Do the Recent Labor Market Changes Negatively Affect the Schooling?

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Abstract

The Chinese labor market has witnessed great transition from dual labor market to a new classic one. With growing wages for skilled workers, its impact on schooling should be concerned by policy makers. Taking advantage of national representative data with large sample, this paper empirically examine the hypothesis that increasing opportunity costs reduce schooling. The empirical result is of particular relevance to poor areas where people tend to have high discount rate and value more on real time income. Although the total public investments in education have been increasing substantially, based on the study in this paper, it is still worth noting that targeting the relevant regions and compensating opportunity costs will improve the efficiency of the investments.

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1. Introduction

The Chinese labor market has witnessed dramatic changes in recent years, which is characterized as frequent labor shortages and growing wages for unskilled workers. The implications for these changes are rich both for current labor market participants and for the future entrants as well. Although it's quite evident to see the impacts of the changing labor market outcomes on workers' behaviors and welfare, its second order effect is often neglected. Among them, whether the wage increase for unskilled workers encourages the students to drop out of schooling is of great importance for policy makers to respond.

The ignorance of such impacts of current labor market outcomes on the future labor market participants is quite dangerous for China's economic development. First of all, with declining potential growth rate (Cai and Lu, 2012), the future economic growth in China heavily relies on productivity growth, which is on the premise of a higher level of human capital. After passing through the Lewis turning point, due to the exhaustion of surplus labor, it is much more difficult for China to gain economic growth through reallocating labor from low productivity sectors to high productivity sectors. For instance, according to our estimation (Du, et. al., 2011), reallocating labor from agricultural to non-agricultural sectors has contributed to 23.1% of economic growth in the first five years of this century, but the share has declined to 11.7% in the subsequent five years. If we compare this results to the estimation on the last two decades in the last century (the World Bank, 1997), it has also witnessed a significant decreased contribution. In order to sustain

the economic growth, which is necessary to a middle-income country approaching to a high-income economy, China will have to help the workers to enhance their productivity at their new sectors by improving their human capital when the economic growth is hard to be achieved by simply moving the labor across sectors with different levels of productivity.

Second of all, unlike many other social policies, the government is the most important stakeholder because of the large externality of education investment. When facing with growing opportunity costs of schooling, it seems rational for individuals to give up schooling and to participate in labor market although the *Compulsory Education Law* has already regulated minimum level of education one has to complete. This is particularly true for poor families that tend to have high discount rate and value more on current income. Under such a circumstance, the country will bear the price of loss in social returns of education. To offset the negative externality of individual decision, the government must take the responsibility to respond the negative externality in public policy.

Thirdly, the timing of policy intervention in individual decision of schooling is quite urgent. As we know, most of labor market participants accumulate their human capital before entering the market, so current decisions may affect the future productivity. When facing with growing wages, the government has to react promptly to keep the students in school in order to catch up the window. Otherwise, the workers in the future labor market would miss the change to accumulate the human capital they should have.

Although the classic theory predicts the negative impacts of high opportunity costs on schooling decisions, there is sparse empirical evidence in China to support this argument. Data limitation in China is one of the main reasons that confine the empirical studies. To sketch the overall situations, national representative datasets are needed. However, the statistics on schooling that is based on reporting system conducted by education administrative system is notorious for low quality. In addition, combining wage information with schooling decision variables together makes more difficulties. Taking advantage of two rounds of population census data,

this paper tries to make some progress in empirical studies.

In this paper, we look at a specific group of children facing with schooling decisions, i.e., kids between age 13 and 16. The reasons to focus on this group of children are as following. First, children at this age group are supposed to study in junior high school. According to the *Compulsory Education Law* in China, this is also a stage of compulsory education, which means that both the government and the parents are responsible for this group of children to complete the education. Second, when reaching age 16, those children are legitimated to enter the labor market and not taken granted as child labor any more. Therefore, the changing labor market outcomes may be very attractive to this group children and affecting their schooling decision.

In contrast to urban areas, the growing wages for unskilled workers would have large impacts on schooling decisions in rural China, in particular for those who live in poor areas. In general the poor family tends to have high discount rate, which makes them value more on current incomes when making intertemporal choices. In addition, although the population policy is universal all over the China, there is still significant distinction between rural and urban areas whereas the women in rural areas are generally allowed to have two or even more children by the policy. For some minorities that belong to the targeted group of this study, the population policy is even more relaxed. Considering that the central and western China is less urbanized than the developed regions, the fertility rates are higher in those areas too. As we have already seen shrinking supply of young workers in China, it is good to believe that in the future the less developed regions in China will play more important role in labor supply. Therefore, for the sake of sustaining economic growth it is of great importance for China to enhance the quality of future human resource in those regions by increasing and improving the education investments in both school infrastructure and individual subsidy as well.

The rest of the paper is organized as follows. The next section describes the labor market changes and how they affect the schooling decisions. Section three introduces the data we use in this paper and the main variables of interests. In section

four we take advantage of national representative data to examine how the growing wages of relevant group of workers affect the schooling decisions in the targeted group of kids we are interested. The last section discusses the main findings in this paper and draw conclusions.

