2000. In the meanwhile, the proportion of women's employment in scientific research, technical services and some other high skill required industries has decreased by 1.9 and 2.7 percentage points from 1990 and 2000, respectively.

In contrast to the pattern of pre-reform period when the gender earnings gap was getting narrowed through the government's effort on allocating jobs equally across social groups for female and male workers, the female-male earnings gap has increased together with the above mentioned widening female-male differences not only in the labor force participation rate but also in the employment rate after the economic reform (Gustafsson and Li, 2000). Surveys on Women's Social Status in China which were initiated by the National Bureau of Statistics of Chinese Government and the All-China Women's Federation jointly shows that female workers in urban China were paid only 77.5 percent of men's averaged wages in 1990 while this percentage declined to 67.3 percent in 2010. Compared to the urban locations, the pattern in the rural places is much worse, female earned 79% of male's averaged wages while by the end of 2010 they were only paid 56% of male's earnings.

Despite various gender disadvantages that resulted from market reforms, there were also some developments favoring women's labor market performance. These include, improvements in female workers' welfare (Lee, 2012; Meng, 2012) and women's schooling and literacy level, particularly following the expansion of higher education sector (Wu and Zhang, 2010; Treiman, 2013; Meng, Shen and Sen, 2013)[5]. The gender gap in educational attainment experienced a dramatic decline according to recent census

[5] Because of the reopening of universities for the public after the Cultural Revolution, the percentage of labor with a higher education level (i.e. tertiary degree) saw a dramatic increase during the 1980s and the early 1990s. This proportion only experienced a slight increase during the 1990s. Therefore, central government of China decided to expand the enrolment rate of higher education by approximately 40 per cent since 1999.

data, from 1.9 years in 1990 (female: 5.5, male: 7.4), to only 0.8 years in 2010 (female: 8.4, male: 9.2). Moreover, data from three rounds of Surveys on Women's Social Status in China also confirms the narrowing the female-male difference in years of schooling, has declined from 1.9 years in 1990 to 1.5 years in 2000 to 0.3 years in 2010. Regarding the participation in higher education, results from these three rounds of surveys also shows that 14.3 percent of female individuals who joined the 2010 survey have obtained tertiary degree, and that 25.7 percent of female individuals from urban locations have obtained tertiary degree. Again, female seems benefited more from this expansion than men, results of census survey shows that the portion of female in the total number of college/university students increased from 40.9% in 2000 to 50.8% (which has exceeded the percentage of male) in 2010.

Unlike the narrowing gender education gap, the gender health gap may have worsened in post-reform years[6]. According to the recent 2015 Report on Chinese Nutrition and Chronic Disease, the average height for male adults in China has increased from 165.8 cm in 1980 to 167.1 cm in 2012 while that for female adults only rose from 155.0 cm to 155.8 cm. This suggests that the gender difference in health capital in terms of adult height has widened in post-reform China. In addition, in the past 10 years, despite the obvious progress in health care and reproductive health services, the gap in accessibility to health services in rural areas between women and men is still there, especially in the western provinces. 3rd Survey on Women's Social Status in China shows that 24.0 percent of pregnant women from the rural places who are younger than 35 year-old had never went for a prenatal check-up in the hospital, which is 18.7 percentage points higher than those pregnant women from the urban locations with the same range of age. The percentage of the same indicator for female

[6] For instance, there is evidence of gender difference in returns to health: the long-term effect of birth weight on monthly wages for women in urban China has been found to be significantly lower than that of male (Rosenzweig and Zhang, 2013).

from the western inland provinces is 21.0 percentage points higher than those come from the eastern coastal provinces.

2.2 Changes in Labor Policies and Social Norms in China

The widening difference in labor force participation and wages between women and men in China over the last few decades is in contrast to the policy objectives and commitments from the Chinese government on promoting gender equality. The communist party has endowed women with equal rights as men from different perspectives of men according to the party constitution since the establishment of China in 1949 (Dasgupta, Matsumoto and Xia, 2015). In 1968, Chairman Mao proposed that 'women should hold up half of the sky in China', subsequently the Chinese government ensured women's labor force participation by expanding existing provisions on social security systems and childcare (Lee, 2004). In the 1990s, the official target on the gender equality was re-emphasized; central government issued the "Law of the People's Republic of China on the Protection of Women's Rights and Interests" in 1992 which aims to guarantee women's equal rights in six fields including political empowerment, education accessibility, work participation, ownership of property, personal decision on marriage and family. A revision on this law was carried out in 2005, which argued that we should not only focus on gender equality in working place but also should pay attention to their equal access to social security. Besides, this revised law stated clearly that any content included in the service contract which limits female workers' decision or behavior on pregnancy should be prohibited. Furthermore, the "China Employment Promotion Law" which came into force in 2008 stipulated that discrimination either on gender or on ethnicity, race or religious belief should be barred (Brown, 2009; Wang, 2013).

In addition to varying national laws, Chinese government also committed to major international conventions regarding the gender equality in economic, social, cultural and political fields and removing women's obstacles in participation in both public and private fields, such as the 'Beijing Declaration and Platform for Action' adopted at the '4th World Conference on Women' in 1995. Furthermore, in the same year, the '1st National Program for Women's Development in China (1995-2000)' which especially focuses on the gender equality in economic and social spheres was carried out by the State Council. Following these domestic commitments on gender equality, China has ratified the Equal Remuneration Convention 1951 and as well as the Employment and Occupation Discrimination Convention 1958, 1988 and 2006 of the International Labor Organization (ILO).

Besides the changes in female-male gaps in the rate of labor force participation and level of earnings and related labor laws during the reform period, China also experienced significant changes in the social norms, especially the one regarding the gender roles.

At the pre-modern period of China, women were in a disadvantaged position since their primary roles in the society or family were moms and wives due to the culture of Confucianism for quite a long time. At that time, only with the permission of the men, women could participate in some limited activities which may generate some income (Zhang, 2015). During the modern period, a lots of government policies (such as the 1950 National Marriage Law which endowed an equal right for women and men in the family and granted women with the freedom to join the labor market instead of only stay home and being housewives) which led to rising female labor force participation and employment rate in last several decades under the state-controlled economy have been initiated after 1949 (Wu and Zhang, 2010; Ge and Yang, 2014). Later, egalitarian

gender role attitudes (e.g. "women should hold half of the sky") proposed by Chairman Mao was widely accepted as a norm and ensured further increase in female engagement in the labor market (Mow, Tao and Zheng, 2004; Yao and You, 2016).

Despite such improvements in the gender equality, the state-imposed policy on giving equal employment opportunities for women and men still unable to change or shift this underlying relations between women and men successfully and completely. Inside the household, women in China are still responsible for caring children and sharing housework, while outside the household, severe occupation segregation exists (Xie, 2013). Consequently, during the economic restructuring in the 1990s, more women were fired compared to men, and many were re-employed with a comparatively lower wage level than men later on. This coincided with the phenomenon of "Women return to the home" action at a time of rising unemployment, asking women to resign from their position for men who are seeking for jobs. During the past few decades, this kind of attitude towards women's work participation has become entrenched, especially with the concern of recent resurgence of patriarchal attitude favoring traditional norms on gender (Fincher, 2014). Even today, majority of the Chinese men (including Chinese women) agree with the statement that "men should be the breadwinner, while women should be the housewives" (*nan zhu wai, nǚ zhu nei*). Again based on the findings from the 3rd Survey on Women's Social Status in China in the year of 2010 shows, the number of female and male who agree with above statement has increased by 4.4 and 7.7 percentage points respectively when compared to ten years earlier.

The above trends in social attitudes have coincided with an unfavorable shift in policy. The considerable gender imbalance caused by the recently ended one-child policy has added to the demand for women in the marriage market. Starting from the year of 2007, the central government has started a media campaign on those "leftover"

women (*sheng nǚ*), standing for women who are still single after 27-year-old but highly educated. Pressure has intensified on educated women from the family, the society and the government to put effort on getting married as early as possible instead of keeping pursue higher education (Fincher, 2014).

Therefore, in summary, given the apparent resurgence of traditional social norms governing gender roles despite some improvements in women's socioeconomic status as we mentioned earlier on, it is critical to examine whether and how patriarchal social norms/attitudes on gender roles influence Chinese women's decision on entering the job marke. Moreover, given the improvements in some human capital among women such as the increased female education level and narrowed female-male education gap, the gender wage gap was expected to narrow in post-reform China since the 1990s, while the fact is the opposite. Therefore, in this thesis, we are going to address these two puzzling questions on female-male gaps in labor market participation and earnings in post-reform China.

CHAPTER 3: LITERATURE REVIEW

3.1 Literature Review on Gender Labor Force Participation Gap

Economic reforms since 1978 not only improved income and living standards, but they have also created tremendous opportunities for Chinese women (Knight and Ding, 2012). However, the labor force participation rate of female workers has declined, and the gender gap in labor force participation has widened during the post-reform period as we discussed in the last chapter with statistics from both international organization database and Chinese government sources as well.

Many existing literatures have recognized the significant gender disparity in labor force participation rate in China (see e.g. Wang and Cai, 2008; Song and Xia, 2013; Tang and Long, 2013; Chi and Li, 2014) and explored reasons for the puzzle of declining female labor supply and the resurgent of gender gap in labor market participation in China after the reform[7].

One of the key explanations that have been found by earlier studies is the large-scale layoffs resulted from the economic restructure on state-owned enterprises (SOE) during the 1990s and 2000s (Du, Yang and Dong, 2006; Knight and Li, 2006; Dong and Pandey, 2012). Moreover, the adverse effect of downsizing of SOE is comparatively larger for women than that for men in China. During 1998 and 2003, approximately half of the laid-off workers were female employees (in total around 28 million workers) , this is a disproportionate amount because women only formed up 45 per cent of the sector's workforce in the beginning of this period (Dong, Yang, Du and Ding, 2006). In addition, reforms on collective firms also led to approximately 13 million jobs being lost during 1996-2000 (Fewsmith, 2001). Although SOEs-targeted reforms were more

[7] For the causes and consequences of changes in the labor participation of women in developing countries please see Health and Jayachandran (2016).

likely to focus on those under efficient and capital-intensive industries which usually be dominated by men, at the enterprise level the number of women who have been affected might be larger that than of men due to their lower occupational status (Dong and Pandey, 2012). Based on a panel data at the firm level from 1995 to 2001, Dong and Pandey (2010) provides evidence that female employees face larger possibility of discharge related to the firms' output growth than men. Moreover, Knight and Li (2007) found that women who have experienced a lay-off are more likely to face a downward mobility of occupation and receive lower wages upon re-employment[8]. Among other institutional changes, He and Zhu (2012) found that a further reduction in female participation in the labor market in later years was due to the downgraded limitation on fertility – 'One-Child Policy' in China.

In addition to above possible sources or explanations for the declining labor force participation of women, Chi and Li (2008, 2014) have provided some potential causes for the increased disparity in labor force participation between women and men as well. This including increased expenditure on raising children, reduced availability of childcare centers funded by government or public sector, the resurrection of the traditional norms on work division between women and men, and income effects. Besides, discriminatory measures against women in the workforce, such as denied employment or promotion all contribute to their lower possibility of being employed and the observed gender gap. For instance, Appleton et al. (2002), Giles et al. (2006) and Dong and Pandey (2012) all indicated that Chinese women have relatively higher possibility to be laid off and lower possibility to get rehired during the labor retrenchment.

[8] Literature which have examined this impact of SOE reforms on other kinds of gender inequality in China's labor market please see e.g. Maurer-Fazio and Hughes, 2002; Demurger, Fournier and Chen, 2007; Cohen and Feng, 2009; He and Wu, 2014.

Apart from the above mentioned reasons for the declining rate of labor force participation or that on the gender gap in this labor market indicator, many researchers have explored the influence of family related characteristics as well.

Women with young children at home may have less possibility to join the job market. For example, as Maurer-Fazio et al. (2011) reported that the rate of labor force participation for female from urban locations with a pre-school age child in China had declined considerably during 1990-2000 but living with grandparents can help women stay in the labor market. This is consistent with former studies from Kilburn and Datar (2002) and Du (2008) which confirmed the availability of childcare facilities as well as that of the informal childcare arrangement (i.e. co-residence with grandparents) both helpful for working-age women to enjoy a higher probability in participating the labor market. While, the number of publicly-funded children centers has declined, and the cost of childcare centers has risen significantly through the economic transition period (Du and Dong, 2010). Additionally, because of the income effect that spousal income can lower female labor force participation (Xu, 2011). Another factor that may affect an individual's decision to work is culture. Croll (1995) and Maurer-Fazio et al. (2007) both argued that an unsupported circumstance/atmosphere in the community could result in a growing rate of labor market withdrawal for women.

In summary, explanations from existing literatures for the declining labor market participation rate among women and the widening female-male gap in labor force participation include the large-scale layoffs resulted from the economic restructure on SOEs (Du, Yang and Dong, 2006; Knight and Li, 2006; Dong and Pandey, 2012), discrimination against women in the workforce (Appleton et al., 2002; Giles et al., 2006; Dong and Pandey, 2012), fewer available childcare centers funded by government or public sector (Kilburn and Datar, 2002; Du, 2008; Du and Dong, 2010), decline in co-

residence across generations resulted from one-child policy (Maurer-Fazio et al., 2011; Shen et al., 2016), and the continuous increase in the housing wealth/value (Fu, Liao and Zhang, 2016).

However, Zhang, Hannum and Wang (2008) concluded that women's disadvantaged position in human and political capital over post-reform years explain little of the gender differences in labor force participation and employment rate, while related to family status strongly. In contrast, research on the impact of social norms/attitude towards gender roles on female labor force participation is quite limited in the context of China, though the fact that unsupportive atmosphere in the community can cause women to quit from the labor market was confirmed by studies from other countries long time ago (see e.g. Croll, 1995; Maurer-Fazio et al., 2007)[9].

Existing studies found social norms to be correlated with differences in time allocated to work between women and men (e.g. Burda, Hamermesh and Weil, 2007) as well as female labor force and paid work participation decision both in developing countries (Contreras and Plaza, 2010; Dildar, 2015; Asadullah and Wahhaj, 2016; Codazzi, Pero and Albuquerque, Sant'Anna, 2018; Bursztyn, González & Yanagizawa-Drott, 2018) and developed countries (e.g. Bertrand, Cortés, Olivetti, & Pan, 2018).

Existing empirical studies on the impact of social norms or gender roles are somehow in line with the social role theory (e.g. Eagly, 1987; Eagly, Diekman, Johannesen-Schmidt and Koenig, 2004). Standard gender stereotypes define women as more communal while men are more agentic, therefore women are defined and proposed as homemakers while men are defined and proposed as breadwinners according to the social role theory. And this kind of setting of roles for women and men

[9] There is only one exception for the case of urban China, Chen and Ge (2018) found that men's preferences for gender roles led to a lower possibility of labor market participation for women who are married.

in the society and the labor market may also tend to affect the society value or norms on the gender roles. In this way, women might face big barriers in entering the labor market because of traditional and general social attitudes on gender division within the household and also in the society as well.In the context of China, along with a dramatic decline in female labor market participation and widening gender differentials in labor market participation, social norms on gender roles (i.e. social and gender identity norms) have also changed paradoxically. As we discussed in the last section, there is a resurgence of attitudes supportive of traditional gender roles since 2007 (i.e. including patriarchal gender attitudes) partly resulting from a state-sponsored media campaign regarding those "leftover" women (*sheng nǚ*) conducted by the central government (Fincher, 2014; Chi and Li, 2014). Therefore, our study attempts to understand the contribution of social norms in explaining female labor force participation decision in China during a period of rapid socio-economic transformation.

Apart from the role of social norms, none of the former studies has simultaneously considered health human capital[10] and cognitive skill as factors that could affect the female labor force participation decision in China, while the significant impact of these two factors have been documented by studies from other developed and developing countries (e.g. Mammen and Pasxon, 2000; Klasen and Pieters, 2012; Cunningham, 2001; Priebe, 2010)[11].

Therefore, in this thesis, we will explore the role of gender norms in determining the labor force participation with control for conventional socio-demographic factors,

[10] For a review of the available research on gender inequality by scholars in China, see Wang et al (2016)

[11] For more theory of labor supply please see Becker (1965), Killingworth and Heckman (1986), Blundell and MaCurdy (1999) and Besamusca, Tijdens, Keune and Steinmetz (2015).

additionally including a rich set of health and cognitive skill covariates. In this way, we will make additional contribution to the previous developing countries' literatures about the impact of social norms, health human capital as well as cognitive skills on female labor market participation decision along with the rapid economic transition years which has experienced a dramatic socioeconomic changes over the post-reform years (Fafchamps and Quisumbing, 2003; Fernandez, Fogli and Olivetti, 2004; Losa, and Origoin, 2006; Munshi and Rosenzweig, 2006; Kawaguchi and Miyazaki, 2009; Kabeer, Mahmud and Tasneem, 2011; Tolciu and Zierahn, 2012; Alesina, Giuliano and Nunn, 2013; Butikofer, 2013; Cerise et al., 2013; Chen and Ge, 2018; De Giusti and Kambhampati, 2016).

3.2 Literature Review on Gender Earnings Gap

Over the past few decades, many researchers have examined the size of the female-male earnings gap in China. A lot of studies have additionally documented the evolution of the gap, explaining how it has changed following the economic reforms introduced in 1978 and onwards as what we presented with statistics from various sources in the last chapter. For instance, Gustafsson and Li (2000) first showed during 1988-1995, the gender pay gap in the labor market of urban locations has become wider. However, during the same time, Ng (2007) found that the female-male wage differentials in urban China had declined then only started to grow from the middle of the 1990s. Chi and Li (2008) argued that this gender pay gap had expanded both in 1987-1996, and 1996-2004 and the expansion was larger in the later period. However, some studies pointed out that the gender wage gap in China has not expanded in recent years and instead remained stable in the last few years, such as what commented by Appleton et al. (2005) that China might have 'crossed the river'.

In these prior studies on the size and/or trends of gender pay gap in China, few have accounted for sample selection problem even though the significance of non-random selection into paid work on gender pay gap estimates have been confirmed studies from other countries such as the United Kingdom (e.g. Blundell et al., 2007), the United States (e.g. Blau and Kahn, 2006; Mulligan and Rubinstein, 2008; Machado, 2010) and the Netherlands (e.g. Albrecht et al., 2009).

Recently, Chi and Li (2014) used data from the China Urban Household Survey 1988-2009 and Heshmati and Su (2015) used data from the Chinese Family Panel studies 2009 round to implement the selection-correction model from Heckman to correct for the sample selection problem. Both concluded that former findings on the gender difference in earnings in China, especially the view that 'China has crossed the river' (Appleton et al., 2005) are optimistic. The authors confirmed that the gender gap in wages would be biased if estimated without taking the problem of non-random selection into paid work into consideration. More precisely, these two studies proved that the size of the female-male wage gap might got underestimated if not accounting for the low-paid female workers who have withdrawn from the labor force. However, these two studies only focused on urban china. Therefore, revisiting the mean gender earnings gap in rural as well as urban China and accounting for sample selection problem is one of the contributions of this thesis.

Alongside research on the size of and trend in gender earnings differentials, prior studies also have looked into the reasons for the gender gap in the Chinese labor market.

Key explanations are the increase in returns to human capital and the development of a flexible labor market along with gender differences in observable human capital, especially in educational attainments and working skills. Indeed researchers have confirmed that the returns to education have grown steadily in post-reform China (Liu,

1998; Li, 2003; Heckman and Li, 2004; Fleisher and Wang, 2005; Zhang et al., 2005; Li et al., 2012). If the individual attainment in the education of female worker is lower than that of male worker significantly, the gender wage gap will come up once the labor market function starts to work. By utilizing data from two large scale surveys covering ten provinces in urban China, Gustafsson and Li (2000) found that a larger proportion of gender earnings differentials could be attributed to differences in factors such as educational attainment while market discrimination was only of secondary importance.

An alternative explanation for gender earnings gap relates to firm behavior in the new economic environment, more precisely, the growing significance of unexplained factors which could relate to both differential reward to unobservable characteristics that affect productivity as well as the possibility of gender discrimination by the employer. For example, Cai and Wang (2008) argue that the existing female-male gap in earnings in Chinese urban labor market comes from the female-male differentials in human capital endowment as well as capturing the pure discrimination effect. Many later studies comparing the explanatory power of the endowment effect and discrimination effect agreed that the later has larger contribution to the gender gap in wages. In other words, most of the raw gender earnings gap in China was dominated by unexplained part rather than gender difference in personal endowments (Rozellet, Dong and Zhang, 2002; Wang and Cai, 2008; Heshmati and Su, 2015). Some researchers also concluded that the portion of the gender earnings differential which was explained by the discrimination effect has been increasing in last few decades (Gustafsson and Li, 2000; Liu et al., 2000; Ng, 2007; Chi and Li, 2008).

Some researchers have examined the discrimination effect in different sectors. For example, within the newly developed industrial sector in rural China, Meng (1998a) not only found gender discrimination to be much worse than that in other developed and

some developing countries, she also found that wage discrimination accounted for the entire gender wage differentials among local government employees (i.e. non-market group), and 2/3 among employees whose jobs was obtained through self-searching channel (i.e. market group). Besides, Wang and Cai (2008) explored the extent to which gender pay gap was caused by inter-sector and intra-sector differences using data from five large cities (i.e. Fuzhou, Shanghai, Shenyang, Wuhan and Xian). Their findings suggest that most of gender earnings gap stemmed from unequal pay within sectors while the portion explained by differences between sectors is comparatively small[12].

Another reason for the female-male earnings gap in China is the occupational segregation, i.e. female workers were crowing into low pay jobs (Meng 1998b). This view was also supported by Shu and Bian (2003) in their analysis on the correlation between the market transition and female-male wage differentials in the urban area of China with the Chinese Household Income Project (CHIP) dataset during 1988-1995. They found that the proportion of the gender wage gap due to the occupational segregation has become larger over time even though there was no longitudinal change in the wage difference between genders during that period. However, Maurer-Fazio and Hughes (2002) found that occupational/industrial segregation was not significant in explaining gender wage differentials among Chinese urban residents.

At the theoretical level, findings from above empirical studies overlap with three economic genres: human capital endowment approach (e.g. Mincer & Polachek, 1974), occupational segregation approach (e.g. Bergmann, 1974) and discrimination approach (e.g. Becker, 1957).

[12] However, according to the firm-level analysis of Dong and Zhang (2009), the impact of discrimination against female workers by the employers on gender earnings differentials in Chinese state-owned enterprises during the 1990s was not significant.

