Higher Education Expansion in China and its Impacts on the Labor Market Outcomes of College Graduates

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Submitted in partial fulfillment of the requirements

for the degree of Master of Development Economics

at

Dalhousie University
Halifax, Nova Scotia
April 2014

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Abstract

In 1999, the Chinese government launched a higher education expansion policy. Between 1998 and 1999, the number of new students enrolled in colleges increased by 40%. The expansion continued for several years. By 2006, the number of new students enrolled in colleges increased to 5.5 million, which was 5 times that in 1998. Using the 1997 and 2006 waves of the China Health and Nutrition Survey, the paper studies the effects of the expansion policy on labor market outcomes of young college graduates. Treating the expansion policy as a natural experiment and using a difference-in-difference strategy, my research results suggest that the expansion policy causes the unemployment of young college graduates to increase by 8.7 percent, the full-time employment rate to decrease by 21 percent, and the average monthly earnings to decrease by 104.07 Yuan, equivalent to 18.35 Canadian dollars.

List of Abbreviations Used

CHNS	China Health and Nutrition Survey
UNC	University of North Carolina
OECD	Organization for Economic Co-operation and Development
DID	Difference in Difference
OLS	Ordinary Least Squares

Chapter 1 Introduction

Education is one of the basic and crucial factors of development. Investment in human capital is necessary for a country to achieve long-run sustainable development. Education not only improves quality of life and gives people a better understanding of the world, but also advances social, economic, and technological development (Ozturk, 2001). Education expansion is one of the most important features in developing countries, which provides more skilled labor to meet social, economic, and technological development. China, the most rapidly developing country in world, has undergone transformational education policy reforms in the past 50 years. The Chinese Government emphasizes the importance of higher education in promoting economic development, and considers the higher education expansion as an important factor in developing China through science and education (Zhao and Sheng, 2008). Since the Chinese economic reform initiated in 1978, China's scale of higher education has expanded. Nevertheless, the expansion in the 1980s and 1990s was much more limited than that in 1999 and after. In 1999, the Chinese government decided to accelerate the expansion of higher education. As a consequence, the number of new students admitted to college increased by over 40%, from about 1.1 million in 1998 to 1.6 million in 1999 (Xing and Whalley, n.d.). In subsequent years, the expansion continued to increase by an average of 0.5 million new students a year. By 2006, the number of new college students reached 5.5 million, which was 5 times that in 1998 (Zhao and Sheng, 2008).

However, along with the educational expansion, there has been an increase in the unemployment rate of college graduates which has led to concerns in China. In 2003, when the 1999 college cohort entered the labor market, about 750,000 college graduates could not find a job. The situation did not improve thereafter even though China experienced huge economic growth after 2003. In 2005, the number of college graduates who were unemployed after graduation increased to 1.2 million. In 2007, one fifth of college graduates were unemployed after graduation (Zhao and Sheng, 2008). In addition, labor market participation rates are much lower for cohorts who entered college after 1999. The share of "unemployment immediately after graduation" and the share of "depending on family for living" are larger for these cohorts. Moreover, the expansion policy has led to a reduction in the returns to college and the income levels of college graduates have decreased (Li and Xing, 2010).

Even though the problem of a worsening labor marker situation for college graduates has raised concerns in China, there is little rigorous empirical research addressing the impacts of the expansion policy on labor market outcomes of college graduates. Understanding the impacts is necessary to evaluate the policy effectiveness, and is helpful for policy makers to improve future education policy in China.

The core question I try to answer in this paper is “What are the impacts of the 1999 higher education expansion on the labor market outcomes of college graduates?” The

labor market outcomes are measured by unemployment, full-time employment, and monthly earnings. I hypothesizes that the 1999 expansion policy has a significantly negative influence on the labor market outcomes of college graduates, which causes their unemployment rate to increase, full-time employment rate to decrease, as well as monthly earnings to decrease.

This paper uses the 1996 and 2007 waves of the China Health and Nutrition Survey (CHNS). To empirically research the impacts of the expansion policy, I treat the policy as a natural experiment and use a difference-in-difference strategy. My basic research strategy is to compare the changes in the labor market outcomes between the younger cohort (ages 22-25) and the older cohort (ages 26-40). By including the older cohort, I am controlling for the change in the overall labor market situations thereby netting out the fixed time effects. This allows the analysis to focus on the younger cohort's experience net of the general labor market situations. Moreover, I use the 1997 wave data to control for the age differential in the labor market outcomes in the absence of the policy effects. My research results support the hypothesis that the expansion policy has a significantly negative influence on the labor market outcomes of young college graduates. I find that the expansion policy causes the unemployment rate of young college graduates to increase, and results in a decrease in their full-time employment rate and monthly earnings.

Furthermore, I investigate how the expansion policy affects the unemployment of young college graduates differently across regions and between genders. I find that the expansion policy causes the unemployment rate of young college graduates to increase much more in central and rural regions than in eastern (coastal) and urban regions. Males encounter a greater increase in unemployment than females because of the expansion policy.

This paper is organized as follows. Chapter 2 briefly describes China's higher education reforms. Section 3 provides a discussion of the relevant literatures. Chapter 4 presents my data set. Chapter 5 identifies the framework for econometric analysis, while Chapter 6 presents and analyzes the econometric results. Conclusions and policy implications are discussed in Chapter 7.

Chapter 2 Higher Education Reforms in China

From the Chinese economic reform initiated in 1978, the scale of China's higher education has continuously expanded. Between 1978 and 1998, there was an increase of 424 in the number of post-secondary educational institutions. The number of new college students enrolled increased by 0.68 million, and the number of college students increased by 2.55 million. However, the growth rate was much more modest than that in 1999 and thereafter (Xing and Whalley, n.d.).

In 1999, the Chinese government made a decision to accelerate the expansion of higher education. The number of new college students enrolled increased by over 40%, from 1.1 million in 1998 to 1.6 million in 1999 (Xing and Whalley, n.d.). In subsequent years, there was an average increase of 0.5 million new students each year. By 2006, the number of new college students was 5.5 million, which was 5 times that in 1998 (Zhao and Sheng, 2008). (Figure 1 shows the number of new college students enrolled from 1978 to 2006). Consequently, the gross enrollment rate (the proportion of people aged 18 to 22 enrolled in higher education) increased greatly from below 10% in 1998 to 22% in 2006. In 2006, the total number of college graduates reached 3,774,708, which was over 4.5 times than that in 1998.

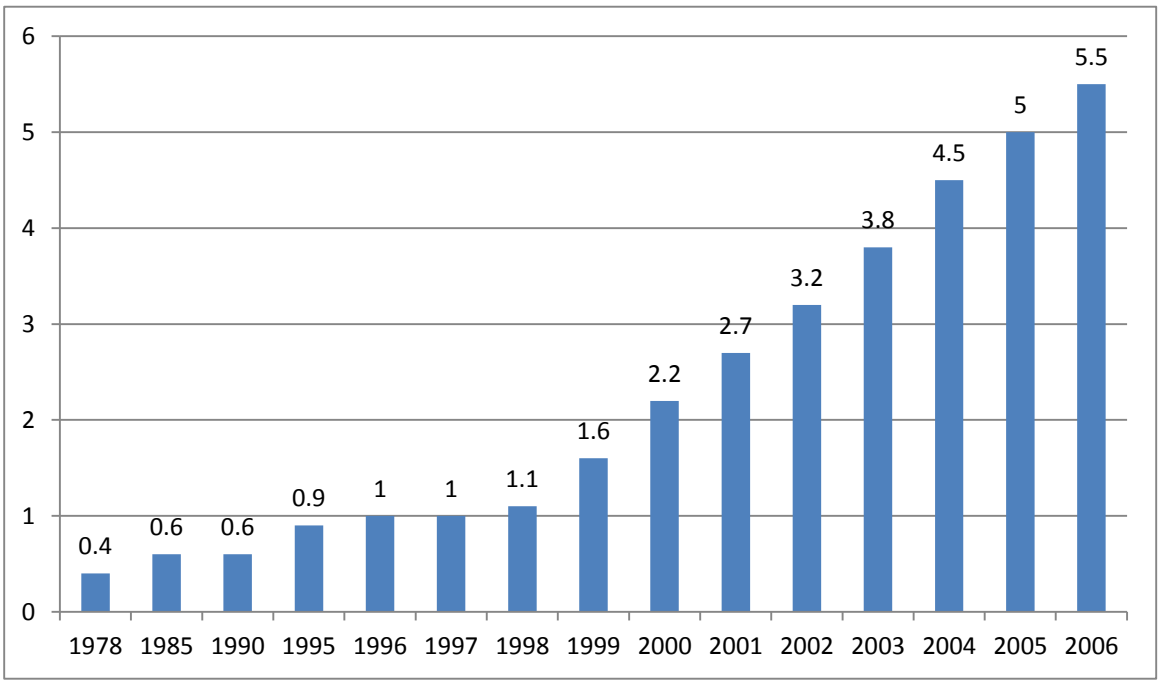

Figure 1: New student enrollment in higher education in China, from 1978 to 2006, million. Adapted from "CHINA' S 'GREAT LEAP' IN HIGHER EDUCATION" by Zhao, L. and Sheng, S, 2008, EAI Background Brief No. 394.