2. Labor Market Changes and Schooling

One of the stylized facts of the labor market changes in recent years is the growing wages for unskilled workers. Although we lack of national representative data to break down the wage information by skill, it is generally acceptable to treat the rural migrant workers as unskilled ones in urban labor market. The wage growth of migration workers contrasts its stagnancy in the last century and reflects the increasing scarcity of unskilled workers. According to the rural household survey conducted by the National Bureau of Statistics (hereafter the NBS), for rural migrant workers, the compound growth rate of wage in real term per annum is 6.7 per cent from 2001 to 2006, and 12.4 per cent from 2006 to 2011. In contrast, the wage growth rate for workers in urban unit[1] is 12.6 per cent and 11.0 per cent during the same periods respectively. This statistics indicates that rural migrants actually have had fast wage growth in recent years.

It is predictable that wages across different groups of workers may converge if the unskilled workers catch up the others quickly. The existing study using three rounds of urban household survey, China Urban Household Survey (CULS), including both urban local workers and migrant workers indicates that in urban labor market the wages have converged between local workers and migrants over time. Meanwhile, among the migrant workers, it is found that the returns to education converge too across workers with various stage of education attainment too. For example, workers finished senior high school earned 25.9 per cent more than workers who only complete the junior high school in 2001. But the premium

[1] Urban unit is the employer reporting its employment inforation to the statistical system. Usually it includes the SOEs, urban collective enterprises, and other state owned sectors, but excludes many emerging private sector. The employment and wage information based on such reporting system is notorious for its inaccuracy.

dropped to 17.3 per cent in 2005 and 16.9 per cent in 2010 (Cai and Du, 2011), which implies that the expected returns to have additional years of schooling have been decreasing over time.

Unlike the wage structure induced by skill biased technology change, which is believed as one of the main forces driving the inequality in developed countries (Acemoglu, 2003), the converging wages between skilled and unskilled workers are helpful to reduce the income inequality in China. Although this is good news to bridge the individual income gap, it is not the case to encourage the human capital accumulation by increasing the opportunity costs of schooling.

The wage convergence also takes place across regions. In recent years, the firms in interior China have also been suffering from labor shortage as the employers in coastal areas did. As a result of labor market integration across regions, the migrant workers' wages in different areas have converged. As shown in figure 1, in 2003 average wage for migrant workers in central and western China was about three fourths of that in coastal areas while in 2009 wages across different regions almost reached the same level even without controlling for the spatial difference in purchasing power. It is obvious that the wage signals from local labor markets affect individuals' decisions more directly than the information from other labor markets. This change is particularly relevant to the poor areas where people are supposed to have high discount rate. In the following analysis of this paper, we may find that kids in poor areas do have high dropout rate.

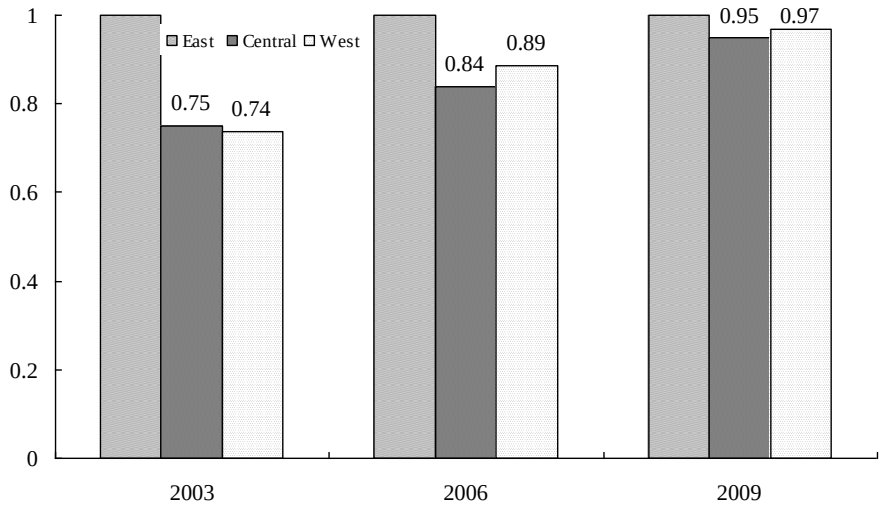

Figure 1 the Wage Convergence of Migrant Workers across Regions

Source: NBS.

To understand how the changing labor market outcomes affect the schooling decisions in China, we construct a simple theoretical model explaining the situation in China. Individual *i* makes schooling decisions in order to maximize his/her income flows in entire life. To simplify, we assume that both the opportunity costs to take education and expected earnings after schooling affect the current schooling decision.

$$S_i = s(T_i, E_i) \tag{1}$$

where T_i and E_i refer to the opportunity costs to have current education and earnings after completion of the education respectively.

