ABSTRACT

WANG, JINYI. Education Returns under Party Affiliation and Regional Difference in Contemporary China. (Under the direction of Dr. Edward Kick and Dr. Julianne Treme).

This thesis examines economic returns to schooling in 2010 China using ordinary least squares (OLS) and instrumental variables (IV) methodologies. First, we find returns to education with regards to the natural log of hourly wage rate have increased 6-7% using OLS and 10% using IV. With no controls for endogeneity bias, the OLS method downwardly biases the results, such that OLS estimates are smaller than IV estimates. Second, we find China's rate of returns to education to be determined by many factors such as Party affiliation, regional development, college type and major in college. Based on the regression results, we give explanations and policy suggestions for each of these factors.

Education Returns under Party Affiliation and Regional Difference in Contemporary China

by
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BIOGRAPHY

I came from Ningbo, Zhejiang, a coastal province near Shanghai. Thanks to its geographical advantage and politically support in economics development, Ningbo has been an economically energetic city and destination for workforce migration. After graduation from high school, I continued my undergraduate education in Shanghai Normal University, where I received four years rigorous economics training and also a second major in English. Currently, I was doing a double major in Economics and Statistics master programs in North Carolina State University.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1: Introduction

The study of education quality has yielded important research on the rate of returns to schooling (Mincer, 1974), college major decisions (Arcidiacono et al., 2012; Beffy et al., 2012), influence of credit constraints (Carneiro & Heckman, 2002), education attainment (Dearden et al., 2002), college attendance (Heckman and Li, 2004) and pupil-teacher ratios (Duflo, Dupas & Kremer, 2014). The focus of this paper is on the rate of returns to formal schooling in China using a newly conducted survey to examine how the rate of returns has been influenced under Communist Party affiliation, regional development, college type and the choice of majors in college.

In this paper, we examine returns to schooling in China using data from the 2010 Chinese Family Panel Studies (CFPS) which is the most updated and comprehensive in regards to asking questions about family background, company types and academic history. The key findings are as follows: Firstly, the overall return to education rate is around 6-7%, which is in accordance with recent research findings. Secondly, the four factors we selected all have significant influence on returns to education. To be more specific, Communist Party affiliation relative to non-party affiliation exhibits a positive effect on education returns, which suggests a policy change within the Chinese Communist Party (CCP) that they have begun to recruit more educated people in hopes of making the Party stronger. Another frequently discussed factor is regional development. Given China's size and heterogeneous environment, resources and development differ across regions sharply throughout the country, and education levels are easily influenced by regional economic development. Our results show that the Northwest part of China has the lowest returns to education, and the richest metropolitan areas—Beijing,

Tianjin and Shanghai—generate the highest returns. Additionally, China has return differences between different college types and college majors. Starting from 1998, China's government has consecutively appointed a group of universities as National Key Universities and granted them huge financial support to help them achieve the standing of "World-class Universities." The results show these universities did not waste national funding. On average, they generated 2% higher returns relative to the rest of "regular" universities. Lastly, to get a deeper understanding of what background of workers the Chinese labor markets are looking for, we regressed the natural log of wage on different majors. In contrast to general thinking, majors that required more advanced mathematic techniques still stand out in the Chinese labor market, but medicine in China generates a below average return. This result may be due to the distorted medical payment mechanism in Chinese public hospitals.

The rest of the paper is organized as follows. Section 2 introduces previous literature on this topic. Section 3 discusses the empirical model and data. Section 4 presents results and the discussion of findings along with their interpretations. The last section concludes the study.

CHAPTER 2: Literature Review

The Mincer earnings function has been a cornerstone for a large literature in empirical economics since Mincer's masterpiece *Schooling, Experience, and Earnings* (1974). In this book, Mincer initiated an approach using the log of earnings to be a linear function of schooling and, impressively, empirical evidence has supported this linearity of mean log earnings. However, this model did not convince every researcher. Richter (2013) argues that Mincer's model relies on a strong assumption that individuals make schooling decisions based on its earning maximization. Alternatively, he adopts a less questionable assumption of utility maximization. On the other hand, Heckman, Lochner and Todd (2003), using data from decades later than 1950s in Decennial Censuses and Current Population Surveys, find the data are inconsistent with Mincer model. They suggest that because of the presence of sequential resolution of uncertainty and option values, the internal rate of return is not a useful guide to policy analysis. However, Andini (2012) finds that a dynamic Mincer equation provides a good fit of the US national Longitudinal Survey of Youth Data, and claims the evidence is robust to a number of sensitivity checks. In addition to Andini (2012), the Mincer equation is regressed worldwide to study educational issues (Duraisamy, 2002; Carneiro, Heckman & Vytlacil, 2010; Tansel & Bodur, 2012), and in this paper, we focus on Chinese education returns.

Many existing studies have found a quite low but increasing return to education in Mainland China. Johnson and Chow (1997), using data from the 1988 Chinese Household Income Project (CHIP-88) in cooperation with China's National Bureau of Statistics (CNBS), reports a low rate of return of 3.34%. Zhang et al. (2005), using fourteen consecutive annual surveys of urban households conducted by CNBS from 1988 to 2001, found the rate of returns

to education was 4% in 1988 urban China and 10.2% in 2001 urban China. These estimated returns are very low. One of the possible explanations is due to data limitations. These past research efforts can only rely on monthly or annual earnings instead of hourly wages and have ignored the fact that generally, more highly-educated people tend to work fewer hours; therefore, these workers' returns to education are, unfortunately, biased downward. With more comprehensive data, Li (2003), using the CHIP-95 survey, found that the rate of return was 5.4% in 1995. And Chen and Hamori (2009), using data from China Health and Nutrition Survey (CHNS) conducted in 2004 and 2006, report a 7-8% return to schooling for the overall sample of male and female respondents.

Most of the research reviewed above used ordinary least squares (OLS) to estimate the rate of returns to education; however, recent studies have noted the problem of endogeneity of schooling in estimation of economic returns to education, which would cause bias when using OLS estimation. Endogeneity arises from measurement error in S, which generally is thought to bias β_2 towards zero, although this effect is believed to be small given the high reliability of schooling data. Another problem causing endogeneity is omitted ability, which is positively correlated with age and school levels, and therefore will cause an upward bias in β_2. However, Card (1999) argued that ordinary least squares (OLS) estimates of β_2 will be biased downward because individuals with high discount rates choose low levels of schooling. The most common approach to fix omitted ability is either adopting an instrumental variable approach or introducing a proxy variable to replace omitted "ability." To test this upward/downward bias disagreement, Leigh and Ryan (2008), using data from the Household, Income and Labor Dynamics in Australia (HILDA), found that the instrument variables (IV) approach gives a

lower estimated return (8-12%) than OLS estimates (13%), while Chen and Hamori (2009), using empirical data from China, and Trostel et al. (2002), using worldwide data across 28 countries, both found a higher coefficients using IV approach. It seems that OLS generates different upward/downward biases based on particular literature, and it is hard to make a generalization of its direction of bias. In our study, the IV approach generates higher estimates than OLS as shown in Table 3.