The number of regular higher education institutions also increased dramatically after the expansion policy was initiated. From 2000 to 2006, as many as 826 new regular higher education institutions were set up. As a result, there was a very large decrease in the number of secondary vocational schools. (Figure 2 represents the number of higher education institutions and the number of secondary vocational schools from 2000 to 2006). Furthermore, between 2000 and 2006 over 70 university towns were built. University Town is an innovative way to expand higher education in China, which usually has a large site area to provide enough space for colleges/universities to expand or be built. It is mainly financed by provincial and municipal governments and banks. To

further expand higher education, the Chinese Government has allowed individuals and social organizations to set up private universities, but does not provide any financial support. Also, many public universities are permitted to set up independent colleges in the absence of government appropriation. These private and public universities are mainly financed by tuition fees and bank loans. Usually, they charge higher tuition fees and lower the admission requirements (Zhao and Sheng, 2008). As a result, students who have lower ability but who can afford the expensive tuition fees still can enter these universities.

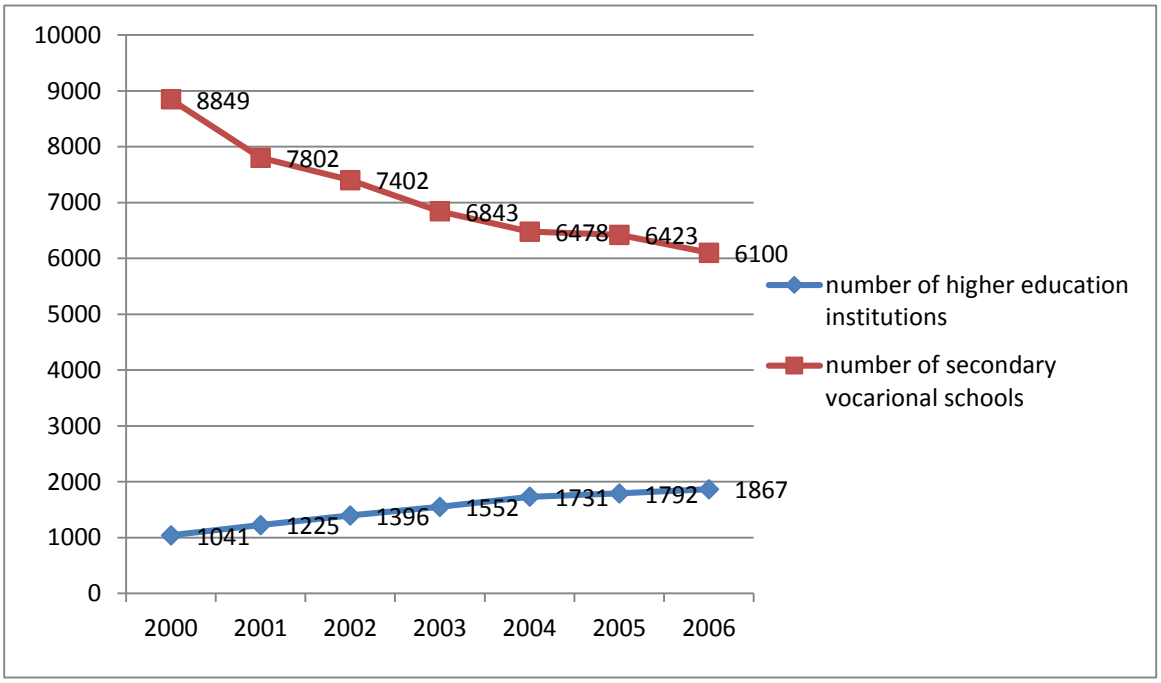

Figure 2: Higher education institutions and vocational secondary schools in China between 2000 and 2006. Adapted from "CHINA' S 'GREAT LEAP' IN HIGHER EDUCATION" by Zhao, L. and Sheng, S, 2008, EAI Background Brief No. 394.

Alongside the higher education expansion, other major reforms in China's higher education system include rise in tuition fees and abolishment of the matching mechanism between college graduates and potential employers. Before the 1978 economic reform in China, higher education was heavily subsidized by the Chinese government. Since the higher education expansion after the 1978 economic reform, the Chinese government gradually deceased subsidies for higher education. The tuition fees increased intensively since the late 1990s higher education expansion. Between 1995 and 2004, the average annual tuition fee increased from 800 Yuan to 5000 Yuan[1] per person (Xing and Whalley, n.d.). From 1997 to 2005, the share of government spending in total expenditure on higher education decreased greatly from 76.5% to 42.5%. However, the share of tuition fees increased sharply from 16.3% in 1997 to 31.5% in 2005 (Zhao and Sheng, 2008). The soaring tuition fees caused a serious financial burden for poor families and this resulted in reduced access to college for their children. Therefore, even though some students from poor families have the ability and merit to attend college, they were unable to due to financial constraints. Affordability becomes an important factor in determining whether students are able to attend college.

Another major reform is to abolish the central planning mechanism that assigns college graduates to job positions. The new job system is like a two-way selection system where students and employers can mutually reach job agreements. Governments do not

[1] 5000 Yuan is equivalent to 881.83 Canadian dollars.

intervene in the job agreements. College graduates have to find jobs by themselves, so they face increasing competition and pressure in the labor market created by the higher education expansion policy (Xing and Whalley, n.d.).

Chapter 3 Literature Review

There is some previous research that examines whether or not the policy of expanding higher education in China puts pressure on labor market outcomes of college graduates. Two key articles are Xing and Whalley (n.d.) and Xing and Li (2010). Using a difference-in-difference strategy, Xing and Whalley (n.d.) studied the impact of the 1999 higher education expansion policy on unemployment of college graduates. They found that the education expansion policy raised the unemployment rate of college graduates by 9%. Relative to Xing and Whalley (n.d.)'s work, my paper not only studies the effect of the expansion policy on unemployment of college graduates, but also investigates its impacts on their full-time employment and monthly earnings. The full-time employment rate and monthly earnings are also important indicators of the labor market situation. Moreover, Xing and Whalley (n.d.) used the 2005 China's 1% population survey data to estimate the effect of the expansion policy. Even though the expansion policy was initiated in 1999, the 2005 data may not accurately identify the impact of the policy on labor market outcomes. Some of cohorts who entered college between 1999 and 2002 were still in school in 2005. The 2006 data from the CHNS I use provides a cleaner measure in terms of timing of the effects of the expansion policy on their labor market outcomes.

Xing and Li (2010) studied the impacts of the higher education expansion on labor

market outcomes of college graduates. They estimated the impacts of the expansion policy on labor market outcomes of college graduates by simply comparing summary statistics between the younger college cohorts who experienced the expansion policy and the older college cohorts who did not experience the expansion policy. They found that the higher education expansion policy increased the unemployment rate of young college graduates and decreased their labor force participation rate, as well as increased the share of living with families. Compared with Xing and Li's paper, the key contribution of my work is to empirically estimate the impacts of the expansion policy on labor market outcomes (unemployment, full-time employment, and monthly earnings) of college graduates. Moreover, Xing and Li (2010) investigated the effects of the expansion policy on relative income level between high school graduates and college graduates. They found the expansion policy caused the income gap between high school graduates and college graduates to decrease. The decrease was mainly because the expansion policy caused the increase in the income levels of high school graduates. The small decrease in the incomes levels of college graduates has an insignificant impact.

It would be helpful to contrast the Chinese policy with that of other countries. There are several papers on education expansion in both developing and developed countries. For example, in Indonesia, Duflo (2001) explored the impacts of primary school construction on educational attainment and earnings. From 1973 to 1978, the Indonesian government engaged a primary school construction program (Sekolah Dasar

INPRES program), which resulted in the construction of more than 61,000 primary schools. Her estimates indicated that each new primary school constructed per 1,000 children resulted in an increase of 0.12 to 0.19 years of education on average, and an increase of 1.5 to 2.7% in wages. The estimated economic returns to education were between 6.8 to 10.6%. Hyui (2011) analyzed the effects of the higher education expansion in the Russian Federation between 1990 and 2000 on labor market outcomes of young college graduates. From 1990 and 2000, the higher education system in the Russian Federation was expanded, which caused both the number of higher education institutions and college graduates to double. She found that the expansion policy caused a significant increase in the wages of people who earned a college degree after the expansion of higher education system. However, their returns to education were lower than people who earned a college degree before the expansion of higher education system. In Taiwan, Clark and Hsieh (2000) exploited the 1968 Nine-Year Education program to study the effects of education expansion on education attainment and wages. In 1968, the Taiwan government launched an education expansion policy that extended basic education from 6 years to 9 years. Consequently, more than 140 new junior high schools were built. Their results suggested that the expansion policy caused the education attainment of children who were between ages 6 and 11 in 1968 to increase by 0.6 years for each new junior high school constructed per 1,000 children between ages 12 and 14. Moreover, the expansion policy resulted in a large increase in the relative supply of educated young workers, so it lowered their returns to education compared with those of older workers. My paper is consistent

with these findings in providing support for education expansion policies can have an important impact on labor market outcomes of cohorts who are affected by the polices.

The reasons why the expansion policy in China puts pressure on college graduates' labor market outcomes have been explored in four related works. The previous research provides important theoretical bases for explaining the reasons for the labor market effects. Wang and Liu (2010) indicated that the current political, economic, and social structures in China could not accommodate all of these college graduates, which caused their unemployment rate to increase. Bai (2006) explained that China's higher education system could not have enough time to adjust to such intensive expansion. The expansion could cause the skill mismatch between higher education supply and labor market demand for education.