Although the individuals do not explicitly know about how much opportunity costs they have to bear for current education, they might make choices based on the current wage rate of reference groups. Meanwhile, the individual's discount rate always affects the decisions.

$$T_i = t(\overline{w}_{ij}, r) \tag{2}$$

where $\overline{w}_{ij}$ is the average wage rate for the workers who have current education at level *j* in the local labor market and *r* is the discount rate. For the same reason, the individuals do not know exactly how much they can earn after they complete more education, so they expect their future earnings based on the current average wage rate for the workers who have the next stage of education at level *j* +1 in the local labor market, i.e.,

$$E_i = e(\overline{w}_{ij+1}) \tag{3}$$

Based on equation 2 and equation 3, we may rewrite the schooling decision function as,

$$S_i = s(\overline{w}_{ij}, r; \overline{w}_{ij+1}) \tag{4}$$

Our hypothesis is that either growing wages for workers with current

education or high discount rate will discourage schooling, and high wage rates for workers with next stage of education will encourage current schooling, which means that

$$\frac{\partial S_i}{\partial \overline{w}_{ij}} < 0 , \frac{\partial S_i}{\partial r} < 0 , \text{ and } \frac{\partial S_i}{\partial \overline{w}_{ij+1}} > 0 \quad (5)$$

The hypothesis on labor market outcomes is tested in the following parts of this paper.

3. Data and Variables

In this paper, we take advantage of the 1% population sampling survey and the sixth population census conducted by the National Bureau of Statistics in 2005 and in 2010 respectively. The strategy of cluster sampling is used for the 1% population sampling survey and the sixth census asked about one tenth of total population to fill the long form that includes rich information about schooling and labor market participation. The structure and contents of questionnaires are kept the same between the two surveys, which makes the information on schooling comparable over time. Although the sample we employed is randomly picked up from the original dataset, one fifth of the sampling survey and one tenth of the sixth census, the sample size is big enough to represent the country (even provinces). It is worth noting that the large sample size is one of the important merits when analyzing the schooling decision. When the compulsory education is universal, the dropout rate is generally low in most areas and the large sample helps to improve the efficiency of estimation.

Dropout rate

As noted earlier, we focus on the cohort that entered age 13 to 16 in the survey years to look at their status of schooling. In the two round surveys, a question of schooling status is directly asked and one of the choices is dropout. However, we

define those who are aged between 13 and 16 and are not in or finished junior high school (chuzhong) as *dropout* rather than direct use of the choice from the surveys. In this case, the definition includes those 1) graduated from primary school but not continued in high school; 2) who were incomplete in junior high school but with certificate (yi ye); and 3) dropped out from junior high school (chuo xue). Using this definition, the observed overall dropout rates from junior high school were 6.84 per cent in 2005 and 3.05 per cent in 2010. Although the overall dropout rate has been decreasing, it can not be inferred that the labor market outcomes have not negatively affect schooling decisions since the overall investments in education have been increasing during the same period.

As expected, however, the dropout rate is not homogeneous across provinces and between the rural and urban areas. To observe the disparity between the rural and urban areas, two definitions on urbanization are employed here. One of them is based on the residence, which defines persons who live in a certain area more than six months are residents. Accordingly the urban area is defined by where the density of population is beyond a criterion. The other distinction is based on the type of household registration (*hukou*), i.e., agricultural or non-agricultural *hukou*.

As table 6 shows, the dropout rates in rural areas are significantly higher than those in urban areas. Therefore, the analysis in the rest of this paper including the regression is focused on rural China. Interestingly, even only targeting on the rural areas, the above two definitions on rural areas make difference in terms of dropout rates. It is obvious that defining the rural people based on the types of *hukou* gives high dropout rates than based on the urbanization. This result implies that, in contrast to infrastructure of school that is more reflected by the locality, the individual decisions that vary across people holding different types of *hukou* may play more active role in determining whether to drop out from school. This distinction also implies that the policy aiming to reduce dropout should be focused more on intervening the individual's decisions rather than simply investing in school infrastructure.

Labor market outcomes

The other important variables are labor market outcomes that are assumed to affect schooling decisions. The 1% population sampling survey asked each worker the wage information, which makes it possible for us to construct relevant labor market outcomes at more aggregated level. Unfortunately, the wage information is not collected any more in the recent survey.

The main purpose of this paper is to look at how the changing labor market outcomes affect the schooling decisions. It is no doubt that wage rate is the most ideal indicator to reflect the labor market changes since one of the most stylized facts in recent labor market is rapid growing wages for unskilled workers. Therefore, we only focus on the wages for workers with high school education or below and ignore the cases for workers with more education. The wage rate is defined for those who hold agricultural *hukou* and migrate out of the township they register their *hukou* more than six months. Workers are grouped by education, such as workers with primary education or below, workers with junior high school education, and workers with senior high school education. The summary statistics are presented in table 2.

Given that the goal of this paper is to look at how the labor market signal affects individual decision, the individual wage rate might too endogenous in analyzing the schooling decisions. In this paper, we construct wage rate at prefecture level by averaging the wage rate of workers with different education attainment. We believe that the regional wage rate affects individual schooling decision, not vise versa. In detail, three groups of workers are categorized to observe their wages, i.e., workers with primary school education, workers with junior high school education, and workers with senior high school education.

In addition to wage, participation in the labor market is another indicator reflecting individual labor supply. For example, the growing wages for unskilled workers may encourage labor market participation for young people. In rural areas, the growing off-farm wages may attract kids to migrate and to be engaged in non-agricultural activities. Therefore, we assume that the regional migration rate of

age group between 13 and 16 affects the each individual's schooling decision in that region. The typical definition of migration proposed by the NBS is applied here, i.e, person who leaves out of the township where he/she registers *hukou* and live outside more than six months. In particular, the wage information is missed in the sixth census and we are not able to look at its impact on schooling decision in 2010 or to observe the impacts from wage changes over time. To make up this discount, we use the migration rate as a substitute, the summary statistics of migration rate is found in table 3.