A large number of previous studies have studied gender differences in qualifications and labor market outcomes with the human capital model, where the core idea of the human capital endowment approach here is each individual has some kind of human capital. Human capital can be defined as some form of skills or abilities that individual has and obtained through education, professional on-job training, or working experiences, and these abilities or skills are the pre-conditions for the individual to gain some earnings. In order to minimize the lost related to the more intermittent attachment with the labor market, female choose occupations according to Mincer and Polachek (1974). Because of the traditional gender division of labor within the household, female tend to accumulate less working experience in the labor market compared to the male one. Moreover, since female working-age labor foreseen a relatively shorter and discontinuous working period than male, they maintain a lower incentives to invest in human capital including education and training therefore lead to a lower level of earnings compared to men. The more effort that female put on family caring and housework duties, the fewer time that female would spend on labor market relative to the male one, therefore to reduce women's earnings and productivity by controlling working hours. The human capital approach presents the significance of the wage structure as a source/explanation of the female-male earnings gap. According to human capital model, which propose that male sample who has more working experience that female sample, therefore the higher rate of returns to working experience for employees, the larger size of gender wage differentials would be. Later, Becker's (1993) human capital theory also made contribution to the explanation on why there is a gender wage gap. As Becker proposed, female labor seems have higher possibility of taking a part-time job or intermittent partly, since women are more tend to quit from the labor market for child-bearing and child-raising purposes. In this way, women had lower incentives to have investment on education endowments that would help to increase the level of

job skills and rate of wage at the market. However, Becker's approach also noticed recently the economic development improved the wage rate of men and as well as that of women, along with the changes in last few decades when family size has reduced, divorce rate has increased and the size of service sector (which employed a large number of female labor) has also expanded. In this context, women started to enjoy greater opportunity in labor force participation and then are induced to put more investment on skills training oriented by labor market demand.

Although many existing studies present that gender differences in human capital endowments is the key factor to explain the female-wage gap according to human capital approach, there are still some studies criticized that the assumption of human capital model is too broad, and this model did not take a fact into consideration – the decision of labor force participation sometimes are not made in a normative context. That's why the empirical studies confirmed that only a small part of the earnings gap between women and men could be explained by gender differences in human capital endowments and working experiences.

Later, a large number of studies confirmed that the part of the gender earnings gap which cannot be explained by female-male human capital endowments is probably resulted from the labor market discrimination. Labor market discrimination could affect the wage rate and the occupation level of women negatively and significantly. According to the most basic analysis of labor market discrimination from Becker (1957), that employers/individuals have some kind of "taste" for discrimination. Becker's approach propose that every individuals in the labor market could have this kind of "taste", employees may have taste for discrimination on their colleagues, also employers may have taste for discrimination on their employees. For example, employers who are agreeable to take in a female worker for a secretary position, but

employers might not agreeable to take in a female worker for a constructor position. In the meanwhile, male employees who are agreeable to work with a female colleague holding a job with lower position, but male employees might not agreeable to work with a female colleague holding a relatively higher position. Another theory related to discrimination effect is from Bergmann (1974) named occupational segregation approach, also named as crowding model. Under the hypothesis of this approach, women are crowded into several kinds of occupations, which are named female-dominated occupations. Due to this kind of occupational segregation/crowding policies, the wage rate of certain occupations started to decline, therefore base and the core of this model is when surplus supply of female workers happens then wage rate will be reduced. And this crowding model is in consistent with the above mentioned empirical findings that after controlling for other factors, the averaged earnings for female dominated occupations are relatively lower than that for male dominated occupations.

In addition to the studies on the mean gender wage gap, some researchers have examined gender earning differentials across the entire wage distributions rather than just a mean in order to test for the so-called ‘‘glass ceiling’’ or ‘‘sticky floor’’ effect. ‘‘Glass ceiling’’ refers to the pay gap at the top end of wage distribution is wider, which indicates that in this higher-income group women workers have much lower earnings than male workers. Oppositely, ‘’sticky floor’’ refers to there is a larger pay gap exists in the bottom-income group of wage distribution, thus female employee are facing bigger disadvantage of wage payment in this bracket (see e.g. Booth, Francesconi and Frank, 2003; Arulampalam, Booth and Bryan, 2007). From the theoretical perspective, the “glass ceiling” and “sticky floor” effects are closely related to the above mentioned three theories. First of all, if we look at the income distribution pattern, labor with less human capital such as education, language skills usually stay at the lower bound of the income distribution. Therefore, women who have fewer incentives to invest on human

capital endowments are more likely to stuck at the poorest or relatively poorer quintiles. Secondly, due to the labor discrimination in the market, female workers are less likely to be chosen to hold the superior position with higher wage. Thirdly, following the explanation of occupational segregation approach, female employees are more likely to be crowded into those female dominated jobs such as cleaners which have a pretty low level of wage, while male employees are more likely to be crowded into those male dominated jobs such as technician and managers which enjoy a pretty high level of wage. Therefore, difference in wages between female worker and male worker shows up across different quintiles.

A lot of previous studies have confirmed the ''glass ceiling'' effect in developed economies such as in Sweden (Albrecht, Bjorklund and Vroman, 2003), Spain (De La Rica, Dolado and Liorens, 2005), Australia (Kee, 2006), 11 European countries together (Arulampalam, Booth and Bryan, 2007), Fance (Jellal, Nordman and Wolff, 2008), and the European Union (Christofides, Polycarpou and Vrachimis, 2014). Finding from the developing world such as Vietnam (Pham and Reilly, 2007), Sri Lanka (Gunewardena et al., 2008); Madagascar and Mauritius (Nordman and Wolff, 2009); South Africa (Ntuli, 2009); Thailand (Fang and Sakellarious, 2011) and Bangladesh (Ahmed and Maitra, 2015) are mixed.

Former studies on China have also looked into the size of gender wage gap for the lower tail versus the higher group of wage distribution. Ge (2007) is one of the earliest studies that applied quantile decomposition method of Machado and Mata (2005) into the Urban Household Survey (UHS) data for the period 1988-2001. He documented that the size of wage differentials between women and men varied across different wage levels and it was larger in the bottom tails but smaller in the upper tails, suggesting a ''sticky floor'' effect in urban China. Secondly, the gender earnings gap in the lower

bracket has become larger while the gap in the higher group showed an opposite trend over time. Thirdly, the reasons behind these two opposing trends have been explored. Growing discrimination against female workers has led to the strong and persistent ‘‘sticky floor’’ effect, while that of narrowing gap in the upper tail was due to the fall in the gender gap in productive characteristics such as education. This is in line with the pattern flowed from the three rounds of Surveys on Women’s Social Status in China, that the average wage of female employees is quite close to that of male who are also in the group of high-paid positions (e.g. managers), while the average wage of female workers is significantly lower than that of male who are also belongs to the group of low-paid positions (e.g. cleaners).

Later studies extended further support to the ‘‘sticky floor’’ effect in urban China. Chi and Li (2008) used the data from the UHS for 1987-2004 period and employed a different method, namely, –the recentered influence function (RIF) developed by Firpo, Fortin, Lemieux (2005). Their findings not only confirmed a larger female-male wage gap in the lower quantiles in the Chinses urban labor market, they also found evidence for the ‘‘sticky floor’’ effect. They attributed the latter to a sub-group of lower-paid female production employees with comparatively shorter years of schooling and working in non-state enterprises. In a recent paper, Xiu and Gunderson (2014) also provided strong evidence of ‘‘sticky floor’’ effect in urban as well as rural China by using the RIF modification of quantile regression method as used by Chi and Li (2008). But this study was carried based on the data from the Life Histories and Social Change in Contemporary China Survey. The authors also reported weaker evidence of a ‘‘glass ceiling’’ effect.

Similar conclusions have been achieved by other studies based on employee samples. For example, employing the data from China Health and Nutrition Survey (CHNS), Qi

and Liu (2009) detected a ‘‘sticky floor’’ rather than a ‘‘glass ceiling’’ effect in both the public and private sectors. By analyzing survey data from fives large cities named Dalian, Shanghai, Wuhan, Shenzhen and Chongqing (conducted by IECASS) in 2006 and data from UHS in 2006, Wang (2010) found that there was a ‘‘sticky floor’’ effect exits among urban employees while a ‘‘glass ceiling’’ effect exits among migrant employees in China[13].

While, compared to the ‘‘sticky floor’’ effect and that trend that was proved by above researches, some other scholars have come to a different conclusion. For example, after divided wages into three brackets- low level, medium level and high level, Chen and Duan (2009) documented that the female-male differences in wages in China was relatively bigger in the middle level while smaller in the low and high levels in 2005 round according to data from the CHNS, which suggests that there was neither a ‘‘sticky floor’’ effect nor a ‘‘glass ceiling’’ effect exists in Chinese labor market but there might be median effect.

Earlier studies that studied on the size and reasons of mean gender wage gap in China or/or the gap across entire wage distribution in China, however, suffer from some limitations. To the best of our knowledge, none of these studies has considered health human capital and cognitive skill as factors driving the gender pay gap in developing countries. The importance of these variables as determinants of labor market success is well-recognized in the literature. Returns to cognitive skill (i.e. foreign language skill) in developed countries is significant see Chiswick and Miller (1995) in Australia, Dustmann and Van (2002) in Germany, Leslie and Lindley (2001), Shields and Price (2002), Dustmann and Fabbri (2003), Case et al. (2009) in UK and Bleakley and Chin

[13] These studies therefore point out that the conventional Blinder-Oaxaca decompositions only focusing on gender pay gap at the mean may mask significant differences in gender earnings gap that may exist in different points in the earnings distribution.

(2004) in US. Recent research has confirmed the significance in developing country content (Lang and Siniver, 2009 in Israel; Paolo and Tansel, 2013 in Turkey; Azam, Chin and Prakash, 2013 in India). Similarly, labor market returns to health capital (including height premium) is significant in developed countries (Behrman and Rosenzweig, 200; Persico, Postlewaite and Silverman, 2004; Heineck, 2005; and Olaf, 2006) and developing countries (e.g. Schultz, 2002, 2003 in Brazil and Ghana; Thomas et al., 2006, Sohn, 2015 in Indonesia; Dercon and Sanchez, 2013 in Peru, India, Vietnam and Ethiopia)[14].

Similarly, a large number of studies have confirmed the premium of several aspects of health capital in the Chinese labor market with empirical analysis as well. For example, by tracking with found rounds of CHNS data (in 1997, 2000, 2004 and 2006), Zhang (2011) found that people with worse health status earned 26% less while people with better health status earned 25% more when compared with those reporting with normal self-reported health status. Moreover, he documented that being bad health status has larger impact on men's earnings than that on women's one. Gao and Smyth (2010) also confirmed that the returns to good health status is higher for male than that female under both OLS and 2SLS estimates with 2005 China Urban Labour Survey. This influence of health capital in terms of self-reported health status on one's earnings has been supported by Fang et al. (2012) with those same four rounds of CHNS data as Zhang (2011) but only in urban China. More precisely, they found that compared to those in excellent health condition, wages for those in good health condition, in normal health condition and in poor health condition are 4%, 15% and 34% lower with OLS estimates, but 5%, 14% and 24% lower with 2SLS estimates. However, in a recent

[14] For a general discussion on health as a form of human capital, see Schultz (1962) and Grossman (1972). They argue that besides education and on job training, health should be regarded as an important human capital. More precisely, that emerging field of health as a form of human capital was built on three interrelated developments as follow, see (1) e.g. Enrlich and Becker, 1972; Enrlich, 2000; (2) Usher, 1973; Murphy and Topel, 2006; (3) Dow et al., 1999.

paper from Mishra and Smyth (2015) found that both being good health status and very good health status are insignificant determinants of hourly wage in urban China according to 2007 Shanghai matched worker-firm dataset either with OLS estimates or Lewbel IV estimates.

Apart from using self-assessed health condition as the measure of health capital in testing the returns to health capital, some studies also looked into the height premium in earnings. For instance, using 2005 China Urban Labour Survey, Gao and Smyth (2010) first documented the premium of height in Chinese urban labor market but the height premium for women and men is different. With OLS estimates, being one cm taller will increase the hourly wage for men by 1.14% but only 0.89% for women, while with IV estimates, the returns to height for women (10.73% higher with 1 cm taller) turns out to be much higher than that for men (4.81%). Later on, Elu and Price (2013) updated these findings on height premium by using 2006 CHNS data set covered both urban and rural samples. Consistent with Gao and Smyth (2010), they also found that returns to height is underestimated by OLS method and the height premium is much higher for female than that for male with IV method[15].

Besides self-reported health status and height, recent studies also started to explore the impact of health-related habits on wages with panel data in order to account for the unobserved heterogeneity which is related to the individual traits and job characteristics in China. For example, Xiao et al. (2015) found that health-related habits such as smoking have a significant negative impact in determining wages only if net of health status, however other health-related activities including drinking tea, drinking alcohol and doing physical exercise do not have a significant effect on earnings. Not only there

[15] In Elu and Price (2013), the returns to height for full sample, male sample and female sample are 1.1%, 0.6% and 0.8% respectively with OLS estimates, while that with IV estimates are 10.3%, 5.1% and 6.8% respectively.

is a different return to health capital either in terms of self-reported health status or height, but also there is a gender difference in the distribution of health capital in China. For example, Gao and Yao (2006) and Song and Bian (2014) both confirmed the gender gap in health inputs such as hospital admission, medial expense, duration of hospitalization and access to health care while Zhang, D'Uva and Van Doorslaer (2015) recorded a clear gender gap in health outcomes in China.

In addition, findings on the impact of cognitive ability on earnings in China are limited and controversial. For example, relying on data from the Gansu Survey of Children and Families (GSCF), Glewwe, Huang and Park (2017) found that although cognitive skill can strongly affect the decision to join the job market and together with a significant differences between boys and girls, it has no impact on their earnings after controlling for education and experience in rural China. While, later on, Mishra and Smyth (2015) documented a significant effect of cognitive skill (i.e. whether the language proficiency is at standard level or not) on one's hourly wage in urban China with Lewbel IV method but not with OLS method.

Therefore, in this thesis, we will re-examine labor market earnings data by gender to test what are the sources of the female-male difference in wages in the labor market of China by incorporating the above mentioned endowment factors. One of the contributions of this analysis is that we incorporate two previously ignored endowment variable, cognitive skill (i.e. English proficiency skills) and health status (i.e. height, BMI and self-reported health status) in the decomposition analysis of gender pay gap. The other contribution is that we address both the sample selection bias problem and the endogeneity bias problem of schooling variable to check the sensitivity of the gender gap estimates and decomposition results of the gaps.

CHAPTER 4: METHODOLOGY

In this chapter, methodology for the analysis on female-male gaps in labor force participation and that in earnings will be respectively presented in Section 4.1 and 4.2.

4.1 Methodology for Analysis on Gender Labor Force Participation Gap

In this section, data and method which have been employed for the analysis on gender labor force participation gap in this thesis will be discussed.

4.1.1 Data and Sample

This thesis used data from the Chinese General Social Survey (CGSS) 2010 round. The total number of samples covered by 2010 round of CGSS is 11,783, where 51.82 percent of them are women and 38.71 percent of them are rural residents. This study is based on female sample aged 25-55 and male sample aged 25-60. Although most of the earlier literature focused on the sample of women who are 16-55-year-old and men who are 16-60-year-old[16] by following the age restriction stated in the labor law where the lowest legal working age in China is 16 year-old, and 55 and 60 year-old are the official retirement age for female and male workers respectively. However, this study follows Schultz (2002) and restricted the sample to individuals with a starting age at 25 instead of 16. The selection of starting age of 25 is because of two reasons: 1) According to Schultz (2000) which focused on the examination of the impact of height on wages in some developing countries, that individual's height among who are 25 year-old is thus affected around 10-50 years before the wages of adult can be observed, and this fact is used to justify treating this kind of health human capital as predetermined when we modeling the determinants of wages, 2) As we presented in Table 2.1, the labor force participation rate of young people who are aged 16-24-year-old has decreased

significantly along three rounds of census period in China due to the rise in senior higher school enrollment and expansion of higher education (Dasgupta, Matsumoto and Xia, 2015). After ignoring missing cases, the final working sample for this section is 7,623 respondents, which comprises 3,896 male individuals and 3,727 women individuals.

Table 4.1 presents the sample observations by labor force participation status. By following Feng, Hu and Moffitt's (2015) division/definition on the status/situation of labor force participation or employment, in this thesis we assigned individuals who are currently doing an agricultural waged work during last three weeks as Category 1 – "Agricultural Waged Work"; individuals who are currently doing a non-agricultural waged work during last three weeks as Category 2 (including with non-agricultural working experiences and without any non-agricultural working experiences before) – "Non-agricultural Waged Work"; individuals themselves are bosses, owners of a private business, together with freelancers as Category 3 – "Self-employed"; individuals who didn't work in last three weeks for any income, but willing to start work within a two weeks' period if there any suitable job and also actively looking for a job through different channels in last three weeks as Category 4 – "In Labor Force but Not Employed"; and individuals who are students at school, or unable to work due to disabilities, retired people and individuals whose main responsibilities are housekeeping (i.e. housewives) as Category 5 – "Not in Labor Force". Moreover, here our definition/division of labor market participation and employment categories in this thesis is consistent with that of the International Labor Organization (ILO) as well[17].

[17] For example, the definitions adopted by ILO in 1982 for an international comparative study on the consistent unemployment rate defined "unemployed" as someone who is capable of working, has working experience with a paid job earlier on, currently do not have any job but is available for work and is actively looking for a new job.

In terms of labor force participation status, as shown in **Table 4.1** that 84.95% of respondents report being in the labor force (64.53% are employed with waged work, 13.27% are self-employed, 7.15% are in labor force but unemployed) while 15.05% of respondents are not in the labor force-such as students, disabled people, retired people and housewives. When we disaggregated by gender, 93.03% of men aged 25-60 were active in the labor force, while only 76.58% of women aged 25-55 were engaged in the labor force.

Table 4.1: Distribution of Sample Individuals by Work Status

		Agricultural Waged Work (%)	Non-agricultural Waged Work (%)	Self-employed (%)	In LF but Unemployed (%)	Not in LF (%)	Total (%)
Without age restriction	Full	24.91	28.99	9.80	6.67	29.63	100
	Female	25.07	23.21	7.48	6.30	37.94	100
	Male	24.75	35.22	12.29	7.07	20.67	100
	Urban	4.41	39.04	12.44	7.26	36.85	100
	Rural	57.24	13.16	5.65	5.71	18.24	100
Female: 16-55; Male: 16-60	Full	24.54	38.07	12.54	7.22	17.63	100
	Female	25.45	31.83	10.05	6.92	25.75	100
	Male	23.64	44.19	14.98	7.51	9.68	100
	Urban	4.03	50.66	15.70	8.09	21.52	100
	Rural	58.06	17.49	7.38	5.79	11.28	100
Female: 25-55; Male: 25-60	Full	26.33	38.20	13.27	7.15	15.05	100
	Female	27.30	31.58	10.82	6.88	23.42	100
	Male	25.39	44.59	15.64	7.41	6.97	100
	Urban	4.45	51.72	16.86	8.13	18.84	100
	Rural	60.93	16.82	7.59	5.60	9.06	100

Note: 1. Data is from the Chinese General Social Survey (CGSS). 2. By following the definition/division of employment status, in this paper we assign people who are currently doing an agricultural waged work during last three weeks as category 1 – "Agricultural Waged Work"; people who are currently doing a non-agricultural waged work during last three weeks as category 2 (including have non-agricultural working experiences and do not have non-agricultural working experiences before) – "Non-agricultural Waged Work"; people himself/herself is a boss, owner of a private business, together with freelancer as category 3 – "Self-employed"; people who didn't work in last week for any income, but willing to start work within two weeks if there any suitable job and also actively looking for a job through different channels in last three weeks as category 4 – "In LF but not Employed"; and people who are students at school, unable to work because of disabilities, retired people and people who are mainly responsible for housekeeping (housewives) as category 5 – "not in LF".

Appendix Table A presents the descriptive statistics of independent variables that been included for the regression analysis on the gender labor force participation gap as shown in Chapter 5. As discussed in Chapter 3, the CGSS 2010 round contains unique information on social norms/attitudes related to female mobility and labor force participation which are not covered by other popular datasets including Chinese Household Income Project (CHIP), China Health and Nutrition Survey (CHNS), China Family Panel Studies (CFPS), China Household Finance Survey (CHFS), China Health and Retirement Longitudinal Study (CHARLS)[18]. And also as we discussed in the last chapter that women and men are holding a different roles within the household and in the society according to the gender stereotypes of social role theory (e.g. Eagly, 1987; Eagly, Diekman, Johannesen-Schmidt and Koenig, 2004), that women are more communal therefore to take more family caring responsibility as housemakers, while men are more agentic therefore to take more family feeding responsibility as breadwinners. In this way, the division of gender not only may affect the society values or attitudes on this point, but also may affect the possibility of labor market participation of women. For example, it would be very difficult for women to convince the family they can handle the balance of work and life and to persuade the potential employers to be a qualified worker and leader compared to men (e.g. Goldberg, 1968; Deaux and Emswiller, 1974).

Therefore, in this thesis, we employed three questions on the attitude towards gender roles to construct the main explanatory variable of interest i.e. community gender norms. The respondents were asked whether they are "totally disagree", "somewhat disagree", "neutral", "somewhat agree" or "totally disagree" with the following three statements:

[18] Although these datasets include some questions that related to social norms/gender roles (i.e. time spending on housework and taking care of family members, reasons for having children-carry on the family bloodline and taking care of parents when they are getting old, son preference and so on), only CGSS got unique questions on social attitude towards women's work and family responsibility.

(1) “Men should focus on career, while women should focus on family”;

(2) “During a recession, female workers should be dismissed first”;

(3) “Housework should not be shared by couples equally”.

In CGSS 2010 round’s questionnaire, the original statement of the third one actually is “Housework should be shared by couples equally”. Here in this thesis, we paraphrase this statement into “Housework should not be shared by couples equally” and the answers correspondingly in order to present consistent results as the first two statements.

By following the recoding method of Chen and Ge (2018), we recode the answers of each statement and construct a binary index where answers with “totally agree”, “neutral”, and “somewhat agree” are treated into “1”, referring to the respondent’s support for a traditional attitude towards gender role. While answers with “totally disagree” and “somewhat disagree” are converted into “0”, referring to the respondent’s support for an egalitarian view on gender roles[19]. Then, each of the binary indicators is averaged at the community level to construct the final gender norm indicator[20]. In order to avoid the possible simultaneity bias, the averaged value of gender norms at the community level are constructed net of the assessment from individuals. As shown in **Appendix Table A**, there are significant differences in the attitude to above mentioned three statements towards gender roles between women and men. Precisely, 73.6% of women vs. 77.2% of men agree with the first statement, 23.8% of women and 31.6% of men agree with the second statement, and 23.0% of women and 29.6% of men agree with the third statement. This indicates that men seem to have a less egalitarian attitude on gender roles than women.

[19] If we recode “neutral” into “0” group, the community norms turns out a larger impact on labor force participation decision of women compared to the current results as shown in Chapter 4.

[20] Here, community (*she qu*) refers to a residential area under a district according to the geographical/administrative division. CGSS 2010 round covers 478 communities in mainland China, and around 25 households are sampled in each community. Previous studies also used same definition of “community”, please see e.g. Xu and Chow (2006).

