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"Does Education Affect Risk Aversion?: Evidence from the British Education Reform"

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Does Education Affect Risk Aversion?

Evidence from the British Education Reform

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Abstract

Individual risk attitudes are frequently used to predict decisions regarding education. However, using risk attitudes as a control variable for education decisions has been criticized because of potential issues related to reverse causality. Causality between risk aversion and education is unclear, and disentangling the different directions it may run is difficult. In this study, we make the first attempt to investigate the causal effects of education on risk aversion by examining the British education reform of 1972, which increased the termination age of compulsory schooling from age 15 to 16. We find that this additional year of schooling increases the level of risk aversion using IV_{2SLS} and Regression Discontinuity Design which is contrary to previous findings in the literature and we also find that this result is particularly strong for less-educated individuals. This positive causal effect of education on risk aversion could relieve our concerns regarding the endogeneity/reverse causality issue when using risk aversion as an explanatory variable for education decisions; the sign would still be credible because the coefficients are underestimated.

JEL Classification: C36 ; I21 ; I28 ; J24

Keywords: Risk Aversion; Education Reform; Instrumental Variable: RDD

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1 Introduction

Can risk aversion explain individual educational decisions? In human capital theory, education is generally considered an investment for a worker, who must surrender present earnings to obtain potentially higher future income based on the acknowledged proposition that education can reduce unemployment risk and lead to increased wages. Thus, although future wages, unemployment and economic labor market conditions are unknown and fluctuating, they can be greatly affected by a worker's investment in education. Nevertheless, as long as future wages remain uncertain, education may be treated as a risk by those who are risk averse; thus, it comes as no surprise that, in general, risk-averse workers are not willing to exchange present job certainty for further education. With this in mind, various economic analyses have focused on education as an investment in future income and have implemented education as an independent variable representing individuals' choices about maximizing total utility. In this manner, individuals' risk attitudes may be closely related to their educational decisions and lead to future wage differentials.

Many economic analyses have attempted to measure the effects of schooling on future outcomes. Levhari and Weiss (1974) found that income uncertainty is correlated with reduced levels of education. Mincer (1974) investigated how earnings variances differ across educational levels over the life cycle. However, because educational choice is also an endogenous variable, the standard reduced-form technique is not well defined. For these reasons, the effects of risk aversion on future consumption smoothing have been studied by only a few researchers. Cameron and Taber (2004), Keane and Wolpin (2001), and Sauer (2004) studied the relationship between financing education and future consumption smoothing as well as the effects of borrowing constraints on schooling decisions. These researchers suggested that borrowing constraints have no effect on schooling decisions. Furthermore, Cameron and Heckman (1998) empirically showed that borrowing constraints and parental income have little effect on education decisions, but a conclusion can only be reached about the first moment of earning distributions. It would be useful

to better understand the relationship between earnings dispersion (wage and employment rate volatility) and education; this topic has been studied by Belzil and Hansen (2004), who emphasize the importance of risk aversion in educational decision making in a study using panel data with dynamic programming models.

However, this reasoning is debatable given the concern regarding the role of education in determining individual risk aversion, as it assumes that risk aversion is uniquely given to individuals and does not vary over time. It has also been suggested that early childhood can determine both individual risk aversion and other characteristics. Dohmen et al. (2005) found that risk attitudes are correlated with gender, age, height, and parental background. Having highly educated parents has been found to diminish risk aversion. Parents can socialize their children with some effort, and this effort can lead to a strong correlation between parents' characteristics and those of their children. Thus, Dohmen et al. (2012) offered empirical evidence for the intergenerational transmission of a number of attitudes, including risk aversion.