CHAPTER 3: Methodology

The model we use is the classical Mincer equation (Mincer, 1974).

$$Ln\ wage = \beta_1 + \beta_2 S + \beta_3 E + \beta_4 E^2 + \varepsilon \quad (1)$$

where β_1 represents a constant intercept, S refers to years of education, E denotes years of experience, calculated through age minus years of schooling minus age first attended primary school. Age for primary school was calculated through primary graduate year minus years in primary school minus birth year. Finally, ε is the error term with $E(\varepsilon) = 0$.

In this paper, we first use the general OLS method and then adopt the IV approach to address the endogeneity bias. The most common instruments used in such circumstances are number of siblings, father's education and mother's education (Ashenfelter & Zimmerman, 1997; Black et al., 2005; Li & Luo, 2004). We also add spouse's education as an additional instrument variable (Chen and Hamori, 2009; Trostel et al., 2002), since the recent research has shown that, in the US census data, husbands and wives are becoming more similar in their schooling backgrounds, and a common level of schooling is also more likely to lead to common experiences and possibly common interests (Pencavel, 1998). The IV estimation in this case should correct the bias because the instrument variables are correlated with schooling but not with wage rates.

To examine the validity of using sibling numbers, father's education, mother's education and spouse's education as instruments, we can check the result from the first-stage estimation of the two-stage least squares (2SLS). Table 1 shows the regression results of these four instruments relative to individual years of schooling. Specifically, spouse's education generates the highest impact, which can be interpreted as each additional year of a spouse's

education leads to a 0.36 increase in individual's years of schooling. We used the IV approach on most of regressions except for regional development and college majors, because using IV methods requires at least equal or more instruments than the endogenous variable (in our case, years of education). Therefore, our four instruments would not satisfy this requirement when it comes to regional development and college majors.

Table 1
Relativity of four instruments to years of education

	(1) Years of schooling
Sibling number	-0.355*** (0.0511)
Father's education	0.0567*** (0.0131)
Mother's education	0.0869*** (0.0116)
Spouse's education	0.361*** (0.0182)
Constant	6.124*** (0.277)
N	2342
R2	0.251
adj. R2	0.250

Standard errors in parentheses
p < 0.05, ** p < 0.01, *** p < 0.001

The data we use for this empirical study was taken from the Chinese Family Panel Studies (CFPS), which is a nationally representative, annual longitudinal survey of Chinese

communities, families, and individuals launched in 2010 by the Institute of Social Science Survey (ISSS) of Peking University, China. We use the adult data, which covers almost 15,000 families and almost 30,000 individuals in 31 provinces. These provinces vary substantially in terms of geography, economic development and preferential policies. Based on their characteristics, we regrouped them into six groups, which are Metropolises (Beijing, Tianjin and Shanghai), Northeast area (Heilongjiang, Jilin and Liaoning), Coastal area (Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan), Central area (Shanxi, Henan, Anhui, Hubei, Hunan and Jiangxi), Northwest area (Inner Mongolia, Shaanxi, Ningxia, Gansu, Qinghai, Xinjiang and Tibet) and Southwest area (Sichuan, Chongqing, Yunnan, Guizhou and Guangxi).

I grouped them this way for several reasons. Among the 31 provinces, I first selected Beijing, Tianjin and Shanghai to form the Metropolitan groups to study the highest rate of returns to education in China. These three cities not only have province-level status, but also are the richest, most politically preferred areas. Heilongjiang, Liaoning and Jilin comprise the northeast area. They are the industrial heartland of China, with economic legacy from Japanese control from 1905, representing the traditionally rich provinces. The coastal area, which refers to Hebei, Shandong, Jiangsu, Zhejiang, Fujian, Guangdong and Hainan, are naturally gifted with arable plains as well as that which facilitates water transportation in the form of river and seacoast. Then the central area consists of Shanxi, Henan, Anhui, Hubei, Hunan and Jiangxi, nurtured by the Yellow River and Yangtze River. This area was named the “Chinese granary” and has a dense population. Moving towards the west, the northwest area includes Inner Mongolia, Shaanxi, Ningxia, Gansu, Qinghai, Xinjiang and Tibet. Insufficient in precipitation

but abundant in mineral resources, the geography has made its agriculture difficult while granting advantages in industries. Lastly, Sichuan, Chongqing, Yunnan, Guizhou and Guangxi make up the Southwest area, a mountainous area with scarce arable land and habitant of minorities. Each regional variable is a dummy variable, coded as "one" when the sampled individual resides in this area, and zero otherwise.

To focus on wage determination in the labor market, we restrict our sample to workers who are engaged in wage employment. In accordance with the standard practice, we exclude individuals aged fifteen or younger (the minimum working age in China is sixteen according to China's labor law) and sixty or older (standard retirement age). We also exclude respondents who provide incomplete information on wage, education, household composition and family education. We do not exclude samples who has a negative ln (wage). Having a negative ln (wage) basically means the hourly wage is less than one yuan ($0.16). Given that most provinces in China set the minimum hourly wage at higher than 9.2 yuan, the data here reveal a more convincing living status than figures written on papers[1]. This generate a sample of 2342 individuals. To define their formal schooling years, a particular number of years of schooling is necessary and assigned to correspondent academic degrees based on the standard form from the United Nation Educational, Scientific and Cultural Organization (Table 2). Also, hourly wage is required and calculated through monthly average wage and monthly working hours. We use the natural log of hourly wage from the main job as the dependent variable, earnings from secondary jobs as well as benefits, subsidies and bonus are excluded from the analysis.

Table 2

Education levels and corresponding standard years

Level of education	Years of education
ISCED9: Not elsewhere classified	Not specified
ISCED8: Doctoral or equivalent level	24
ISCED7: Master's or equivalent level	19
ISCED6: Bachelor's or equivalent level	16
ISCED5: Short-cycle tertiary education	15
ISCED4: Post-secondary non-tertiary education	15
ISCED3: Upper secondary education	12
ISCED2: Lower secondary education	9
ISCED1: Primary education	6
ISCED0: Early childhood education	0

Source: UN Educational, Scientific and Cultural Organization (2011).