Zhao and Sheng (2008) indicated that the higher education in China was expanded in so a short time that the labor market and education resources could not match the expansion. Firstly, oversupply of college graduates was a main reason that caused such high unemployment. Secondly, the quality of education deteriorated as the number of students increased more rapidly than the number of faculty. Moreover, as colleges become more reliant on tuition fees, for some colleges the expansion of student enrollment became more important than improving the quality of education. This was especially true for private and independent colleges.

Xing and Whalley (n.d.) illustrated four reasons for the negative impacts of the expansion policy on the unemployment of college graduates. Firstly, the expansion policy lowered the requirements of college entrance exams, which allowed students with relatively low ability to go to colleges. The compositional change in ability possibly resulted in the unemployment problem. Secondly, location mismatch also caused the unemployment problem. Labor demand in coastal regions in China was higher than central and western regions, but most of college graduates in central and western regions did not find it is easy to migrate to coastal regions. Therefore, the unemployment problem was relatively serious in the central and western regions in China. Thirdly, skill mismatch was another important reason for the unemployment problem. The mass expansion policy resulted in a huge increase in labor supply of college graduates in a short period, so the labor market could not adjust well enough to absorb all of the graduates. Lastly, most college graduates increased their reservation wage after the expansion policy, so they did not want to find a job with low pay, which also contributed to the increase in unemployment.

Moreover, two articles on policy implications of the expansion policy provide crucial theoretical bases for future higher education policy development. Ke (2011) studied how some key factors affect higher education expansion. These factors include economic development, population, industry, labor market, urbanization, and policy. She indicated that in an economic and institutional reform process, implementing higher

education expansion needed an appropriate economic and institutional environment in which a significantly reformed industry structure and an appropriately provided labor information system were required. Fasih (2008) studied the linkage between education policy and labor market outcomes. He suggested that education policies must take into account both the supply of education and demand for education to link the education and labor market well. This will help avoid the skill mismatches between education supply and labor market demand for education.

Chapter 4 Data Collection

The data I use in this paper comes from the China Health and Nutrition Survey (CHNS). The CHNS is a panel survey. The main purpose of the panel survey is to study the impacts of the Chinese social and economic transformation on the health and nutritional situation of Chinese people. The survey is conducted in China covering nine provinces that differs in geography, economic development, public resources, and health indicators. The nine provinces are Guangxi, Huizhou, Henan, Hubei, Hunan, Jiangsu, Liaoning, Heilongjiang, and Shandong. The survey includes about 4,400 households, which includes 26,000 individuals. The first wave of the CHNS was collected in 1989, which included household, community, health, and nutrition data. Subsequent six waves were collected in 1991, 1993, 1997, 2000, 2004, and 2006, respectively (UNC, 2013).

In this paper, I use data from the 1997 and 2006 waves of the CHNS. In the 1997 wave, I use data from the household survey. It provides information on occupation, education, and socioeconomic characteristics of each household member. For the 2006 wave, the information on occupation, education, and socioeconomic characteristics of each surveyed adult household member is provided on the adult survey. Moreover, the survey provides information on the highest education level an individual has attained. My paper studies the impacts of the 1999 higher education expansion policy on labor market consequences of college graduates, so I only focus on people aged 22 to 40 who have

high school degrees or above. The purpose of this selection is to focus on people who are more likely affected by the expansion policy. After these restrictions, the total sample size is 10,802.

Chapter 5 Methodology

The survey does not provide information on the year when people entered college, so I assume a theoretical year when people were enrolled in college at 18 years old. In the 1997 wave, the theoretical year people aged 22 to 40 entered college is between 1993 and 1975 (prior to the expansion). In the 2006 wave, the younger cohort (ages 22-25) was enrolled in college between 2002 and 1999 (after the expansion policy). However, the older cohort (ages 26-40) was enrolled in college between 1998 and 1984 (before the expansion policy).

Figure 3 presents the unemployment rate of college graduates by age. The red line indicates the unemployment rates by age in 2006. The blue line shows the unemployment rates by age in 1997. From the figure, we can see in both survey years the younger cohort (ages 22-25) had higher unemployment rate than the older cohort (ages 26-40). However, the 2006 younger cohort who entered college after the expansion policy has a much higher unemployment rate than their 1997 counterpart. In the 1997 survey, no observations are affected by the expansion policy, so the variation in unemployment rate only reflects the age difference in unemployment rate (younger people tend to have higher unemployment rates than older people). The larger difference in unemployment rate between the younger cohort in 1997 and the younger cohort in 2006 reflects the effect of the expansion policy on unemployment. The underlying assumption is that the differential in unemployment rate between the younger cohort and the older cohort would be same in

both 1997 and 2006, in the absence of the policy impact.

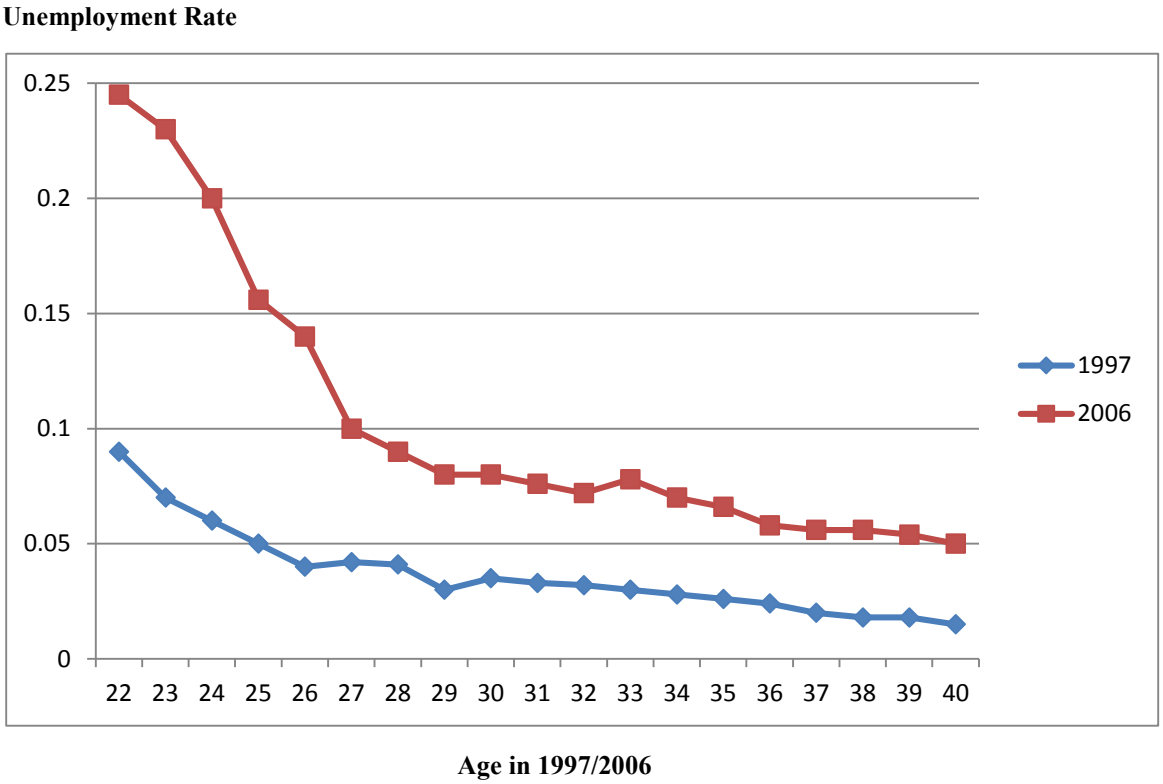

Figure 3: Unemployment rate of college graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

If the changes in economic situations between 1996 and 2007 cause unemployment of the younger cohort to increase more severely than the older cohort, it still can result in the larger difference in unemployment rate between the younger cohort in 1997 and the younger cohort in 2006. The effect of the changes in economic situations on unemployment can bias my estimates of the expansion policy effect. In this case, people with other education degrees should be also affected by the changes in economic situations, and reflect similar trends for those with college degrees. Figures 4 and 5 show

the unemployment rates of vocational and high school graduates by age, respectively. From the two figures, we can find that people in 2006 have a higher unemployment rate than those in 1997 for each age group, and the younger cohort has higher unemployment rate than the older cohort in both survey years. However, we cannot see the larger difference in unemployment rate between the younger cohort in 1997 and the younger cohort in 2006. Therefore, it was more likely that the expansion policy did raise the unemployment rate of the younger cohort who was enrolled in college in 1999 or after.