Moreover, CGSS data also provides detailed information on respondents' endowments including language skills and health conditions which have been unaccounted for in the earlier studies in the female-male difference in the labor force participation rate in developing countries. Again the gender-wise breakdown of summary statistics in **Appendix Table A** shows that the sample women in China are much shorter (159.64 cm) than sample men (169.71 cm). Taking normal self-reported health status as the base group, we can see that the percentage of people having lousy health status for women (15.2%) is considerably higher than that for men (11.9%). Regarding the body-mass index (BMI), taking normal BMI (18.5 ⩽BMI <25) as the base group, , among the female population, the percentage of underweight (BMI<18.5) people has reached 9.3% while that among male group only marks up 4.7%. Similarly, Chinese men have significantly higher schooling (9.88 years) compared to women (9.02 years)[21]. But the opposite is true in case of cognitive skills. Here, having good English skill is a dummy variable, it was used to show that whether the respondent's English skill (covering speaking and listening) is at/above the standard level of proficiency, 1 for yes, otherwise 0. It shows that the percentage of the female sample having good English language skill is higher (9.7%) than that of the male sample (8.7%)[22]. As shown in Appendix Table A, all the differences between women and men in above mentioned education and health human capital are statistically significant. On average, except for English language skill, men appear to have superior endowments particularly when we consider additional measures of human capital (i.e. health). This may partly account for the growing gender labor force participation gap in China, will explore this possibility as well in Chapter 5.

[21] Another study on gender inequality in China on education, health care and pension benefits is Shen, Wang and Cai (2016).

[22] Earlier studies on gender differences in cognitive ability in China please see Lei, Smith, Sun and Zhao (2014).

4.1.2 Empirical Framework

This section will describe how to model the determinants of labor force participation with the 2010 round of CGSS data, by taking the role of respondents' endowments especially English language skills, health conditions and social norms into consideration.

First of all, we estimate the determinants of being in the labor force with a probit model as equation (1):

$$P_{ij} = X_{ij}\,\alpha_j + G\,\theta + \mu_{ij} \quad i= 1, \ldots, n;\ j=m(male), f(female) \qquad (1)$$

Here, the dependent variable P is a dummy variable which takes a value of 1 if the respondent participated in the labor force in the last three weeks and 0 otherwise. G is a dummy variable for gender which takes a value of 1 if the individual is female, and 0 for male, thus coefficient θ is the estimated gender gap in this equation. It supposedly measures the gender labor force participation differential after controlling several characteristics included in X, a vector of individual characteristics that may affect the probability of participating in the labor force (α is the estimated coefficient of personal characteristic variables). Including age, aged squared, ethnicity (a dummy variable which takes a value of 1 if the individual is minority and 0 otherwise), type of *hukou*[23](a dummy variable which takes a value of 1 if the individual holds a non-agricultural *hukou* and 0 otherwise), marital status (a dummy variable which takes a value of 1 if the individual is currently married and 0 otherwise), the number of children[24], years of education, and location (a dummy variable which takes a value of 1 if the individual

[23] Earlier studies which also examined the role of *hukou* please see Melander and Pelikanova (2013), Wu (2015).

[24] Some earlier studies shows that young children are more possible to affect the labor force participation decision instead of older children. For example, Contreras and Plaza (2010) found that having children who are younger than 4 year-old at home affect the female work participation possibility negatively in Chile. Due to the unavailability of data on age of children in CGSS dataset, this thesis is only able to investigate the effect of number of children regardless of their age.

comes from rural area, 0 for those come from urban area) and region of residence (using "middle of China" as the reference group). And μ is the error term.

Then, we repeat the above regression by adding a dummy variable of cognitive skill[25]: having good English speaking and listening skill or not, which takes a value of 1 if the English speaking and listening skill of the respondent is at/above the standard proficiency level and 0 otherwise. Although cognitive skills cover many dimensions, here we use language proficiency only as the proxy measure for cognitive skills due to the data availability of CGSS and also by following earlier studies. For example, according to Acosta and Muller (2018), that cognitive skill is generally divided into two categories. The first category includes basic (lower-order) cognitive skills such as language skills and numeracy skills, while the second category covers advanced (higher-order) cognitive skills such as problem solving ability and critical thinking ability.

Then, we add in three measures of health capital endowments: height (in cm), self-assessed health condition (taking normal self-reported health status as the base group) and body-mass index (BMI, taking normal BMI where 18.5 $\leqslant$BMI <25 as the base group. Height, weight, body mass index (BMI) and self-assessed health situation are being increasingly used as indicators of health capital or health status of population for studies on labor market outcomes (e.g. Thomas and Strauss, 1997; Schultz, 2002). Following the earlier studies, for BMI, it captures a short-term nutritional status of the individual. However, for height, it captures a long-term effect of nutritional status of the individual since childhood (e.g. Fogel, Engerman and Trussell, 1982; Waaler, 1984; Fogel, 1994). Comparing to height and BMI, self-reported health status captures more

[25] Earlier studies have examined both the impact of formal education and that of the cognitive skills on labor market participation decision and wages, and that of non-cognitive skills in China as well (e.g. Glewwe, Huang and Park, 2017).

latest and recent health condition of the individual, and is much more subjective. Therefore, including of height, BMI indicators together with self-assessed health condition dummies would help us to have a result to be less biased by cultural conditioning, or subjective consideration, or possible chronic diseases that usually shows up in one's later age (Rodrick and Rosenzweig, 2009).

Next, we expand the X vector by adding three community gender norms covariates (S) as shown in equation (2). As we mentioned in Section 4.1.1, S refers to three dummy variables, which take a value of 1 if the individual supports for the following three statements respectively: "Men should focus on career, while women should focus on family", "During a recession, female workers should be dismissed first", and "Housework should not be shared by couples equally". Here, we are following the previous studies which explored the impact of social values or norms especially for female labor market participation decision and outcomes among the developing countries, which have used gender division of breadwinner and homemaker, gender division of housework time, and workplace discrimination related to dismissal as proxies for social norms on gender roles (e.g. Brayfiled, 1992; Hersch and Stratton, 1994; Fortin, 2005; Chen and Ge, 2018; Humlum, Nandrup and Smith, 2019; Jayachandran, 2020).

As shown in equation (2), γ is the estimated coefficient of social norms variables

$$P_{ij} = X_{ij}\,\alpha_j + G\,\theta + S_{ij}\;\gamma + \mu_{ij} \quad i= 1, \ldots, n;\ j=m(male), f(female) \tag{2}$$

In this way, our estimate of discrimination component won't be biased due to the unmeasured endowments by this extra controlling for health and human capital. For health capital, we expect people who are taller, with better self-assessed health status and with normal body-mass index have higher possibility to participate in the labor

force. And women residing in communities with a more traditional attitude on the traditional division of labor by gender may have a lower possibility of participating in the labor force. In order to make the model clear, we listed detailed descriptions for all the variables been included in the analysis on gender labor force participation gap as below in Table 4.2.

Table 4.2: Variables Descriptions for Analysis on Gender Labor Force Participation Gap

Variables	**Description**
<u>Dependent Variable</u>	
Labor Force Participation	Captures if the individual is participating or not participating in the Chinese labor market, is a dummy variable which =1 if an individual participated in the labor market in the last three weeks and 0 otherwise. Individuals who are currently doing 1) an agricultural waged work, 2) an non-agricultural waged work, 3) self-employed (e.g. bosses, owner of a private business) in last three weerks for some income, 4) who didn't work in last three weeks for any income but willing to start work within a two weeks' period if there any suitable job and also actively looking for a job through different channels are regarded as "in the labor force/labor market" (=1). While individuals who are students at school, or unable to work due to disabilities, retired people and individuals whose main responsibilities are housekeeping as regarded as "not in the labor force/labor market" (=0).

Independent Variables	
Personal Characteristics	
Age	Age of the respondent, ranges from 25-55 for female, 25-60 for male
Age square	Age of the respondent squared to account for non-linearity
Gender	A dummy variable which =1 if the respondent is female, =0 if the respondent is male.
Minority	A dummy variable which =1 if the respondent is a minority, =0 if Han ethnicity.
Non-agricultural *Hukou*	Captures the respondent's type of Hukou, is a dummy variable which =1 if the respondent is holding a non-agricultural hukou, =0 othersewise
Currently Married	Is a dummy variable which =1 if the respondent is currently married, =0 if the respondent is single, divorced or widowed.
Number of Children	Captures the number of children of the respondent
Schooling and Cognitive Skills	
Years of Education	Captures the years of formal schooling of the respondent
Good English Skill	Captures the respondent's English language ability, is a dummy variable which =1 if the English skill (including speaking and listening) of the respondent is at/above the

	standard proficiency level, =0 otherwise.
Health Capital	
Height	Captures the height of the respondent, in cm
Self-reported Health Status	
Bad	Captures the respondent's health status, is a dummy variable which =1 if the respondent reported he/she is in a bad health situation, =0 otherwise. The reference category is in "normal health condition".
Good	Is a dummy variable which =1 if the respondent reported he/she is in a good health situation, =0 otherwise. The reference category is in "normal health condition".
Body Mass Index (BMI)	
BMI<18.5, Underweight	Captures the respondent's BMI, is a dummy variable which =1 if the respondent is underweight (BMI<18.5), =0 otherwise. The reference category is 18.5≤BMI<25, which regarded as the respondent has a normal BMI index.
25≤BMI<30, Overweight	Is a dummy variable which =1 if the respondent is overweight (25≤BMI<30), =0

	otherwise. Reference category is 18.5≤BMI<25, which regarded as the respondent has a normal BMI index.
BMI≥30, Obese	Is a dummy variable which =1 if the respondent is obese (BMI≥30), =0 otherwise. Reference category is 18.5≤BMI<25, which regarded as the respondent has a normal BMI index.
Community Gender Norms	
Norm related to gender division in career and family	Captures the respondent's attitude on gender roles question, is a dummy variable which = 1 if the individual supports for the following statement: "Men should focus on career, while women should focus on family", =0 otherwise. Then, the binary indicator is averaged at the community level to construct the final gender norm indicator.
Norm related to female workers dismissal	Is a dummy variable which = 1 if the individual supports for the following statement: "During a recession, female workers should be dismissed first", =0 otherwise. Then, the binary indicator is averaged at the community level to construct the final gender norm indicator.

Norm related to housework sharing	Is a dummy variable which = 1 if the individual supports for the following statement: "Housework should not be shared by couples equally", =0 otherwise. Then, the binary indicator is averaged at the community level to construct the final gender norm indicator.
Geographic Location	
Rural	Captures the residency of the respondent, is a dummy variable which =1 if the respondent lives in the rural area, =0 if the respondent lives in the urban area.
East of China	Is a dummy variable which =1 if the respondent lives in coastal provinces of China, =0 otherwise. The reference group is "Middle of China".
West of China	Is a dummy variable which =1 if the respondent lives in western provinces of China, =0 otherwise. The reference group is "Middle of China".

Note: Data is from the Chinese General Social Survey (CGSS).

However, the probit regression which pools data across men and women with a gender dummy ignored an important fact that men and women might receive different rewards for the same characteristics. Therefore, we further employ the Blinder-Oaxaca (1973) decomposition approach to breaks the total gender difference in labor force participation possibility into two parts: one part which can be explained by the gender gap in those observed attributes such as education and health human capital, and the other part which resulted from the gender differences in the returns to those attributes. The Blinder-Oaxaca method has been a popular method that implemented by earlier literature to study various gender differences in China (see e.g. Qi and Dong, 2016; Zhao and Zhao, 2018) and other countries as well (see e.g. Karamessini and Loakimoglou, 2007). The method requires first estimating the regression model separately for each gender group. The coefficients from these two regression models are then used to decompose the raw difference in the outcome variable. If the community gender norm is important, it would matters for the gender gap in labor force participation through gender differences in estimated coefficients.

Formally, decomposition exercise corresponding to a linear model can be expressed as follows:

$$\bar{P}_m - \bar{P}_f = (\bar{X}_m - \bar{X}_f)\,\hat{\beta}_m + \bar{X}_f(\hat{\beta}_m - \hat{\beta}_f)\,, \qquad m=male,\ f=female \qquad (3)$$[26]

Here, in the equation (3), X vector includes English language skill variable, three measures of health capital: height, self-assessed health condition and body-mass index (BMI) and together with three community gender norms covariates as well. However, OLS regression produces inconsistent estimates in the case of discrete or limited dependent variables. Moreover, the parameter estimates of nonlinear models usually

[26] Here, in the equation (3), X vector includes English language skill variable, three measures of health endowment :together with three community gender norms covariates as well.

quite different from the marginal effects of the latent outcome variable which therefore cannot be used to process the standard Blinder-Oaxaca decomposition analysis. For these reasons, the conditional expectations $E(P_{ig}|X_{ig})$ differs from $\overline{X}_g \hat{\beta}_g$ and decomposition analysis on the outcome variable using equation (3) is not suitable for non-linear models. Therefore, earlier researchers have developed a modified Blinder-Oaxaca decompositions approach precisely for the non-linear models (Gomulka and Stern, 1990; Even and Macpherson, 1993; Yun, 2004; Fairlie, 1999, 2005). A formal extension of the Blinder-Oaxaca decomposition to nonlinear regression models has been initiated by Bauer and Sinning (2008) who decomposed the mean difference of P_i with the conditional expectations evaluated at different coefficient estimates:

$$\bar{P}_m - \bar{P}_f = [E\beta_m(L_{im}|X_{im}) - E\beta_m(L_{if}|X_{if})] + [E\beta_m(L_{if}|X_{if}) - E\beta_f(L_{if}|X_{if})] \quad (4)$$

Where $E\beta_g(P_{ig}|X_{ig})$ refers to the conditional expectation of P_{ig} and $E\beta_g(P_{ih}|X_{ih})$ to the conditional expectation of P_{ih} evaluated at the parameter vector β_g, with g, h=(m,f) and $g \neq h$.

In the equation (4), the first term on the right-hand side presents the part of the difference in the outcome variable between the two groups that is owing to the differences in the covariates X_{ig}, while the second term on the right-hand side refers to the part of the differential in Y_{ig} which is resulted from the differences in the coefficients β_g.

Although Bauer and Sinning's approach (2008) can produce a decomposition analysis on the mean outcome variable for the nonlinear model, it cannot separate out the contributions from each single variable. Then, we employ Power, Yoshioka and Yun's (2011) detailed nonlinear decomposition approach which allow us to figure out

the contribution of each characteristic to the explained component and the unexplained part.

$$\bar{P}_M - \bar{P}_F = E + U = \sum_{k=1}^{K} W_{\Delta Xk} E + \sum_{k=1}^{K} W_{\Delta \beta k} U = \sum_{k=1}^{K} E_k + \sum_{k=1}^{K} U_k \qquad (5)$$

where, $W_{\triangle Xk}$ ($W_{\triangle \beta k}$) equals to the relative contribution of each covariate based on magnitude of the difference in the mean value of the covariate (in the size of the effect) then weighted by the effect of the covariate in male group (by the mean value of the covariate in female group). Therefore, E_k and U_k (k=1,…, K) represent the unique contribution of the k^{th} covariate to the E (explained part) and U (unexplained part).

The analysis which emphasizes on the detailed decomposition of the explained part with a focus on the previously ignored language skills and health capital variables, and that of the unexplained part given another focus on social norms of gender role will be presented in Chapter 5.

4.2 Methodology for Analysis on Gender Earnings Gap

In this section, data and method which have been employed for the analysis on the gender wage gap in this thesis will be discussed.

4.2.1 Data and Sample

As mentioned earlier, analysis for this second gap also based on the CGSS 2010 dataset as the last section. For this section, we also restricted our sample into female aged 25-55 and male aged 25-60 by following Schultz (2002). Again, the reasons for the restriction on the range of the ages has been discussed in Section 4.1

After ignoring missing cases, the final working sample for this section covers 4223 waged workers. **Appendix Table B** summarizes the dependent the independent variables that we included for the regression analysis on the determinants of earnings and decomposition analysis of the gender earnings gap. The average monthly employment income in our dataset is RMB 1631.36. Sample women have significantly lower monthly wages than men: women are paid only 72.63%, 75.70%, 60.20%, 71.84%, 73.09%, 76.81%, 66.76% and 64.45% of men's monthly wages in whole sample, urban area, rural area, pre-higher education expansion cohort[27], post-higher education expansion cohort, eastern (coastal) region, middle region and western region respectively.

As we pointed out earlier, the CGSS 2010 data is representative of urban and rural China and contains rich information relating to worker endowments which have not been accounted for the earlier studies on gender earnings gap in developing countries. As shown in **Appendix Table A** and **Appendix Table B**, on average, except for English language skill, men appear to have superior endowments, particularly when we

[27]Refers to respondent whose age is at or above 18 years old in the year of 1999 when the higher education expansion policy was issued.

consider additional measures of human capital (i.e. health). This may partly account for the growing gender wage gap in China, we will explore this possibility in Chapter 5. Moreover, consistent with the pattern of female percentage in different occupations during 1980-2010 that documented by Li and Xie (2015)[28] earlier on with four rounds of Chinese census data (1982, 1990, 2000 and 2010), our dataset also shows that women in China tend to segregate in low-paid sectors as shown in **Appendix Table C** and **Appendix Table D**.

4.2.2 Empirical Framework

This section will present how to model the determinants of earnings with the 2010 round of CGSS data, by taking the role of respondents' endowments especially English language skills and health conditions into consideration.

First of all, we estimate the gender earnings gap with a parsimonious Mincerian earnings function which is as equation (6):

$$lnW_{ij} = X_{ij}\beta_j + G_{ij}\beta_{jf} + \varepsilon_{ii} \qquad i = 1,\ldots,n;\ j = m\ (male),\ f\ (female) \qquad (6)$$

Here, in equation (6), the dependent variable *lnW* is (log) monthly wage. G is a dummy variable for gender which takes a value of 1 if the individual is female, and 0 for male, the coefficient of the female dummy reflects the estimated gender gap in earnings.X_{ij} is a vector of individual characteristics that may affect one's wages which includes age, age-squared, ethnicity (a dummy variable which takes a value of 1 if the individual is minority and 0 otherwise), type of *hukou* (a dummy variable which takes a

[28] During 1982-2010, Li and Xie (2015) found that women's share in high paid jobs (i.e. high-level white-collar, such as administrative staff) increased only modestly, from 10.3 in 1982 to 25.1 in 2010. Moreover, Chinese women still predominantly in low-paid, low-skill required work, the share of women in service sector and that in farming, forestry, animal husbandry sector are 51.7% and 49.2% in 2010 census.

value of 1 if the individual holds a non-agricultural *hukou* and 0 otherwise), marital status (a dummy variable which takes a value of 1 if the individual is currently married and 0 otherwise), years of education, geographic location (a dummy variable which takes a value of 1 if the individual comes from rural area) and region of residence (using "middle of China" as the reference group). This earnings function is estimated with the OLS method.

Subsequently, equation (6) is augmented in a step-wise manner allowing controls for various measures of education and health capital that have been ignored in the earlier studies, namely, cognitive skills which is proxied by a dummy variable - having good English language skill or not (which takes a value of 1 if the individual's English speaking and listening skill is at/above the standard proficiency level, and 0 otherwise) and three proxies for health human capital: individual's height (in cm), self-assessed health situation (taking normal self-reported health status as the base group) together with body-mass index (BMI, taking normal BMI where $18.5 \leqslant BMI < 25$ as the base group). We also add controls for occupational status as women often segregate in certain sectors. As we discussed in Section 4.2.1 and shown in **Appendix Table C** and **Appendix Table D**, women in China tend to segregate in low-paid jobs. Unfortunately, CGSS does not provide information on the individual's specific occupation. But, as a crude test of occupational segregation as another explanation for the observed gender earnings gap in China, we will control for the employment sector dummies (instead of occupational dummies due to the lack of details in the CGSS data, and taking employed with an agricultural job as the reference group) as well in the last specification of our regression model in Section 5.2. As shown in the Appendix Table B, the percentage of women (43.0%) who are employed with an agricultural job is significantly higher than that of men (35.1%), while the percentage of men (21.4%) who are employed with SOE is significantly higher than that of women (19.1%). If the gender pay gap in the

regression model reflects the difference in occupational choice then this specification should lower the estimated gender gap. In the decomposition analysis, this should increase the share of the unexplained variation since the gender gap in this case arises because of occupation-specific returns which disfavor women compared to men. Here, the inclusion of above mentioned but previous ignored factors, cognitive skill (i.e. English language skill) and health capital are in line with the theories – human capital model and labor market discrimination model discussed in the last chapter. From one side, according to the human capital approach that women are usually have less incentives to invest in human capital endowments such as language skills training and health human capital, therefore part of the gender earnings gap might can be explained by the female-male differences in the language skills and health capital. For the other side, according to the labor market discrimination approach that women who are holding the same kind/level of human capital as men, are still might not be able to enjoy the same returns as that for men due to the employer's taste of discrimination. In this way, part of the gender difference in earnings would be explained by the discrimination effect in the labor market resulted from the differential returns to human capital endowment. Moreover, the inclusion of occupational sector dummies here is in line with the occupational segregation theory as discussed in the last chapter as well. Women are less likely to be crowded into positions inside the State-owned enterprises and collectively owned enterprises, which are positions with higher wages.

Next, we use gender-specific estimates of the earnings function to implement Blinder-Oaxaca decomposition analysis and break down the observed gender gap into the part that will be explained by endowment differentials between women and men while the residual which is unexplained by observed characteristics.

In the meanwhile, we also expand the Blinder-Oaxaca method to address a common methodological problem that may lead to a biased OLS estimate. If the participation in the labor market is not random i.e. selection into the labor force is based on some individual unobservables, which also has an impact in determining wages, then our OLS estimates would be biased which means the estimation of gender wage gap would suffer sample selection bias. More precisely, the female-male earnings gap might got underestimated if the selection is positive, while the female-male earnings gap would be overestimated if there is a negative selection. Therefore, in order to address this issue – to correct for the possible non-random selection in labor force participation, we employed Heckman (1979) two-steps method in this study. By following the framework proposed by Heckman (1979), we have to exclude at least one variable from our wage equation but to be included in the first stage which is a probit equation on labor force participation decision, therefore to identify the lambda term. For this purpose, we employed data for non-labor income, including incomes that come from three different sources: bequest, lease of land together with sales of property as excluded identifying variables by following earlier studies (e.g. Duraisamy, 2002)[29]. Having large number of non-labor income is likely to reduce the possibility of joining the labor market but unlikely to have a direct impact on wages. Besides the non-labor income, to account for an important choices lies between join the labor market and not join the labor market especially for women, we also use number of children as the additional excluded identifying variable in the first stage of Heckman two-step model which is a Probit

[29] For now, only two studies on China have implemented the selection correction, Chi and Li (2014) and Heshmati and Su (2015), they confirmed that the gender wage is biased if estimated without taking the non-random selection into paid work into consideration. However, their estimation on the mean gender earnings gap only restricted into urban China. While Chi and Li used data on the presence of young children (below/equal 6 year-old) in a household as the excluded variable, Heshmati and Su didn't disclose the excluded variables.

model of determinants of labor force participation[30]. The revised earnings function with the selection correction term is as follow:

$$\ln W_{ij} = X_{ij}' \beta_j + \boldsymbol{\lambda}_{ij}\theta_j + \varepsilon_{ij} \qquad i = 1,\ldots,n;\ j = m(male), f(female) \qquad (7)$$

θ_j is the estimated coefficient of $\boldsymbol{\lambda}_{ij}$ (the inverse Mill's ratio computed from the Probit model of determinants of labor force participation) from the extended wage regression where $\boldsymbol{\lambda}_{ij}$ will be included as an additional explanatory variable.