CHAPTER 4: Results

4.1 Communist Party Affiliation

It is an open secret that under the leadership of the CCP, people with a Party affiliation possess various advantages compared with non-party members. In order to test for the differences between party members versus non-party members, we added interaction variables on the schooling and experience variables. Based on our data, there are 2023(86.38%) individuals who are party members. The resulting regression becomes:

$$Ln\ wage = \beta_1 + \beta_2 S + \beta_3 E + \beta_4 E^2 + \beta_5 Com + \beta_6 Com * S + \beta_7 Com * E + \beta_8 Com * E^2 + \varepsilon \quad (3)$$ [2]

Table 3 shows the result. It is interesting to note, a communist affiliation increase wages by 4.35% keeping all else equal compared with an estimated of 7.02% for non-communists. This contrasts with previous research conducted by Johnson and Chow (1997), who reported a 2.42% rate of returns for communist party members and 3.68 percent for non-party members using the same model. Also, Li et al. (2007), using Chinese urban twins data, showed a similar 10 percent increase earnings for communist party members with OLS on whole sample. However, their estimate dropped to zero when they ran another generalized least squares (GLS) within twin pair estimates. Based on this two-regression model, they concluded that it is the higher ability of the individual rather than special political status that contributed to their success during China's economic transition. Yet, we find this conclusion dubious because the authors ignored the possibilities both twins could share the benefits and connections as long as

[2] The Com variable in this equation is a dummy variable, it is one if the respondent is party member, otherwise it is zero.

one of them joined the party. In other words, using twins data to study education returns between Party members and non-Party members might bias the non-Party twin's education returns upwardly, and therefore covers the gaps between Party member and non-party member. On the other hand, to investigate a more realistic education return gap between Party members and non-Party members as well as to justify our belief that CCP's policy towards recruitment has changed giving a higher reward to educated professionals, we can adopt a retrospective inspection of their policy trends.

Starting from August 1980, when Deng Xiaoping pointed out cadres four modernizations standard (Deng Xiaoping Wenxuan, 1980, p. 361), the idea of having more revolutionized, educated, specialized and younger cadres has gradually become the principle for recruiting cadres. As for the revolutionized requirement, it refers to supporting the communist ideology and serving the people wholeheartedly. "Educated" mainly refers to improving the cadres' education levels, valuing academic degree as well as genuine talent. Specialization emphasizes the cadres' professional and operational capacities, expertise and knowledge. "Younger" mainly requires cadres' ability to handle heavy workloads energetically. Continuing carry out the requirement for education and specialization, the Central Committee of the Communist Party of China issued the Party Leading Cadres' Selection and Appointment Interim Regulations in 1995. In the Article seven, line four, it clearly states that: "For general leading position promotion, candidates should acquire at minimum completion of the professional school level or above, and among those who head for Hall and Bureau level positions, cadres in general should have a minimum of the undergraduate degree or above." It is of great importance to understand that the CCP has added educational

requirements into its recruitment regulations and started to replace redness/communist ideology by education as a selection criterion (Kou, 2006). This culminates in a very different leading generation characterized as technocrats, who no longer share strong bonding revolutionary experiences such as the Long March and political solidarity like the previous leadership led by Mao and Deng. This generation of Party leaders were mostly born in the late 1940s and 1950s, grew up during the early years of the Cultural Revolution, had long been disillusioned about Mao and Communist ideology, and valued economic reform and development more than the political extreme (Cheng, 2000).

This new trend started with the third generation of leaders, led by Jiang Zemin, who presided over the General Secretary of the Communist Party of China (GSC) from 1989 to 2004. During his term, the ratio of technocrats grew largely, from 1992 to 2002, the number of committee member on the Politburo Standing Committee (PSC) who had an education level of undergraduate or above has increased from 20 out of 29 (68.97%) to 26 out of 34(76.47%) compared to the previous number of 10 out of 30 (33.33%) in 1982 and 15 out of 23 (65.22%) in 1987 (Zhao & Zhang, 2006). Besides the increase in numbers, cadres with higher education promoted to high ranks signal a dynamic of even more importance. The most evident case rests on Zhu Rongji, former Premier of the People's Republic of China (PRC). Zhu Rongji, core leader of the third generation of leaders, graduated from Tsinghua University in 1951. After graduation, he worked for the Northeast China Department of Industries as deputy head of its production planning office. Having criticized Mao's irrational high growth, Zhu was labeled 'Rightist' and sent to work in the rural farms until 1969. After Deng started economic reforms in 1978, Zhu was re-appreciated because of his forward-thinking and bold economic ideas, and

was appointed deputy bureau chief in the Ministry of Petroleum Industry in 1979; vice-chairman of the Central Economic Commission; later, Mayor of Shanghai; Party Chief in Shanghai from 1987 to 1991; member of PSC in 1992; and president of People's Bank of China in 1993. Meanwhile, he also served as dean of schools of Economics and Management in Tsinghua from 1984 to 2001. From the petroleum industry to the economic commission, plus four years' experience in economic development frontier-Shanghai. Implemented with pragmatism and expertise, Zhu really made significant contributions in directing China's economic development.

Following the third generation of leaders, the favor for technocrats became more and more apparent in the fourth generations of leaders. Hu Jintao, appointed informally as successor of Jiang by Deng, was also graduated from Tsinghua University, department of Hydraulic Engineering. His colleague, Wen Jiabao, Premier successor of Zhu Rongji from 2003 to 2013, was graduated from China University of Geosciences (National Key University), and Wu Bangguo, vice premier of the state council of the PRC, had graduated from department of radio electronics, Tsinghua Universities. Also, in the current fifth generation of leaders, the incumbent GSC, Xi Jinping was also a graduate from Tsinghua and has Doctor of Juridical Science, and Li Keqiang, incumbent Premier of PRC, was graduated from Peking University with Ph.D in economics. Cheng (2000) showed a distribution of education levels of the fourth generation of leaders 27 (9.1%) leaders who have a post-graduate degree, 222 (74.5%) finished undergraduate school, 9 (3.0%) went to 2-year college or polytechnic, 12 (4.0%) graduated from party school, and 25 (8.4%) finished high school or below. Also, 153 (56%) of them majored in engineering and natural science, 27 (9.9%) majored in economics and management,

41 (15%) studied social science and law, 44 (16.1%) learned humanities and 4 (1.5%) majored in military science. The trend within the communist party has been clear—they have been recruiting higher educated and specialized intellectuals in subjects like engineering and economics to enhancing the nation's development; meanwhile, they have altered the nation's objectives from drastic political movements such as purging capitalism to high-speed economic construction. Given the fact that the CCP tends to recruit highly educated people, a question arises about whether to attribute the phenomenon to selection bias or the positive effect of Party affiliation. For now, due to data limitations, it is hard to adjudicate these positions. Further research may be needed upon this matter.

4.2 Regional development

Due to the fact China is a geographically large country, regional disparity remains an intensive problem in directing its future development. Except the three exceptionally rich province-level metropolises(Beijing, Tianjin and Shanghai), the ratio of national GDP per capita between the wealthiest province Jiangsu and the poorest province Guizhou was 3.25 in 2013, indicating unequal economic development between these two (China Statistical Yearbook, 2014). Household income levels, population education distributions and government investment differ largely under this disparity, which also was reflected in differentiated regional returns to education. In this section, we regrouped 31 provinces into six groups according to their similarities and regressed them on years of education, experience and experience squared.