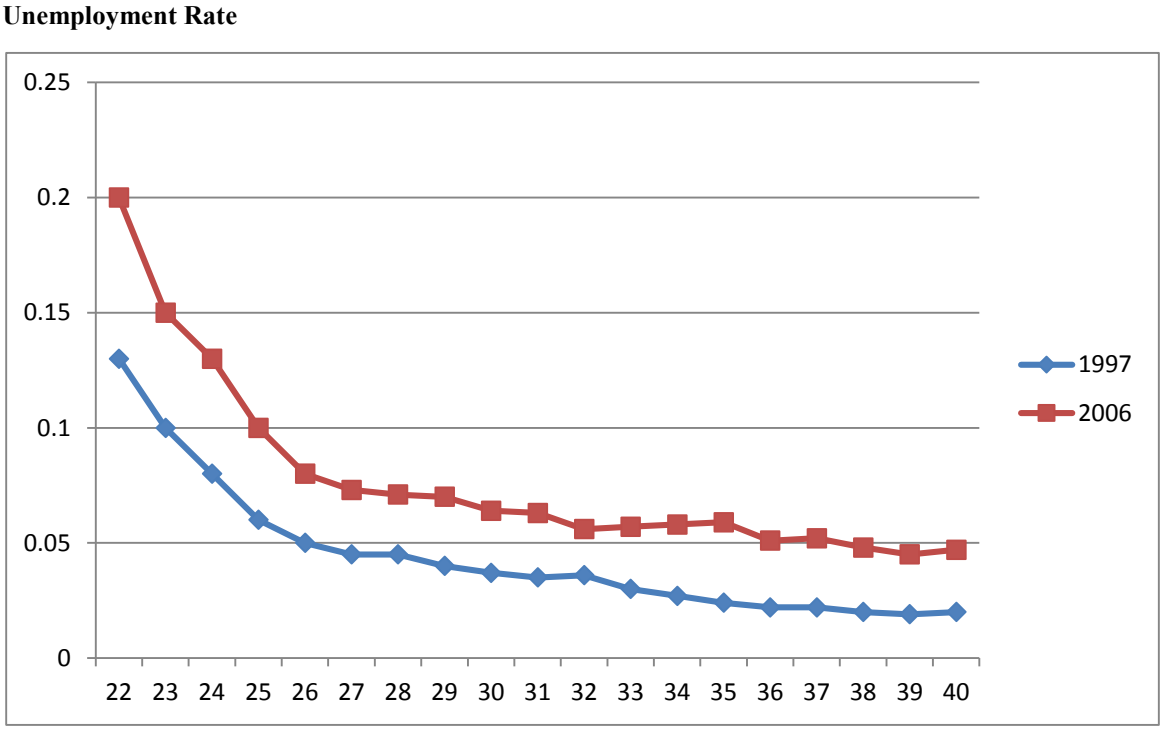

Figure 4: Unemployment rate of vocational graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

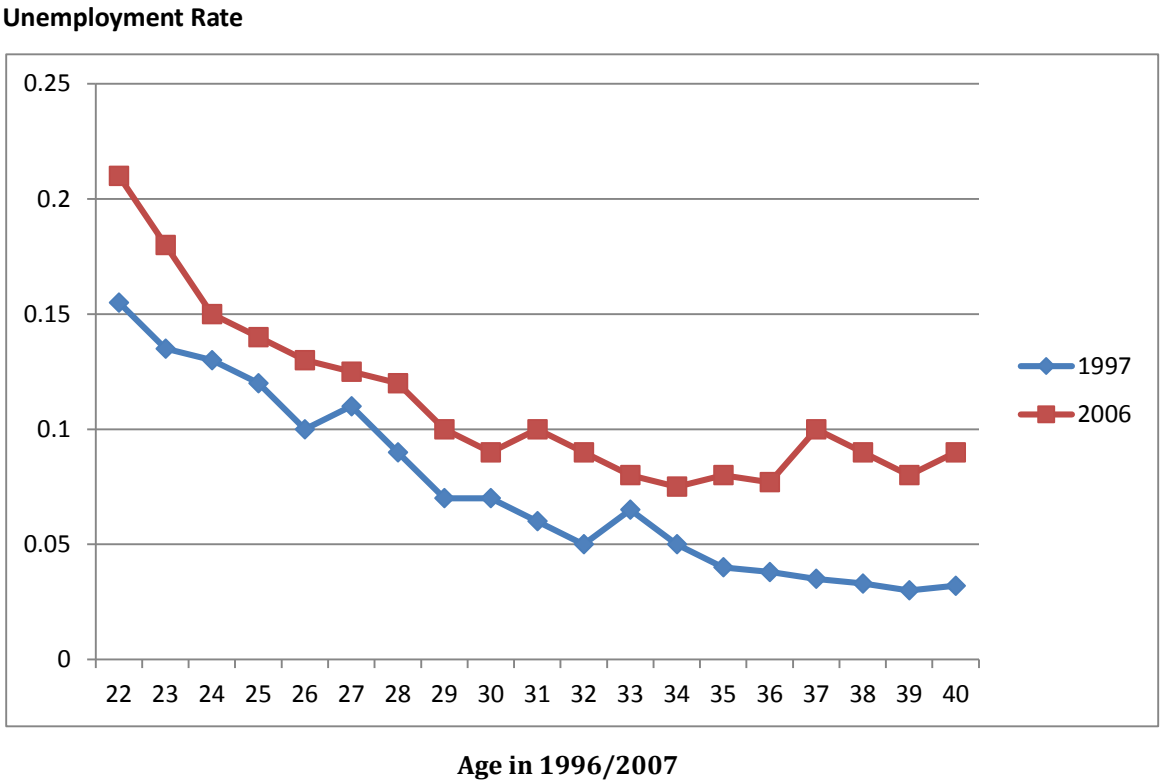

Figure 5: Unemployment rate of high school graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

If China's economic development process itself is an underlying cause of such high unemployment of college graduates, they would have similar patterns to those of industrialized countries. As a comparison, I include unemployment rates for recent college graduates in industrialized countries. Figure 6 shows the unemployment rates of college graduates for United States, Canada, Organization for Economic Co-operation and Development(OECD) countries (the average), and China in 2005, 2008, and 2011, respectively. China's unemployment rates (around 10%) are much higher than those of industrialized countries (below 5%). Therefore, the possibility that the economic

development process itself is an underlying reason for such high unemployment should be excluded. The soaring unemployment situation in China is particular worrying. The oversupply of skilled labor incurred by the expansion policy may be an important reason for such high unemployment of college graduates.

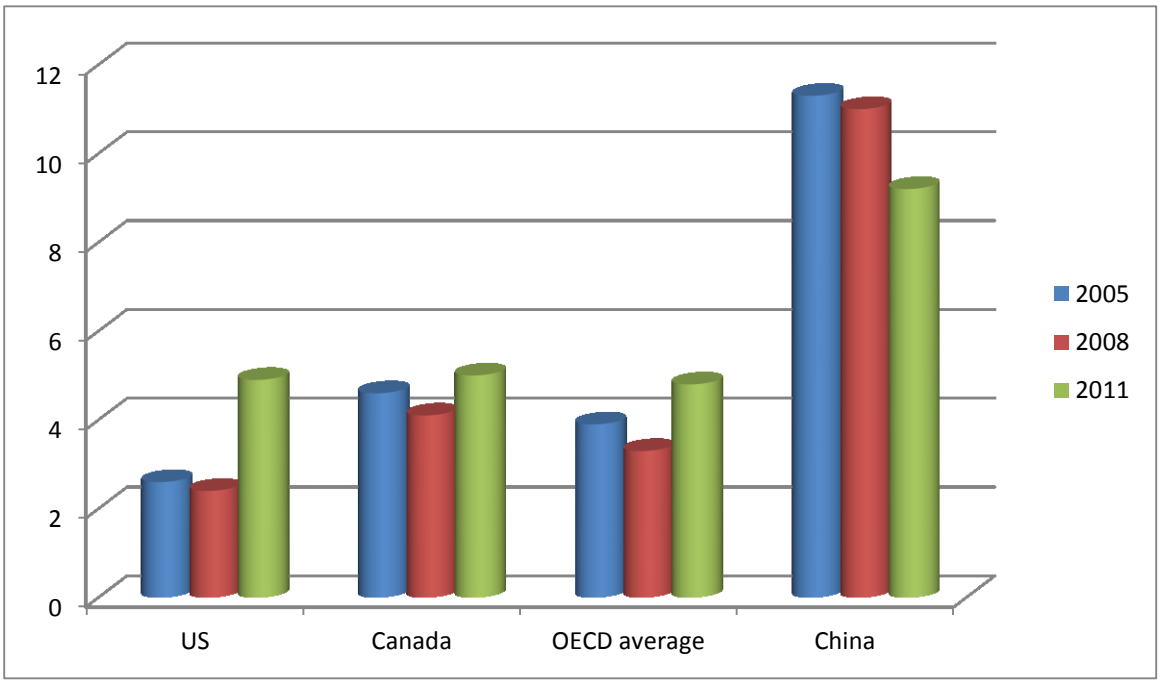

Figure 6: Unemployment rates for college graduates in United States/Canada/OECD countries (2005, 2008, and 2011).
Data Sources: OECD. Labor Market, Economic and Social Outcomes of Learning Network Labor Force Survey, and European Union Labor Force Survey