To address the impacts of labor market outcomes on schooling decisions in poor families, we need to compare the poor areas versus non-poor areas too. In 2012, the State Council Leading Group Office of Poverty Alleviation and Development redefined 592 counties as National Designated Poor Counties. Among those poor counties, 217 of them are located in central China and 375 in western China. We compare the poor areas with non-poor areas in 2010 dataset. For the 1% sampling survey we only can get access to the prefecture codes rather than the county codes. Therefore, we define the local labor market at prefecture level. Since there are no county codes, unfortunately, we are unable to identify the National Designated Poor Counties in 2005 dataset.

4. Empirical Model and Results

In this section, we take advantage of the datasets we described earlier to look at the impacts of labor market outcome variables on schooling decisions, with focus on rural areas in the less developed part of China.

Empirical Model

The following empirical model is applied to this study so as to observe the impacts of labor market outcomes on schooling decision, as presented in equation 6.

The dependent variable is whether dropped from junior high school. As defined in the previous section, we denote the status of schooling of the kids between 13 and 16 who are not in school but did not complete junior high school as 1, otherwise as 0. The independent regressors consist of three groups of variables as presented in the equation.

$$\mathbf{D}_{i,j,k} = \mathbf{C}_{i,j,k}\boldsymbol{\alpha} + \mathbf{H}_{j,k}\boldsymbol{\beta} + \mathbf{M}_{k}\boldsymbol{\gamma} + \mathbf{P} + \boldsymbol{\varepsilon}_{i,j,k} \quad (6)$$

The first group is the individual characteristics, for instance gender of the kid. The second group of variables is the household characteristics that may affect the schooling decision, including father's education, mother's education, the household size, the share of household member below age 16, and the share of household member above 65. In fact, the individual and household variables are proxy for the discount rate that is unobservable in our dataset. The third group is the variables to reflect regional labor market outcomes, which are also our interested variables. In the regression this group is composed of three variables, the average wage rate of workers with primary school education in the region, the average wage rate of workers with junior high school education in the region, and the average wage rate of workers with senior high school education in the region. The main purpose of this regression is to look at the sign of wage rate of workers with high school education after controlling for the other determinants that may also affect schooling decisions. Other than wages, we also use the specifications including other variable reflecting labor supply, for instance, the regional migration rate of the people whose ages are between 13 and 16. In addition, the provincial dummies are included in the equation to control for the other factors in the labor market but not reflected by our regressors.

Results

A Probit model is applied to the regression specifications. The estimation results are presented in table 4 and table 5. For all the models, we only include the rural sample since the dropout from junior high school is not of relevance in urban areas any more, as we have already seen from the summary statistics in table 6. We

take the first column as the benchmark estimators since the impacts on the schooling decisions in the less developed areas are our main interests.

As predicted in the theoretical model, the higher wages of unskilled worker are, the more kids drop out from high school. In the first column of table 4, the sign of regional wage rates for workers with junior high school education is positive, which indicates that the high wages for the workers with such level of education do increase the opportunity costs of kids to continue their education. According to the estimated coefficient, given other things constant, the wages in that group of workers increase 10 per cent would result in 0.29 percentage point of increase of dropout rates from the mean dropout rate. In contrast, the variable of regional wage rate for workers with senior high school education is proxy for the expected earnings to have the next stage of education. The negative sign of this variable is also consistent with our hypothesis that the high expected earnings encourage kids to stay in school.

Among the control variables, it is interesting to see that the girls are disadvantaged to boys in terms of schooling decisions. But this result needs further empirical evidence if we want to dig out its implications. For instance, this could be explained as in general the girls are treated unfairly, but it could also because girls tend to enter the labor market earlier and have high opportunity costs to stay in school.

The parents' education is important to affect kids' schooling. The sign for both father's and mother's education is negative, which indicates that more educated parents tend to make decisions to facilitate schooling. Especially, according to the magnitude of the coefficients, mother's education is more important than father's in determining children's education.

Robustness Check

To test whether above results are robust, we estimated the model in some different ways to look at the sign and significance of labor market outcome variables. First of all, as we have already clarified, the growing wages for unskilled workers

may only have effect on schooling decisions in less developed regions, so, to contrast, we also test the model in application to the sample of coastal areas and the whole sample. Secondly, the attraction from labor market may affect kids at various ages differently. therefore, we also test the model by dividing the sample by age. Finally, we replace the labor market outcome variables of wage by migration rate to check if the result is consistent with our hypothesis when measuring the labor market outcomes in a different way. The last two columns of table 4 and table 5 present the regression results.

The results using different spatial sub-samples or the whole sample are consistent with our hypothesis. In the second column of table 4, only the sample from developed areas is included in the regression. The coefficients of both interested variables are not statistically significant, which implies that in the coastal China the recent labor market outcomes have no impact on schooling decisions. This result is consistent with our description earlier in this paper. When looking at the whole sample, the sign of the interested variables are invariant as the benchmark regression, but the magnitude of the coefficients going down. The coefficients are statistically significant in the overall sample because the sample from less-developed regions dominates the one from the coastal areas.