Table 3

Returns to years of schooling under impact of communist affiliation, regional development and college type (dependent variable: natural log wage)

Technique	OLS (1) Base equation	IV (2) Base equation	OLS (3) Communist affiliation	IV (4) Communist affiliation	OLS (5) Regional development	OLS (6) College type	IV (7) College type
Years of schooling	0.0611***	0.109***	0.0702***	0.105***	0.0617***	0.0637***	0.0949***
	(0.00474)	(0.0146)	(0.00458)	(0.0117)	(0.00941)	(0.00449)	(0.0130)
Experience	0.0117	0.0250**	0.00541	0.0200*	0.0362*	0.0135	0.0214**
	(0.00695)	(0.00805)	(0.00750)	(0.00884)	(0.0150)	(0.00692)	(0.00759)
Experience square	-0.000184	-0.000348	-0.000105	-0.000313	-0.00109*	-0.000228	-0.000315
	(0.000175)	(0.000184)	(0.000189)	(0.000201)	(0.000467)	(0.000174)	(0.000179)
Communist party	-0.00183	-0.110	-0.802*	-0.590*			
	(0.0459)	(0.0561)	(0.313)	(0.271)			
College	0.356***	0.144					
	(0.0518)	(0.0806)					
Com*years-of-schooling			0.0435**				
			(0.0155)				
Com*experience			0.0124	-0.00734			
			(0.0205)	(0.0208)			
Com*experience square			0.000155	0.000587			

Table 3 continued

	(0.000521)	(0.000537)		
Com instrument		0.0265*		
		(0.0115)		
Metro* years-of-schooling			0.0395***	
			(0.0110)	
Northeast* years-of-schooling			-0.00331	
			(0.0120)	
Coastal* years-of-schooling			0.0245*	
			(0.0107)	
Central* years-of-schooling			0.00206	
			(0.0104)	
Northwest* years-of-schooling			-0.0158	
			(0.0136)	
NKUS				0.0343***[3]
				(0.00491)

3 We also test the hypothesis that $\beta_4 = \beta_5$ in both regression 6 and regression 7. The test statistics are all greater than critical value, therefore reject the null hypothesis and conclude these two coefficients are not equal.

TTUS						0.0138***	
						(0.00381)	
Table 3 cont'd							
NKU*instrument							0.0234***
							(0.00543)
TTU*instrument							0.00385
							(0.00457)
Constant	1.187***	0.535**	1.202***	0.669***	1.060***	1.153***	0.724***
	(0.0886)	(0.208)	(0.0948)	(0.193)	(0.0861)	(0.0864)	(0.188)
N	2342	2342	2342	2342	2342	2342	2342
R^2	0.158	0.120	0.145	0.127	0.200	0.160	0.145
adj. R^2	0.156	0.118	0.143	0.124	0.193	0.158	0.143

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The regression results in Table 3, regression 5 show that the three metropolitans no doubt lead in the rate of returns to education of 10.12% (at a level of significance of less than 1%) which is approximately 4% higher than the national level, which indicates educated people are rewarded highest in this area than the rest of the country. The second highest goes to the coastal area with 8.62% rate of returns, also significant, which partially explains its role as destination for recent huge inflow of workforce migration (nearly 164 million workers, 60% percent of overall workforce migration)[4]. Then follows the central area (6.38%), southwest area (6.17%)[5], northeast (5.84%), and northwest area (4.59%). These findings are in contrast to Fleisher and Chen (1997), Li (2003) and Fleisher et al. (2010), who all found a higher returns to education in undeveloped areas than developed areas in China. Li (2003) reported 6% returns in Gansu and 4% returns in Guangdong, and gave two explanations for this gap. First, he argues the lower educated workers are rewarded much less in developed areas in the private sector; secondly, the share of state-owned enterprise (SOE) is much smaller in Guangdong, and SOE means firms provide high returns to low education levels. To test these two arguments, we break down the institution types from coastal area and northwest area, and regressed on these institution types. After focusing on these two specific areas, the observations declined to 591 for the coastal area and 163 for the northwest area. Table 4 presents the institution type distribution; given several types are very limited in size, we regrouped them into three

[4] Data from 2014 *National Monitoring Survey of Migrant Workers*, published by National Bureau of Statistics of China. This report specifies, "Among those who migrates to work, 164.25 million of people works in eastern area… 57.93 million of people works in middle area… and 51.05 million works in western area. " And eastern area includes Beijing, Tianjing, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan.

[5] The southwest area rate of return to education is the base estimate of years of schooling.

categories: “state” category includes state-owned enterprises, state/collective owned institutes, government/military and village autonomy committees; “private” includes private enterprises, self-employed, LLC, joint-stock enterprises, rural household business, collective enterprises and private non-enterprise organization; and “invested” refers to foreign-invested enterprises and Hong Kong/Macau/Taiwan-invested enterprises. Combined with the regression results (Table 5), several interesting points deserve further interpretation.

Table 4
Company type distribution

	Coastal		Northwest	
	#	%	#	%
State-owned enterprises	47	7.95	36	22.09
State/collective owned institutes	38	6.43	23	14.11
Government/military	36	6.09	14	8.59
Village autonomy committees	11	1.86	3	1.84
Private enterprises	188	31.81	35	21.47
Self-employed	100	16.92	14	8.59
LLC	45	7.61	7	4.29
Joint-stock enterprises	19	3.21	2	1.23
Rural household business	16	2.71	3	1.84
Collective enterprises	13	2.20	6	3.68
Private non-enterprise organization	6	1.02	2	1.23
Foreign-invested enterprises	28	4.74	2	1.23
Hong Kong/Macau/Taiwan-invested enterprises	12	2.03	2	1.23
Others	15	2.54	6	3.68
Undefined	17	2.88	8	4.91
Sum	591	100	163	100

Table 5[6]

Coastal and Northwest returns to education for company types (dependent variable: natural log wage)

	(1) Coastal State	(2) Northwest State	(3) Coastal Private	(4) Northwest Private	(5) Coastal Invested	(6) Northwest Invested
Years of schooling	0.0805***	0.0130	0.131***	0.0359**	0.0912***	0.0406***
	(0.00991)	(0.0157)	(0.0152)	(0.0140)	(0.00858)	(0.0113)
Experience	0.00138	-0.00715	0.0155	0.0247	0.0131	-0.0155
	(0.0156)	(0.0355)	(0.0219)	(0.0397)	(0.0139)	(0.0282)
Experience square	0.0000863	0.00000348	0.000134	-0.000109	-0.0000978	0.000565
	(0.000389)	(0.000905)	(0.000561)	(0.00111)	(0.000349)	(0.000752)
State	-1.328***	-0.861				
	(0.427)	(0.649)				
State*Schooling	0.0750***	0.0624**				
	(0.0227)	(0.0279)				
State*Experience	0.0295	-0.00713				
	(0.0313)	(0.0597)				
State*Experience Square	-0.000163	0.00104				
	(0.000828)	(0.00163)				
Private			0.764**	0.817		
			(0.365)	(0.584)		

[6] Parsimonious model has been regressed and variables with significance did not change.

