After Higher Education Expansion

The College Wage Premium is Increased or Decreased?

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Abstract

Using the data of China Economic, Population, Nutrition, and Health Survey （CHNS），this paper reports estimates of the change of college wage premium for young graduates (Work less than 3 years) from the period when the higher education participation rate increased dramatically. Using difference-in-difference-in-differences (DDD) estimate, our analysis suggests, quite remarkably, that despite the large rises in higher education participation, the college wage premium for young graduates is increasing. We will interpret it as: the ability distribution of both the non-graduate group and the graduate group are likely to have changed. We therefore, might expect that the college premium might change differentially across the ability distribution.

Keywords: Higher Education Expansion, The College Wage Premium, Ability

I. Introduction

China's higher education has been experiencing transformation during the whole reform period, and is still transforming. Ever since the beginning of the reform and open-up policy, the scale of higher education in terms of new entering college students and college graduates kept increasing. But the increase in the 1980s and most of 1990s is not large, which is especially dwarfed by the major increase in 1999 and thereafter. In 1999, the central government of China made a decision to enlarge the scale of higher education. As a result, the number of new students admitted to college increased by over 40% in 1999 with comparison 1998. By 2005, the number of new college students over quadrupled (4.7) that of 1998. Given the unprecedented scale of the expansion, many people term this radical policy a great leap forward in higher education.

The expansion increased the supply of college graduate, whose employment is a major problem in current China. Meanwhile, because the high school enrolment ratio is raising, the proportion of high school graduate decline relatively. (the fact from Almanac of China's population is high school enrolment ratio is 27.3% in 1990, after 2000 the ratio is about 80%.)

The central question which we pose here is: how did this sharp increase in the supply of Chinese graduates affect the college wage premium? Is the college-high school

wage differential increasing?

According to economic theory, the forces of supply and demand are the key to determining wage rates in our society. The suddenness and size of the Chinese HE(high education) supply side change is that it is likely to swamp any possible changes in the demand side that occurred over this relatively short time period and so the increasing of supply should lead to a decline in wages of college graduates, ultimately reduce the college-high school wage differential if the wage of high school graduates hasn't change. However, the response of the labor market isn't so simple. For some high school graduates, they can gain access to high-paying occupations pre HE expansion, while the opportunity to gain good job is significantly reduce post the expansion. More high school graduates can only gain low-wage job, it will directly reduce the wages of high school graduates. Moreover， the most able students who were previously unsuccessful in gaining entry to HE would, post-expansion, have been able to find a place. Thus, the ability distribution of both the high school graduate group and the college graduate group are likely to have changed. In particular, it seems likely that there was an influx of new students into HE with lower ability relative to what was previously the case. The corresponding exodus of high-ability students from the non-graduate distribution will imply that the average ability of this group will also have fallen. We therefore, might expect that the college premium might change differentially across the ability distribution.

Thus, our focus is on how the college premium has varied across time. To this, we will use the difference-in-difference-in-differences (DDD) method to analyze the wage of worker who graduated more than 3 years.

Section II explains the selection of our data and describes the characteristics of the sample used in our analysis. Section III presents results. In Section IV we conclude.

II. Data

We use the China Health and Nutrition Survey (CHNS) cross-section datasets pooled 2000, 2006 and 2009. Collecting the 2000 data to reflect the situation of pre-expansion, the 2006 and 2009 reflect the situation of post expansion.

In some cases a more convincing analysis of a policy change is available by further refining the definition of treatment and control groups. One possibility is to use data only on people in the college graduates with the HE expansion, both before and after the change, with the control group being people whose age is 36-40 (old graduates worked 14-18 years)and the treatment group whose age is 20-25(new graduates worked 0-3 years). To estimate the college wage premium, a different DD analysis would be to use high school graduates as another control group. So the high school new graduates are 17-21 years old, the high school old graduates are 32-36 years old.

CHNS data shows that the proportion of high school graduates in the whole 20-25 year olds has little change. The proportion is 29.05% in 2000, 30.23% in 2006, 32.10% in 2009. It is clear that there is a large rise in this proportion for collage graduates, from 6.85% in 2000 to 15.43% in 2006(a 125% rise in the proportion). These are huge increases over a period of just 6 years. The CHNS data matches the trends in the official statistics, which are based on the population of college entrants,

very well.

Table 1 reports the comparison of the wage between the treatment group and the control group in the year of survey. The mean and the median of the collage wage for control group are higher than the high school graduates in the years, and for the treatment group the median is so. Moreover the wage of the collage and high school graduates get increasing over time. However, there are some unusual appearances reported by the data. First, the mean of the collage wage is lower than the high school in 2006. Second, the mean of the high school wage falls in 2009 than in 2006. Thus, at first sight, the HE expansion affects the college wage premium.

III. Analysis

To estimate the college wage premium, we compute difference-in-difference-in-difference (DDD) estimates, for those new collage and high school graduates that went to college post the HE expansion compared to those that attended pre-expansion, for a narrow age group(the high school new graduates are 17-21 years old and the collage new graduates are 20-25 years old).