It is also interesting to observe whether the impact of the interested variables on schooling decision varies across ages. The results in the first four columns of table 5 show that the kids approaching to legal age of entering labor market have larger coefficients although the coefficients are statistically significant for all the sub-samples by age.

In the last column of table 5 we substitute wage variables by migration rate of kids between 13 and 16 in the region. We assume that migration is positively associated with labor supply and participation in off-farm activities. The regression result indicates that we still can observe its effects on schooling decision even measuring the labor market outcome in a different way.

The New Dataset

As noted earlier in this paper, the 1% population sampling survey is the only large sample population survey including wage information. Although we are unable to apply the above model to the new dataset, for instance the sixth census, it is still valuable to observe the schooling outcomes in the regions where are proved to be relevant in the previous estimation.

Although the public expenditures on education have been increasing rapidly, the schooling disparity across regions is still substantial. As table 1 shows, in some less-developed provinces in southwest and northwest China where the poverty is concentrated, the dropout rates are still very high. According to our definition on dropout, there are still four provinces where average dropout rates are beyond 10 percent. However, this region is also the prioritized areas that the education investments from central government preferred. This trend implies that increasing the expenditure would not be sufficient to improve the education outcomes when the impact from labor market was not well concerned.

Using the new dataset, we can still observe the impact from labor market by looking at the dropout rates by age across different regions as shown in table 7. Two trends are found in the table for both years. First of all, in each age group, the dropout rates increase with the development level going down, which is not surprising and consistent with our previous findings in this paper. Secondly, the average dropout rate goes up when the kids approach to age 16, which suggests that the labor market signals attract more strongly for older children even they have already pay several years of cost in schooling.

5. Conclusions and Implications

Conclusions

The Chinese labor market has witnessed great transition from dual labor market to a neoclassical one. With growing wages for skilled workers, its impact on schooling should be concerned by policy makers. Taking advantage of national

representative data with large sample, this paper empirically examine the hypothesis that increasing opportunity costs reduce schooling. The empirical result is of particular relevance to poor areas where people tend to have high discount rate and value more on real time income. Although the total public investments in education have been increasing substantially, based on the study in this paper, it is still worth noting that targeting the relevant regions and compensating opportunity costs will improve the efficiency of the investments.

Implications

The regression results are rich of implications in terms of public policies on education and human capital investments. According to our benchmark regression, given other things constant, a 10 per cent increase of the average wage rate for the group of workers with junior high school education would result in 0.29 percentage point of increase of dropout from school. In 2010, the number of kids between 13 and 16 amounted to 67.93 million in China, and 38.26 million live in interior areas. When applying our estimator into the practice, without changes in any other conditions, the 10 per cent increase of average wage rate of unskilled workers with primary education would encourage about 110.9 thousand children to leave high school.

In fact, the Chinese labor market has witnessed a significant wage increase for unskilled workers. According to the rural household survey conducted by the NBS, the average wage for migrant workers has been increasing for 68 per cent between 2005 and 2010 although we lack of their wage information across sub-groups by education. Using the CULS data conducted by the Institute of Population and Labor Economics, we find that the workers completed junior high school have fast wage growth than those who complete senior high school (Cai and Du, 2011). So it is reasonable to expect that such change would discourage kids approaching to 16 to leave school.

The policy implication on education investment is also quite direct. Among

its public program, the Chinese government has addressed the investments in education for a long time. In the *Education Law,* the spending on education is explicitly required to account for 4 per cent of total public expenditures. The actual share in recent years is approaching to this requirement. Considering that the fiscal revenue in China has grown much fast the GDP, the overall public investment in education is quite substantial. The previous investments in education have been dominantly focused on improving the facility and capacity of schools. This policy orientation was absolutely right when the basic infrastructure was insufficient. Also the achievement in education that China has already benefited from demonstrated the rightness of that policy. In recent years, the Chinese government started to subsidize the students directly, for example, the exemption tuition from individuals. However, the empirical results in this paper indicate that the current subsidy is not sufficient to keep the kids in poor areas in school when the opportunity costs of schooling are getting high. As far as the labor market changes are concerned, further direct subsidy compensating the opportunity costs of education is necessary and urgent, particularly in poor areas.

As noted earlier, the empirical results in this paper are focused on the individuals in central and western China. Although the labor market outcomes only statistically affect schooling decision in the less developed regions, the fertility rate in the central and western China are higher than the coastal areas. In 2010 the crude birth rate in the provinces that column 2 of table 4 covered is 1.16% while the number in developed areas is 1.01%. In addition, people living in the areas where we observed correlation between labor market outcomes and schooling decisions account for 64.8 per cent of total population in China. Based on such demographic fact, it is good to believe that the provinces suffering from negative impacts of labor market changes on schooling decision will quantitatively dominate the labor supply in the future Chinese labor market, which means that the subsidy in education should be kept targeting in this region.