Table 5 continued

Private*Schooling			-0.0580***	0.00332		
			(0.0185)	(0.0248)		
Private*Experience			-0.00686	-0.0790		
			(0.0278)	(0.0569)		
Private*Experience Square			-0.000243	0.00114		
			(0.000707)	(0.00152)		
Invested					-1.173	-3.610
					(0.880)	(2.984)
Invested*Schooling					0.0899*	0.0237
					(0.0462)	(0.0851)
Invested*Experience					0.0302	0.399
					(0.0792)	(0.521)
Invested*Experience Square					-0.000913	-0.00919
					(0.00246)	(0.0240)
Constant	1.100***	1.787***	0.328	1.169***	0.861***	1.535***
	(0.195)	(0.375)	(0.300)	(0.389)	(0.173)	(0.287)
N	591	163	591	163	591	163
R^2	0.205	0.117	0.204	0.120	0.197	0.125
adj. R^2	0.196	0.077	0.195	0.080	0.187	0.085

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

First, the costal area's rate of returns are on average 5-6% higher than the northwest area, indicating an overall low education return regardless of company types in the northwest area. Second, in the coastal area, the invested enterprises give the highest returns of 18.11%, followed by the state institutions at 15.55%. This complies with the commonly presumed "high-paid" image of invested companies and reaffirms its leading role in pushing up the coastal rate of education returns. Also, given the state institutions run the second place of rate of returns, it seems that in coastal area, state institutions provide adequate conditions in attracting employees, at least greater than those private sectors. Meanwhile, in the northwest area, state institutions generate the highest and most significant rate of returns, while invested companies follow second with 6.43% rate of returns, and private enterprises with 3.91% rate of returns. In contrast to Li's previous argument, employees in the coastal area are rewarded much better than the northwest area, no matter whether analyzed overall or by group. Although he was right on the private sector saying that employees with lower education are rewarded much less than in developed areas, he falsely blamed state institutions as the reason for low returns. Actually, in the northwest area, the state institutions did a fair job in education returns when comparing the variation of schooling across the state institution types (the interaction term). The key factor dragging down its rate of returns is the base schooling. In addition to the regression results, two-thirds of the northwest institutions are either government owned or government controlled. These facts show the still-dominant position of the government's hold on image in current China, even after its 30 years of market-orientated economic reform. The second interesting finding focuses on the private sector. Given high employment in both areas (65.48% in the coastal area, 42.33% in the northwest area), private enterprises present only

7.3% and 3.92% respectively. This indicates there is still plenty of potential in increasing market returns to education if private enterprises reward higher educated employees more. Thirdly, those types of investment companies generate high returns to education in the coastal area, but in the northwest area, the quantity is as meager as its returns. In the northwest area, there are only 4 individuals working in invested companies, and the returns are neither attractive nor promising. It is reasonable to conjecture that maybe it is because of the insufficient infrastructure and underdeveloped institutions that characterize the disadvantaged northwest. They are unable to attract investment, and even when they grab one or two, this poor area has been unable to make appropriate use of them.

In addition to company type, another reason that may account for the low returns to education in the northwest area is its overall low-income level; in other words, its low GDP per capita has an impact. Maybe their companies value other endowments higher than knowledge, or maybe they are too poor to value anything. How poor are they, and what caused this regional inequality? Démurger et al. (2002) have tracked the reasons back to 1978 when China established a market-orientated economic reform at the Third Plenum of the Eleventh Party Congress. The strategy on the international front was a series of preferential policies in special economic zones, where the majority was to provide tax benefits in order to attract foreign direct investment (FDI). For example, "firms in these open economic zones could import intermediate inputs duty-free to produce exports, collaborate with foreign companies in investment, manufacturing and distribution… escape the confiscatory taxation." However, these policies do not mean steady state subsidies to keep falling enterprises alive. There were certainly bank loans in the beginning, but firms since then have had to bear their own profits

and losses. Under these policies, the coastal area became its first beneficiary, for they are where FDI was concentrated. On the other hand, the “opening-up” reform also carries out a set of domestic strategies, which include the decentralization of agricultural production, the fiscal system and prices. The decentralization of the fiscal system serves as a double-edge sword. It helps boost up the national economy on one hand, and on the other, it lays much more expenditure on the province level. Lack of funds in provincial governments resulted in their being unable to undertake poverty alleviation programs or reduce development expenditures in the poorest areas, and this caused further underdevelopment in these areas. Equally important is the decentralization of prices strategy. This policy initially took the form of a dual price system for industrial inputs. Continuous artificially low prices made the northwest area (the main supplier of raw industrial resources) consequently poorer and poorer as their wealth was stolen for the richer coastal factories. Fortunately, this system was moved away out of consideration of regional disparity in 1990-1991. Under the effect of preferential policies, domestic strategies and geographical advantages, the coastal area undoubtedly in contrast has become richer and richer.

Then what should be done to balance this inequality? Is banning the preferential policies a good idea? In fact, inland provinces also benefit from this policy. Instead of denying this completely, it is more sensible to increase access of the inland provinces to these preferential policies (Démurger et al., 2002). Further, another reason for arguing there is no need for abolishment is that the FDI effect is much smaller after 1994, and private enterprises has replaced them becoming new China’s growth engine (Fleisher et al., 2010). Our results also show that foreign-investment enterprises did not lead to a significant increase in the

northwest area, yet private enterprises have more potential to grow into the major force. In addition, increased interprovincial trade business seems to be a sensible way to balance regional inequality. To achieve that, establishing reforms in China's Hukou system became unavoidable necessities in China (Démurger et al., 2002; Pedroni & Yao, 2006). The rigid Hukou system (Chinese household registration system) approves people to live, work, receive publicly provided education and healthcare services in urban areas only when the individual has urban permits, which are issued based on citizen's birth location. More specifically, this Hukou system has two categories: based on individual's parents' occupation, the individual would either be agricultural of non-agricultural; and based on the agricultural/non-agricultural classification, each citizen is also distinguished by whether he has a local Hukou with respect to an administrative unit. The local Hukou defines one's right for many activities in a specific locality, and "agricultural" classification, a social control system inherited from Maoist era, excludes rural population from access to state-provided goods, welfare and entitlements, creating a massive pool of poor rural labor tied to land who maintain a self-sustained life. Though in recent years, reforms on the Hukou system have eliminated the agricultural and non-agricultural classification and devolved the power to issue own hiring rules to local governments, these changes barely have relevance for the great majority of rural migrant workers (Wing Chan & Buckingham, 2008) because the locally determined entry requirements in many migration destinations are set so prohibitively high that only the riches and high-educated could meet those requirements. Furthermore, since those rural migrant workers are not eligible to get a local Hukou, they are barred from applying for jobs from official organizational channels; therefore, they could only take-up those low-skilled 3D (dangerous,

dirty and demeaning) jobs (Chan, 2010; Zhang, 2010). This opportunity discrimination caused by Hukou system actually resulted in an inefficient labor market and disrupted social harmony by making those hardworking migrant laborers second-class citizens. In addition to empirical observation, statistical simulation on Hukou abolition also indicates the Hukou system plays a significant role in preventing movements of labor, which moves the Chinese economy towards a more equal distribution of income (Whalley & Zhang, 2007). Although the agricultural and non-agricultural classification is abolished, the Hukou system is still alive and potent in China, and the road of reforms ahead is no doubt a long and uncertain one.