In order to make the model clear, we listed detailed descriptions for all the variables been included in the analysis on gender earnings gap as below in Table 4.3.

[30] For a similar approach, see Du and Dong (2013) for China and Silles (2016) for the UK. The latter study finds a significant effect of family size on women's labour supply.

Table 4.3: Variables Descriptions for Analysis on Gender Earnings Gap

Variables	**Description**
Dependent Variable	
Earnings	Monthly employment income of the respondent (in RMB), a gross one.
Independent Variables	
Personal Characteristics	
Age	Age of the respondent, ranges from 25-55 for female, 25-60 for male
Age square	Age of the respondent squared to account for non-linearity
Gender	A dummy variable which =1 if the respondent is female, =0 if the respondent is male.
Minority	A dummy variable which =1 if the respondent is a minority, =0 if Han ethnicity.
Non-agricultural *Hukou*	Captures the respondent's type of Hukou, is a dummy variable which =1 if the respondent is holding a non-agricultural hukou, =0 othersewise
Currently Married	Is a dummy variable which =1 if the respondent is currently married, =0 if the respondent is single, divorced or widowed.

Schooling and Cognitive Skills	
Years of Education	Captures the years of formal schooling of the respondent
Good English Skill	Captures the respondent's English language ability, is a dummy variable which =1 if the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level, =0 otherwise.
Health Capital	
Height	Captures the height of the respondent, in cm
Self-reported Health Status	
Bad	Captures the respondent's health status, is a dummy variable which =1 if the respondent reported he/she is in a bad health situation, =0 otherwise. The reference category is in "normal health condition".
Good	Is a dummy variable which =1 if the respondent reported he/she is in a good health situation, =0 otherwise. The reference category is in "normal health condition".
Body Mass Index (BMI)	
BMI<18.5, Underweight	Captures the respondent's BMI, is a dummy variable which =1 if the respondent is

	underweight (BMI<18.5), =0 otherwise. The reference category is 18.5≤BMI<25, which regarded as the respondent has a normal BMI index.
25≤BMI<30, Overweight	Is a dummy variable which =1 if the respondent is overweight (25≤BMI<30), =0 otherwise. Reference category is 18.5≤BMI<25, which regarded as the respondent has a normal BMI index.
BMI≥30, Obese	Is a dummy variable which =1 if the respondent is obese (BMI≥30), =0 otherwise. Reference category is 18.5≤BMI<25, which regarded as the normal BMI index.
Occupation	
State Owned Enterprise	Captures the employment sector of the respondent, is a dummy variable which =1 if the respondent was employed with a SOE, =0 otherwise. The reference category is employed with an agricultural job.
Collectively Owned Enterprise	Captures the employment sector of the respondent, is a dummy variable which =1 if the respondent was employed with a collectively owned enterprise, =0 otherwise. The reference category is employed with an agricultural job.

Privately Owned Enterprise	Captures the employment sector of the respondent, is a dummy variable which =1 if the respondent was employed with a privately owned enterprise, =0 otherwise. The reference category is employed with an agricultural job.
Hong Kong, Macau or Taiwan Funded Enterprise	Captures the employment sector of the respondent, is a dummy variable which =1 if the respondent was employed with a Hong Kong, Macau or Taiwan funded enterprise, =0 otherwise. The reference category is employed with an agricultural job.
Foreign Funded Enterprise	Captures the employment sector of the respondent, is a dummy variable which =1 if the respondent was employed with a foreign funded enterprise, =0 otherwise. The reference category is employed with an agricultural job.
Geographic Location	
Rural	Captures the residency of the respondent, is a dummy variable which =1 if the respondent lives in the rural area, =0 if the respondent lives in the urban area.
East of China	Is a dummy variable which =1 if the respondent lives in coastal provinces of China, =0 otherwise. The reference group is "Middle of China".
West of China	Is a dummy variable which =1 if the respondent lives in western provinces of China, =0

	otherwise. The reference group is "Middle of China".
Family Background (Instrument Variables)	
Parental death	Captures the respondent's family background which may affected one's school participation choice directly, is a dummy variable which =1 if parents died when the respondent was 14-year-old.
Father's education	Captures the years of formal schooling of the respondent's father, which may affect one's school participation choice directly.
Mother's education	Captures the years of formal schooling of the respondent's mother, which may affect one's school participation choice directly.
Identifying Variables for Heckman Analysis	
Number of Children	Captures the number of children of the respondent
Non-labor Income from Bequest	Captures the amount of income from bequest of the respondent, in RMB
Non-labor Income from Rent out Land	Captures the amount of the income from rent out land, in RMB
Non-labor Income from Sales of Property	Captures the amount of the income from sales of property, in RMB

Note: Data is from the Chinese General Social Survey (CGSS).

Based on equation (7), the gender earnings differentials can be presented with the following equation:

$$D = \ln\bar{W}_m - \ln\bar{W}_f = (\bar{X}_m - \bar{X}_f)' \hat{\beta}_m + \bar{X}_f' (\hat{\beta}_m - \hat{\beta}_f) + (\hat{\theta}_m \bar{\lambda}_m - \hat{\theta}_f \bar{\lambda}_f) \quad (8)$$

The first item on the right-hand side is the part where the gender earnings gap can be explained by differences in observed characteristics at the mean between women and men (i.e. endowment effect). The second item is the unexplained part, standing for the female-male wage differentials which are resulted from the differential reward for the equal characteristics (i.e. discrimination effect). The third item captures the contribution from the differences in the average selectivity bias.

$$D = (\bar{X}_m - \bar{X}_f)[\Omega \hat{\beta}_m + (I - \Omega) \hat{\beta}_f] + [\bar{X}_m (I - \Omega) + \bar{X}_f \Omega] (\hat{\beta}_m - \hat{\beta}_f) + (\hat{\theta}_m \bar{\lambda}_m - \hat{\theta}_f \bar{\lambda}_f) \quad (9)$$

Here, by following Reimers (1983), I is an identity matrix and Ω is a diagonal matrix of weights specified as the averaged gap between the male and female wage structures (i.e. $\Omega = 0.5I$). . The diagonal of Reimers (1983) suggested weighting the coefficient vectors by the proportions in the two groups (female and male samples). With the Reimers's weighting system, the unexplained part of the gap is equal to the arithmetic average of the averaged wage loss for disadvantaged workers (here refers to female workers) and the averaged wage gain for advantaged workers (here refers to male workers). Existing studies on China shows some variation in the results based on the choice of the weighting index, where the discrimination component of the total gap by following the Reimers method is larger than that by using the male weights, but is smaller than that by using the female weights (e.g. Liu et al., 2000; Chen and Hamori, 2008). We will also look into the variation of the discrimination component of the gender wage gap by using different weights as shown in Table 5.17 in the Chapter 5 as a robustness test. Lastly, we applied the detailed decomposition method developed by

Jann (2008) to examine the contribution of gender difference in each factor, especially that in education and health capital in explaining the above calculated explained component and the unexplained component of the observed gap in earnings between female and male labor.

CHAPTER 5: RESULTS & DISCUSSION

In this chapter, findings for analysis on the female-male gaps in labor force participation and that in earnings based on the methodology introduced in Chapter 4 will be respectively presented in Section 5.1 and 5.2.

5.1 Results and Discussion for Analysis on Gender Labor Force Participation Gap

In this section, findings for analysis on the determinants of labor force participation, and decomposition on the gender labor force participation gap based on the methodology introduced in Section 4.1 will be discussed.

5.1.1 Determinants of Labor Force Participation

In this section, we first present the estimation results on the influencing factors of participating in the labor force in China using a Probit model. **Table 5.1** shows the results based on six separate models; the first specification incorporates a female dummy variable, personal demographics, education, and location dummy variables as well to control for differences in labor force participation possibility across geographic areas. Then each of the following regressions includes additional explanatory variables covering language proficiency, height, self-reported health status, BMI dummies and finally the social norms variables.

For the analysis on gender labor force participation gap in Section 5.1.1 and analysis on gender earnings gap in Section 5.1.2 in this thesis, six regression specifications and five specifications are included respectively. The main reason for including multiple regression specifications for the analysis part is to show the variation or changes in the coefficient of female dummy variable – the estimated size of gender gap as shown in Table 5.1 and Table 5.12 after adding additional controls, and as well to show the

variation or changes in the size of explained part of the gender gap as presented in Table 5.5 and Table 5.14 after including additional controls.

The total sample size of CGSS 2010 is 11,783, while after restrict to the female sample into 25-55 year-old, and male sample into 25-60 year-old, the sample size becomes 7781. After excluding missing cases for labor market participation variable, minority variable, hukou variable, marital status variable, number of children variable, education variable, urban/rural location variable, and regional location variable, the final sample size becomes 7704, 7692, 7690, 7688, 7688, 7684, 7684 and 7684 (as shown in first specification). Then the sample size further reduce to 7671, 7671, 7663, 7663, and **7623** (as shown in sixth specification) after excluding missing cases for language skills variable, height variable, self-reported health variable, BMI variable, and social norms variables.

The coefficient for the female dummy as shown in **Table 5.1,** indicating a sizeable gender disparity in labor force participation even after controlling for the differentials on the personal and demographic attributes and location dummies. More precisely, the estimated gender labor force participation gap, given in specification (1) and (2), are 19.7 per cent. Then, it increases to 19.9 per cent up to specification (5) after adding controls for three measures of health capital, which means failure to account for women's lower health capital and the negative impact of being overweight/obese on their labor force participation possibility, would biases the estimated size of the female-male labor force participation gap to be downward. The last specification adds three social norms variables, including these variables again increases the estimated gender gap from 19.9 to 20.3 per cent, reflecting that being a woman is to decrease the probability of participating in the labor force by 20.3 percentage points. Additionally,

omitting the social norms variables will lead to a downward bias on the estimated gender gap in labor force participation.

And the possibility of being the labor force is first increasing and then falling with age. Moreover, additional one-year education will lead to 0.5 percentage points higher probability in joining the labor force. Regarding the cognitive skill, one variable of our interest, which is proxied by a dummy variable for the individual's English language skill (covering both listening and speaking skills) is good or not, the effect of having a standard/above standard English language level is to increase that probability by 6.1 percentage points. Then, if we look into another variable of our focus, health capital, we found that reporting a bad health status and being overweight is associated with a 4.3 and 2.2 percentage points' decrease in participating in the labor force respectively. While height is not a significant determinant of labor force participation in China, that is being taller will not increase the labor force participation probability.

Table 5.1: Probit Estimates of the Determinants of Labor Force Participation (Full Sample)

	(1)	(2)	(3)	(4)	(5)	(6)
Personal Characteristics						
Age	.044***	.046***	.045***	.046***	.046***	.047***
	(12.96)	(13.38)	(13.38)	(13.56)	(13.71)	(13.96)
Age square	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***
	(14.59)	(14.92)	(14.92)	(14.91)	(15.05)	(15.28)
Female	**-.197*** **	**-.197*** **	**-.199*** **	**-.197*** **	**-.199*** **	**-.203*** **
	(22.65)	**(22.73)**	**(17.84)**	**(17.75)**	**(17.86)**	**(18.11)**
Minority	-.011	-.009	-.009	-.012	-.011	-.010
	(0.86)	(0.70)	(0.71)	(0.97)	(0.88)	(0.83)
Non-agricultural *Hukou*	-.012	-.013	-.013	-.011	-.011	-.012
	(1.29)	(1.46)	(1.42)	(1.28)	(1.20)	(1.34)
Currently married	-.013	-.009	-.009	-.016	-.015	-.016
	(1.20)	(0.76)	(0.76)	(1.41)	(1.34)	(1.45)
Number of Children	.011**	.011**	.011**	.010**	.010**	.010**
	(2.35)	(2.35)	(2.36)	(2.23)	(2.26)	(2.23)

Schooling and cognitive skills						
Years of Education	.008***	.007***	.007***	.006***	.006***	.005***
	(8.27)	(6.77)	(6.78)	(5.98)	(5.91)	(4.95)
Good English Skill		.062***	.062***	.062***	.061***	.061***
		(5.10)	(5.12)	(5.19)	(5.09)	(5.13)
Health Capital						
Height, in cm			-.001	-.001	-.001	-.001
			(0.42)	(0.69)	(0.63)	(0.62)
Self-reported Health Status:						
Bad				-.042***	-.042***	-.043***
				(3.58)	(3.59)	(3.65)
Good				.032***	.033***	.033***
				(3.77)	(3.87)	(3.81)
Body Mass Index (BMI):						
BMI<18.5, Underweight					.002	.002
					(0.19)	(0.19)
25≤BMI<30, Overweight					-.022**	-.022**
					(2.50)	(2.46)
BMI≥30, Obese					-.038	-.039
					(1.45)	(1.51)
Community Gender Norms						
Norm related to gender division in career and family						-.022***
						(2.77)
Norm related to female workers dismissal						-.012*
						(1.52)
Norm related to housework sharing						-.015*
						(1.90)
Geographic Location						
Rural	.106***	.104***	.104***	.104***	.103***	.103***
	(12.06)	(11.86)	(11.85)	(12.00)	(11.90)	(11.95)
East of China	.026***	.022***	.023***	.018**	.019**	.018**
	(3.24)	(2.76)	(2.78)	(2.25)	(2.43)	(2.26)
West of China	.041***	.039***	.039***	.041***	.040***	.038***
	(4.61)	(4.47)	(4.40)	(4.73)	(4.61)	(4.35)
N	7684	7671	7671	7663	7663	7623
Pseudo R2	0.1728	0.1771	0.1771	0.1859	0.1871	0.1899

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. Good English skill is a dummy variable which indicates whether the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level (=1) or not (=0); 6. For self-reported health status, the reference category is "in normal health condition"; 7. For Body Mass Index (BMI), the reference category is "normal, 18.5≤BMI<25"; 8. Three community gender norms variables - "gender division in career and

family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"; 9. For regional dummies, the reference group is "middle area of China". 10. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 11. Robust standard errors are reported in parentheses.

Table 5.2 provides the gender-specific regression results with a Probit model for the influencing factors of labor force participation with the CGSS 2010 round data also for six specifications as shown in last table. First of all, we found that the coefficient on three social norms is negative and significant for the female sample only, not for the male sample. Women holding traditional attitude on gender roles - supporting "women should focus on family not career", "female workers should be dismissed first during a recession" and "women should take over more housework chores" opinion, will have relatively lower possibility to join the labor force compared to women holding a more egalitarian attitude.

Here, we are aware of the problem that estimates for the "community gender norms" might suffer endogeneity, however, in this CGSS 2010 dataset, we are not able to find any appropriate instrument variable (IV) to exploit the exogenous shock to attitudes, etc. Therefore, instead of using the average answer for social norms in the community, we also test the role of social norms in making labor force participation decision based on different reference group (i.e. against women only and against men only in the community) as shown in Table 5.10 in the robustness test section, the results don't change therefore our results are robust to different choices of the reference group. Second, the effect of education on the possibility for women is larger than that for men, an additional one-year education will lead to 0.9 percentage points higher probability on joining the labor force for women, while only 0.1 percentage points for men. In addition, having a good English skill matters for women's labor force participation only but not for men. This is consistent with previous studies where Deng and Ding (2012)

employed the China Family Panel Studies (CFPS) dataset 2010 round and also found that the impact of human capital especially education attainment has larger effect on the labor force participation for women than that for men in post-reform China. Moreover, the reason behind this fact is somehow in line with the theory of Becker that increased female education could help to reduce the degree of discrimination they received in the labor market thus to enjoy a higher possibility of enter the labor market than men (Deng and Ding, 2012).

Third, similar to the education pattern, health human capital shows a significantly larger influence on women. For example, having a good health condition could increase the probability of joining in the labor force for women by 4.3 while it only increases the one for male by 2.3 percentage point. Again, being overweight and obese yet is not a significant determinant of male labor force participation status, while it has a significant but negative influence on female ones.

Fourth, women who are currently married are less likely to join in the labor force, while married men are more likely to join the labor force as shown in this table. On the one hand, this is in line with the pattern that been observed in Table 2.1 where there is a significant reduction in the labor force participation rate among women aged between 25 and 34 year-old over the last few decades, who are usually responsible for child-bearing, activities which often compel them to leave the labor market (Dasgupta, Matsumoto and Xia, 2015). Moreover, the lower labor force participation possibility for married women compared that to the unmarried one coincidence with the decline in institutional support to married women for childcare facilities (Liu, Zhang and Li, 2009). On the other hand, this is somehow also in line with the prevailing beliefs about women's social roles and especially resurrection of the traditional norms on work division between women and men (Fincher, 2014) during the post-reform period. In

addition, this is contrast to the pattern of US during 1980-2000 when the traditional division of labor between female and male is breaking down - women were less likely perceived as the secondary earners within their families and less likely to be affected by the income effect from their spouses. During that period the "labor supply elasticity" of American women declined significantly and the impact of increase in the wage level of husbands on the working hours of married women became significantly lower as well (Blau and Kahn, 2007). Overall, the finding shows that attitude on gender roles and the work division within the family can restrain female's labor force participation among those women from better educated despite the high opportunity cost. Moreover, another interesting finding we noticed in Table 5.2 is that women who are residing in western inland provinces enjoyed higher possibility of joining the labor market, more precisely, the possibility of being in the labor force is 8.2 per cent higher compared to a woman from middle of China. This is consistent with the previous findings on women from western inland region of China are much easier to be employed especially with a low-paid agricultural job, mainly due to the higher competitiveness of labor market in coastal region of China resulted from the higher wage level and fewer available agricultural job vacancies (Zhang and Guo, 2011; Wang and Zhou, 2014; Ma, Chen and Shi, 2018). Additionally, this is also in line with the survey conducted by the Ministry of Human Resources and Social Protection, Government of China in the year of 2015, that the ratio of number of job vacancies over number of female job applicants in the western, middle and coastal provinces of China are 1.16, 1.13 and 1.08 respectively.

Table 5.2 also reports an F-test of the joint significance of three social norms variables. The F-test statistic on the estimated coefficients for these norms variables is only significant and large for female sample not for the male sample. This again suggests that community social norm is a significant determinant of labor force participation decision for women only but not for men

Table 5.2: Probit Estimates of the Determinants of Labor Force Participation (Female vs. Male Sample)

	Female						Male					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Personal Characteristics												
Age	.073***	.077***	.076***	.076***	.078***	.080***	.016***	.016***	.016***	.016***	.016***	.016***
	(9.28)	(9.66)	(9.65)	(9.65)	(9.75)	(9.99)	(5.62)	(5.74)	(5.74)	(6.26)	(6.29)	(6.37)
Age square	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***
	(9.88)	(10.17)	(10.17)	(10.09)	(10.17)	(10.38)	(7.31)	(7.40)	(7.40)	(7.72)	(7.75)	(7.81)
Minority	-.031	-.028	-.028	-.032	-.029	-.028	.005	.005	.005	.004	.004	.005
	(1.27)	(1.14)	(1.14)	(1.31)	(1.18)	(1.11)	(0.43)	(0.46)	(0.47)	(0.39)	(0.42)	(0.51)
Non-agricultural *Hukou*	-.014	-.017	-.016	-.016	-.015	-.018	-.012	-.012	-.012	-.008	-.008	-.009
	(0.76)	(0.95)	(0.91)	(0.90)	(0.87)	(0.99)	(1.58)	(1.60)	(1.62)	(1.15)	(1.11)	(1.12)
Currently married	-.091***	-.083***	-.083***	-.087***	-.085***	-.088***	.041***	.042***	.041***	.028***	.027***	.028***
	(4.02)	(3.59)	(3.60)	(3.78)	(3.72)	(3.83)	(3.75)	(3.79)	(3.78)	(2.86)	(2.81)	(2.89)
Number of Children	.012	.012	.012	.013	.013	.012	.005	.005	.005	.004	.004	.004
	(1.27)	(1.26)	(1.26)	(1.29)	(1.30)	(1.26)	(1.33)	(1.38)	(1.37)	(1.08)	(1.13)	(1.16)
Schooling and cognitive skills												
Years of Education	.014***	.011***	.012***	.011***	.011***	.009***	.003***	.003***	.003***	.002**	.002**	.001*
	(6.95)	(5.52)	(5.58)	(5.35)	(5.23)	(4.11)	(3.44)	(3.09)	(3.05)	(2.04)	(2.06)	(1.76)
Good English Skill		.125***	.126***	.128***	.125***	.126***		.014	.014	.013	.012	.012
		(5.11)	(5.15)	(5.23)	(5.09)	(5.15)		(1.14)	(1.13)	(1.15)	(1.13)	(1.12)
Health Capital												

Height, in cm			-.002	-.002	-.002	-.002		-.001	-.001	-.001	-.001	
			(1.10)	(1.21)	(1.22)	(1.17)		(0.26)	(0.27)	(0.24)	(0.31)	
Self-reported Health Status:												
Bad				-.016	-.015	-.015			-.049***	-.049***	-.047***	
				(0.68)	(0.67)	(0.65)			(4.69)	(4.66)	(4.60)	
Good				.043**	.045***	.043**			.023***	.023***	.023***	
				(2.53)	(2.66)	(2.54)			(3.25)	(3.24)	(3.29)	
Body Mass Index (BMI):												
BMI<18.5, Underweight					.009	.011				-.009	-.009	
					(0.39)	(0.43)				(0.78)	(0.70)	
25≤BMI<30, Overweight					-.046**	-.046**				-.007	-.007	
					(2.45)	(2.45)				(1.06)	(1.03)	
BMI≥30, Obese					-.102*	-.103*				-.003	-.004	
					(1.74)	(1.76)				(0.20)	(0.24)	
Community Gender Norms												
Norm related to gender division in career and family						-.046***					.006	
						(2.83)					(0.96)	
Norm related to female workers dismissal						-.024*					.007	
						(1.39)					(1.21)	
Norm related to housework sharing						-.061***					.009	
						(3.69)					(1.68)	
Geographic Location												
Rural	.185***	.181***	.180***	.181***	.180***	.182***	.047***	.047***	.047***	.046***	.045***	.045***

	(10.52)	(10.35)	(10.32)	(10.32)	(10.29)	(10.35)	(6.22)	(6.14)	(6.15)	(6.45)	(6.36)	(6.45)
East of China	.039**	.031*	.032*	.029*	.033**	.029**	.013**	.013*	.013*	.008	.009	.008
	(2.42)	(1.92)	(1.95)	(1.77)	(1.98)	(1.79)	(2.01)	(1.94)	(1.90)	(1.30)	(1.35)	(1.31)
West of China	.087***	.086***	.085***	.089***	.086***	.082***	.004	.004	.004	.003	.003	.003
	(5.01)	(4.89)	(4.77)	(5.00)	(4.83)	(4.56)	(0.54)	(0.53)	(0.56)	(0.39)	(0.41)	(0.40)
N	3763	3755	3755	3748	3748	**3727**	3921	3916	3916	3915	3915	**3896**
F-test of joint significance: social norms variables						**25.72*****						5.08
Pseudo R2	0.0795	0.0868	0.0871	0.0904	0.0925	0.0985	0.2130	0.2139	0.2139	0.2470	0.2478	0.2523

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. Good English skill is a dummy variable which indicates whether the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level (=1) or not (=0); 6. For self-reported health status, the reference category is "in normal health condition"; 7. For Body Mass Index (BMI), the reference category is "normal, 18.5≤BMI<25"; 8. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"; 9. For regional dummies, the reference group is "middle area of China". 10. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 11. Robust standard errors are reported in parentheses.