We explore this issue using the British education reform of 1972 as a natural experiment. The effect of compulsory schooling on economic outcomes has been widely studied. In particular, the econometric foundation and the economic consequences of compulsory-schooling change have been widely examined, following Acemoglu and Angrist (2001), who estimated monetary returns on schooling in the United States, and this change has been shown to have improved educational levels (Lleras-Muney (2002), Goldin and Katz (2008), Oreopoulos (2006)). Most of the papers on early compulsory schooling follow an instrumental-variable strategy. Considering the British education reform of 1972, Harmon and Walker (1995) employed a standard Mincerian wage equation in which the minimum school leaving age instrumented the years of education and found that two-stage least squares (2SLS) estimates of the returns to schooling were higher than ordinary least squares (OLS) estimates. Similar results were obtained from the application of this instrument approach (Callan and Harmon (1999), Levine and Plug (1999), Vieira (1999), and Brunello and Miniaci (1999). However, Pischke and von Wachter (2008) found zero

returns from increasing the minimum school leaving age in West German states during the period from 1948 to 1970, and Oosterbeek and Webbink (2007) found no beneficial effect from extending the length of vocational training programs in the Netherlands from three to four years. The Regression Discontinuity Design analysis conducted by Devereux and Hart (2010) found no return for women and a modest return for men using the 1947 British compulsory schooling law that had been previously analyzed by Harmon and Walker (1995) and Oreopoulos (2006). More recently, Grenet (2013) conducted a comparative study of the changes in the compulsory schooling laws in France and the UK and found a significant wage increase for each additional year of compulsory schooling under the British reform but found no effect for the French reform.

In addition, both economic outcomes and other features of compulsory schooling change have been considered. Lochner and Moretti (2004), Milligan et al. (2004), and Lleras-Muney (2005) investigated the effect of compulsory schooling laws on criminal behaviors, political participation, and health status, respectively. Moreover, subjective well-being and teenage childbirth were examined by Oreopoulos (2007) and Black et al. (2008). Oreopoulos et al. (2006) evaluated the intergenerational effects of changes in compulsory schooling and found that parental education indeed affects children's grade retention and drop-out rates, whereas Black et al. (2005) did not find any significant intergenerational effect of compulsory schooling laws on children's education in Norway. More recently, using PSID data, Hryshko et al. (2011) found that a change in compulsory schooling years reduces the risk aversion of children whose parents were affected by the law.

A few studies indicate that education is negatively correlated with risk aversion (Donkers et al. (2001), Hartog et al. (2002)). However, no study has examined the direct effect of education on determining individual risk aversion because of a lack of data containing information on both risk aversion and exogenous educational shocks. Thus, we undertake the first attempt to examine the direct causal effects of education on risk aversion, and we use the recent wave of the British Household Panel Survey that enables

us to elicit individual risk aversion data and data regarding the British education reform of 1972.

In this paper, we use the British education reform of 1972 as an instrument for education, which enables us to observe a rise in the average education level before and after September 1, 1972. We use this reform as an exogenous education variable and observe the direct effect of education on individual risk aversion using IV_{2SLS} and further using Regression Discontinuity Design suggested by Imbens and Lemieux (2008) and Lee and Lemieux (2010) which became a new fashion in the impact evaluation of the reform. In contrast to the previous literature, we find that the reform increased risk aversion. This effect was significant only for individuals with lower education (those with at most a high school diploma or those who left school prior to completing high school); those with higher education levels were not significantly affected by the reform. From this result, we can infer that the negative relationship between education and risk aversion is primarily based on whether one has completed higher education (tertiary education).

2 Background

The school year begins for British pupils on September 1, and education is compulsory for all children from their fifth birthday to the last Friday in June of the school year in which they turn 16. The change in the minimum school leaving age analyzed in our paper was part of the 1972 Education Act that took effect on September 1, 1972. Individuals who were born before September 1957 and who turned 15 before the law changed could leave school at the end of the term in which they turned 15 (the UK school year is divided into three terms). Individuals who were born in September 1957 or later and who turned 15 after the law changed had to stay in school until the end of the term in which they turned 16, i.e., until the summer of 1972. This law change had a substantial effect on the average age at which British pupils left school (Harmon and Walker (1995), Oreopoulos (2006)).

The objective of the 1972 Education Act was to expand access to secondary education in England and Wales. Before the reform, in the early 1950s, the system was so exclusive that only one-quarter of good students could enter the selective grammar schools, the academic track that leads to higher education.[1] This elite promotion of secondary education raised criticism, which triggered the need for education reform. As a replacement for the old system, the more open and equal 'comprehensive' system was introduced by the reform (Pischke and Manning (2006)).

Against this background, the 1972 Education Act is considered an important change in many ways, not only in terms of institutions but also because this reform affected subject individuals in various aspects of their lives, as discussed above. Thus, we use this reform as a reliable exogenous change in education to evaluate its effect on individual characteristics, and we specifically consider risk aversion in this paper.