4.3 College Type

Every June since 1977 has been crucial for Chinese high school graduates. On exactly the same two days, hundreds of thousands of high school graduates across the entire nation sit in classrooms taking College Entrance Examinations to compete for their seats in college. Those who are exceptionally excellent would select those National Key Universities, also called “985” and “211” universities, which are government selected and financed. Though experience has repeatedly infused in the population that these universities represent high standard and high quality of education and research, graduates from these universities are called the “backbone of the country.” However, to what extent did the market reward their high quality of education? To address this problem, we used regression analysis on different college types. According to available data sets, the college type was divided into two categories. National Key Universities denote those who belong to either 985 project or 211 project. Both projects involve national and local governments allocating large amounts of funding in order to push them into world-class universities in the 21st century. “Regular” universities denote

those selected and financed by municipal government universities, and those not specifically financed, but that receive subsidies from the government.

Regression analyses on these categories show the examinees' strategy is justified. Among those who received higher education, National Key Universities generate 2% higher education returns (Table 3, Regression 6). What factors have contributed to this gap? Is it that more money could really buy more academic autonomy and creativity that guarantees their better quality? It is true that individual institutions may be granted with a differentiated degree of autonomy and benefits based on their specific status, and that National Key Universities do receive special care both economically and politically? For example, the prestigious Tsinghua University, ranked top on both "985" and "211" project, received an appropriation of 350 million yuan (60 million dollars) in 1994 from the "211" project, then again 1999, was allocated with another 1800 million yuan (300 million dollars) within 4 years (Pan, 2007). Admittedly, these heavy financial supports benefitted education development in every physical sense, including building up high-tech classrooms and experimental laboratories, recruiting more exceptional professors and supporting research academic projects; however, are there counter balancing constraints and checks that may threaten the university's autonomy and influence education development?

A key argument in recent years has described the relationship between university autonomy and funding as a linear effect, and the relationship between government funding and industrial funding as a substitute effect, meaning the more diverse the funding base, the more autonomy; the more reliance on government, the less autonomy. In China's case, the majority of universities (1802 out of 2246, 80.23%) are public universities, financed by either state or

local government. Is university autonomy seriously damaged in China under these conditions? Since this topic seems to be sensitive to the current government, there is no large-scale empirical research on this topic in Mainland China, but few limited scope case study results exist. Yang et al. (2007) conducted a series of 21 semi-structured interviews in Nanjing University (NU) and Nanjing University of Science and Technology (NUST). Their interviewees include 11 full professors, 6 associate professors, and 4 lecturers. Although the sample size is limited and recognizing that there are possible biases due to the nature of the sample, it still appears that when it comes to general institutional autonomy, there was almost total consensus that universities in China have more autonomy now than they did ten years ago, yet in a specific respect, there are still limitations. Universities can hire and fire staff members at low ranks, but had to receive appointed president and Party secretaries by central authorities. Universities have freedoms in designing course content and curriculum on most subjects, but political education and sensitive areas of research are still controlled by Ministry of Education (MOE). Universities can decide on enrollment quota on postgraduate recruitment, but the undergraduate recruitment is pinned-down by state government. Besides regulations on institutional autonomy, the MOE also introduced performance evaluations for University to demonstrate accountability. This evaluation of undergraduate programs on teaching quality has the most severe critics. Many respondents expressed their concerns that this prescriptive accountability measures could force a convergence of university structures towards a single model, that it wastes manpower and money, and has the danger of making universities into a standardized mechanical factory creating approved products.

Wang (2014) shared similar concerns. He conducted fieldwork in universities in Beijing. Wang's study cites includes 9 higher education institutions (HEIs), which include 3 universities directly affiliated with MOE, 3 affiliated with Beijing municipal government, 1 Minban College and 2 independent colleges. Minban Colleges are operated by non-public organizations, and independent colleges are collaboratively managed by both non-public partners and public universities. Although his sample is small, he finds that besides the government control described for public universities, private universities began to share a similar fate with their public counterparts. Private institutions have more administrative flexibility in appointing their own presidents and senior administrations, but this autonomy has been challenged as CCP branches are being established in private colleges and the Party is becoming more influential. Apart from this, interviewees from a Minban College complained the local government even put many restrictions on the choice of textbooks and admission quotas, though it had no investment in the college. Wang also noted that in 2007, nearly one-fifth of the tertiary students joined the CCP; over half of the teaching staff and an even higher rate with the administrative staff in HEIs in Beijing are party members. And this successfully established controlling system "has provided subordinate officials with career incentives to follow central decisions without forcing them to do so" (Heilmann, 2005).

Then is it the fact that heavy reliance on government funding has become the main cause threatening university autonomy? Will diversifying funding bases, especially introducing more industrial funding and cutting government funding, alleviate this situation and bring more autonomy and boost academic qualities in universities? Not necessarily. Industrial funding, indeed, is significantly related to applied research activities and strongly

correlated with high publication productivities. However, this effect differs largely between fields and contexts. Along with those entrepreneurial funding are possible decreases in long-term research or changed research agendas, increased commodification and commercialization, pressures on the researchers and traditional teaching and basic research tasks they carry out (Gulbrandsen & Semeby, 2005). Secondly, about the existing relationship between government funding and industrial funding, Muscio et al. (2013) argue that contrary to the common assumption of substitute relation, government funding to universities actually complements funding from research contracts and consulting activity. "Complementing" implies that public funding would be indispensable, not only to guarantee the survival and the financial sustainability of universities, but also to stimulate universities' research activities whose results can be eventually transferred to industry, therefore consolidating universities' role as an engine of economic growth. Thirdly, funding effects differ in a cultural context. In a comparative research study on university autonomy and funding between England and Taiwan, the author has specified that all funding comes with demands and constraints, free from government control; yet looking elsewhere for funding may paradoxically lead universities entering another realm of external control (Chiang, 2004). Some interviewees from English universities even defend government funding by arguing that it represents less interference than industry funding, and offers financial security to allow universities to plan ahead. To be more specific, in Taiwan, an east realm with shared origin and traditions with Mainland China, private universities are encouraged to operate in the market, but they are limited by heavy legislation and regulations on how they use their discretionary income. Instead of seeking alternative funds or diversifying funding bases, Taiwan private universities

are more concerned with whether they are allowed to deploy and invest their own resources. In fact, autonomy in Taiwan universities demands more upon good will or trust from the government rather than on how well universities attract alternative sources of funding. And this trust is hard to realize in eastern culture regimes where government was accustomed to have a top-down vertical control over universities.