However, it might be questioned that what we define as community-level social norms holds true only for a specific sub-group of women, such as married vs. unmarried, rich vs. low-income family. Which means our estimate of social norm only represent the norm within some specific groups. In order to test these possibilities, we report the additional results on heterogeneous effects of social norms among women by adding the interaction term of social norms with an individual's marital status (a dummy variable which takes a value of 1 if the individual is currently married and 0 otherwise), and social norms with household wealth (a dummy variable which takes a value of 1 if the family economic status of the individual was above the median community level when she was 14 years old and 0 otherwise) in the **Table 5.3**.

The first model of Table 5.3 as shown below is the specification (6) of Table 5.2 for female sample. Then the second model of Table 5.3 additionally includes three interaction terms of each community gender norm variable with the marital status dummy variable. It shows that none of these three interaction terms is significant, suggesting that social norms do not have any significant impact on determining the labor force participation decision for women who already got married. The third model of this table includes three interaction terms of each community gender norm variable with the household wealth dummy variable. Again, none of these three interaction terms is significant, indicating that social norms do not have any significant impact on determining the labor force participation decision for women who come from richer families.

Table 5.3: Probit Estimates of the Heterogeneous Effects of Social Norms

(Female Sample)

	(1)	(2)	(3)
Personal Characteristics			
Age	.080***	.080***	.080***
	(9.99)	(9.98)	(10.01)
Age square	-.001***	-.001***	-.001***
	(10.38)	(10.37)	(10.43)
Minority	-.028	-.027	-.032
	(1.11)	(1.09)	(1.30)
Non-agricultural *Hukou*	-.018	-.018	-.017
	(0.99)	(0.98)	(0.97)
Currently married	-.088***	-.109***	-.089***
	(3.83)	(2.67)	(3.88)
Number of Children	.012	.012	.012
	(1.26)	(1.31)	(1.19)
Schooling and cognitive skills			
Years of Education	.009***	.009***	.009***
	(4.11)	(4.10)	(3.98)
Good English Skill	.126***	.127***	.127***
	(5.15)	(5.19)	(5.14)
Health Capital			
Height, in cm	-.002	-.002	-.002
	(1.17)	(1.21)	(1.38)
Self-reported Health Status:			
Bad	-.015	-.013	-.014
	(0.65)	(0.55)	(0.64)
Good	.043**	.043**	.043**
	(2.54)	(2.58)	(2.57)
Body Mass Index (BMI):			
BMI<18.5, Underweight	.011	.011	.011
	(0.43)	(0.46)	(0.39)
25≤BMI<30, Overweight	-.046**	-.046**	-.044**
	(2.45)	(2.42)	(2.34)
BMI≥30, Obese	-.103*	-.103*	-.103*
	(1.76)	(1.77)	(1.74)
Community Gender Norms			
Norm related to gender division in career and family	-.046***	-.033**	-.036**
	(2.83)	(2.58)	(2.09)

Norm related to female workers dismissal	-.024*	-.134**	-.020**
	(1.39)	(2.22)	(2.34)
Norm related to housework sharing	-.061***	-.093**	-.055**
	(3.69)	(1.58)	(3.19)
Gender Norms*Marital Status (Currently Married)			
*Norm related to gender division in career and family*Currently Married*		.015	
		(0.26)	
*Norm related to female workers dismissal *Currently Married*		.099	
		(0.61)	
*Norm related to housework sharing*Currently Married*		.031	
		(0.55)	
Family Economic Status ("Wealth") during Adolescence			.059*
			(1.43)
Community Gender Norms*Wealth			
*Norm related to gender division in career and family*Wealth*			-.074
			(1.30)
*Norm related to female workers dismissal*Wealth*			-.037
			(0.61)
*Norm related to housework sharing*Wealth*			-.039
			(0.71)
Geographic Location			
Rural	.182***	.180***	.183***
	(10.35)	(10.32)	(10.41)
East of China	.029**	.029*	.034**
	(1.79)	(1.80)	(2.06)
West of China	.082***	.081***	.083***
	(4.56)	(4.51)	(4.61)
N	**3727**	3727	3727
Pseudo R2	0.0985	0.0995	0.1004

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"; 6. Marital status is defined as a dummy variable, which takes a value of 1 if the individual is currently married and 0 otherwise; 7. Household wealth is defined as a dummy variable, which takes a value of 1 if the family economic status of the individual was above the median community level when she was 14 years old and 0 otherwise; 8. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 9. Robust standard errors are reported in parentheses; 10. Model 1 of this table is the specification (6) as shown in Table 5.2 for female sample.

In addition, it might be questioned about the estimation of social norms is endogenous since it may capture some omitted individual-specific factors which can affect the labor force participation as well. For example, an exposure to a relatively modern gender norm before getting married (e.g. raised up by an employed mother) may also affect adult women's employment outcomes (McGinn, Castro and Lingo, 2016). Thus, we also control for mother's employment status and mother's education additionally in **Table 5.4**.

The first model of Table 5.4 as shown below is the specification (6) of Table 5.2 for female sample. Then the second model of Table 5.4 additionally includes the mother's employment status variable (a dummy variable which takes a value of 1 if the individual's mother was employed when the respondent was 14 years old, 0 otherwise). It shows that raised up by an employed mother is an insignificant determinant of female labor force participation. The third model of this table additionally includes mother's education variable (a dummy variable which takes a value of 1 if the individual's mother finished the primary school, 0 otherwise). Again, mother's education background does not affect female's labor force participation decision significantly. The insignificance of mother's employment status and education attainment on female respondent's labor force participation status is consistent with earlier studies from Fernandez, Fogli and Olivetti (2004) and Chen and Ge (2018). In summary, adding controls for mother's/family's background related factors does not change/wash out the effect of social norms on the labor force participation decision making among women significantly.

Table 5.4: Probit Estimates of Social Norms Effects on Women's Labor Force Participation, Accounting for Omitted Parental Backgrounds

	(1)	(2)	(3)
Personal Characteristics			
Age	.080***	.078***	.077***
	(9.99)	(9.75)	(9.50)
Age square	-.001***	-.001***	-.001***
	(10.38)	(10.12)	(9.92)
Minority	-.028	-.023	-.020
	(1.11)	(0.94)	(0.80)
Non-agricultural *Hukou*	-.018	-.008	-.006
	(0.99)	(0.46)	(0.35)
Currently married	-.088***	-.084***	-.082***
	(3.83)	(3.60)	(3.50)
Number of Children	.012	.009	.009
	(1.26)	(0.94)	(0.85)
Schooling and cognitive skills			
Years of Education	.009***	.009***	.009***
	(4.11)	(3.97)	(4.07)
Good English Skill	.126***	.122***	.122***
	(5.15)	(4.93)	(4.88)
Health Capital			
Height, in cm	-.002	-.002	-.002
	(1.17)	(1.06)	(1.24)
Self-reported Health Status:			
Bad	-.015	-.013	-.016
	(0.65)	(0.58)	(0.68)
Good	.043**	.046**	.044**
	(2.54)	(2.68)	(2.55)
Body Mass Index (BMI):			
BMI<18.5, Underweight	.011	.008	.008
	(0.43)	(0.33)	(0.33)
25≤BMI<30, Overweight	-.046**	-.044**	-.047**
	(2.45)	(2.32)	(2.53)
BMI≥30, Obese	-.103*	-.103*	-.103*
	(1.76)	(1.78)	(1.79)
Community Gender Norms			
Norm related to gender division in career and family	-.046***	-.047***	-.049***
	(2.83)	(2.90)	(2.99)

Norm related to female workers dismissal	-.024*	-.022*	-.026*
	(1.39)	(1.78)	(1.54)
Norm related to housework sharing	-.061***	-.063***	-.064***
	(3.69)	(3.81)	(3.79)
Mother Was Employed		.024	.025
		(1.48)	(1.47)
Mother Completed Primary Schooling			.023
			(1.45)
Geographic Location			
Rural	.182***	.179***	.178***
	(10.35)	(10.22)	(10.03)
East of China	.029**	.024**	.025**
	(1.79)	(1.48)	(1.47)
West of China	.082***	.076***	.074***
	(4.56)	(4.25)	(4.07)
N	**3727**	**3727**	**3727**
Pseudo R2	0.0985	0.1017	0.1013

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"; 6.Mother's employment status is defined as a dummy variable which takes a value of 1 if the individual's mother was employed when the respondent was 14 years old, 0 otherwise; 7. Mother's education variable is defined as a dummy variable which takes a value of 1 if the individual's mother completed the primary school, 0 otherwise; 8. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 9. Robust standard errors are reported in parentheses; 10. Model 1 of this table is the specification (6) as shown in Table 5.2 for female sample.

5.1.2 Decomposition Analysis on Gender Labor Force Participation Gap

Table 5.5 presents the results with the Oaxaca decomposition analysis. After extensive controls for personal endowments and additional controls for social norms, for the whole sample, the Oaxaca decomposition for non-linear model confirms that the gender gap in labor force participation in China is dominantly explained by gender behavioral differences which refers to the differential rewards/returns to demographic factors, human capital and social norms variables in labor force participation possibility between women and men (stands for the second term on the right-hand side of equation (4))– 117.17%. This unexplained percentage is quite high, previous studies on other Asian developing countries also found that the gap is dominantly explained by the behavioral differences between women and men, where the unexplained part accounted for more than 90 percent of the total gap in labor force participation (Abdulloev, Gang and Yu, 2014; Asadullah and Wahhaj, 2016).

The contribution of the explained part remains negative irrespective of which underlying regression model has been used. As explained by Jann (2018) that the negative contributions are acceptable, because this refers that the overall difference would even be larger if the average characteristics of women and men would be the same. Moreover, instead of looking at the sign of the contribution only, the changes/variation in the size of the contribution part after adding different controls across different specifications should be the focus of the analysis. For example, in the model 2, after we add controls for English language skill, this negative value becomes bigger which refers that the overall difference/gap would even be larger if English skill of women and men would be the same. As shown in **Appendix Table A**, the share of the female population who has good English language skill is much bigger than that of the male population. Therefore, if we eliminate this language advantage of women, they would be even worse off and, hence, the gender gap in labor force participation would

increase. Though equalizing the endowments between female and male may help to reduce this gender gap, it is not possible to be reduced substantially unless women are not treated with discrimination but are treated equally as men in the Chinese labor market.

Table 5.5: Oaxaca Decomposition of Gender Gap in Labor Force Participation

		(1)	(2)	(3)	(4)	(5)	(6)
Full Sample (N=7623)	**Explained** Variation (%)	-0.030(-18.40)	-0.031 (-19.02)	-0.029 (-17.79)	-0.029 (-17.79)	-0.029 (-17.79)	-0.028(-17.17)
Mean Difference=**0.163**	**Unexplained** Variation (%)	0.193(118.40)	0.194 (119.02)	0.192 (117.79)	0.192 (117.79)	0.192 (117.79)	0.191 (117.17)
Control for age, ethnicity, *hukou*, marital status, no. of children, education & location dummies		**Y**	Y	Y	Y	Y	Y
Control for language proficiency		N	**Y**	Y	Y	Y	Y
Control for height		N	N	**Y**	Y	Y	Y
Control for self-reported health status		N	N	N	**Y**	Y	Y
Control for BMI dummies		N	N	N	N	**Y**	Y
Control for Gender Norms		N	N	N	N	N	**Y**

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Results based on regression specifications used in Table 5.2.

Next, as we discussed in Chapter 4 that although Table 5.5 can show a decomposition analysis on the mean outcome differential for nonlinear regression models, it is not able to separate out the contributions of each single variable. Then we employed Power, Yoshioka and Yun's (2011) detailed nonlinear decomposition approach which allow us to figure out the contribution of each characteristic to the explained component and the unexplained part, the results are shown as below in Table 5.6.

Our findings confirm the role of education, language skill and health endowment difference between women and men in interpreting the explained part of the observed gender labor force participation gap in China. At the same time, our finding shows that three social norms variables together account for 41.36 percent of the unexplained portion of the female-male labor force participation difference. Besides, health endowments together account for 4.71 percent of this unexplained variation though not too much. Overall, our findings confirm the critical role of social norms in determining the labor force participation for women and the total female-male gap in labor force participation rate in China. Again, similar to what we noticed in Table 5.5 that the sign for some of the variables are negative in Table 5.6 as well, such as the English language skill one. As explained by Jann (2018) that the negative contributions are perfectly fine, because this refers that the explained part of the total gender labor force participation gap would increase if we eliminating the language advantage of women.

Table 5.6: Detailed Decomposition of Gender Gap in Labor Force Participation

	Explained Part (-0.028)		Unexplained Part (0.191)	
	Value	Percentage	Value	Percentage
Schooling and cognitive skills				
Years of Education	0.003***	**-10.71%**	-0.014	-7.33%
Good English Skill	-0.001***	**3.57%**	-0.004	-2.09%
Sub-total(education capital)		**-7.14%**		**0.00%**
Health Capital				
Height, in cm	0.005	17.86%	0.062	32.46%
Self-reported Health Status:				
Bad	0.002***	**-7.14%**	-0.009***	**-4.71%**
Good	0.003***	**-7.14%**	0.018*	**9.42%**
Body Mass Index (BMI):				
BMI<18.5, Underweight	0.001	-3.57%	-0.002	-10.47%
25≤BMI<30, Overweight	-0.001*	**3.57%**	0.001	0.52%
BMI≥30, Obese	-0.001**	**3.57%**	0.001	0.52%
Sub-total (health capital)		**-7.14%**		**4.71%**
Community Gender Norms				
Norm related to gender division in career and family	-0.001	3.57%	0.037**	**19.37%**
Norm related to female workers dismissal	-0.001	3.57%	0.001*	**0.52%**
Norm related to housework sharing	-0.002	-7.14%	0.041***	**21.47%**
Sub-total (social norms)		**0.00%**		**41.36%**
Sub-total (education + health + social norms)		**-14.28%**		**46.07%**

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Results based on regression specifications used in 5.2; 4. Estimates are based on procedure described in Powers, Yoshioka and Yun (2011); 5. Good English skill is a dummy variable which indicates whether the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level (=1) or not (=0); 6. For self-reported health status, the reference category is "in normal health condition"; 7. For Body Mass Index (BMI), the reference category is "normal, 18.5≤BMI<25"; 8. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"

5.1.3 Robustness Analysis

In this section, we test the robustness of the results presented in Section 5.1.1 and 5.1.2 in five ways. First of all, as we mentioned in Chapter 4 that by following the recoding method of Chen and Ge (2018) that we recode the answers of each statement on social norms and construct a binary index where answers with ‘‘neutral’’, ‘‘somewhat agree’’ and ‘‘total agree’’ are treated into ‘‘1’’, while answers with ‘‘totally disagree’’ and ‘‘somewhat disagree’’ are converted into ‘‘0’’, results are presented in above tables. Here, instead of going for a binary variable on gender norms questions, we include the answers for gender norms questions in a discrete form as shown in **Table 5.7**. As shown in Table 5.7, for column (1) is following the full specification of model (6) as shown in Table 5.1 for full sample, and for column (2) and (3) are following the full specification of model (6) as shown in Table 5.2 for female sample and male sample respectively, where we controlled for personal characteristics, schooling and cognitive skills, three proxies of health capital and geographic location variables. Here, in consistent with results of Table 5.1 and Table 5.2, our findings of Table 5.7 also shows that the social norms matters for female labor force participation decision only (significantly and negatively) while not for men, which means our conclusions are robust to using such a discrete format.

Table 5.7: Probit Estimates of the Determinants of Labor Force Participation, Including Community Gender Norms Variables in Discrete Form

	Full	Female	Male
Personal Characteristics			
Age	.047***	.081***	.016***
	(13.94)	(10.03)	(6.34)
Age square	-.001***	-.001***	-.001***
	(15.27)	(10.43)	(7.79)
Female	**-.203*** **		
	(18.08)		
Minority	-.011	-.029	.005
	(0.87)	(1.19)	(0.50)
Non-agricultural *Hukou*	-.012	-.017	-.007
	(1.33)	(0.99)	(1.10)
Currently married	-.015	-.087***	.028***
	(1.39)	(3.78)	(2.87)
Number of Children	.010**	.012	.004
	(2.25)	(1.29)	(1.18)
Schooling and cognitive skills			
Years of Education	.005***	.008***	.002**
	(4.85)	(3.85)	(1.86)
Good English Skill	.061***	.125***	.012
	(5.08)	(5.11)	(1.13)
Health Capital			
Height, in cm	-.001	-.002	-.001
	(0.63)	(1.27)	(0.27)
Self-reported Health Status:			
Bad	-.043***	-.013	-.048***
	(3.62)	(0.57)	(4.60)
Good	.033***	.046***	.023***
	(3.89)	(2.71)	(3.28)
Body Mass Index (BMI):			
BMI<18.5, Underweight	.002	.012	-.009
	(0.21)	(0.48)	(0.78)
25≤BMI<30, Overweight	-.022**	-.046**	-.006
	(2.42)	(2.43)	(1.00)
BMI≥30, Obese	-.039	-.099*	-.003
	(1.50)	(1.72)	(0.21)

Community Gender Norms			
Norm related to gender division in career and family	-.009***	-.019***	.001
	(2.88)	(3.29)	(0.52)
Norm related to female workers dismissal	-.003*	-.008*	.001
	(1.09)	(1.23)	(0.23)
Norm related to housework sharing	-.007**	-.025***	.003
	(2.08)	(3.79)	(1.26)
Geographic Location			
Rural	.104***	.181***	.045***
	(11.95)	(10.34)	(6.42)
East of China	.018**	.027*	.008
	(2.21)	(1.64)	(1.34)
West of China	.038***	.080***	.003
	(4.38)	(4.51)	(0.46)
N	7623	3727	3896
Pseudo R2	0.1896	0.0991	0.2507

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 6. Robust standard errors are reported in parentheses. 7. For column (1) is following the full specification of model (6) as shown in Table 5.1, for column (2) and (3) are following the full specification of model (6) as shown in Table 5.2 for female sample and male sample respectively; 8. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively in a discrete form (1, 2, 3, 4, 5): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally";

Secondly, we repeated the analysis by using an alternative index of gender norms instead of including three separate gender norms variables. Following Contreras and Plaza (2010), this aggregate index assigns a value of 1 if the individuals agree with all three attitudinal questions (corresponding to the three individual measures of gender norms) and 0 otherwise. As shown in **Table 5.8**, for column (1) is following the full specification of model (6) as shown in Table 5.1 for full sample, and for column (2) and (3) are following the full specification of model (6) as shown in Table 5.2 for female sample and male sample respectively, where we controlled for personal characteristics, schooling and cognitive skills, three proxies of health capital and geographic location

variables. In consistent with results of Table 5.1 and Table 5.2, that our findings from **Table 5.8** shows that the coefficient is significant and negatively signed in the full sample and female sub-sample but insignificant for males, which means our conclusions are robust to using such an aggregate index.

Table 5.8: Probit Estimates of the Determinants of Labor Force Participation, Using an Aggregate Community Gender Norms Index

	Full	Female	Male
Personal Characteristics			
Age	.047***	.077***	.016***
	(13.74)	(9.71)	(6.30)
Age square	-.001***	-.001***	-.001***
	(15.07)	(10.11)	(7.75)
Female	-.201***		
	(17.93)		
Minority	-.011	-.029	.004
	(0.90)	(1.21)	(0.42)
Non-agricultural *Hukou*	-.011	-.015	-.008
	(1.21)	(0.89)	(1.11)
Currently married	-.015	-.086***	.027***
	(1.40)	(3.75)	(2.79)
Number of Children	.010**	.013	.004
	(2.26)	(1.32)	(1.13)
Schooling and cognitive skills			
Years of Education	.005***	.011***	.002**
	(5.73)	(4.98)	(2.05)
Good English Skill	.061***	.126***	.012
	(5.10)	(5.11)	(1.13)
Health Capital			
Height, in cm	-.001	-.001	-.001
	(0.64)	(1.19)	(0.25)
Self-reported Health Status:			
Bad	-.042***	-.016	-.049***
	(3.59)	(0.70)	(4.66)

Good	.033***	.045***	.023***
	(3.89)	(2.67)	(3.25)
Body Mass Index (BMI):			
BMI<18.5, Underweight	.002	.010	-.009
	(0.20)	(0.41)	(0.77)
25≤BMI<30, Overweight	-.022**	-.047**	-.006
	(2.51)	(2.47)	(1.07)
BMI≥30, Obese	-.038	-.102*	-.007
	(1.45)	(1.75)	(1.07)
Community Gender Norms Index	-.023*	-.062**	.002
	(1.75)	(2.12)	(0.30)
Geographic Location			
Rural	.103***	.180***	.045***
	(11.90)	(10.30)	(6.36)
East of China	.019**	.033**	.008
	(2.42)	(2.00)	(1.34)
West of China	.039***	.085***	.003
	(4.56)	(4.82)	(0.39)
N	7623	3727	3896
Pseudo R2	0.1876	0.0936	0.2497

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 6. Robust standard errors are reported in parentheses. 7. For column (1) is following the full specification of model (6) as shown in Table 5.1, for column (2) and (3) are following the full specification of model (6) as shown in Table 5.2 for female sample and male sample respectively; 8. The aggregate index takes a value of 1 if the individuals agree with all three attitudinal questions (corresponding to the three individual measures of gender norms) and 0 otherwise.

Thirdly, in our analysis social norms are measured by three questions averaged at the community level. Therefore, we need to identify the effect of social norms in a more careful way to exclude other possible effects at the community level. A direct way to deal with or check for the possible confounding effects is to include more community variables Therefore we re-estimated the regression models by including two important community-level variables: average female schooling and average household income in the community; we take out index respondent from the community aggregate to avoid simultaneity bias. Here, female schooling level is the averaged years of education of women at the community level, and household wealth level is the averaged answers to the question on how is the household wealth level when the individual was 14 year-old (level 1 to 10) at the community level as we. Women who come from a community where has higher averaged education level would have higher possibility in joining the labor force, while those who come from a community where are relatively wealthier would have lower possibility in joining the labor force. **Table 5.9** shows that the community level female schooling exerts a statistically significant and positive influence on the dependent variable – participated in the labor force or not in last three weeks; average household income effect is insignificant for full sample. But the inclusion of these community variables still does not wash out the influence of our gender norm variables on labor force participation.