Because the 1999 expansion policy was announced just prior to the college entrance exams, for many high school graduates the expansion policy was unexpected. Hence, the policy did not influence their behavior much. The feature of "unexpectedness"

made the expansion policy like an experiment (Xing and Whalley, n.d.). I treat the expansion policy as a natural experiment, and use a difference-in-difference (DID) strategy, to empirically estimate the effects of the expansion policy on the labor market outcomes of college graduates. Because there is a difference in the unemployment rate for the comparison and treatment group, I use the 1997 wave to control for this difference which is assumed to be fixed. My basic research strategy is to compare the changes in the labor market outcomes between the younger cohort (ages 22-25) and the order cohort (ages 26-40), using observations from the 2006 wave. By comparing to the older cohort, I can control for the changes in overall labor market conditions (such as, economic conditions, trade policy, and the changes in labor supply, which would affect labor market situations). Therefore, I can focus on the young cohort's experience net of the general labor market situations to check the effects of expansion policy on the labor market outcomes of young college graduates. The treated group is the younger cohort (ages 22-25) from the 2006 survey. The basic model specification is similar to Xing and Whalley (n.d.)'s Linear Probability Model:

$$Y_i = \beta_0 + \beta_1 Young_i + \beta_2 Year\_2006_i + \beta_3 Young_i * Year\_2006_i + \beta_4 X_i + \varepsilon_i$$

where Y_i indicates a labor market outcome of the individual i. The labor market outcomes in this paper are measured by *unemployment*, *full-time employment*, *and monthly earnings.* I dropped all observations of people who were still in school. People who are not

presently working in the week of the survey are defined as unemployed[2]. People who worked 40 hours or more in the week just before the survey are defined as full-time employed. In addition, the survey provides information on average monthly earnings (excluding subsidies and bonuses) of people who are employed. *Monthly earnings* are measured in real 1997 Yuan[3]. *Unemployment* is a dummy variable taking a value of one if an individual is unemployed, and taking a value of zero otherwise. Also, *Full-time employment* is a dummy variable indicating whether an individual is employed full-time (=1) or not (=0). $Young_i$ is a dummy variable taking a value of one if individual i is between ages 22 and 25, and taking a value of zero otherwise. $Year\_2006_i$ is a dummy variable that equals one if individual i is interviewed in the 2006 survey, and equals zero otherwise. $Young_i * Year\_2006_i$ is an interaction term between $Young_i$ and $Year\_2006_i$. X_i represents a vector of controlling variables, including gender (male=1), marriage status (married =1), and urban site (=1 if an individual is living in urban area, = 0 otherwise). ε_i is an error term.

B_0 is a constant term. The coefficient B_1 captures the age effect on the labor market outcomes, and B_2 captures the year effect on the labor market outcomes. The coefficient B_3 on the interaction term $Young_i * Year\_2006_i$ captures the effect of the expansion policy on labor market outcomes. It is supposed to be significant and positive when the dependent variable is *unemployment*, which tests the hypothesis that the expansion policy

[2] The definition of unemployment in this paper is not the standard definition of unemployment — not employed, but actively looking for work.

[3] I set 1997 as a base year, and converted monthly earnings in 2006 into real monthly earnings in 1997 using the China Consumer Price Index.

causes the unemployment rate of college graduates to increase. It is expected to be significant and negative when the dependent variable is *full-time employment*, which tests the hypothesis that the expansion policy results in the full-time employment rate of college graduates to decrease. Moreover, it is supposed to be significant and negative when the dependent variable is *monthly earnings*, which tests the hypothesis that the expansion policy causes the average earnings of college graduates to decrease. B_4 is a vector of parameters representing the effects of the controlling variables (gender, marriage status, and urban site) on the three labor market outcomes, respectively.

Table 1 shows the summary statistics of each variable.

Table 1: Summary Statistics.

Variable	Observations	Mean	Std. Dev.
Unemployment	10764	0.18	0.39
Full-time Employment	6328	0.68	0.46
Monthly Earnings	4604	688.42	2154.04
Young	10802	0.30	0.23
Year_2006	10802	0.50	0.50
Male	6798	0.45	0.50
Married	7768	0.86	0.35
Urban	10802	0.40	0.49

Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

Chapter 6 Econometric Results

6.1 Unemployment

Specification (1) of Table 2 shows regression results for unemployment of college graduates. The estimated coefficient on the interaction term *Young*Year_2006* is 0.087, which is statistically significant at the 1% level. The expansion policy causes the unemployment rate of young college graduates to increase by 8.7%. The coefficient on the control variable *Married* is statistically significant at the 5% level and negative. Married people have 4% lower probability of being unemployed than unmarried people. The coefficient on *Urban* is statistically significant at the 5% level and positive. People living in urban areas have 3% higher probability of being unemployed than people living in rural areas.

Specification (1) in Tables 3 and 4 represent regression results for unemployment of vocational and high school graduates, respectively. Compared with college graduates, the expansion policy has a slightly negative impact on the unemployment of vocational graduates and high school graduates. The unemployment rate of vocational graduates decreases by 4% because of the expansion policy. The unemployment rate of high school graduates decreases by 2% due to the expansion policy. Nonetheless, the impacts are far from statistically significant.

Table 2: Effects of the 1999 higher education expansion policy on unemployment, full-time employment, and monthly earnings of college graduates (OLS regression).

	Unemployment	**Full-time Employment**	**Monthly Earnings(Yuan)**
	(1)	(2)	(3)
*Young*Year_2006*	0.087***	-0.21***	-104.07*
	(0.049)	(0.062)	(0.083)
Year_2006	0.184***	-0.18***	342.54***
	(0.013)	(0.024)	(0.066)
Young	0.041	-0.17	-130*
	(0.027)	(0.054)	(0.087)
Male	-0.11	0.073***	302.12**
	(0.012)	(0.021)	(0.024)
Married	-0.04**	0.004	221.81
	(0.021)	(0.033)	(0.147)
Urban	0.03**	0.14***	149.03
	(0.013)	(0.021)	(0.159)
Intercept	0.20***	0.60***	105.35
	(0.022)	(0.041)	(0.268)
P-value testing ß3=0	0.001	270.001	0.07
R^2	0.04	0.053	0.038

Note: (1) Standard errors are showed in parentheses. (2) *, **, and *** represents statistically significant at 10%, 5%, and 1% level, respectively.

Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

Table 3: Effects of the 1999 higher education expansion policy on unemployment, full-time employment, and monthly earnings of vocational graduates (OLS regression).

	Unemployment	**Full-time Employment**	**Monthly Earnings (Yuan)**
	(1)	(2)	(3)
*Young*Year_2006*	-0.04	0.021	224.46**
	(0.08)	(0.08)	(0.052)
Year_2006	0.09***	0.10**	429.59***
	(0.025)	(0.041)	(0.091)
Young	0.048	-0.19	-120.59
	(0.051)	(0.081)	(0.142)
Male	-0.09***	0.021	144.69
	(0.026)	(0.035)	(0.135)
Married	-0.005	-0.02	192.73
	(0.039)	(0.052)	(0.074)
Urban	0.02**	0.02	130.58
	(0.019)	(0.036)	(0.059)
Intercept	0.12***	0.72***	181.74
	(0.041)	(0.068)	(0.152)
P-value testing ß3=0	0.101	0.305	0.025
R^2	0.067	0.02	0.031

Note: (1) Standard errors are showed in parentheses. (2) *, **, and *** represents statistically significant at 10%, 5%, and 1% level, respectively.

Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

Table 4: Effects of the 1999 higher education expansion policy on unemployment and full-time employment, and monthly earnings of high school graduates (OLS regression).

	Unemployment	**Full-time Employment**	**Monthly Earnings (Yuan)**
	(1)	(2)	(3)
*Young*Year_2006*	-0.02	0.03	262.45**
	(0.116)	(0.186)	(0.087)
Year_2006	0.109***	-0.05***	406.16***
	(0.018)	(0.03)	(0.069)
Young	0.059	-0.26	-213.06
	(0.046)	(0.064)	(0.145)
Male	-0.17***	0.03	180.83
	(0.019)	(0.027)	(0.129)
Married	-0.05	-0.007	214.09
	(0.033)	(0.043)	(0.095)
Urban	0.07***	0.08**	95.54
	(0.019)	(0.027)	(0.066)
Intercept	0.21***	0.74***	172.52
	(0.037)	(0.051)	(0.062)
P-value testing ß3=0	0.121	0.225	0.023
R^2	0.03	0.03	0.024

Note: (1) Standard errors are showed in parentheses. (2) *, **, and *** represents statistically significant at 10%, 5%, and 1% level, respectively.

Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

6.1.1 Results by Region

In China, economic development and higher education resources are unbalanced among different regions. East (coastal) regions have better economic development and greater resources for post-secondary educational institutions (such as, more post-secondary educational institutions and better faculty resources) than central and west regions. The geographic difference in resources may be an important factor that affects the unemployment effect of the expansion policy. Thus, it is worth studying the effect of the expansion policy on unemployment of college graduates for different regions.

According to the difference in economic situations and education resources, I separate the whole country into four regions: east (coastal), northeast, central, and west regions (from economically and educationally strongest to weakest). Moreover, to check how the unemployment effect differs between urban and rural areas, I divide the whole nation into urban and rural areas. I run the same DID regressions on unemployment by regions. The estimation results are reported in Table 5. The expansion policy caused the unemployment rate of young college graduates to increase by 5.4% in the east (coastal) region, 9.1% in the northeast region, and 14.1% in the central region. For the west region the unemployment rate only increased by 3.6%, which is statistically insignificant. It is possible that the west region of China has very few education resources, so the expansion policy has little influence on this region (Xing and Whalley, n.d.). Additionally, the expansion policy has a larger influence on the unemployment rate of young college graduates in rural areas (increases by 9.8%) than those in urban areas (increases by 6.7%).

Table 5: Effect of the 1999 higher education expansion policy on unemployment of college graduates by region (OLS regression).