Then is it possible to establish this reciprocal trust between government and universities in Mainland China? The answer is a conditional, "yes." Tsinghua University and Huazhong University of Science and Technology (HUST) have illustrated distinct examples of striving for their own autonomy. As discussed in the previous context, Tsinghua University has shared a close relationship with the ruling party. This is of great importance in granting them advantages in approaching top decision makers, negotiating with government and testing the states' tolerance. Secondly, Tsinghua was already a first-class university before the CCP came to power in 1949 as their specializations made extra contributions in national defense and economic development. With a combination of these two, Tsinghua has earned the government's trust and pursues its own goals of striving for universities' autonomy (Pan, 2007). Similarly to Tsinghua, HUST also has the top technological specialization advantage and shares close links with Wuhan municipal government. In addition to its university-government link, HUST builds up its university-industry linkage by actively participating in the establishment of the East Lake High-tech Zone, which is also an important part of Wuhan Optics Valley of China. By the end of 2010, more than 70 percent of the enterprises in this science park have been founded and run by the faculties and alumni of HUST. This advantage grants not only research opportunities, but also contributes billions of financial funding to

HUST’s development (Liu, 2012). Maintaining a close relationship with the running Party and possessing excellent academic specializations, plus establishing mutually beneficial linkages with industry enable Chinese National Key universities to obtain more resources and opportunities; this also produces better education quality, which in turn is reflected in their graduates as higher rate of returns to education.

4.4 Major in College

The last factor regressed is major in college, and abundant research has documented that large earning differences exist across different majors (Chevalier, 2011; Del Rossi & Hersch, 2008; Finnie & Frenette, 2003; Hamermesh and Donald, 2008; Kelly et al. 2010; Robst, 2007; Walker and Zhu, 2011). For example, James et al. (1989) argue that “while sending your child to Harvard appears to be a good investment, sending him to your local state universities to major in Engineering, to take lots of math, and preferably to attain a high GPA, is an even better private investment” (p.25). In general, students with a better math ground earn more than those graduates from arts major.

Table 6
Major distribution

	Number
Philosophy	1
Medicine	17
Management	43
Economics	36
Law	37
Education	30
Literature	46
History	4
Science	17
Engineering	65
Agriculture	5
Sum	301

Fortunately, the 2010 CFPS survey asked specific questions regarding an individual's college major. According to the dataset, eleven majors are available. In order to run regressions (sample size larger than 30), we grouped them according to their genre. Those majors include three math-background required majors: Science, Engineering and Agriculture; two social science majors: Economics and Management; and five humanity majors: Philosophy, Law, Literature, History and Education; and Medicine. Table 6 gives the distribution of college majors among those who finished college degree and above, and Table 7 shows the regression results. The results shown are in alignment with the international trend, specifically, those math-required majors did perform remarkably superior to other majors, especially the Engineering major, which gives 57% (Table 7 regression 6) higher increate rate of wage compared to other majors. Meanwhile, when we compared the first three regressions, the math-required majors as a group generate a significant but positive explanatory coefficient, and the

rest of the majors, Economics- Management, Humanity and Medicine majors, all generate negative rate of returns. In fact, these parameters are very fit in explaining China's development process. Let us pause for a second and take a closer look to these individuals. The average age for these individuals is 34.71, with 6.51 standard deviation. And back to when they were born were exactly the period when China focuses its development on heavy industrial development and therefore embedded their growing up environment with admiration of science and engineering. After they graduated, the industry provided increasing demands for graduates from these fields. Just as Chen and Quan (2008) show among the 32 years after 1949, there were nearly 1.07 million students graduated from Post-secondary technical schools, and 98.1% of them were assigned to work in the industrial factories. On the other hand, the economics and humanities majors have not been taken seriously until very recently.

Another surprising finding is that in contrast to the United States and Western countries where physicians are recognized as high-income professions who earn high returns to education, graduates in medicine in China unexpectedly receive a significant below average rate of returns. To get a clearer reason for this phenomenon, we ran two additional multiple linear regressions; one contains only medicine as additional explanatory variable with baseline variables, the other one with interactions on the Medicine major. From the Table 7 regression 4, the medicine major gives a statistically significant 50% lower increase rate compared to average college education returns. And from Table 7 regression 5(although due to the sample size limitation, the results are not statistically significant) it is shown that the Medicine major generates a 9.3% rate of returns, which is 5% lower than the average of other majors. Then does this indicate that the health sector is paid less than other economic or humanity major

required sectors? Combined with other findings, the mean earnings in the public health sector is ranked lowest in the Chinese economy (Qin et al., 2013). However, on the other hand, the share of out-of-pocket health expenditure by individuals has been skyrocketing since the 1980s in China, from 20% in 1980 to 49% in 2006 (You &Kobayashi, 2011). Then where did the money go and what has caused such low returns in medicine? With no exception, policy change and government interference account for most of their reasons (Wang, 2009). Similar to most public service providers in China, the health care sector was dominated by public hospitals. These government-owned, financed and run hospitals have advantages in many aspects relative to private hospitals, such as capacity, reputation and policy supply. For instance, patients prefer to use public health service rather than private hospitals because most of private hospitals are not listed as the designated providers for the various public insurance programs (Pan et al., 2015; Qin et al., 2013). For these public hospitals, the government has imposed a system of price regulations since 1978 when China issued its policy of a privatized economy and changed the way it financed the health sector. The central government reduced its share of national health spending from 32% to 15% from 1978 to 1999, and placed the responsibilities to provincial and local authorities. Meanwhile, to keep the health care accessible, the government has put a cap on fee charges on routine visits and services, such as standard diagnosis, surgeries and routine pharmaceuticals. However, on the other hand, to keep hospitals solvent, the government also permitted facilities to earn 15% profits on prescribing new drugs, high-tech diagnostic services and 25% for Chinese medicine[7] (Blumenthal, 2005;

[7] Chinese medicine refers to the theory of traditional Chinese herbal therapy.

Pan et al., 2015). As a result, over-prescription behavior is common and consistently accounts for high national health expenditure, even though Chinese doctors' official income is small (Yang & Fan, 2012). Apart from physicians receiving kickbacks and interests from pharmaceutical companies, patients and their families usually give informal payments like gifts and "red pocket" money to doctors to show their gratitude (Chiu et al., 2007). After taking considerations of these factors, the income for Chinese doctors seems very small from statistical data alone, and generates an inexplicable below average return to medicine education. It can be interpreted as an unwelcoming market for physician workers, but the reality actually tells a different story. In fact, China faces a situation of excess demand for physicians. The growth in the supply of health care professionals cannot keep up with the increasing demand for them and the outpatient workload is very heavy for Chinese doctors. It is common for Chinese doctors to see around 100 patients daily, resulting in less than 3 minutes diagnosis for each patient, and it has further caused patients' dissatisfaction and the deterioration of doctor-patient relationship. (Li & Xie, 2013). This unfortunate distrust between doctor and patient contributed to aggregated over-prescription due to the physician's' "defensive medicine" to avoid disputes with patients (He, 2014). And this act will undoubtedly elevate out-of-pocket health expenditures, which cause further dissatisfaction and leads to more defensive medicine, culminating in a vicious cycle.