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Table 1 The dropout in the less-developed areas in 2010

	Poor	Non-poor	Rural poor	Rural non-poor
Hebei	5.16	3.21	5.54	3.66
Shanxi	2.38	2.38	2.70	3.14
Inner Mongolia	4.34	1.31	4.68	2.40
Jilin	1.64	5.06	-	7.73
Heilongjiang	2.56	3.68	3.54	5.65
Anhui	2.94	1.85	3.21	2.17
Jiangxi	2.23	1.68	2.45	1.86
Henan	1.44	1.71	1.58	1.96
Hubei	2.42	2.84	2.77	3.51
Hunan	3.10	1.99	3.26	2.42
Guangxi	5.38	3.98	5.75	4.33
Hainan	4.17	1.57	3.85	1.89
Chongqing	3.64	3.07	3.93	3.56
Sichuan	14.3	3.19	15.67	3.76
Guizhou	5.08	3.88	5.25	4.53
Yunnan	10.12	7.30	10.66	8.42
Tibet	20.99	20.99	21.38	21.38
Shaanxi	2.99	1.69	3.07	1.98
Gansu	6.61	3.21	7.05	4.08
Qinghai	15.38	9.43	15.67	12.40
Ningxia	4.91	4.29	5.41	6.98
Xinjiang	5.00	3.88	5.16	4.60

Source: authors' calculation.

Table 2 the migration rates between 13 and 16 in rural China (%)

	2005	2010
China	8.33	9.47
Costal	15.50	14.89
Less-Developed	4.96	6.64
Poor	-	3.93
Non-Poor	-	7.54

Source: authors' calculation.

Table 3 the summary statistics of wage rates at local labor market in 2005

	China	Coastal China	Interior China
Primary education or below	689 (926)	724 (1076)	622 (539)
Junior High School	842 (759)	872 (800)	774 (653)
Senior High School	1050 (1045)	1115 (1091)	901 (914)

Note: standard deviations in parentheses.

Source: authors' calculation.

Table 4 the determinants of dropout from junior high school in 2005

	(1)	(2)	(3)
	Less	Developed	All
log of av. wage with below junior high school	-0.030***	0.002	-0.017***
	(0.004)	(0.004)	(0.003)
log of av. wage rate with junior high school	**0.029*** **	**-0.001**	**0.018*** **
	(0.005)	**(0.007)**	**(0.004)**
log of av. wage rate with senior high school	**-0.010*** **	**-0.003**	**-0.007*** **
	(0.003)	**(0.005)**	**(0.002)**
Gender (male=1)	-0.009***	-0.005***	-0.007***
	(0.002)	(0.002)	(0.001)
Father's education	-0.016***	-0.006***	-0.012***
	(0.001)	(0.001)	(0.001)
Mother's education	-0.022***	-0.011***	-0.018***
	(0.001)	(0.001)	(0.001)
household size	0.013***	0.004***	0.010***
	(0.001)	(0.001)	(0.000)
share of household member below 16	-0.091***	-0.054***	-0.078***
	(0.004)	(0.004)	(0.003)
share of household member above 65	-0.114***	-0.054***	-0.093***
	(0.008)	(0.009)	(0.006)
Tianjin	-	0.048***	0.076***
	-	(0.015)	(0.021)
Hebei	-	-	0.040**
	-	-	(0.016)
Shanxi	-0.007	-	0.033**
	(0.005)	-	(0.015)
Inner Mongolia	0.031***	-	0.082***
	(0.009)	-	(0.022)
Liaoning	-	0.061***	0.082***
	-	(0.016)	(0.022)
Jilin	0.100***	-	0.166***
	(0.011)	-	(0.028)
Heilongjiang	0.118***	-	0.187***
	(0.012)	-	(0.030)
Shanghai	-	-0.000	0.001
	-	(0.010)	(0.015)
Zhejiang	-	-0.004	-0.005
	-	(0.008)	(0.011)
Jiangsu	-	-0.006	-0.008
	-	(0.008)	(0.011)
Anhui	-0.048***	-	-0.017*
	(0.003)	-	(0.009)

Fujian	-	0.023**	0.031**
	-	(0.011)	(0.015)
Jiangxi	-0.029***	-	0.006
	(0.004)	-	(0.012)
Shandong	-	0.010	0.014
	-	(0.009)	(0.013)
Henan	-0.033***	-	0.001
	(0.004)	-	(0.012)
Hubei	-0.026***	-	0.012
	(0.004)	-	(0.013)
Hunan	-0.029***	-	0.007
	(0.004)	-	(0.012)
Guangdong	-	-0.006	-0.011
	-	(0.008)	(0.010)
Guangxi	-0.014***	-	0.028*
	(0.005)	-	(0.015)
Hainan	-0.004	-	0.041**
	(0.007)	-	(0.017)
Chongqing	-0.023***	-	0.013
	(0.005)	-	(0.014)
Sichuan	0.010*	-	0.056***
	(0.006)	-	(0.018)
Guizhou	-0.001	-	0.046***
	(0.006)	-	(0.017)
Yunnan	0.153***	-	0.230***
	(0.009)	-	(0.029)
Tibet	0.210***	-	0.305***
	(0.017)	-	(0.037)
Shaanxi	-0.023***	-	0.014
	(0.004)	-	(0.013)
Gansu	0.016***	-	0.068***
	(0.006)	-	(0.019)
Qinghai	0.097***	-	0.163***
	(0.011)	-	(0.028)
Ningxia	0.072***	-	0.134***
	(0.011)	-	(0.026)
Xinjiang	-0.002	-	0.044**
	(0.008)	-	(0.017)
No. of Obs.	102,908	46,316	149,224