The dummy T captures possible differences between the treatment and control groups prior to the policy change, and $T=1$ represent 2006 or 2009, $T=0$ represent 2000. The dummy $D=1$ if the observation is a collage graduate. The dummy $Y=1$ if the observation belongs in the new graduate group that will eventually be treated. Write the DDD as

$$\ln w = c + \alpha_1 D + \alpha_2 T + \alpha_3 Y + \beta_1 D \cdot T + \beta_2 D \cdot Y + \beta_3 T \cdot Y + \gamma D \cdot T \cdot Y + \varepsilon \quad (1)$$

Some specifications of log earnings equations that control only for whether individual comes form eastern region or central region, comes form city, has some work experience qualification, and being man.

To refine this DDD analysis we take the microdata, collapse it into cells defined by Investigation year. Table 2 reports DDD regressions run for 2000-2006 and 2000-2009 respectively. From the two DDD regressions, it can be seen that collage and time prior consistently enter with predicted positive sign at a 10% level of significance. The new graduate enter positively although always significantly. Similarly, the Interaction terms are insignificant for the two regressions. Most importantly, the coefficients of the interaction terms are not only same sign but also almost the same value.

Comparing the immediately pre (2000) and post expansion (2006)groups, the college wage premium has a 18.68% rise for the new graduates and 14.68% rise for the old graduates, and it implies that the post-expansion the college premium rose by around 4%. Similarly, comparing the immediately pre (2000) and post expansion (2009) groups, the college wage premium has a 23.86% rise for the new graduates and 19.45% rise for the old graduates, and it implies that the post-expansion the college premium increased by more than 4.4%.

IV. Conclusion

Our analysis suggests, quite remarkably, that despite the large rises in HE participation in the late 1990's through to the mid 2000's, there has not been decreased, but increased by around 4% in the college premium although insignificantly.

We think that it is not a temporary increase in the college wage premium from 2006 and 2009 consistent estimator results. One explanation stems from considering the role of replacement of collage graduates to high school graduates at the high-paying occupations. The implication of the results is that the negative effect on wages came from the growth in the supply of college graduates passed upon in the high school graduates.

However, our estimates may suffer from bias associated with omitted ability bias which is traditionally thought to bias the schooling coefficient upwards. There is some suggestion in the literature that ability bias approximately cancels out the bias associated with measurement error in schooling but there is a worry, in this context, that one or both of these sources of bias may be changing over time10. In the traditional ability bias story earnings and schooling are determined by $\ln w = \beta S + \alpha A + \varepsilon$, $S = \gamma A + \xi$, where $\ln w$ is the (log) wage rate, S s years of schooling, A s ability, ε s uncorrelated with S or with A, and ξ is uncorrelated with ε.That is, ξ and $\ln w$ are correlated only through their joint dependence on A. However, A is unobservable, so least squares estimates of β in $\ln w = \beta S + \varepsilon$ will be biased such that $p\lim(\beta_{ols}) = \beta + \alpha(\sigma_{AS} / \sigma_S^2)$. If, as seems reasonable, $\gamma > 0$ and $\sigma_{AS} > 0$, and if $\alpha > 0$, then $\beta_{ols} > \beta$. That is, OLS estimates of β capture the effects of both S and unobservables that are correlated with both S and $\ln w$, such as A.

The expansion of HE is likely to result in σ_{AS} falling since HE institutions would then be accepting individuals with lower unobserved skills, A. This results in a fall in the estimate of β_{ols} even β if were constant – that is, we would expect the anticipated fall in the OLS estimate of the college premium (β_{ols}) in response to the supply of college graduates to appear to be even larger than the fall in the true effect (β). The only way to reconcile the rise in college graduate supply with the absence of a fall in the OLS estimate of the college premium is if α were also rising. Of course α, the return to unobserved skill, may not be constant. Indeed, much of the existing literature suggests that α has been rising as well as β. Thus, our estimates

are consistent with the view that the return to unobserved skill has been rising in the China. It would be useful, in future work, to attempt to obtain IV estimates of β that might, arguably, be free of ability bias to see if such estimates were depressed by the expansion of HE.

Table 1 Compare the wage between the treatment group and the control group in the year of survey Unit: (RMB) Yuan

	Sample sizes	Mean	Maximum	Median	Minimum
2000					
treatment group					
high school	81	612	5642	420	120
college	54	716	6800	450	40
control group					
high school	114	701	7280	580	100
college	43	787	3300	730	300
2006					
treatment group					
high school	26	605	2666	625	286
college	39	963	2666	865	480
control group					
high school	79	952	4805	824	384
college	40	1207	2380	1142	192
2009					
treatment group					
high school	38	943	2626	854	426
college	53	1308	2626	1281	171
control group					
high school	82	1404	8754	1107	175
college	49	1784	4377	1751	525

Table 2 difference-in-differences-in-differences of changes in log wages

	2000-2006	2000-2009
α_1	0.1789** (0.0445)	0.1545* (0.0847)
α_2	0.3845*** (0.0000)	0.6829*** (0.0000)
α_3	0.4836* (0.0899)	0.2239 (0.4146)
β_1	0.1468 (0.2614)	0.1945 (0.1280)

β_2	-0.0340（0.8005）	-0.0181（0.8935）
β_3	-0.0085（0.9541）	-0.0713（0.6007）
γ	0.0400（0.8542）	0.0441（0.8273）
Obs	545	588
R-squared	0.2375	0.3887

Note: P-value in parentheses. *indicates10% confidence level, ** indicates5% confidence level, *** indicates1% confidence level.

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