	East	***Northeast***	***Central***	***West***	**Urban**	**Rural Area**
	(1)	(2)	(3)	(4)	(5)	(6)
Young*Year_2006	0.054**	0.091**	0.141***	0.036	0.067**	0.098***
	(0.011)	(0.031)	(0.085)	(0.114)	(0.075)	(0.079)
Year_2006	0.183**	0.179**	0.153**	0.144**	0.179**	0.104**
	(0.021)	(0.022)	(0.019)	(0.019)	(0.017)	(0.013)
Young	-0.015	0.038	0.041	0.165*	0.032	0.026
	(0.054)	(0.048)	(0.054)	(0.057)	(0.043)	(0.037)
Male	-0.116	-0.147*	-0.166	-0.063	-0.131*	-0.121
	(0.020)	(0.023)	(0.018)	(0.018)	(0.017)	(0.012)
Married	-0.006**	-0.033	-0.044	-0.081***	-0.012	-0.056**
	(0.033)	(0.048)	(0.033)	（0.029）	(0.027)	(0.023)
Urban	0.046**	-0.055**	0.057***	0.085***	omitted	omitted
	(0.023)	(0.024)	(0.019)	(0.020)		
Intercept	0.192***	0.195***	0.242***	0.117***	0.193***	0.213***
	(0.037)	(0.052)	(0.036)	(0.030)	(0.028)	(0.024)
P-value testing ß3=0	0.033	0.021	0.004	0.976	0.037	0.003
R^2	0.031	0.093	0.081	0.092	0.068	0.048

Note: (1) Standard errors are showed in parentheses. (2) *, **, and *** represents statistically significant at 10%, 5%, and 1% level, respectively.

Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

6.1.2 Results by Gender

The increase in female college graduates is a salient feature of the higher education expansion (Xing and Whalley, n.d.). Perhaps, the high unemployment of young college graduates is because of the expansion of female college graduates, in particular those who get married. If the mechanism works, the unemployment rate of female college graduates would increase to a larger extent than that of male college graduates. Thus, it is interesting to investigate the unemployment effect of the expansion policy by gender.

I run the same estimates for the subsamples of males and females. Table 6 presents the estimation results for males and females, respectively. The unemployment rate of young male college graduates increases by 14.9% after the expansion policy. However, the unemployment rate of young female college graduates only increases by 3.2% due to the expansion. Moreover, the coefficient on *married* (0.002) in the female sample is very small and not statistically significant. This means marriage has little influence on unemployment of female college graduates. Therefore, the hypothesis that the high unemployment of young college graduates is mainly due to the expansion of female college graduates should be rejected.

Table 6: Effect of the 1999 higher education expansion policy on unemployment of college graduates by gender (OLS regression).

	Male	**Female**
	(1)	(2)
Young*Year_2006	0.149**	0.032**
	(0.073)	(0.079)
Year_2006	0.182***	0.160***
	(0.013)	(0.016)
Young	0.043	0.025
	(0.035)	(0.045)
Male	omitted	omitted
Married	-0.070***	0.002
	(0.022)	(0.027)
Urban	0.034**	0.049***
	(0.013)	(0.016)
Intercept	0.114***	0.133***
	(0.023)	(0.028)
P-value testing ß3=0	0.04	0.03
R^2	0.038	0.04

Note: (1) Standard errors are showed in parentheses. (2) *, **, and *** represents statistically significant at 10%, 5%, and 1% level, respectively.

Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

6.2 Full-time Employment

Figure 7 shows the full-time employment rate of employed college graduates for different ages. For both survey years (1997 and 2006), the younger cohort has a lower full-time employment rate than the older cohort. However, the differential was much larger in 2006 than in 1997. The younger cohort in 2006 had a much lower full-time

employment rate than the younger cohort in 1997. Figures 8 and 9 present the full-time employment rate of employed vocational graduates and high school graduates for different ages, separately. Like college graduates, the younger cohort of vocational and high school graduates had a lower full-time employment rate than the older cohort, while the larger gap between the 1997 younger cohort and the 2006 younger cohort is not found.

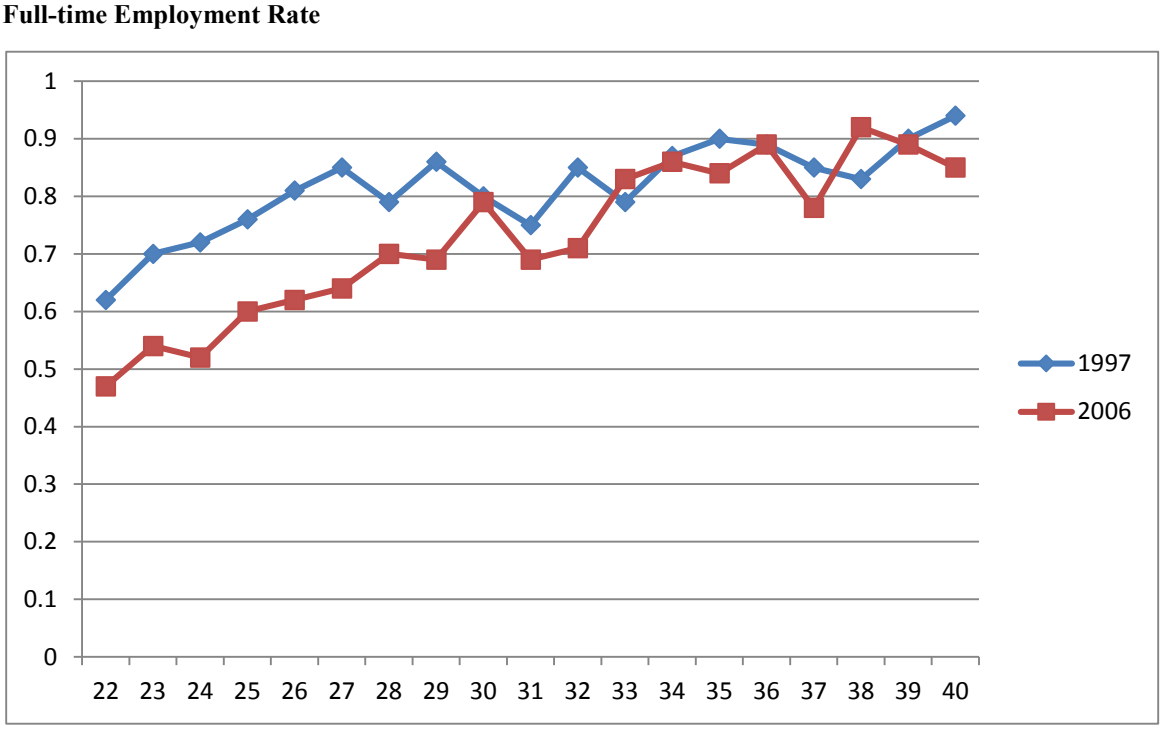

Figure 7: Full-time employment rate of employed college graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

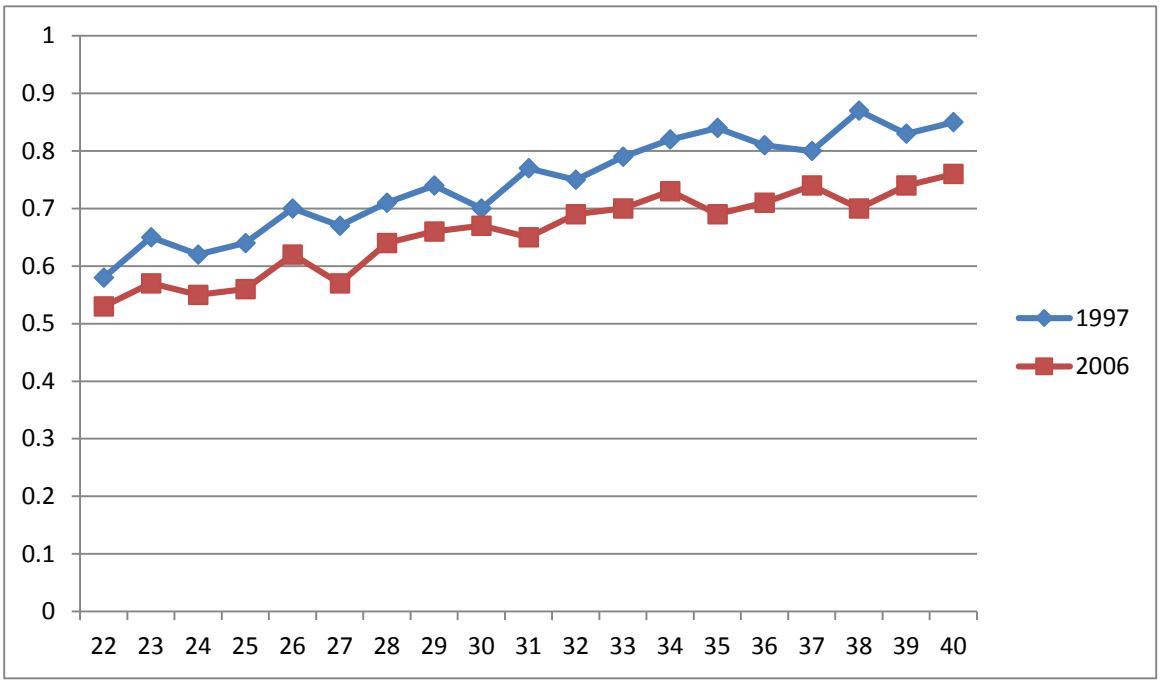

Figure 8: Full-time employment rate of employed vocational graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