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 5 the determination of dropout in 2005

	(1)	(2)	(3)	(4)	(5)
	Age 13	Age 14	Age 15	Age 16	All ages
log of av. wage with below junior high school	-0.020***	-0.043***	-0.023***	-0.035***	-
	(0.006)	(0.007)	(0.008)	(0.010)	-
log of av. wage rate with junior high school	**0.024*** **	**0.021** **	**0.039*** **	**0.034** **	-
	(0.008)	**(0.010)**	**(0.011)**	**(0.014)**	-
log of av. wage rate with senior high school	**-0.008***	**-0.012** **	**-0.010***	**-0.008**	-
	(0.004)	**(0.005)**	**(0.006)**	**(0.007)**	-
migration rate of aged between 13 and 16	-	-	-	-	**0.187*** **
	-	-	-	-	**(0.040)**
Gender	-0.009***	-0.015***	-0.000	-0.004	-0.008***
	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)
father's education	-0.009***	-0.012***	-0.018***	-0.019***	-0.016***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
mother's education	-0.012***	-0.017***	-0.023***	-0.030***	-0.022***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
household size	0.006***	0.008***	0.015***	0.026***	0.013***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
share of household member below 16	-0.037***	-0.049***	-0.062***	-0.049***	-0.090***
	(0.007)	(0.009)	(0.010)	(0.013)	(0.003)
Share of household member above 65	-0.057***	-0.050***	-0.118***	-0.192***	-0.113***
	(0.012)	(0.014)	(0.017)	(0.022)	(0.008)
Shanxi	0.001	0.002	-0.012	-0.014	-0.007
	(0.008)	(0.010)	(0.009)	(0.011)	(0.005)
Inner Mongolia	0.032**	0.049***	0.001	0.058***	0.027***

	(0.016)	(0.018)	(0.014)	(0.022)	(0.009)
Jilin	0.044***	0.085***	0.110***	0.164***	0.106***
	(0.016)	(0.020)	(0.019)	(0.023)	(0.010)
Heilongjiang	0.048***	0.122***	0.115***	0.192***	0.124***
	(0.018)	(0.025)	(0.022)	(0.026)	(0.011)
Anhui	-0.023***	-0.039***	-0.059***	-0.071***	-0.044***
	(0.005)	(0.006)	(0.006)	(0.008)	(0.003)
Jiangxi	-0.023***	-0.024***	-0.044***	-0.018	-0.024***
	(0.005)	(0.008)	(0.007)	(0.013)	(0.004)
Henan	-0.013*	-0.031***	-0.038***	-0.050***	-0.035***
	(0.007)	(0.007)	(0.008)	(0.010)	(0.004)
Hubei	-0.020***	-0.024***	-0.040***	-0.004	-0.018***
	(0.005)	(0.007)	(0.008)	(0.013)	(0.004)
Hunan	-0.004	-0.022***	-0.039***	-0.049***	-0.023***
	(0.008)	(0.008)	(0.008)	(0.010)	(0.004)
Guangxi	-0.003	-0.021**	-0.028***	0.003	-0.007
	(0.008)	(0.008)	(0.009)	(0.014)	(0.005)
Hainan	0.004	-0.014	-0.006	0.005	-0.001
	(0.012)	(0.011)	(0.014)	(0.019)	(0.007)
Chongqing	-0.016**	-0.009	-0.033***	-0.019	-0.024***
	(0.007)	(0.011)	(0.010)	(0.015)	(0.005)
Sichuan	-0.006	0.017	0.010	0.029*	0.015***
	(0.007)	(0.011)	(0.011)	(0.015)	(0.006)
Guizhou	-0.005	-0.004	0.002	0.013	0.010*
	(0.008)	(0.010)	(0.011)	(0.015)	(0.006)
Yunan	0.082***	0.128***	0.168***	0.256***	0.170***

	(0.016)	(0.018)	(0.017)	(0.020)	(0.009)
Tibet	0.178***	0.214***	0.206***	0.268***	0.229***
	(0.034)	(0.036)	(0.033)	(0.038)	(0.015)
Shaanxi	-0.012*	-0.029***	-0.030***	-0.014	-0.020***
	(0.006)	(0.007)	(0.008)	(0.012)	(0.004)
Gansu	0.008	0.019	0.015	0.033**	0.029***
	(0.009)	(0.011)	(0.011)	(0.014)	(0.006)
Qinghai	0.083***	0.098***	0.099***	0.129***	0.130***
	(0.021)	(0.022)	(0.022)	(0.027)	(0.012)
Ningxia	0.030*	0.066***	0.070***	0.127***	0.068***
	(0.016)	(0.021)	(0.020)	(0.026)	(0.010)
Xinjiang	0.006	-0.008	-0.008	0.015	0.002
	(0.011)	(0.011)	(0.012)	(0.017)	(0.006)
Observations	24,309	26,031	28,547	24,832	106,746