3 Data

We use the 18th wave of the British Household Panel Survey collected in 2009, which poses a self-reported risk aversion question to respondents. The question is presented as "Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?", and the respondents are asked to answer using a 10-point Likert scale from 0 (not willing at all: most risk averse) to 9 (fully: most risk seeking). We converted this measure by subtracting it from 10 to create a risk aversion measure that is increasing with risk aversion. Only individuals who were born between 1945 and 1975 are considered, as the reform was implemented within this period (for the 1957 cohort). Another reason to select only a subsample of the wave is to reduce the age effect of having much older or much younger generations. We thus obtained a working sample of 6,513 observations. The descriptive statistics are presented in Table 1.

As the reform divides cohorts into two groups according to their dates of birth, Table

[1] There were three categories of secondary education: grammar schools, technical schools and modern schools.

Table 1: Summary Statistics

Variable	Mean	s.d.	Min	Max	Observations
	Individual Characteristics:				
School Cohort	1960.27	8.62	1945	1975	6,513
% Woman	0.54	0.50	0	1	6,513
Age	47.07	8.64	32	64	6,513
Risk Aversion	4.54	2.03	0	9	6,513
Income	1,419	1,086	0	32,619	5,032
Married (=1)	0.68	0.47	0	1	6,513
	Schooling:				
Reform in 1972	0.65	0.48	0	1	6,513
Age Left School	19.25	5.98	9	29	6,513
Years of Schooling	12.22	3.61	2.42	20	6,513

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2: Descriptive Statistics: By Reform

	(1) Not In Reform		(2) In Reform		
Variable	Mean	s.d.	Mean	s.d.	diff (1)-(2)
	Individual Characteristics:				
School Cohort	1950.41	3.46	1965.62	5.18	***
% Woman	0.54	.50	0.55	0.50	
Age	56.94	3.50	41.72	5.20	***
Risk Aversion	4.78	2.05	4.40	2.01	***
Income	1,358	1,307	1,445	974	*
Married (=1)	0.73	0.44	0.65	0.48	***
	Schooling:				
Reform in 1972	0	0	1	0	
Age Left School	18.64	6.19	19.57	5.84	***
Years of Schooling	11.69	3.60	12.51	3.59	***
Observations	2,292		4,221		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

2 presents summary statistics for those who were affected by the reform and those who were not affected by the reform. The average age of those who were affected by the reform is, of course, lower than that of those who were not affected. The number of years of schooling differs between the affected and unaffected individuals: after the reform, the average number of years of education increased by approximately 1.7 years. Two reasons can explain this difference: one reason is the reform, and the other reason is the general

cohort effect in which the younger generation tends to pursue higher education at a higher rate than the preceding generation. By contrast, the risk aversion score decreases after the reform, although it is unclear whether risk aversion decreases due to the reform or because of the age difference in the samples[2], as younger individuals are found to be less risk averse than older individuals. Table 3 compares the two groups, i.e., those with

Table 3: Descriptive Statistics: By Education

	Low Education		High Education		
Variable	Mean	s.d.	Mean	s.d.	diff (1)-(2)
	Individual Characteristics:				
School Cohort	1959.33	8.64	1961.40	8.47	***
% Woman	0.55	.50	0.54	.50	
Age	48.02	8.66	45.94	8.48	***
Risk Aversion	4.73	2.06	4.30	1.98	***
Income	1,212	1059	1,634	1,072	***
Married (=1)	0.67	0.47	0.69	0.46	
	Schooling:				
Reform in 1972	0.60	0.49	0.70	0.46	***
Age Left School	15.88	0.76	23.29	6.93	***
Years of Schooling	9.52	0.97	15.46	2.89	***
Observations	3,554		2,959		

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

less education (a high school diploma at most) and those with higher education. Clearly, those who attained higher education have different characteristics; they are younger, they earn more, and they are less risk averse. Table 4 shows the distribution of risk aversion across gender and education groups. In general, women are more risk averse than men (4.87 vs. 4.14), and more educated individuals assessed themselves as less risk averse than individuals with less education assessed themselves. Therefore, we assume that the educational reform may have had an effect in terms of individual risk aversion. We introduce our empirical strategy in the following section.