Table 5.9: Probit Estimates of the Determinants of Labor Force Participation, Additional controlling for Community Variables

	Full			Female			Male		
Personal Characteristics									
Age	.046***	.047***	.047***	.081***	.079***	.081***	.015***	.016***	.016***
	(13.90)	(13.94)	(13.92)	(10.04)	(9.96)	(10.04)	(6.30)	(6.36)	(6.29)
Age square	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***	-.001***
	(15.14)	(15.26)	(15.15)	(10.37)	(10.35)	(10.37)	(7.70)	(7.81)	(7.69)
Female	-.195***	-.202***	-.195***						
	(17.47)	(17.96)	(17.50)						
Minority	-.010	-.011	-.011	-.028	-.026	-.028	.006	.005	.006
	(0.82)	(0.80)	(0.84)	(1.15)	(1.05)	(1.14)	(0.59)	(0.50)	(0.62)
Non-agricultural *Hukou*	-.007	-.011	-.007	-.012	-.015	-.012	-.004	-.008	-.005
	(0.82)	(1.25)	(0.87)	(0.68)	(0.85)	(0.68)	(0.63)	(1.21)	(0.74)
Currently married	-.016	-.016	-.015	-.091***	-.089***	-.091***	.031***	.028***	.031***
	(1.43)	(1.47)	(1.41)	(4.00)	(3.89)	(4.00)	(3.14)	(2.88)	(3.17)
Number of Children	.007	.010**	.006	.007	.014	.006	.002	.004	.002
	(1.43)	(2.25)	(1.34)	(0.66)	(1.39)	(0.66)	(0.60)	(1.21)	(0.56)
Schooling and cognitive skills									
Years of Education	.007***	.005***	.008***	.014***	.009***	.013***	.002**	.001	.002**
	(6.79)	(5.07)	(6.78)	(5.86)	(4.38)	(5.86)	(2.58)	(1.64)	(2.48)
Good English Skill	.062***	.061***	.062***	.128***	.127***	.129***	.014	.011	.013
	(5.34)	(5.17)	(5.32)	(5.29)	(5.20)	(5.29)	(1.33)	(1.05)	(1.22)
Health Capital									

Height, in cm	-.001	-.001	-.001	-.001	-.001	-.001	.001	-.001	.001
	(0.14)	(0.51)	(0.20)	(0.89)	(0.98)	(0.88)	(0.15)	(0.37)	(0.10)
Self-reported Health Status:									
Bad	-.045***	-.044***	-.044***	-.018	-.016	-.019	-.048***	-.046***	-.046***
	(3.80)	(3.69)	(3.76)	(0.80)	(0.72)	(0.80)	(4.71)	(4.53)	(4.57)
Good	.033***	.033***	.033***	.044***	.043**	.044***	.022***	.023***	.022***
	(3.82)	(3.80)	(3.83)	(2.62)	(2.54)	(2.62)	(3.22)	(3.31)	(3.26)
Body Mass Index (BMI):									
BMI<18.5, Underweight	-.001	.002	-.001	.007	.009	.007	-.013	-.008	-.013
	(0.07)	(0.16)	(0.05)	(02.9)	(0.37)	(0.29)	(0.99)	(0.69)	(1.02)
25≤BMI<30, Overweight	-.021**	-.022**	-.021**	-.045**	-.046**	-.045**	-.005	-.007	-.005
	(2.35)	(2.45)	(2.35)	(2.39)	(2.46)	(2.39)	(0.86)	(1.06)	(0.88)
BMI≥30, Obese	-.035	-.039	-.034	-.096*	-.103*	-.095*	-.002	-.004	-.001
	(1.35)	(1.52)	(1.33)	(1.65)	(1.77)	(1.65)	(0.13)	(0.23)	(0.07)
Community Gender Norms									
Norm related to gender division in career and family	-.023***	-.022***	-.023***	-.046***	-.046***	-.046***	.006	.005	.005
	(2.84)	(2.77)	(2.84)	(2.84)	(2.81)	(2.84)	(1.00)	(0.87)	(0.12)
Norm related to female workers dismissal	-.014*	-.013*	-.014*	-.027	-.025	-.026	.008	.006	.007
	(1.75)	(1.56)	(1.72)	(1.58)	(1.48)	(1.59)	(1.32)	(1.13)	(1.26)
Norm related to housework sharing	-.015*	-.015*	-.015*	-.059***	-.060***	-.059***	.009	.009	.009
	(1.86)	(1.88)	(1.87)	(3.62)	(3.63)	(3.61)	(1.68)	(1.69)	(1.74)
Other Community Variables									
Female Schooling Level	.010***		.011***	.018***		.018***	.005***		.005***

	(5.53)		(5.53)	(4.69)		(4.33)	(3.52)		(4.13)
Household Wealth Level		-.004	-.004		-.018*	-.003		.005	.009**
		(0.85)	(0.90)		(1.85)	(0.33)		(1.46)	(2.53)
Geographic Location									
Rural	.079***	.100***	.080***	.140***	-.045***	.140***	.032***	.047***	.034***
	(8.17)	(11.17)	(8.25)	(7.10)	(2.80)	(7.05)	(4.21)	(6.48)	(4.50)
East of China	.027***	.021**	.025***	.044***	-.025	.044***	.013**	.006	.009
	(3.35)	(2.52)	(2.95)	(2.65)	(1.47)	(2.57)	(2.13)	(0.93)	(1.44)
West of China	.037***	.038***	.036***	.078***	-.059***	.078***	.002	.003	.002
	(4.20)	(4.40)	(4.12)	(4.39)	(3.59)	(4.38)	(0.34)	(0.38)	(0.28)
N	7623	7623	7623	3727	3727	3727	3896	3896	3896
Pseudo R2	0.1934	0.1900	0.1935	0.1040	0.0993	0.1040	0.2533	0.2534	0.2566

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"; 6. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 7. Robust standard errors are reported in parentheses; 8. For column (1) is following the full specification of model (6) as shown in Table 5.1, for column (2) and (3) are following the full specification of model (6) as shown in Table 5.2 for female sample and male sample respectively; 9. Community female schooling level is the averaged years of schooling of women at the community level; 10. Community household wealth level is the averaged answers to the question on how is the household wealth level when the individual was 14 year-old (level 1 to 10) at the community level.

Fourth, as we mentioned in Table 5.2 that instead of using the average answer for social norms in the community, we'd like also to test the role of social norms in determining labor force participation based on difference reference group (i.e. against women only and against men only in the community). Therefore, here we repeated the analysis using gender-specific measures of community-level social norms. As shown in in the following table, we include three gender norms variables against women only in the community together with three gender norms variables against men only in the community. The results are presented in **Table 5.10**. Reassuringly, the sign on all three social norms variables remains negative and significant but only for female sample only; men's attitude at the community level is not a significant determinant of their waged work participation decision. Findings here is in consistent with that of Table 5.2 that community gender norms only matters for women's labor force participation decision making but not for men, hence our results remain unchanged and are robust to different choices of the reference group.

Table 5.10: Probit Estimates of the Determinants of Labor Force Participation with Sex-specific Measure of Community Gender Norms

	Full	Female	Male
Personal Characteristics			
Age	.046***	.078***	.016***
	(13.52)	(9.77)	(6.07)
Age square	-.001***	-.001***	-.001***
	(14.82)	(10.19)	(7.49)
Female	-.197***		
	(17.66)		
Minority	-.011	-.030	.005
	(0.88)	(1.22)	(0.54)
Non-agricultural *Hukou*	-.009	-.013	-.007
	(1.04)	(0.74)	(1.00)
Currently married	-.014	-.085***	.027***
	(1.31)	(3.71)	(2.78)
Number of Children	.010**	.011	.004
	(2.20)	(1.09)	(1.34)
Schooling and cognitive skills			
Years of Education	.007***	.012***	.002**
	(6.19)	(5.55)	(2.16)
Good English Skill	.061***	.124***	.011
	(5.06)	(5.06)	(0.99)
Health Capital			
Height, in cm	-.001	-.002	-.001
	(0.47)	(1.11)	(0.04)
Self-reported Health Status:			
Bad	-.042***	-.017	-.047***
	(3.60)	(0.75)	(4.59)
Good	.033***	.045***	.023***
	(3.91)	(2.69)	(3.21)
Body Mass Index (BMI):			
BMI<18.5, Underweight	.002	.009	-.010
	(0.14)	(0.39)	(0.81)
25≤BMI<30, Overweight	-.022**	-.046**	-.007
	(2.45)	(2.47)	(1.04)
BMI≥30, Obese	-.038	-.103*	-.004
	(1.46)	(1.76)	(0.23)
Female Attitudes			

Gender division in career and family	-.011	-.001	.009
	(0.55)	(0.01)	(0.69)
Female worker dismissal	-.008	-.028	.008
	(0.44)	(0.71)	(0.56)
Housework sharing	-.029	-.087**	.013
	(1.44)	(2.12)	(0.83)
Male Attitudes			
Gender division in career and family	.005	-.041	.017
	(0.24)	(1.03)	(1.01)
Female worker dismissal	.034	-.078**	.001
	(1.93)	(2.22)	(0.08)
Housework sharing	.014	-.042	.001
	(0.82)	(1.23)	(0.07)
Geographic Location			
Rural	.099***	.172***	.044***
	(10.82)	(9.26)	(5.97)
East of China	.022***	.036**	.008
	(2.60)	(2.10)	(1.29)
West of China	.041***	.084***	.005
	(4.51)	(4.54)	(0.61)
N	7623	3727	3896
Pseudo R2	0.1875	0.0946	0.2476

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"; 6. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 7. Robust standard errors are reported in parentheses; 8. For column (1) is following the full specification of model (6) as shown in Table 5.1, for column (2) and (3) are following the full specification of model (6) as shown in Table 5.2 for female sample and male sample respectively.

Fifth, as we discussed in the introduction section and also in the Chapter 2 there was a declining labor force participation rate of women compared to men during the post-reform period. However, due to the data unavailability for other rounds, our analysis is only at a point in time with CGSS 2010 round and therefore does not per se explain the declining female labor force participation over time in China. As an alternative way to deal with this concern, we have nonetheless interacted those three social norm variables with the age of the respondent to approximate potential time effect as shown in **Table 5.11**. The results shows that the interaction term on ‘‘gender division on career and family * age’’ is positive and only significant for women, while neither those three social norms variables alone nor the interaction terms with age matters for men’s labor force participation decision. This confirms that the negative social norm effect is primarily driven by the younger (or more recent) cohort of Chinese women. Therefore, this finding is in line with the phenomenon that we introduced in the beginning of this thesis on the resurgence of attitudes supportive of traditional gender roles since 2007, partly resulting from a state-sponsored media campaign on those ‘‘leftover’’ women. This campaign only started within recent years and targeted for younger cohort of women who are still single around 27-year-old. Moreover, this finding can be used as an answer for the puzzle of declining female labor force supply and resurgent of gender labor force participation during the post-reform period. The larger decline in female labor force participation compared to the male one as discussed in Chapter 2 with statistics along the reform years is somehow related to the larger impact of social norms on female sample compared to the male one.

Table 5.11: Probit Estimates of the Determinants of Labor Force Participation with Additional Control for Interaction Terms between Norms & Respondent Age

	Full	Female	Male
Personal Characteristics			
Age	.047***	.079***	.016***
	(13.62)	(9.85)	(5.95)
Age square	-.001***	-.001***	-.001***
	(15.52)	(10.64)	(7.84)
Female	-.204***		
	(18.21)		
Minority	-.011	-.028	.005
	(0.84)	(1.12)	(0.51)
Non-agricultural *Hukou*	-.011	-.016	-.007
	(1.19)	(0.88)	(1.05)
Currently married	-.014	-.086***	.029***
	(1.30)	(3.74)	(2.96)
Number of Children	.010**	.012	.003
	(2.19)	(1.20)	(1.12)
Schooling and cognitive skills			
Years of Education	.005***	.009***	.001*
	(4.88)	(4.14)	(1.76)
Good English Skill	.061***	.125***	.012
	(5.06)	(5.08)	(1.13)
Health Capital			
Height, in cm	-.001	-.002	-.001
	(0.59)	(1.24)	(0.33)
Self-reported Health Status:			
Bad	-.042***	-.016	-.046***
	(3.59)	(0.69)	(4.54)
Good	.033***	.043**	.023***
	(3.82)	(2.53)	(3.32)
Body Mass Index (BMI):			
BMI<18.5, Underweight	.002	.009	-.008
	(0.12)	(0.38)	(0.69)
25≤BMI<30, Overweight	-.021**	-.046**	-.006
	(2.39)	(2.42)	(1.05)
BMI≥30, Obese	-.038	-.101*	-.003
	(1.45)	(2.66)	(0.17)
Community Gender Norms			

Norm related to gender division in career and family	-.087***	-.173***	.032
	(2.99)	(2.66)	(1.28)
Norm related to female workers dismissal	-.076*	-.151	.057
	(1.81)	(1.62)	(1.60)
Norm related to housework sharing	-.055	-.089	.017
	(1.44)	(1.06)	(0.64)
Interaction Terms			
*(Gender division in career and family)**Age	.002**	.004*	.001
	(2.42)	(2.10)	(1.11)
*(Female worker dismissal)**Age	.001	.003	.001
	(1.50)	(1.36)	(1.38)
*(Housework sharing)**Age	.008	.001	.001
	(1.06)	(0.35)	(0.29)
Geographic Location			
Rural	.103	.181***	.045***
	(11.96)	(10.33)	(6.47)
East of China	.018	.030*	.008
	(2.28)	(1.82)	(1.30)
West of China	.038	.081***	.003
	(4.37)	(4.54)	(0.39)
N	7623	3727	3896
Pseudo R2	0.1917	0.1004	0.2543

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Marginal effects are reported instead of coefficients; 4. Standard errors are corrected for clustering at the community level; 5. Three community gender norms variables - "gender division in career and family", "female workers dismissal", and "housework sharing" are defined as the community average of the individual respondent to the following statements respectively (1 if agreement with the statement; 0 if disagreement): (1) "Men should focus on career, whereas women should focus on family", (2) "During a recession, female workers should be dismissed first", (3) "Housework should not be shared by couples equally"; 6. The dependent variable is a dummy variable which takes a value of 1 if an individual participated in the labor force in last three weeks and 0 otherwise; 7. Robust standard errors are reported in parentheses; 8. For column (1) is following the full specification of model (6) as shown in Table 5.1, for column (2) and (3) are following the full specification of model (6) as shown in Table 5.2 for female sample and male sample respectively.

5.2 Results and Discussion for Analysis on Gender Earnings Gap

In this section, findings for analysis on the determinants of earnings, and decomposition of the gender earnings gap based on the methodology introduced in Section 4.2 will be discussed.

5.2.1 Determinants of Earnings

In this section, we first present the results on the determinants of monthly wage based on the standard Mincerian earnings function which is subsequently augmented in a step-wise manner for full sample in **Table 5.12** with an OLS estimates. Table 5.12 presents the findings across five different models; the first model includes the female dummy variable, personal demographics, education and location dummy variables as well to control for differences in wage rate across geographic areas. Then each of the followed regressions incorporates additional explanatory variables - language proficiency, height, self-reported health status, BMI dummies and occupational dummies. As we mentioned earlier on in the last chapter, since CGSS does not provide information on the individual's specification occupation, therefore we controlled for the employment sector dummies (instead of occupational dummies, and taking employed with an agricultural job as the reference group) in the last specification of Table 5.12 as a crude test of occupational segregation as another explanation for the observed gender earnings gap in China. Then, following the specifications of Table 5.12, results for the gender specific sub-samples are presented in **Table 5.13.**The total sample size of CGSS 2010 is 11,783, while after restrict to the female sample into 25-55 year-old, and male sample into 25-60 year-old, the sample size becomes 7781. After excluding missing cases for labor market participation information (used to identify having a waged work or not) and monthly wages information, the sample size reduce to 4238. Then, sample size becomes 4232 (as shown in first specification) after including minority variable, hukou variable, marital status variable, number of children variable, education variable,

urban/rural location variable, and regional location variable. Next, the full sample size reduce to 4226, 4226, 4223, 4223 and **4223** (as shown in fifth specification) after excluding missing cases for language skills variable, height variable, self-reported health variable, BMI variable, and occupation sector variables.

Three patterns follow from out from analysis in **Table 5.12** and **Table 5.13**. First of all, consistent with literatures for both developed countries (see e.g. Subramanian and Kawachi, 2004; Case and Paxson, 2008; Case et al., 2009; Heineck, 2005, 2008) and developing countries (see e.g. Scultz, 2002, Dinda et al., 2006) that health capital affects the wages in China significantly. Our results with the OLS estimates for the full sample shows that an increase of one centimeter in height could bring a 1.2 percent increase in wages, and this result is quite close to recent findings in other studies on height premium for China. For example, Gao and Smyth (2010) confirmed the height-wage premium in China with the 2005 China Urban Labour Survey data for the first time. More, precisely, they found that the return to height in for male and female labor is 1.14 percent and 0.89 percent respectively in urban China. In our study, the height premium for female and male is very close, 1.5 percent and 1.1 percent respectively as shown in Table 5.13. According to the data from the urban and rural sample of CHNS 2006 round, Elu and Price's (2013) findings on the rate of returns to height is quite close to our study, 1.1 percent, for China. Besides the height-wage premium, we also found that being good health status has a significantly positive impact on earnings and this estimates here is similar to Zhang's (2011) and Fang et al.'s (2012) studies on China. Where, we noticed that being obese only matters for women's wage significantly.

Secondly, our findings suggests a clear relationship between language proficiency and wages, where people with good English speaking and listening skill enjoyed 26.2 percent higher of wages than those who do not have good skill. This positive earnings

premium obtained owing to cognitive skills (i.e. English language proficiency level) is in line with previous studies from the developed economies (e.g. Dustmann and Van Soest, 2002; Leslie and Lindley, 2001; Shields and Price, 2002; Dustmann and Fabbri, 2003; Bleakley and Chin, 2004) and other developing countries (e.g. Lang and Siniver, 2009; Paolo and Tansel, 2013; Azam, Chin and Prakash, 2013). Moreover, comparing to returns to other kind of skills, the rate of returns to foreign language skill is extremely high (Sakellariou, 2013; Deming, 2017). And this is also true for China, for example, according to data from China Adult Literacy Survey (CALS), Giles et al. (2003) documented a 9.3-11.4 percent high rate of return to the literacy skills of the adult (which cover for the knowledge of vernacular knowledge) for Chinese from the urban locations. However, one of the earlier researches that Mishra and Smyth (2015) found that English language skills is not statistically nor significantly related to wages in China with OLS estimates. This is probably because the dataset employed by Mishra and Smyth (2015) is for manufacturing sector only from Minhang district in Shanghai. Their total number of observations – 628 samples is employed with manufacturing companies from industries including food processing, paper and paper products, textile wearing apparel, footwear and caps, furniture and so on, which mostly don't require for good English language skills. Additionally, as presented in Table 5.13 that our analysis also shows that having good English skill has larger contribution to female workers' wages when compared with that to male's.

Thirdly, the role of education on wages in China is still significant and positive even we account for various measures of health capital and language proficiency. The rate of returns to schooling varies within a range between 9.3 percent and 7.4 percent in the full sample. In this paper, our estimate with OLS method is close to what has been documented in earlier studies of China which ranges between 7 and 10 percent (see e.g. Chen and Hamori, 2009; Mishra and Smyth, 2015). Moreover, as shown in Table 5.13,

one additional year of schooling could increase the wage for female sample by 7.8 percent, while for male sample by 7.3 percent. Which suggest that women enjoys a higher rate of return to education than men in the post-reform China with the CGSS 2010 data, in line with what have been confirmed by earlier literatures with the data from China as well (Wang, 2013; Mishra and Smyth, 2015).

Fourth, the individual with a non-agricultural job enjoyed a significantly higher level of salary than those agricultural job holders. As shown in Table 5.12, for example, the average salary of State-owned enterprises' employees 46.3 percent higher than that of agricultural workers. Moreover, as shown in Table 5.13, the positive impact of being employed with a State-owned enterprise on women's monthly earnings is larger than that on men's monthly earnings. However, as we discussed in Chapter 4 on figure presented in the Appendix Table B, there are less women employed with SOE than men (19.1 percent of women employed with SOE vs. 21.4 percent of men employed with SOE) but more women employed with an low-paid agricultural job than men (43.0 percent of women employed with an agricultural job vs. 35.1 percent of men employed with an agricultural job).

Fifth, Table 5.12 shows that by taking "middle of China" as the reference group, "east of China" has a significant positive influence on one's wages while "west of China" is an insignificant determinant of wages. This suggests that residents from east of China (costal area) enjoyed higher level of wages than those from inland provinces. On the one hand, this is in line with our descriptive statistics as presented in Appendix Table B that the monthly employment income of east (i.e. coastal) provinces is 2631.394 RMB, while that of middle provinces and western provinces are 1003.746 RMB and 1061.152 RMB respectively. On the other hand, findings on this regional dummy is consistent with previous studies which found that employees from coastal provinces had relatively

higher wages, and they also concluded that the sizeable portion of the observed gap on earnings between coastal area and inland area is mostly due to the relatively faster economic growth rate and larger capital inflow from foreign companies into the coastal region during the economic reform period, and also due to the inadequate mobility of labor between inland-coastal regions (e.g. Kanbur and Zhang, 2009). As commented by many previous studies (e.g. Knight and Xue, 2006; Knight and Yueh, 2009), during the post-reform period, urban workers were still facing some institutional obstacles for cross-region mobilization while the regional mobility of migrant workers who are originally from rural places has improved significantly along the period. Additionally we noticed in Table 5.13 that being employed in the coastal area has significantly larger impact on men's wages than that on women, which is again in line with the pattern as presented in Appendix Table B that the difference in wages between women and men in the coastal region (677.586 RMB) is relatively larger than other regions (middle of China: 389.123 RMB, west of China: 442.955 RMB).