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 6 dropout rate by *hukou* status and urbanization (%)

	2005					2010				
	All	Non-Agricultural	Agricultural	Urban	Rural	All	Non-Agricultural	Agricultural	Urban	Rural
Beijing	1.85	0.50	3.74	1.71	2.28	0.69	1.19	-	0	3.09
Tianjin	4.97	1.20	8.28	2.78	10.36	2.01	1.01	3.38	1.79	2.40
Hebei	5.73	1.02	6.37	4.10	6.38	3.59	0.55	4.07	2.19	4.54
Shanxi	4.96	0.91	5.93	2.50	6.47	2.38	0.53	3.03	0.73	3.77
Inter Mongolia	6.75	1.64	10.05	2.73	10.99	2.32	0.58	3.36	1.06	3.85

Liaoning	6.36	1.10	9.74	2.91	10.58	3.01	1.09	4.67	1.26	5.05
Jilin	11.85	1.84	16.97	4.37	18.05	4.83	1.31	7.28	2.26	7.37
Heilongjiang	11.77	2.56	19.27	4.55	20.27	3.55	0.40	5.31	1.43	5.91
Shanghai	1.56	0.55	3.93	1.71	0.35	1.25	0.45	2.72	1.11	2.56
Jiangsu	3.04	1.80	3.47	2.49	3.55	1.96	0.90	2.66	1.52	2.51
Zhejiang	2.83	0.67	3.30	3.44	2.20	2.21	0.39	2.61	2.01	2.46
Anhui	2.59	0.45	2.93	1.87	2.96	2.19	0.69	2.53	1.01	2.88
Fujian	6.03	2.00	6.71	4.51	7.06	2.38	0.96	2.74	1.68	3.16
Jiangxi	4.21	1.49	4.73	2.80	4.95	1.83	0.55	2.04	0.98	2.40
Shandong	4.54	0.97	5.03	2.50	5.98	1.31	0.54	1.41	0.75	1.79
Henan	3.16	1.27	3.39	2.35	3.46	1.64	1.21	1.86	0.58	2.18
Hubei	4.48	1.27	4.99	3.16	5.24	2.74	0.62	3.29	1.91	3.42
Hunan	4.20	1.32	4.63	2.22	5.07	2.18	0.30	2.58	1.23	2.82
Guangdong	3.09	1.66	3.44	2.64	3.52	1.61	1.71	1.98	1.20	2.03
Guangxi	6.09	2.48	6.42	4.46	6.71	4.21	1.39	4.59	2.25	5.06
Hainan	6.42	3.17	7.62	4.23	8.38	1.93	2.06	2.16	0.87	2.80
Chongqing	4.08	1.95	4.59	2.69	4.88	3.32	0.26	3.74	2.72	3.76
Sichuan	7.90	2.53	8.66	3.26	9.35	5.67	0.76	6.63	1.37	7.45
Guizhou	8.31	2.87	8.88	4.98	9.32	4.59	0.74	4.98	2.55	5.30
Yunnan	24.87	3.99	26.27	13.76	28.04	8.84	-	9.70	3.63	10.74
Tibet	41.82	20.18	43.41	27.03	46.46	20.99	1.15	21.38	-	20.16
Shaanxi	4.54	1.28	5.03	3.28	5.16	2.20	1.29	2.45	1.66	2.55
Gansu	10.06	2.20	11.13	5.11	11.46	5.30	2.12	6.06	0.85	6.80
Qinghai	19.11	2.85	23.54	4.41	26.04	12.25	-	14.12	2.94	17.00
Ningxia	12.56	1.56	16.03	3.01	17.16	4.55	3.00	6.14	3.61	5.22
Xinjiang	6.74	2.25	8.44	5.04	7.26	4.21	0	4.82	2.95	4.91

Source: authors' calculation.

Table 7 The dropout rates by age

		2005				2010				
		China	Costal	Interior China	Interior Rural	China	Costal	Interior China	Poor	Rural Poor
13		3.68	1.84	4.55	5.20	1.89	1.02	2.27	3.10	3.24
	Boys	3.27	1.55	4.10	4.64	1.96	1.28	2.26	3.15	3.33
	Girls	4.11	2.14	5.02	5.78	1.82	0.72	2.29	3.05	3.14
14		5.77	2.76	7.21	8.16	2.45	1.31	2.94	4.21	4.58
	Boys	5.28	2.72	6.52	7.29	2.50	1.55	2.93	4.29	4.76
	Girls	6.26	2.80	7.91	9.03	2.38	1.02	2.97	4.12	4.38
15		7.72	4.10	9.47	10.83	3.71	2.14	4.40	6.61	7.12
	Boys	7.84	3.92	9.37	10.68	4.06	2.21	4.84	6.95	7.47
	Girls	7.60	4.29	9.57	10.97	3.31	2.06	3.87	6.19	6.69
16		9.94	5.74	12.03	14.02	4.75	2.92	5.53	8.32	9.05
	Boys	9.80	5.61	11.88	13.79	5.09	2.93	6.03	8.91	9.89
	Girls	10.08	5.88	12.18	14.27	4.36	2.91	4.98	7.68	8.14

Source: authors' calculation.