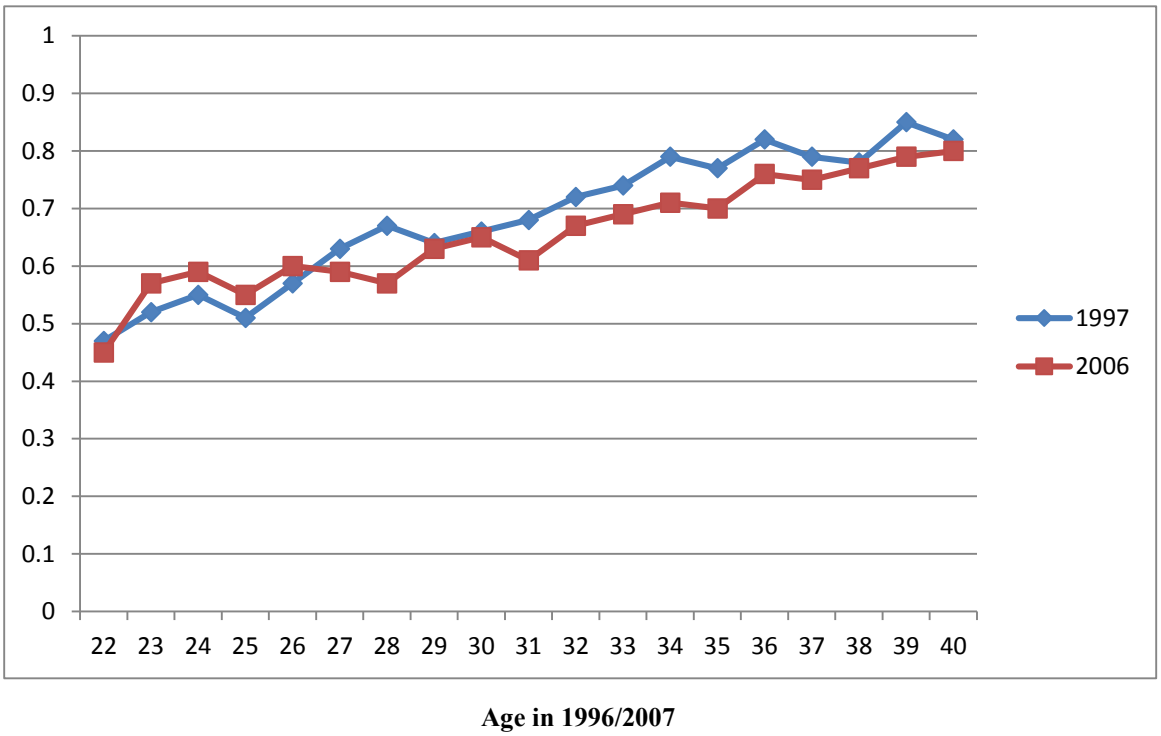

Figure 9: Full-time employment rate of employed high school graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

The estimation results for full-time employment are reported in specification (2) of Tables 2, 3, and 4, respectively for college graduates, vocational graduates, and high school graduates. The expansion policy has a statistically significant and substantially negative influence on full-time employment of college graduates. The full-time employment rate of young college graduates decreased by 21% due to the expansion policy. Men have 7.3% higher probability of having full-time employment than women. The coefficient is statistically significant at the 1% level. People living in urban areas have 14% higher probability of having full-time employment than people living in rural

areas, which is statistically significant at the 1% level.

For vocational and high school graduates, the effects of the expansion policy are positive, but very small and statistically insignificant. After the expansion policy the full-time employment rate of vocational graduates and high school graduates increased by only 2.1% and 3%, respectively.

6.3 Monthly Earnings

Figure 10 shows the average monthly earnings of college graduates for different ages. The average monthly earnings have increased clearly from 1997 to 2006 for all ages, while the increase for the younger cohort is smaller than the older cohort. The smaller increase may be because the skilled labor supply shock has caused the average earnings of young college graduates to decrease. Figures 11 and 12 show the average monthly earnings of vocational and high school graduates for different ages, respectively. Like college graduates, the monthly earnings of vocational and high school graduates increased from 1997 to 2006. However, the increase of the younger cohort is larger than that of the older cohort. Possibly the expansion policy has caused the size of the young less-educated graduates to decrease relatively, which caused their average earnings to rise substantially.

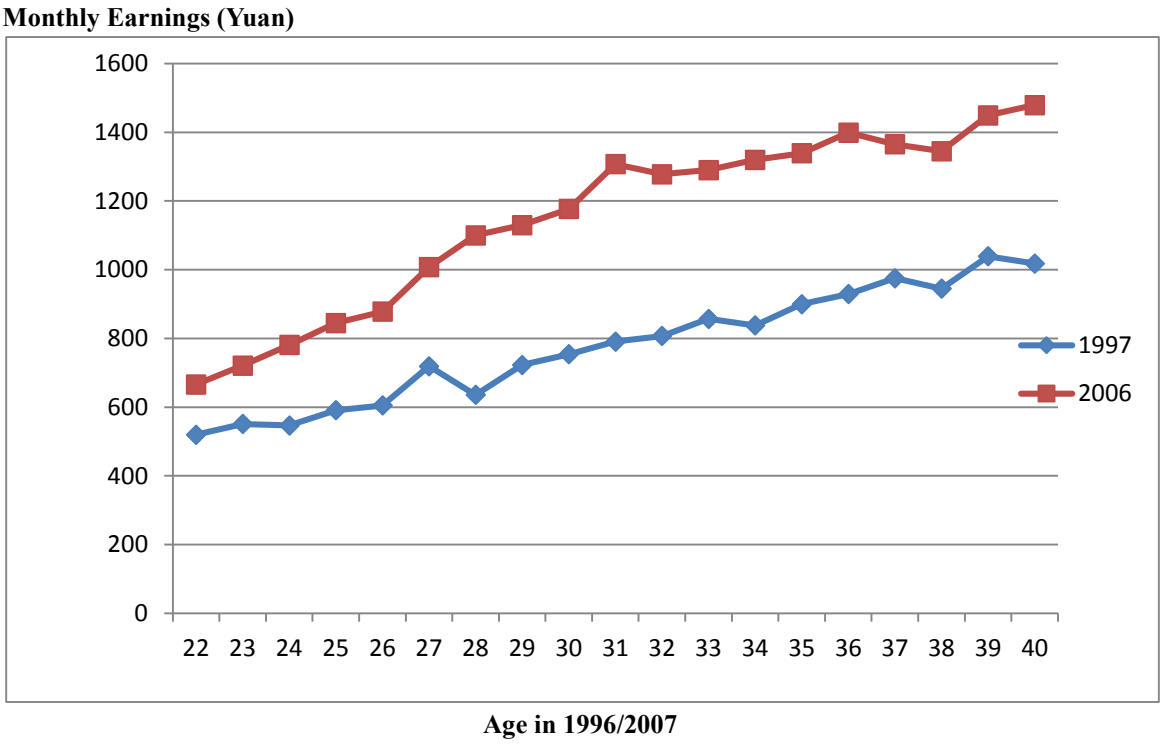

Figure 10: Monthly earnings of college graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

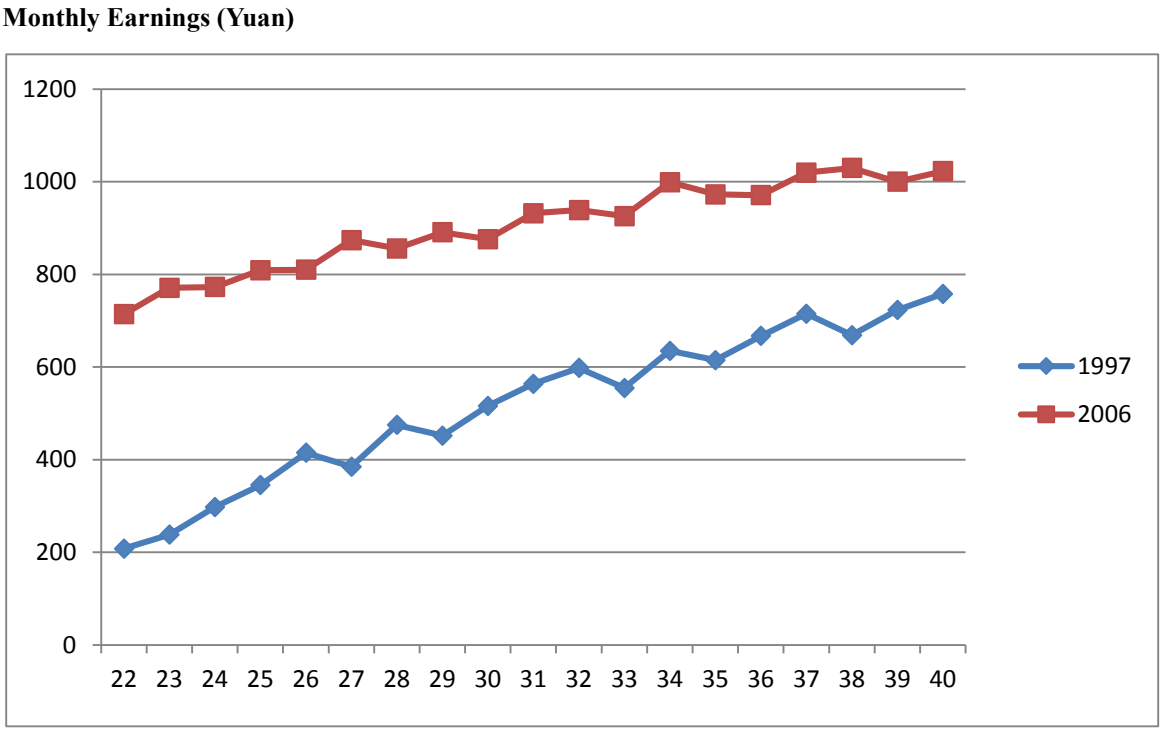

Figure 11: Monthly earnings of vocational graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