Table 5.12: OLS Estimate on the Determinants of Earnings (Full Sample)

	(1)	(2)	(3)	(4)	(5)
Personal Characteristics					
Age	.039***	.048***	.049***	.051***	.050***
	(3.17)	(3.89)	(4.02)	(4.14)	(4.09)
Age square	-.001***	-.001***	-.001***	-.001***	-.001***
	(4.22)	(4.84)	(4.87)	(4.84)	(4.68)
Female	-.402***	-.415***	-.275***	-.265***	-.266***
	(15.59)	(16.12)	(7.84)	(7.60)	(7.73)
Minority	.001	.005	.009	-.009	-.001
	(0.02)	(0.11)	(0.22)	(0.22)	(0.03)
Non-agricultural *Hukou*	.205***	.194***	.175***	.175***	.097***
	(5.64)	(5.37)	(4.83)	(4.86)	(2.68)
Currently married	.044	.067	.064	.040	.051
	(1.06)	(1.61)	(1.55)	(0.97)	(1.26)
Schooling and cognitive skills					
Years of Education	.093***	.086***	.084***	.082***	.074***
	(24.59)	(22.05)	(21.73)	(21.13)	(19.13)
Good English Skill		.297***	.288***	.289***	.262***
		(6.72)	(6.54)	(6.60)	(6.02)
Health Capital					
Height, in cm			.014***	.013***	.012***
			(5.88)	(5.58)	(5.48)
Self-reported Health Status:					
Bad				-.173***	-.143***
				(3.85)	(3.24)
Good				.111***	.113***
				(3.58)	(3.71)
Body Mass Index (BMI):					
BMI<18.5, Underweight					-.059
					(1.23)
25≤BMI<30, Overweight					.003
					(0.10)
BMI≥30, Obese					-.147*
					(1.72)
Occupation					
State Owned Enterprise					.463***
					(11.31)
Collectively Owned Enterprise					.257***
					(4.32)

Privately Owned Enterprise					.333***
					(9.28)
Hong Kong, Macau or Taiwan Funded Enterprise					.556***
					(3.13)
Foreign Funded Enterprise					.823***
					(7.48)
Geographic Location					
Rural	-.411***	-.413***	-.413***	-.404***	-.276***
	(11.34)	(11.47)	(11.51)	(11.32)	(7.48)
East of China	.407***	.390***	.379***	.373***	.315***
	(13.07)	(12.57)	(12.24)	(12.12)	(10.23)
West of China	-.063**	-.066**	-.049	-.031	-.022
	(1.96)	(2.08)	(1.53)	(0.96)	(0.70)
Constant	5.500***	5.322***	2.974***	3.014***	2.941***
	(21.49)	(20.80)	(6.38)	(6.39)	(6.32)
N	4232	4226	4226	4223	4223
Adj R-squared	0.4984	0.5034	0.5073	0.5135	0.5316

Note: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Good English skill is a dummy variable which indicates whether the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level (=1) or not (=0); 4. For self-reported health status, the reference category is 'in normal health condition'; 5. For Body Mass Index (BMI), the reference category is 'normal, 18.5≤BMI<25'; 6. For regional dummies, the reference group is 'middle area of China'; 7. For occupation, the reference group is 'employed with an agricultural job'; 8. For regional dummies, the reference group is "middle area of China"; 9. The dependent variable is the monthly wage in log term; 10. Robust standard errors are reported in parentheses.

Table 5.13: OLS Estimate on the Determinants of Earnings (Female vs. Male Sample)

	Female					Male				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Personal Characteristics										
Age	.029	.045**	.048**	.045**	.045**	.035**	.040**	.042***	.043***	.041***
	(1.28)	(1.96)	(2.09)	(1.98)	(2.00)	(2.21)	(2.55)	(2.69)	(2.77)	(2.65)
Age square	-.000	-.001**	-.001**	-.001**	-.001*	-.001***	-.001***	-.001***	-.001***	-.001***
	(1.55)	(2.13)	(2.21)	(2.00)	(1.91)	(3.28)	(3.57)	(3.64)	(3.62)	(3.42)
Minority	.023	.027	.022	-.012	-.012	-.018	-.015	-.004	-.012	.001
	(0.36)	(0.43)	(0.35)	(0.19)	(0.21)	(0.31)	(0.25)	(0.07)	(0.21)	(0.02)
Non-agricultural *Hukou*	.261***	.242***	.229***	.226***	.135**	.165***	.159***	.138***	.139***	.067
	(4.69)	(4.40)	(4.17)	(4.14)	(2.46)	(3.42)	(3.32)	(2.88)	(2.89)	(1.38)
Currently married	-.074	-.041	-.029	-.059	-.069	.146***	.161***	.152***	.130**	.149***
	(1.11)	(0.62)	(0.45)	(0.91)	(1.09)	(2.67)	(2.95)	(2.79)	(2.39)	(2.77)
Schooling and cognitive skills										
Years of Education	.098***	.089***	.088***	.084***	.078***	.087***	.082***	.080***	.079***	.073***
	(17.64)	(15.62)	(15.35)	(5.97)	(13.06)	(16.53)	(15.09)	(14.77)	(14.61)	(13.41)
Good English Skill		.384***	.377***	.377***	.299***		.213***	.203***	.205***	.203***
		(6.02)	(5.92)	(5.97)	(4.72)		(3.49)	(3.34)	(3.38)	(3.38)
Health Capital										
Height, in cm			.016***	.015***	.015***			.012***	.011***	.011***
			(4.12)	(3.90)	(4.00)			(4.19)	(3.90)	(3.69)
Self-reported Health Status:										

Bad	-.211***	-.206***	-.141**	-.100
	(3.22)	(3.21)	(2.25)	(1.63)
Good	.120***	.119***	.103**	.106***
	(2.56)	(2.61)	(2.52)	(2.62)
Body Mass Index (BMI):				
BMI<18.5, Underweight		-.019		-.128*
		(0.31)		(1.67)
25≤BMI<30, Overweight		-.049		.031
		(0.94)		(0.80)
BMI≥30, Obese		-.415**		-.067
		(2.45)		(0.67)
Occupation				
State Owned Enterprise		.586***		.392***
		(8.68)		(7.56)
Collectively Owned Enterprise		.326***		.219***
		(3.47)		(2.83)
Privately Owned Enterprise		.378***		.315***
		(6.39)		(6.89)
Hong Kong, Macau or Taiwan Funded Enterprise		.404***		.587***
		(1.27)		(2.74)
Foreign Funded Enterprise		.973***		.712***
		(6.35)		(4.45)
Geographic Location				

Rural	-.372***	-.379***	-.385***	-.366***	-.193***	-.434***	-.435***	-.432***	-.429***	-.320***
	(6.69)	(6.89)	(7.02)	(6.69)	(3.34)	(9.08)	(9.11)	(9.09)	(9.07)	(6.61)
East of China	.366***	.346***	.342***	.327***	.262***	.438***	.425***	.410***	.409***	.355***
	(7.67)	(7.30)	(7.25)	(6.97)	(5.61)	(10.69)	(10.35)	(9.99)	(10.02)	(8.67)
West of China	-.046	-.049	-.030	-.003	.003	-.071*	-.074*	-.059	-.046	-.035
	(0.92)	(1.01)	(0.60)	(0.07)	(0.06)	(1.68)	(1.77)	(1.40)	(1.09)	(0.83)
Constant	5.213***	4.888***	2.305***	2.460***	2.283***	5.642***	5.537***	3.407***	3.462***	3.463***
	(11.38)	(10.72)	(2.98)	(3.20)	(3.03)	(17.18)	(16.83)	(5.64)	(5.73)	(5.80)
N	1802	1799	1799	1797	1797	2430	2427	2427	2426	2426
Adj R-squared	0.5097	0.5187	0.5230	0.5312	0.5547	0.4598	0.4625	0.4662	0.4707	0.4872

Note: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Good English skill is a dummy variable which indicates whether the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level (=1) or not (=0); 4. For self-reported health status, the reference category is 'in normal health condition'; 5. For Body Mass Index (BMI), the reference category is 'normal, 18.5≤BMI<25'; 6. For regional dummies, the reference group is 'middle area of China'; 7. For occupation, the reference group is 'employed with an agricultural job'; 8. For regional dummies, the reference group is "middle area of China"; 9. The dependent variable is the monthly wage in log term; 10. Robust standard errors are reported in parentheses.

5.2.2 Decomposition Analysis on Gender Earnings Gap

In this section, we breakdowns the observed pay gap into the component with Oaxaca decomposition analysis (with OLS estimates) as reported in **Table 5.14** for the full sample and six sub-samples (urban vs. rural, coastal vs. non-coastal, pre vs. post-higher education expansion cohort) based on the five specifications as shown in Table 5.13.

First of all, for the full sample, there is a significant change in the size of explained part of the gap across five specifications along when we adding control for different education and health capital variables. Same as OLS regression on the determinants of earnings as shown in Table 5.12 and Table 5.13, here Oaxaca analysis highlight the gender difference in 'health human capital' as an critical source for the explanation of growing gender difference in earnings in China. As we can see from Table 5.14, adding control for height in the earnings function in column 3, reduces the estimated unexplained component in Oaxaca analysis by more than 30 percentage points (from 100% in column 2 to 66% in column 3). And adding control for self-assessed health condition in the earnings function in column 4, reduces the estimated unexplained component in Oaxaca analysis for another 3 percent points (from 66% in column 3 to 63% in column 4).

Secondly, we did not find any evidence to show that the gender-specific differences in endowments can be an exclusive driver of this observed gender wage gap. Even after extensive controls for demographic characteristics (age, marital status), *hukou* (household registration status), ethnicity, education capital and health capital, occupational segregation and location, we still find that 64% of the gender earnings gap remains unexplained as shown in column 5 for the full sample. In the meanwhile, results of the column 5 as presented for other six sub-samples shows that the estimate of the

unexplained portion of the earnings gap is even larger in urban locations (84.98%), coastal area (98.09%) and pre-higher education expansion cohort (63.30%). The size of the unexplained portion in urban area, 84.98%, stemmed from our CGSS 2010 dataset is extremely close to a very recent study from Heshmati and Su (2015) which used the Chinese Family Panel studies 2009 data and found that the 85.1-87.1 percent of the gender gap in earnings in the urban labor market is due to discrimination effect. Moreover, this comparatively larger portion of unexplained part is also consistent with Blau and Kahn's (2017) recent review on the gender wage gap literatures that the labor market discrimination effect continues to be an important contributor to the observed gender wage gap by 2010, while human capital variables taken together explained only litter bit of it, while the labor market discrimination continues to be important.

Thirdly, we also noticed that, consistent with Sakallariou (2013), although cognitive skill (i.e. good English skill) plays a critical role in labor market success, control for cognitive skills seems not able to bring in any significant difference to the estimate of the unexplained part of the gap compared to when cognitive skills are not controlled for (column 2 vs column 1). Additionally, we also explore the impact of social norms on explaining the gender wage gaps here. As shown in Appendix Table E, similar to the findings of the Section 5.1 on gender gap in labor force participation, social norms only matters for women's wages (significantly and negatively) while not for men's. And we found that including the community social norms variables only reduce the explained portion of the gender earnings gap very slightly, from 36.145 per cent (without controls for social norms) to 35.969 per cent (with controls for social norms) for the full sample as shown in Appendix Table F. This is somehow in consistent with findings of Fortin (2005), using data from the World Value Surveys in 1990, 1995, and 1999, and found that anti-egalitarian gender role attitudes has a negative impact on female employment rate and slightly associated with the gender pay gap in 25 OECD countries.

Table 5.14: Oaxaca Decomposition of Gender Gap in Earnings

		(1)	(2)	(3)	(4)	(5)
Full Sample (N=4223)	**Explained** Variation (%)	0.012 (**2.892**)	0.000 (**0.000**)	0.141 (**33.976**)	0.150 (**36.145**)	0.150 (**36.145**)
	Unexplained Variation (%)	0.403 (97.108)	0.415 (100.000)	0.274 (66.024)	0.265 (63.855)	0.265 (63.855)
Mean Difference=0.415						
Urban Sample (N=2288)	**Explained** Variation (%)	-0.025 (**-7.082**)	-0.031 (**-8.782**)	0.065 (**18.414**)	0.065 (**52.163**)	0.053 (**15.014**)
	Unexplained Variation (%)	0.378 (107.082)	0.384 (108.782)	0.288 (81.586)	0.288 (47.837)	0.300 (84.986)
Mean Difference=0.353						
Rural Sample (N=1935)	**Explained** Variation (%)	-0.020 (**-4.000**)	-0.026 (**-5.200**)	0.145 (**29.000**)	0.162 (**32.400**)	0.191 (**38.200**)
	Unexplained Variation (%)	0.520 (104.000)	0.526 (105.200)	0.355 (71.000)	0.338 (67.600)	0.309 (61.800)
Mean Difference=0.500						
Eastern (i.e. coastal) Provinces (N=1586)	**Explained** Variation (%)	-0.055 (**-14.986**)	-0.065 (**-17.711**)	0.019 (**5.177**)	0.014 (**3.815**)	0.007 (**1.907**)
	Unexplained Variation (%)	0.422 (114.986)	0.432 (117.711)	0.348 (94.823)	0.353 (96.185)	0.360 (98.093)
Mean Difference=0.367						
Non-coastal provinces (N=2637)	**Explained** Variation (%)	0.045 (**9.978**)	0.039 (**8.647**)	0.203 (**45.011**)	0.213 (**47.228**)	0.209 (**46.341**)
	Unexplained Variation (%)	0.406 (90.022)	0.412 (91.353)	0.248 (54.989)	0.238 (52.772)	0.242 (53.659)
Mean Difference=0.451						
Pre-Higher Education Expansion Cohort (N=3766)	**Explained** Variation (%)	0.030 (**6.881**)	0.017 (**3.899**)	0.149 (**34.174**)	0.158 (**36.239**)	0.160 (**36.697**)
	Unexplained Variation (%)	0.406 (93.119)	0.419 (96.101)	0.287 (65.826)	0.278 (63.761)	0.276 (63.303)
Mean Difference=0.436						
Post-Higher Education Expansion Cohort (N=457)	**Explained** Variation (%)	-0.016 (**-4.734**)	-0.025 (**-7.396**)	0.229 (**67.751**)	0.235 (**69.527**)	0.190 (**56.213**)
	Unexplained Variation (%)	0.354 (104.734)	0.363 (107.396)	0.109 (32.249)	0.103 (30.473)	0.148 (43.787)
Mean Difference=0.338						
Control for age, ethnicity, *hukou*, marital status& education		Y	Y	Y	Y	Y
Control for language proficiency		N	**Y**	Y	Y	Y
Control for height		N	N	**Y**	Y	Y
Control for self-reported health status		N	N	N	**Y**	Y
Control for BMI dummies		N	N	N	N	**Y**
Control for Occupation		N	N	N	N	**Y**
Control for Location		Y	Y	Y	Y	**Y**

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. Reimer weights is used for decomposition analysis as mentioned in Chapter 4; 3. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Results based on regression specifications used in Table 5.13; 4. Pre-higher education expansion cohort indicates individual who was older than 18-year old in 1999, while post-higher education expansion cohort indicates individual who was at or younger than 18-year old in 1999.

As we discussed in Chapter 4, in order to figure out the contribution of gender difference in each factor, especially that in education and health capital in explaining the above calculated explained component and the unexplained component of the observed gap in earnings between female and male labor, we applied the detailed decomposition analysis by following the method developed by Jann (2008) **Table 5.15**. Results of this table confirmed the role of education and health endowment difference between women and men in interpreting the explained part of the observed gender earnings gap in China.

On the one hand, **Table 5.15** shows that the characteristics impact of education factor is significantly positive for the full sample (where men enjoyed longer years of schooling than women in China as shown in **Appendix Table A** and **Appendix Table B**, which means that if the gender difference in educational attainment disappears (i.e. if women could enjoy the same length of schooling as men), the explained gender pay gap can be reduced. While the characteristics effect of educational attainment is not significantly positive for the urban sample, post-higher education expansion cohort and coastal sample where women enjoyed similar even longer averaged schooling than men[31]. In total, gender gap in educational attainment and language skills together accounts for 30.66% of the explained gender wage gap for full sample, and for 11.08% of the total gender wage gap.

On the other hand, gender differences in different types of health capital are also significant contributor to the explained gender pay gap. Especially the gender gap in height became the main driver of this explained part in the full sample and all sub-samples. **Table 5.15** suggests that the male-female height gap alone accounts for 84% of the explained gender wage gap for the full sample, and accounts for 164.15%,

[31] Years of schooling for women and men for urban sample, post-higher education expansion cohort and coastal sample are 12.01 vs. 12.01; 12.66 vs. 12.43; and 11.66 vs. 11.60 respectively.

74.35%, 1371.42%, 61.72%, 71.87% and 129.47% for the explained gender wage gap in urban, rural, coastal, non-coastal, pre and post-higher education expansion age cohorts respectively. Therefore, reducing the gender height gap matters more for narrowing the explained gender pay gap in the urban area, post-expansion cohort and coastal China. However, differences in these factors do not have significant explanatory power for the unexplained part of the observed gender earnings gap for the full sample and all six sub-samples as well as shown in Table 5.15.

Table 5.15: Detailed Decomposition of Gender Earnings Gap

	Full		Urban		Rural		Coastal		Non-coastal		Pre-expansion		Post-expansion	
	Value	Percentage (%)	Value	Percentage (%)	Value	Percentage (%)	Value	Percentage (%)	Value	Percentage (%)	Value	Percentage (%)	Value	Percentage (%)
						Explained Part of the Gender Earnings Gap								
Schooling and cognitive skills														
Years of Education	0.054***	36.000	-0.002	-3.774	0.047***	24.607	-0.006	-85.714	0.074***	35.407	0.067***	41.875	-0.020	-10.526
Good English Skill	-0.008***	-5.333	-0.008**	-15.094	-0.002	-1.047	-0.013**	-185.714	-0.003*	-1.435	-0.007**	-4.375	-0.011	-5.789
Sub-total(education capital)		**30.667**		**-15.094**		**24.607**		**-185.714**		**33.972**		**37.500**		**0.000**
Health Capital														
Height, in cm	0.126***	84.000	0.087***	164.151	0.142***	74.346	0.096**	1371.429	0.129***	61.722	0.115***	71.875	0.246***	129.474
Self-reported Health Status:														
Bad	0.006**	4.000	-0.001	-1.887	0.007	3.665	-0.007*	-100.000	0.009*	4.306	0.006**	3.750	0.001	0.526
Good	0.006**	4.000	0.001	1.887	0.018***	9.424	0.001	14.286	0.013***	6.220	0.007***	4.375	-0.001	-0.526
Body Mass Index (BMI):														
BMI<18.5, Underweight	0.003	2.000	0.004	7.547	0.001	0.524	0.003	42.857	0.004	1.914	0.002	1.250	0.018	9.474
25≤BMI<30, Overweight	0.001	0.667	-0.003	-5.660	-0.001	-0.524	-0.017***	-242.857	0.005**	2.392	0.001	0.625	-0.009	-4.737
BMI≥30, Obese	-0.002	-1.333	-0.005*	-9.434	0.001	0.524	-0.007*	-100.000	-0.001	-0.478	-0.002	-1.250	-0.001	-0.526
Sub-total (health capital)		**92.000**		**154.717**		**83.770**		**928.572**		**74.640**		**80.000**		**129.474**
Sub-total (education + health)		**122.667**		**139.623**		**108.377**		**742.858**		**108.612**		**117.500**		**129.474**
						Unexplained Part of the Gender Earnings Gap								
Schooling and cognitive skills														
Years of Education	-0.014	-5.28	-0.197	-65.667	0.022	7.120	-0.126	-35.000	0.014	5.785	0.001	0.362	-0.244	-164.865
Good English Skill	-0.011	-4.15	-0.021	-7.000	0.010**	3.236	-0.009	-2.500	-0.003	-1.240	-0.008	-2.899	-0.038	-25.676
Sub-total (education capital)		**0.000**		**0.000**		**3.236**		**0.000**		**0.000**		**0.000**		**0.000**
Health Capital														
Height, in cm	-0.682	-257.360	0.077	25.667	-0.915	-296.117	-0.034	-9.444	-0.938	-387.603	-0.865	-313.406	1.451	980.405

Self-reported Health Status:														
Bad	0.013	4.910	0.026**	8.667	-0.022	-7.120	0.020	5.556	0.008	3.306	0.016	5.797	-0.009	-6.081
Good	-0.009	-3.400	0.032	10.667	-0.097	-31.392	0.050	13.889	-0.056	-23.140	-0.015	-5.435	0.004	2.703
Body Mass Index (BMI):														
BMI<18.5, Underweight	-0.007	-2.640	-0.003	-1.000	-0.014	-4.531	-0.009	-2.500	-0.006	-2.479	-0.006	-2.174	-0.019	-12.838
25≤BMI<30, Overweight	0.014	5.280	0.005	1.667	0.018	5.825	0.028	7.778	0.009	3.719	0.018	6.522	-0.013	-8.784
BMI≥30, Obese	0.005	1.890	0.004	1.333	0.005	1.618	0.012*	3.333	0.001	0.413	0.006	2.174	-0.001	-0.676
Sub-total (health capital)		**0.000**		**8.667**		**0.000**		**3.333**		**0.000**		**0.000**		**0.000**
Sub-total (education + health)		**0.000**		**8.667**		**3.236**		**3.333**		**0.000**		**0.000**		**0.000**

Notes: 1. Data is from the Chinese General Social Survey (CGSS); Reimer weights is used for decomposition analysis as mentioned in Chapter 4; 3. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 4. Results based on regression specifications used in Table 5.13; 5. Good English skill is a dummy variable which indicates whether the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level (=1) or not (=0); 6. For self-reported health status, the reference category is "in normal health condition"; 6. For Body Mass Index (BMI), the reference category is "normal, 18.5≤BMI<25"; 7. Pre-higher education expansion cohort indicates individual who was older than 18-year old in 1999, while post-higher education expansion cohort indicates individual who was at or younger than 18-year old in 1999.

5.2.3 Robustness Analysis

As we discussed in Chapter 4, we also expand the Blinder-Oaxaca method to address a common methodological problem that may lead to a biased OLS estimate. This is because, if the participation in the labor market is not random, i.e. selection into the labor force is due to some individual unobservables, which also has an impact in determining one's wages, then our OLS estimates as shown in Section 5.2.2 would be biased which refers to the estimation of female-male wage gap would suffer sample selection bias. Precisely, the gender wage gap would be underestimated if there is a positive selection, while the gender wage gap would be overestimated if there is a negative selection. Therefore, in order to address this sample selection issue - to account for the possible issue of non-random selection into labor force, we employed Heckman (1979) two-steps method in this study. In the first stage which is a Probit estimate of labor force participation decision as shown in Appendix Table G, we employed non-labor income variables (non-labor income from bequest, lease of land together with sales of property) as excluded variables by following earlier studies (e.g. Duraisamy, 2002) to identify the sample selection issue which is presented by lambda term (as shown in the bottom of **Table 5.16**). Having large number of non-labor income is likely to reduce the possibility of joining the labor market but unlikely to have a direct impact on wages. Moreover, besides the non-labor income, we also included number of children as an additional identifying variable which is excluded from the first stage of Heckman two-step approach to account for an importance choices lies between joining the labor market and not joining the labor market especially for female sample.

As we also discussed in Chapter 4 as well, besides the sample selection issue, the endogeneity of schooling variable is another methodological problem that needs to be concerned in the analysis of this part. In order to address this problem, previous studies on the economic returns to education with data from developed and developing

economies including China applied the instrumental variable (IV) method. Mainly, two types of IV estimates have been employed: (a) experimental and (b) non-experimental. Earlier experimental studies used different kind of institutional changes including variation on the minimum age before withdraw from the school (e.g. Harmon and Walker, 1995) that led to exogenous changes in schooling variable. Earlier non-experimental studies also used variables such as the background of the family (Li and Luo, 2004), the education level of the parents (Heckman and Li, 2004; Mishra and Smyth, 2013) and the education level of the spouse (Chen and Hamori, 2009; Mishra and Smyth, 2013; Gao and Smyth, 2015) as excluded IVs for schooling variable in China and other nations as well (e.g. Trostel et al., 2002).

