Maternal Education and Their Offspring's Income in China

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Abstract: In this paper, I study the relationship between maternal education and offspring income higher education are more likely to cultivate offspring with higher education. Using 2012 and 2014 China Labor Force Dynamics Survey, I find that one year increase of maternal education is associated with a 1.7% increase in children's income. In studying the mechanism, I suggest that maternal education improves offspring's income via improving children's education. Hence, I conclude that women with a strong individual educational background devote more time and energy to their children. Consequently, their offspring earn a higher income.

Keywords: Maternal Education, Income, Individual Education

1. Introduction

In the past, people believed that women should not have the same educational opportunity as men because they are not responsible for making money and only take charge of domestic duties. This prejudice gradually formed the discrimination towards females. Education is, however, a fundamental right for all. A specific objective of my study is to determine whether females with higher education are more likely to cultivate offspring with higher education.

Carneiro et.al (2012) pointed out in their study that parental education has a significant effect on children's human capital. They concluded that maternal education reduces the incidence of behavioral problems by 8.6% and grade repetition by 3.2% in their children. Also, more-educated mothers delay childbearing by 1 year on average, are more likely to be married, have significantly better-educated spouses and have higher family incomes. Kalil et.al (2012) found that high-educated mothers spend an average of more than 50% of their time caring for children and also alter the composition of that time to suit children's developmental needs more than their less-educated counterparts. Those who have higher education are more likely to pay attention to "investing in children" by 42%. Additionally, Harding (2015) found that maternal education increases were positively correlated with children's standardized cognitive scores, as well as higher teacher-reported externalizing behavioral problems in 1st grade. Increases in externalizing behavioral problems were greater among children whose mothers had less than a college degree at baseline. According to Katherine et.al (2009), in- creases in maternal education are also associated with concurrent improvements in children's school readiness and language skills by 12.8%.

Prior studies focused predominantly on mothers' education and infant/baby/primary school development, which have relatively short-term effects. In reality, however, many mothers, especially economically and educationally disadvantaged mothers, returned to school after they gave birth to their children. In the present study, I use data of 2012 and 2014 China Labor Force Dynamics Survey and investigate the effect of mothers' finally educational level on their grown-up children's income. Preliminary results suggest that one year increase of maternal education is associated with a 1.7% increase in children's income. The mechanism study suggests that the improvement in offspring's education is the major channel in that one-year increase in mother education is associated with 0.305 year increase in children education.

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2. Data and Empirical Specification

In this study, I use the data from China Labor Force Dynamics Survey in 2012 and in 2014. The total number of the observations is 22880. Table 1 summarizes the descriptive statistics. From Table 1, we find that the average year of mother's education is only 2.8 years, suggesting that most females have not completed primary school education yet. This is consistent with the social norm in Asian country that females are commonly exempted from consecutive and supported education.

Table 1. Descriptive Sample Statistics

Variable	obs	mean	Std.Dev	min	max
Years of Mother Education	23,620	2.791	3.717	0	16
Years of Individual Education	23,704	8.063	4.051	0	19
Age	23,741	45.910	10.107	19	65
Health Index	23,714	2.325	0.952	1	5
Support Index	22,880	8.542	9.913	0	50
Working Experience (Years)	23,704	23.851	11.931	0	49
Income (Yuan)	23,714	21483.77	18448.07	0	8,0000

Note: (1) Working experience is measured using age - years of education; (2) In- come is calculated by the real income of RMB; (3) Years of education is 0 for no education, 6 for primary school, 9 for middle school, 12 for high school, 14 for some college, 16 for university, and 19 for masters above; (4) Health Index: healthy= 1 o r2; fair = 3; unhealthy = 4 or 5; (5) Social Support
Connection: strong (30 - 50 people) ;fair (10 - 30 people); weak(1 - 10 people); none (0 people) To investigate the relationship between maternal education and children's income, we use a baseline regression that takes the form of

$$lnYi,j = \beta 1 Edui,m,j + \beta 2 Xi,j + \gamma j + \epsilon i,j$$

where $lnYi,j$ indicates the logarithm annual income of individual i who lives in province j . $Edui,m,j$ indicates the final educational level of individual i's mother m. Here, we use the total years of a mother receiving education to measure her educational level. Xi,j denotes the control variables that include demographic variables and productivity. For demographic variables, we include age, gender, health status and social support. γj is a province level fixed effect. we add this fixed effect to eliminate the bias caused by provincial attributes, for instance, the education policy/income level of each province. ϵi,j is the error term.
In this regression, the key coefficient is $\beta 1$. If $\beta 1$ is significantly positive, then it indicates that maternal education will bring a positive influence on children's income, which is consistent with our original hypothesis.

3. Results

3.1 Main Results

According to Column (5) in Table 2, we can find that one year increase of maternal education is associated with a 1.7% increase in children's income. The results are robust in both magnitude and significance regardless of adding different controls. We would like to note that we do not add children's education into the regression because children's education is the outcome of maternal education and hence can be considered as a bad control as proposed by Angrist and Pichke (2009). If adding children's education into the regression, it will reintroduce selection bias into the regression. Let us consider a simplified version, that is, we divide children's education to two categories: high education and low education. If controlling children's education, then we are investigating the impact of maternal education on children's income given the level of children's education is fixed. This is inappropriate. For instance, if we focus on children whose educational level is high, then we are also very likely to focus on mothers whose educational level is high, which reintroduces selection bias.