Table 7

Regression on majors

	(1) Lnwage	(2) lnwage	(3) lnwage	(4) lnwage	(5) lnwage	(6) lnwage
Years of schooling	0.0793*	0.0869**	0.0817*	0.0943**	0.0980**	0.0954**
	(0.0418)	(0.0424)	(0.0426)	(0.0420)	(0.0477)	(0.0412)
Experience	0.0201	0.0173	0.0193	0.0119	0.00529	0.0154
	(0.0214)	(0.0217)	(0.0218)	(0.0216)	(0.0226)	(0.0215)
Experience square	0.000568	0.000583	0.000565	0.000745	0.000876	0.000774
	(0.000726)	(0.000737)	(0.000737)	(0.000732)	(0.000759)	(0.000726)
Math-required	0.292***					
	(0.0946)					
Econ-Management		-0.0578				
		(0.0983)				
Humanity			-0.0964			
			(0.0905)			
Medicine				-0.496***	-0.212[8]	
				(0.187)	(1.746)	

[8] This drop in the significance level is not caused by the multicollinearity, but caused by addition of explanatory variables.

Table 7 continued						
Medicine* Schooling					-0.0512	
					(0.104)	
Medicine* Experience					0.0781	
					(0.0889)	
Medicine* Experience Square					-0.00131	
					(0.00332)	
Engineering						0.577***
						(0.124)
Management						0.193
						(0.140)
Economics						0.155
						(0.148)
Law						0.0714
						(0.150)
Literature						0.244*
						(0.138)
Constant	0.935	0.941	1.029	0.869	0.862	0.560
	(0.719)	(0.730)	(0.735)	(0.722)	(0.823)	(0.714)

Table 7 continued

N	301	301	301	301	301	301
R^2	0.114	0.087	0.089	0.107	0.116	0.155
adj. R^2	0.102	0.074	0.077	0.095	0.095	0.132

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

To break this unpleasant circle and restore fairness and efficiency to the health market, China's central government began implementing new health system reforms in 2009 with a commitment to more than 90% medical insurance coverage by 2020, and the introduction of an essential drugs program and deregulation of the hospital market with increased incentives for private investment. Aims to improve access to basic health service, to reduce irrational drug prescription and encourage private hospitals to satisfy unmet medical need, mostly headed in the right direction. This program has the potential to play an important role in enhancing Chinese health performance. In additional to these policy agendas, we provide another three recommendations for improving health qualities and reducing expenditure costs. First is to improve doctors' wages by replacing the fixed salary base by a fee-for-service or performance-based standard. By comparing the wage elasticity between self-employed physicians and public hospital employees, the estimated wage elasticity is 0.575 in private hospitals, indicating an upward-sloping labor supply curve, while in public health providers, the figure is a non-significant 0.02, indicating the labor supply is low and barely responsive to wage change. Hence, with a more flexible performance-based payment system, private health providers are more willing to work longer hours, providing better services for higher financial income (Qin et al., 2013; Yip et al., 2012). Second is to encourage entry of private hospitals and clinics into the marketplace to create competition and force the public sector to improve quality and efficiency. However, this suggestion puts a high demand on government, requiring it to develop a strong and transparent regulatory mechanism to reap market efficiency while preventing private for-profit hospitals from simply running after those riches (Pan et al., 2015; Yip et al., 2012). Hopefully these reforms and recommendations would achieve its goals of

creating a competitive health sector with more efficiency and a responsive labor supply curve, along with a more flexible performance-based payment system. In the future, these changes could contribute to a more "reasonable" above average rate of returns to education and encourage producing well-trained primary health care physicians and nurses to fulfill the vast needs in China's health sector.

CHAPTER 5: Conclusion

Our results on returns to education in China have showed the returns have increased to 6-7% in 2010 relative to previous 4-5% in 1990s. I present OLS and Instrumental results, even though OLS, the method to estimate returns with no control for endogeneity bias, may bias downwardly the results, I suggest looking at the results from both methods, because OLS is easier to interpret, while the Instrumental technique gives more precise results. Also, from the results, education level carries the major weight in boosting an individual's wage level, given estimates of 6.11% and 10.9% in the base model using OLS and IV respectively, relative to experience, which correspondingly gives an 1.17% and 2.45% average increase to wage when increasing one year of experience. This difference in some sense indicates education return is quite good in China, where the values of knowledgeable learning ability are rewarded approximately five times more than repeatedly accumulative professional expertise. This sends a benevolent message to the mass public about increasing the importance of human capital, therefore encouraging individuals to advance their education, and, in turn, to generate positive social returns to education. In addition to vertical comparison, it is also meaningful to compare internationally with the rest of the world. Based on the 2013 World Bank report on *Returns to Schooling around the World*, China's corrected 10.9% rate of returns has reached the average level of returns to schooling of East Asia and Pacific area (10.3%). Also, this report argues that the returns to schooling have declined significantly since the 1980s, and this could be due at least partly to the unprecedented expansion in schooling since the 1980s. However, from our analysis, China's rate of returns, instead of decreasing, have been climbing up since 1990s. This might be explained by the rapid economic growth due to the "opening-up" reform, which

brings in large numbers of investment companies as well as provides positive stimulus for local enterprises, both of which increase the demand for better-educated labor. The expansion of education suitably fits with the national policy and therefore pushes up the rate of returns to education.

Another interesting point is that the heterogeneous environment in China is complicated; education returns are under the impact of various factors, party affiliations, regional development, college financial bases and majors in college as well as many other unspecified factors, and all deserve serious investigation when it comes to returns to education. We also revealed many deep-rooted social problems that are even more urgent and severe (for example, the ongoing reforms on household registration system). What are the implications for the modifications, and to what extent should this system relax so that it will both enhance education and labor migration entrance equality while avoiding driving mass populations flock to rich areas and leaving abandoned hometowns for severer disparity? Along with the reforms of the Hukou system, should the pension system and healthcare system also break the regional boundaries and modify themselves towards a more equal and efficient service supplier platform? Also, problems concerning education are not confined with rate of returns. Given the rapid expansion in higher education since the late 1970s, researchers have found evidence of over-education in developed countries like US, UK and Sweden (Dolton &Silles, 2008; Korpi &Tåhlin, 2009; Tsai, 2010) as well as developing countries like Philippines, Mexico, India and Thailand (Mehta et al., 2011). What is the present supply and demand relationship between labor market and higher education graduates in China? Is over-education a partial reason for relatively low rate of returns to education of higher education in China? What

changes should be made in China's higher education system so that it would supply more effectively to the labor market? These problems are all of great importance and worth further investigation.

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