Therefore, apart from the OLS and Heckman estimates, we also applied the two-stage least squares (2SLS) estimates of equation (1) together with the implementation of the Oaxaca method. In this thesis we used whether the individual's father and mother passed away when the individual was 14-year-old and education background of the parents (i.e. father's education and mother's education) as three excluded instruments for schooling completed. We assume that the timing of parents' death is not directly related to the inherent abilities of their children while still can affect their education's level especially after their adolescent period. Lastly, it should be noted that the existing literature on estimating returns to education in China that utilized parental education as instrument variables have often done so only for a sub-sample - only if the respondents' parents are also presented in the same household, therefore the instruments become available (Wang, 2013). Since the CGSS asked all respondents related questions about their parental background in the retrospective manner, our data/study does not suffer from this problem. The result of the first stage of 2SLS estimates is also presented in Appendix Table G.Results for checking the sensitivity of the gender gap estimates in order to correct for these two econometric problems are presented in **Table 5.16**.On the

one hand, we find no evidence to suggest the existence of sample selection bias in our analysis on determinants of earnings in China for full and six sub-samples (results for six sub-samples are available in Appendix Table H) with the Heckman estimates since the lambda term is not significant in any of these samples as shown in the bottom of Table 5.16 and Appendix Table H as well.

On the other hand, the estimated gender earning gap doesn't change significantly after our re-estimation with IV method, even though IV estimates of the rate of returns yield higher record (14.9 percent) than OLS return (7.4 percent) that consistent with existing Chinese studies (e.g. Li and Luo, 2004; Fleisher et al., 2005; Gao and Smyth, 2015; Mishra and Smyth, 2015). And we also found that female employees enjoyed higher rate of returns to education (15.9 percent) compared to male employees (13.3 percent) with IV method as international findings (e.g. Mishra and Smyth, 2013; Wang, 2013).

Therefore, our above findings on Oaxaca decomposition of gender pay gap with OLS method are robust to correction for sample selection bias with Heckman selection correction approach and for endogeneity bias of schooling attainment with 2SLS regression approach as well.

Table 5.16: Robustness Check of the Estimated Gender Earnings Gap (for full, female and male sample)

	Full			Female			Male		
	OLS	**Heckman**	**IV**	**OLS**	**Heckman**	**IV**	**OLS**	**Heckman**	**IV**
Personal Characteristics									
Age	.050***	.050***	.057***	.045**	-.008	.062**	.041***	.058***	.040**
	(4.09)	(2.97)	(4.46)	(2.00)	(0.14)	(2.53)	(2.65)	(3.06)	(2.53)
Age square	-.001***	-.001***	-.001***	-.001*	.001	-.001**	-.001***	-.001***	-.001***
	(4.68)	(3.28)	(4.57)	(1.91)	(0.21)	(2.13)	(3.42)	(3.68)	(2.93)
Female	-.266***	-.260***	-.218***						
	(7.73)	(4.67)	(5.75)						
Minority	-.001	-.020	.008	-.012	-.046	.008	.001	-.001	.005
	(0.03)	(0.48)	(0.19)	(0.21)	(0.70)	(0.12)	(0.02)	(0.02)	(0.09)
Non-agricultural *Hukou*	.097***	.117***	-.068	.135**	.180***	-.072	.067	.059	-.058
	(2.68)	(3.02)	(1.35)	(2.46)	(3.08)	(0.92)	(1.38)	(1.16)	(0.87)
Currently married	.051	.055	.053	-.069	.016	-.013	.149***	.178***	.119**
	(1.26)	(1.29)	(1.23)	(1.09)	(0.18)	(0.19)	(2.77)	(3.00)	(2.09)
Schooling and cognitive skills									
Years of Education	.074***	.072***	.149***	.074***	.064***	.159***	.073***	.075***	.133***
	(19.13)	(16.13)	(9.48)	(13.06)	(6.62)	(7.12)	(13.41)	(12.63)	(5.87)
Good English Skill	.262***	.234***	.068	.299***	.159	.102	.203***	.199***	.043
	(6.02)	(4.61)	(1.12)	(4.72)	(1.42)	(1.20)	(3.38)	(3.09)	(0.51)
Health Capital									
Height, in cm	.012***	.012***	.011***	.015***	.015***	.012***	.011***	.012***	.009***
	(5.48)	(5.48)	(4.40)	(4.00)	(3.88)	(2.86)	(3.69)	(3.89)	(2.95)

Self-reported Health Status:									
Bad	-.143***	-.123***	-.069	-.206***	-.148**	-.127*	-.100	-.158**	-.053
	(3.24)	(2.58)	(1.42)	(3.21)	(2.14)	(1.72)	(1.63)	(2.24)	(0.82)
Good	.113***	.107***	.117***	.119***	.105**	.111**	.106***	.115***	.119***
	(3.71)	(3.30)	(3.63)	(2.61)	(1.97)	(2.24)	(2.62)	(2.63)	(2.83)
Body Mass Index (BMI):									
BMI<18.5, Underweight	-.059	-.050	-.039	-.019	.000	.032	-.128*	-.142*	-.121
	(1.23)	(1.01)	(0.77)	(0.31)	(0.00)	(0.46)	(1.67)	(1.80)	(1.51)
25≤BMI<30, Overweight	.003	.003	-.012	-.049	.-.016	-.038	.031	.025	-.006
	(0.10)	(0.11)	(0.36)	(0.94)	(0.25)	(0.68)	(0.80)	(0.63)	(0.14)
BMI≥30, Obese	-.147*	-.115	-.092	-.415**	-.287	-.320*	-.067	-.029	-.040
	(1.72)	(1.28)	(1.02)	(2.45)	(1.50)	(1.74)	(0.67)	(0.27)	(0.39)
Occupation									
State Owned Enterprise	.463***	.483***	.322***	.586***	.608***	.383***	.392***	.411***	.304***
	(11.31)	(11.39)	(6.20)	(8.68)	(8.74)	(4.33)	(7.56)	(7.68)	(4.73)
Collectively Owned Enterprise	.257***	.262***	.150**	.326***	.351***	.199*	.219***	.217***	.144*
	(4.32)	(4.27)	(2.26)	(3.47)	(3.69)	(1.85)	(2.83)	(2.70)	(1.72)
Privately Owned Enterprise	.333***	.353***	.311***	.378***	.045***	.325***	.315***	.332***	.320***
	(9.28)	(9.50)	(8.14)	(6.39)	(6.63)	(5.06)	(6.89)	(7.06)	(6.74)
Hong Kong, Macau or Taiwan Funded Enterprise	.556***	.506***	.419**	.404	.314	.234	.587***	.542**	.479**
	(3.13)	(2.65)	(2.25)	(1.27)	(0.92)	(0.69)	(2.74)	(2.36)	(2.16)
Foreign Funded Enterprise	.823***	.809***	.693***	.973***	.974***	.786**	.712***	.683***	.654***
	(7.48)	(7.00)	(5.85)	(6.35)	(6.08)	(4.60)	(4.45)	(4.04)	(3.97)
Geographic Location									

Rural	-.276***	-.295***	-.159***	-.193***	-.365**	-.029	-.320***	-.285***	-.249***
	(7.48)	(5.55)	(3.45)	(3.34)	(2.39)	(0.39)	(6.61)	(4.82)	(4.29)
East of China	.315***	.307***	.274***	.262***	.234***	.203***	.355***	.352***	.327***
	(10.23)	(9.45)	(8.08)	(5.61)	(4.49)	(3.81)	(8.67)	(8.16)	(7.48)
West of China	-.022	-.007	.021	.003	-.013	.054	-.035	-.027	-.002
	(0.70)	(0.22)	(0.60)	(0.06)	(0.20)	(0.99)	(0.83)	(0.61)	(0.04)
Constant	2.941***	2.867***	2.259***	2.283***	3.366***	1.504*	3.463***	2.892***	3.125***
	(6.32)	(5.19)	(4.48)	(3.03)	(2.62)	(1.81)	(5.80)	(4.24)	(5.02)
N	4223	4223	4223	1797	1797	1797	2426	2426	2426
Adj R-squared	0.5316			0.5547			0.4872		
Lambda		-.050			-.426			.295	
		(0.38)			(1.30)			(1.61)	

Note: 1. Data is from the Chinese General Social Survey (CGSS); 2. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Good English skill is a dummy variable which indicates whether the English skill (including speaking and listening) of the respondent is at/above the standard proficiency level (=1) or not (=0); 4. For self-reported health status, the reference category is 'in normal health condition'; 5. For Body Mass Index (BMI), the reference category is 'normal, 18.5≤BMI<25'; 6. For regional dummies, the reference group is 'middle area of China'; 7. For occupation, the reference group is 'employed with an agricultural job'; 8. The dependent variable is the monthly wage in log term; 9. Robust standard errors are reported in parentheses; 10. OLS specification doesn't control for father's and mother's education as there two variables along with early parental death are used as excluded instruments in IV model; 11. Heckman estimates of wage regression here use non-labor income, including income received from bequest, land leasing, and sales of property and number of children as excluded identifying variables.

As we discussed in Chapter 4, existing studies on gender earnings gap shows some variation in the results based on different choices of weighting index. Therefore, in this thesis, we also look into the variation of the explained portion and unexplained portion of the gender wage gap by using Reimers weights, female weights, and together with male weights as shown in Table 5.17 as robustness test. Our findings are consistent with results of existing studies on China, where the discrimination component of the total gap by following the Reimers method is larger than that by using the male weights, but is smaller than that by using the female weights (e.g. Liu et al., 2000; Chen and Hamori, 2008). For instance, Liu et al. (2000) found that discrimination portion accounted for 88 per cent of the total gap by using male weights, for 93 per cent of it by using the female weights and for 90 per cent of it by using the Reimers method. Similarly, Chen and Hamori (2008) found that the discrimination component to be 75 per cent by following the Reimers method, and decreased to 70 per cent by using the male weights. As shown in Table 5.17, the discrimination portion with Reimers method is 63.855 per cent, which is larger than 59.326 per cent with male weights, and smaller than 67.102 per cent with female weights for the full sample. Additionally, this pattern applies to the remaining six sub-samples as well.

Table 5.17: Oaxaca Decomposition of Gender Gap in Earnings with Different Weighting Index

		Male Weights	Reimers	Female Weights
Full Sample (N=4223)	**Explained** Variation (%)	0.169 (40.674)	0.150 (36.145)	0.137 (32.898)
	Unexplained Variation (%)	0.246 (**59.326**)	0.265 (**63.855**)	0.278 (**67.102**)
Mean Difference=0.415				
Urban Sample (N=2288)	**Explained** Variation (%)	0.077 (21.656)	0.053 (15.014)	0.038 (10.573)
	Unexplained Variation (%)	0.276 (**78.344**)	0.300 (**84.986**)	0.315 (**89.427**)
Mean Difference=0.353				
Rural Sample (N=1935)	**Explained** Variation (%)	0.207 (41.291)	0.191 (38.200)	0185 (36.945)
	Unexplained Variation (%)	0.293 (**58.709**)	0.309 (**61.800**)	0.315 (**63.055**)
Mean Difference=0.500				
Eastern (i.e. coastal) Provinces (N=1586)	**Explained** Variation (%)	0.025 (6.739)	0.007 (1.907)	0.001 (0.183)
	Unexplained Variation (%)	0.342 (**93.261**)	0.360 (**98.093**)	0.366 (**99.817**)
Mean Difference=0.367				
Non-coastal provinces (N=2637)	**Explained** Variation (%)	0.222 (49.217)	0.209 (46.341)	0.207 (45.879)
	Unexplained Variation (%)	0.229 (**50.783**)	0.242 (**53.659**)	0.244 (**54.121**)
Mean Difference=0.451				
Pre-Higher Education Expansion Cohort (N=3766)	**Explained** Variation (%)	0.192 (43.892)	0.160 (36.697)	0.134 (30.635)
	Unexplained Variation (%)	0.244 (**56.108**)	0.276 (**63.303**)	0.302 (**69.365**)
Mean Difference=0.436				
Post-Higher Education Expansion Cohort (N=457)	**Explained** Variation (%)	0.208 (61.504)	0.190 (56.213)	0.182 (53.572)
	Unexplained Variation (%)	0.130 (**38.496**)	0.148 (**43.787**)	0.156 (**46.428**)
Mean Difference=0.338				
Control for age, ethnicity, *hukou*, marital status& education		Y	Y	Y
Control for language proficiency		Y	Y	Y
Control for height		Y	Y	Y
Control for self-reported health status		Y	Y	Y
Control for BMI dummies		Y	Y	Y
Control for Occupation		Y	Y	Y
Control for Location		Y	Y	Y

Notes: 1. Data is from the Chinese General Social Survey (CGSS); 2. Three weighting indexes – Reimer, Female and Male weightings are used for decomposition analysis; 3. *, ** and *** indicate significance at the 10%, 5% and 1% levels respectively; 3. Results based on regression specifications used in Table 5.13; 4. Pre-higher education expansion cohort indicates individual who was older than 18-year old in 1999, while post-higher education expansion cohort indicates individual who was at or younger than 18-year old in 1999.

5.3 Summary of Results on Gender Gaps in Labor Force Participation and Earnings

In the above two sections, we did extensive analysis on determinants of labor force participation, sources of gender labor force participation gap, determinants of earnings, and sources of gender earnings gap as well in post-reform China with CGSS 2010 data, a series of robustness tests have been conducted as well.

Key findings for the first part analysis on the gender labor force participation gap can be summarized as below: 1) our probit model estimates show that women with high education, good English skills, better health condition and living in a community with egalitarian attitude on gender roles enjoyed higher labor force participation possibility; 2) the gender-wise analysis shows that community social norms towards women's work and family responsibility only matters for female labor force participation decision, not for men; 3) the estimated gender differentials of labor force participation possibility between females and males is 0.16, and this gap remains significantly unexplained even after extensive controls for health and other personal endowment differences. Which means it is dominantly driven by the difference in returns to characteristics (i.e. discrimination effect) not by productive endowment (i.e. endowment effect); 4) gender norms has been confirmed as a key determinant of women's labor force participation, explaining almost half (i.e. 48.46%) of the total gender gap.

Key findings for the first part analysis on the gender earnings gap can be summarized as below: 1) the estimated gender earnings gap in China is 0.41; 2) decomposition analysis reveals that the wage gap is not driven by gender-specific gaps in endowments but by differences in returns to these endowments -- 64% of the gap remains unexplained even after holding differences in social, demographic and human capital endowment difference; 3) detailed decomposition analysis confirmed that the differences in educational attainment, language skill and various health capital are the

main driver of the explained part of gender wage gap in China. The female-male height gap alone accounts for 84% of the explained part of gender earnings gap, 30.36% of the conditional wage gap while these female-male education and health gaps do not have explanatory power for the unexplained part of the observed earnings differentials between women and men; 4) these findings are robust to correction for sample selection bias and endogeneity bias in the schooling variable.

Based on these findings from analysis of gender gaps in labor force participation and earnings, policy suggestions will be discussed in the next Chapter, together with the limitation of the study.

CHAPTER 6: CONCLUSION

6.1 Conclusion of Findings

Despite dramatic economic development, poverty reduction, significant efforts in achieving gender equity in the workplace, decline in occupational gender segregation and improvement in female schooling and literacy, China has experienced a declining labor force participation rate of women and widening gender disparity in labor force participation and earnings as well over the post-reform period. The widening gender gaps in these two labor market indicators (i.e. labor force participation and earnings) have received significant attention from researchers; many of them have explored reasons for the puzzle of declining female labor supply and the resurgent of gender labor force participation gap and gender earnings gap along the post-reform years. However, the existing studies suffer from some limitations. First of all, none of these former studies has simultaneously considered health human capital and cognitive skill as explanatory variables during the analysis on influencing factors that determine the participation in labor market. Secondly, research on the contribution of social norms/attitude on gender roles in explaining the female labor force participation and gender gap in labor force participation in China is quite limited, while there was a paradoxical change in social and gender identity norms during the period of rapid socio-economic transformation. Thirdly, similar to the first limitation, none of existing literature on the gender wage differentials in the developing world (including China) has investigated the role of two important aspects of workers' endowments, i.e. health capital and language skills.

Therefore, this thesis adds to the existing literatures by addressing two previously under-researched factors - health endowment and cognitive skill in the analysis of earnings gap between women and men, together with another earlier ignored factor –

community social norms towards women's outside work and family responsibility in the analysis of labor force participation gap between women and men in the Chinese labor market during the post-reform period.

We do so by employing the Chinese General Social Survey (CGSS) 2010 round dataset, which is representative of post-reform rural and urban China, to answer research questions as listed in Section 1.2.First of all, analysis with modified Blinder-Oaxaca decomposition for non-linear models shows that the estimated size of gender gap in labor force participation possibility is 0.16. Secondly, gender-wise analysis shows that language skills and community social norms towards women's work and family responsibility only matters for female labor force participation, and health capital has larger impact on female labor force participation possibility than that on the male sample. Moreover, that 0.16, is predominately driven by the gender differential returns to characteristics (i.e. unexplained part), detailed decomposition further shows that community social norms accounted for 41.36% of the unexplained gender labor force participation gap while the endowment differences only explained small portion of the explained gender gap (e.g. English language skill accounted for 3.57% of the explained part). Thirdly, Blinder-Oaxaca decomposition shows that the estimated size of gender gap in earnings is 0.41. Fourth, detailed decomposition analysis confirms that the gender differences in human capital (i.e. education attainment, language skill) and variables health capital are the main driver of the explained part of the gender earnings gap in China, accounted for 30.67% and 92.00% of the explained part of gender earnings gap respectively, however female-male differences in education and health endowments have no explanatory power for the unexplained part of the gap. Additionally, these findings are robust to a series of tests including the correction for sample selection bias and endogeneity bias in the schooling variable.

6.2 Policy Implications

Above findings suggest that despite various reforms measures introduced during China's economic transition to a market-oriented one since the 1990s, women still face hidden barriers that cause labor market disadvantages compared to men with similar qualification and skills. Some changes in future policies might be helpful to address the gender gap in these two labor market indicators in China.

First of all, since cognitive skills which is proxied by English language skill only matters for female labor force participation decision (but not for men), and English language skill has larger impact on earnings for female sample than that for male sample, additionally language skills together with other education endowments account for significant portion of the explained part of the two gaps, policies or practices which can further improve the language proficiency level of women therefore to maintain/enlarge the advantaged position of women in language skills would be helpful. Advantage in English language skill would be able to increase the labor force participation rate and wage rate of Chinese women and then to narrow the gender gaps in these two indicators during the post-reform period. Interventions such as offering more language education opportunities or some language education subsidiary for women before entering the labor market or providing on-job language training quotas for women would be helpful and favored.

Secondly, besides the significant difference in health capitals as shown in Appendix Table A and Appendix Table B with CGSS data, previous studies also confirmed the gender health gap in China. For example, Gao and Yao (2006) and Song and Bian (2014) both confirmed the gender gap in health inputs such as hospital admission, medial expense, duration of hospitalization and access to health care and Zhang, D'Uva and Van Doorslaer (2015) recorded a clear gender gap in health indicators in China. Since

health capital has larger impact on the labor force participation and earnings for women than that for men, and gender health gap accounted for a large portion of the explained part of the gender earnings gap (e.g. female-male height gap along takes up 84 percent of the explained part of the gap), policies which can narrow gender gap in pre-market health status through improving access to health facilities and medical care for women, or interventions such as improving nutritions for girls during childhood period would be likely to narrow the gender gap in labor market earnings in China.

Thirdly, the policy with a focus on social norms might be more effective to narrow the current gender gap in labor force participation rate in China significantly, since the gender norms have been confirmed as a key determinant of women's labor force participation and also explained around half of the total gender gap. Policies which can promote favorable attitudes towards female employment especially during the time of economic crisis, and reform initiatives which can shift entrenched social norms towards women's household work and care responsibilities would be useful to improve women's overall labor force participation in post-reform China. Interventions such as enhancing the role of assets (female ownership of assets would help to increase the decision-making power, it's also associated with lower possibility of domestic violence, and women's better economic position would help them to challenge the social norms on gender roles within the household and also the society) , increasing the political mobilization (political representation would help to shift the social norms related to women's capacity in leadership at the workplace), improving the accessibility to information (exposure to effectives of female leaders or less gender stereotypical opinions through cable televisions would help to change the gender norms related to marriage, fertility and gender-based mobility), continuously increasing education opportunities (education is significantly associated with greater power in family and labor market participation's decision making) for women would be helpful to shift

social practices and norms towards equality between women and men not only in the labor market but also in the whole society based on previous evidences from developing countries (World Bank, 2012).

6.3 Limitations of Study

Several limitations of this thesis will be discussed in this section.

First of all, during the post-reform period, gender inequality increased together with general inequality due to market mechanisms revealing the value of endowments and reflecting the societal preferences and norms. However, in this thesis we only focused on examining the mean size of female-male difference in terms of labor force participation and earnings, the gender gaps across the general income distribution are not been explored yet. Further studies looking at the sources of female-male gaps in labor market outcomes in different quintiles are recommended to proceed, it would be helpful to figure out specific conclusions and relevant polices to address the problems of general inequality in post-reform China.

Secondly, as mentioned in the literature review chapter, previous studies found that economic restructuring (downsizing effect of State-owned enterprises, diminishing availability of publicly-funded childcare centers, and decline in co-residence across generations resulted from the one child policy affected female labor force participation significantly. However, due to the data unavailability in CGSS, this thesis is unable to test these factors as potential sources for gender gaps in labor force participation.

Thirdly, as mentioned in the introduction and literature review chapter, labor force participation was declining and gender gaps in labor force participation and earrings were expanding over the last few decades. Again, because of no comparable CGSS data from pre-reform era and other rounds, our analysis is only at a point of time with CGSS

2010 and therefore we are unable to show how did the labor force participation rate really changed, and how did the gender gaps in labor force participation and earnings really changed as well across different rounds of data. Alternatively, we deal with this concern by interacted social norms variables with the age of the respondent to approximate potential time effect as shown in Table 5.11. And we found that the negative social norm effect is primarily driven by the younger (or more recent) cohort of Chinese women.

Fourth, as we mentioned in methodology chapter, CGSS does not provide detailed information on the individual's specific occupation, so we are only able to carry a crude test of occupational segregation as another explanation for the observed gender earnings gap in China by controlling for the employment sector dummies. In this way, we are not able to have a clear test for the segregation hypothesis in this thesis due to the unavailability of disaggregated data on occupation.

Above are the limitations of this study, researchers on these fields could be carried in the future to contribute to the literatures on gender gaps in the labor market of China and developing countries as well.

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