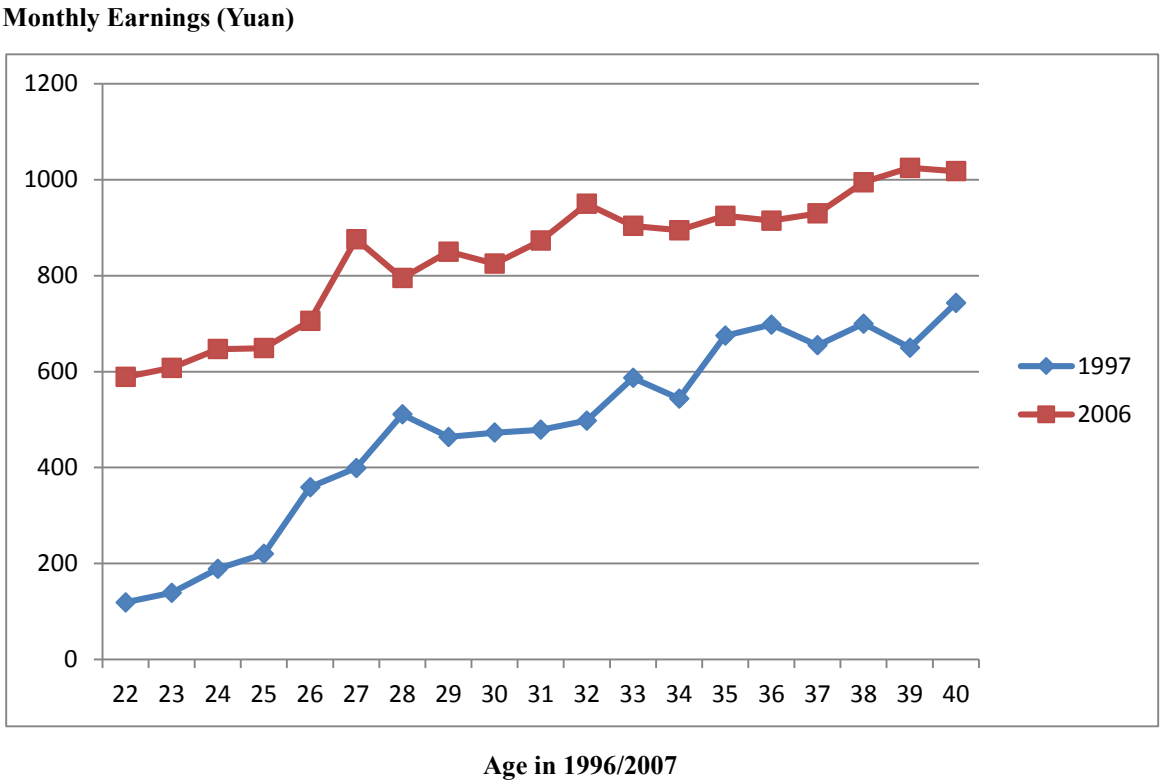

Figure 12: Monthly earnings of high school graduates by age.
Data Sources: 1997 and 2006 waves of China Health and Nutrition Survey.

The results for monthly earnings are presented in the specification (3) of Tables 2, 3, and 4, separately for college graduates, vocational graduates, and high school graduates. Furthermore, the expansion policy caused the average *Monthly Earnings* of college graduates to decrease slightly by 104.07 Yuan, which is statistically significant at the 10% level. The coefficient for the male dummy is 302.12 and statistically significant at the 10% level. Male college graduates can earn much more (302.12 Yuan) than female college graduates.

However, the expansion policy has a much larger impact on the earnings of

vocational graduates than college graduates. The expansion policy causes the average monthly earnings of vocational graduates to increase by 224.46 Yuan, which is statistically significant at the 5% level. Similar to vocational graduates, the average monthly earnings of high school graduates increases substantially (by 262.45 Yuan) due to the expansion policy. The main reason is that the expansion policy caused a large increase in the supply of college graduates, so the relative supply of high school and vocational graduates decreases. Therefore, the decrease in the relative supply of high school and vocational graduates may have caused their earnings to increase.

Chapter 7 Conclusion and Discussion

The higher education expansion policy was initiated in 1999 in China, which had a huge impact on China's society and economy. However, there is little empirical evidence on the impact of the expansion policy on labor market outcomes. This paper uses the 1997 and 2006 waves from the China Health and Nutrition Survey to study the effects of the expansion policy on the labor market outcomes of young college graduates. The results show that the expansion policy causes the unemployment rate of young college graduates to increase by 8.7%, the full-time employment rate to decrease by 21%, as well as the average monthly earnings to decrease by 104.07 Yuan. Overall, the results support the hypothesis that expansion policy has a statistically significant and negative impact on the labor market outcomes of college graduates. The expansion policy incurs a huge increase in the supply of college graduates, which appears to reduce their relative labor market opportunities. My results are consistent with the findings of Xing and Whalley (n.d.) and Xing and Li (2010). Xing and Whalley (n.d.) found that the expansion policy caused the unemployment rate of college graduates to increase by 9%, which was very similar to the estimated effect in my paper (I find the unemployment rate increases by 8.7%). Relative to these papers, the key contributions of my work are using unemployment, full-time employment, and monthly earnings to more comprehensively analyze the labor market situations for college graduates after the policy initiation. The decrease in earnings for college graduates is mainly due to the oversupply of college

graduates, which brings down the equilibrium income level (Zhao and Sheng, 2008). The decrease in full-time employment rate reflects a tight labor market situation, which may be caused by the fierce job competition among college graduates due to the expansion policy. Moreover, the increase in unemployment rate may be mainly caused by the intensive increase in labor supply of college graduates due to the expansion policy. In a short period, the labor market cannot adjust to absorb all of these graduates, and the education system needs time to adjust in order to match the skill of labor supply to labor market demand (Xing and Whalley, n.d.). Furthermore, my results are consistent with the findings of Xing and Li (2010) that the expansion policy increases the income levels of high school graduates significantly, and has a smaller impact on the income levels of college graduates.

Furthermore, in order to distinguish how different mechanisms (besides the oversupply of skilled labor) affect the high unemployment of young college graduates, I study the effects on unemployment separately by region and gender. I find that the effects on unemployment are unbalanced among different regions. The unemployment rate increases more in central and rural regions than in east (coastal) and urban regions. Hence, location mismatch is an important reason for the high unemployment of young college graduates. Lastly, I find that the expansion policy increases the unemployment rate of young male college graduates by a greater extent than that of female college graduates. Therefore, the expansion of female college graduates is not a persuasive explanation of

such high unemployment.

In the meantime, the relative number of vocational and high school graduates decreased. The expansion policy causes the average monthly earnings of young vocational and high school graduates increased significantly, by 224.26 and 262.45 Yuan respectively. This key reason is that the relative decrease in the labor supply of vocational and high school graduates after the expansion policy caused their average earnings to increase. Besides, the younger cohort, especially those who graduated from vocational schools, has professional skills and empirical experience, and many companies need such technicians, so the younger cohort can bargain higher earnings when the labor supply decreases. In contrast to college graduates, the effects of the expansion policy on the unemployment and full-time employment of young vocational and high school graduates are very small and far from statistically significant. Thus, the change in economic situations as a main reason for worsening the labor market situations of young college graduates can be excluded. If the change in economic situations is a main reason that causes college graduates' labor market situations to worsen, we should see similar trends for vocational and high school graduates (Xing and Whalley, n.d.). However, my results suggest that it is not the case. It is more certain that the expansion policy worsens the labor market outcomes of college graduates.

The results also have important implications for some related policy debates. Firstly,

in an economic and institutional reform process, effectively implementing higher education expansion needs an appropriate economic and institutional environment in which a significantly reformed industry structure and an appropriately provided labor information system are required (Ke, 2011). China is facing an intensive economic and institutional reform. The higher education expansion should match the reforming economic and intuitional structure. Even though the reform to the economy created an increased demand for skilled workers, the intensively rapid expansion of college graduates resulted in an excess supply of skilled people. Therefore, in the short run, the Chinese economy cannot adjust quickly enough to absorb the very large supply of skilled people, which may have caused an increase in unemployment. Moreover, an appropriate labor information system should be combined with the expansion policy in order to help college graduates obtain timely labor market information to find a job. Secondly, when implementing an education expansion policy, the Chinese government should take into account not only the supply of graduates but also the demand for the given skills in order to provide more suitable matches between employers and graduates. The 1999 higher education expansion mainly focuses on expanding the scale of college education; however, it does not focus on improving education quality. When implementing an education expansion policy, it is crucial to match the quality and efficiency of education supply with labor market demand for education to avoid the problem of skill mismatch. (Fasih, 2008). The skill mismatch also can cause the problem of unemployment. Lastly, the results show the location mismatch is another important reason that causes the high

unemployment of young college graduates. To reduce the unemployment rate, the Chinese government should promote free mobility of labor force. The coastal region in China has better economic development, and can absorb more skilled labor. Eliminating impediments, such as the Hukou system and limited housing supply, can encourage labor force mobility to reduce the high unemployment rate of young college graduates nationwide (Xing and Whalley, n.d.).

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