Table 2. Years ofMaternal Education and Children's Income

Outcome: Children's Income	(1)	(2)	(3)	(4)	(5)
Years of Mother Education	0.067***	0.044***	0.042***	0.040***	0.017***
	(12.79)	(8.95)	(8.75)	(8.42)	(5.27)
Age		-0.023***	-0.020***	-0.020***	0.060***
		(-11.34)	(-8.68)	(-8.55)	(8.70)
Male		0.508***	0.480***	0.476***	0.359***
		(17.29)	(17.30)	(17.59)	(15.12)
Healthy			0.170***	0.163***	0.140***
			(6.17)	(5.66)	(6.01)
Unhealthy			-0.350***	-0.345***	-0.287***
			(-7.85)	(-7.73)	(-5.86)
Strong Support				0.199***	0.161***
				(3.26)	(3.54)
Fair Support				0.208***	0.152***
				(5.24)	(4.92)
Weak Support				0.120***	0.097***
				(3.39)	(3.16)
Working Experience					-0.075***
					(-12.72)
N (obs)	22082	22082	22082	22082	22072
Provincial Fixed Effect	Yes	Yes	Yes	Yes	Yes
Adj R2	0.157	0.246	0.267	0.271	0.327

Note: (1) *** indicates being significant at the 1% significance level, ** indicates being significant at the 5% significance level, and * indicates being significant at the 1% significance level; (2) exp = age – years of education – 16; (3) standard errors are robust standard errors.

From Table 2, we can drive the conclusion that the relation between maternal education and the offspring's income is significantly positive. Moreover, maternal education can be considered exogenous in this setting. First, there is no reverse causality that children's income cannot affect maternal education. Second, the birth of a child can be considered randomized. Admittedly, the children's intelligence might be a confounder here. It is reasonable to assume that maternal education and children's intelligence are correlated, and children's intelligence can affect their income as well. However, due to data limitations, currently, I cannot add intelligence as a control to the regression. It renders a task for my future study.

3.2 Mechanism Study

Why would maternal education affect children's income? Magunson (2007) showed that children of mothers with higher levels of education perform better academically at middle school because women with a strong individual educational background have more time and energy to invest into their children's education. Further, children's cognition regarding studies and self-improvement would be potentially and greatly influenced by their mothers' consciousness and knowledge. Therefore, we propose that there must be a relationship between maternal education and her children's education, as the children would reap the benefits of human capital premium if their mothers have higher educational backgrounds, and they are also likely to have higher incomes in the workplace.

To investigate the mechanism of how maternal education affects children's income, we use another regression:

$$Edui,j = \beta 1 Edui,m,j + \beta 2 Xi,j + \gamma j + \epsilon i,j$$

Where $Edui,j$ indicates the years of education of the individual i. Similarly, if $\beta 1$ is significantly positive, then it states that maternal education will bring a positive influence on children's education, which can exactly explain how maternal education affects children's income.

Table 3. Years ofMaternal Education and Children's Education

Outcome:Years of Children's Education	(1)	(2)	(3)	(4)
Years ofMothers' Education	0.394***	0.317***	0.312***	0.305***
	(20.63)	(15.95)	(15.40)	(14.99)
Age		-0.073***	-0.066***	-0.066***
		(-9.23)	(-9.06)	(-9.34)
Male		1.694***	1.626***	1.593***
		(10.32)	(10.23)	(10.10)
Healthy Status			0.330***	0.294**
			(3.07)	(2.55)
Unhealthy Status			-0.808***	-0.783***
			(-5.49)	(-5.06)
Strong Support				0.789**
				(2.8)
Fair Support				0.996***
				(4.97)
Weak Support				0.551***
				(3.19)
N (obs)	22,786	22,786	22,786	22,786
Provincial FE	Yes	Yes	Yes	Yes
Adj R2	0.223	0.292	0.299	0.305

Note: (1) *** indicates being significant at the 1% significance level, ** indicates being significant at the 5% significance level, and * indicates being significant at the 1% significance level; (2) exp = age – years of education – 16; (3) standard errors are robust standard errors.

According to Table 3, we find that when a mother receives 1 more year of education, then her children would receive 0.305 more year of education. The results are robust in both magnitude and significance regardless of adding different controls. This explains that human capital is one critical mechanism that maternal education can benefit children's income, thus, if a mother hopes her children to receive higher education and then to get higher income, she should improve her educational level at first.

4. Conclusion

This research is actually enlightened by one of China's Inspirational Role Models in 2021, Zhang Guimei. In what she is appealing to the public, women's education is not only tied to their own future, but also to the prospect of every family, and even the flourish and growth of a nation.

The results of our research directly support this conclusion, as we observed that when maternal education increases, the offspring's educational level increases as well, and the relationship between maternal education and the offspring's income is also positive. We can therefore attest to this view–maternal education plays an important role in the development and achievement of children. Accordingly, the obsolete tradition that women are not sup- posed to pursue their education as much as possible is really a mistake. Women's education determines not only their own destiny, but also that of their offspring. The inherent and genetic intelligence has also been indicated in Mechanism Study as a significant variable that greatly influences children's income, but owing to limited data, we cannot discuss about it in this paper. In fact, it will provide a valuable insight into our future research–whether the increase in maternal education will also result in an increase in children's intelligence.

Therefore, we will still use the words of Zhang Guimei as the conclusion, "education for women can influence three generations of individuals", hence, we hope this research can inspire more reflection and care for women's education.

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