[2]Age and reform are negatively correlated.

Table 4: Distribution of Risk Aversion

	Mean	s.d.	Min	Max	Observations	Diff
Full Sample	4.54	2.03	0	9	6,513	
Men	4.14	1.98	0	9	2,966	***
Women	4.87	2.02	0	9	3,550	
Low Education	4.73	2.05	0	9	3,555	***
High Education	4.3	1.98	0	9	2,961	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4 Empirical Method

Table 5 presents the correlation matrix for the variables of interest, including risk aversion, female gender, age, years of schooling, and marital status. Similar to the findings of previous studies (Dohmen et al. (2005)), risk aversion is positively correlated with being female and with age but negatively correlated with years of schooling (as noted above, i.e., based on human capital theory). Unlike female gender and age, which are given exogenously, education is an individual choice *per se*. Therefore, with this correlation, we cannot identify the causality, although we can clearly state that women and older individuals are more risk averse. In human capital theory, less risk-averse individuals tend to choose another year of schooling as an investment in future income. Given the possibility that risk aversion may be time varying, early childhood education may affect individual characteristics, such as risk aversion. Therefore, this correlation consists of two directions of composite effects: one from risk aversion to educational choices and the other from education to determining individual risk aversion. In this section, we establish our empirical strategy to investigate the direction of causality from education to risk aversion using instrumental-variable methods.

To investigate how education influences individual risk aversion, we use the 1972 British education reform, which increased the amount of compulsory schooling by one year. In this setting, we can divide our sample into two groups: pre-reform and post-reform. The reform allows us to observe a discontinuity in the average education of people with lower education levels who are at the margins and would have left school early; however, this reform does not truly affect those who would have pursued a college

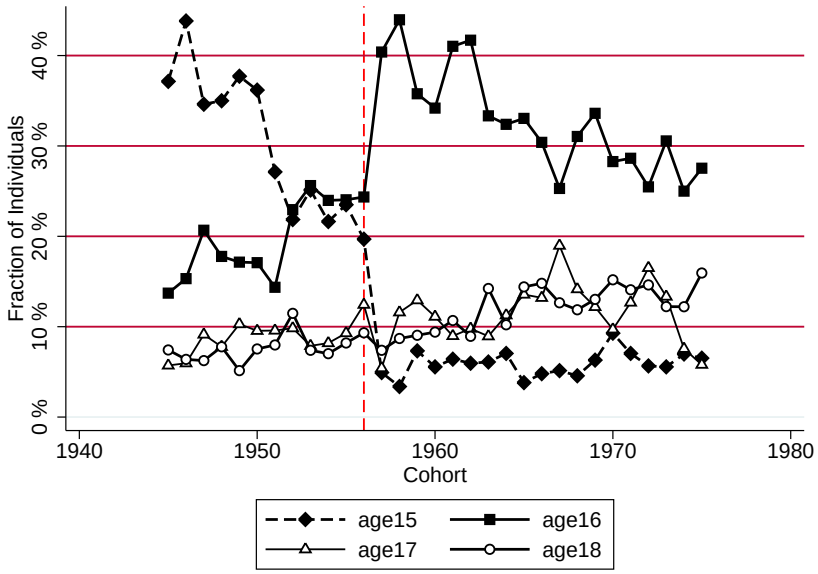
Table 5: Correlation Matrix of Variables of Interest

	Risk Aversion
Woman (=1)	0.18*
Age	0.26*
Years of Schooling	-0.15*
Tertiary Education (=1)	-0.13*
Professional/Manager/Skilled Father (=1)	-0.06*
Married (=1)	0.03*

* $p < 0.05$

education in either case. We will consider these two different types of effects later in this section.

Figure 1: Distribution of school leaving ages in the UK across school cohorts, 1945-1970



Our empirical model follows a regression-discontinuity design. We observe discontinuity in compulsory education before and after the reform of 1972. The education reform can explain the real effect of education on individual risk attitudes. Figure 1 shows the distribution of school leaving ages across school cohorts for 1945-1970 in the UK. Each curve presents the percentage of individuals who left school by a given age. This graph shows that the new compulsory schooling law introduced with the 1972 British reform

significantly increased the proportion of individuals who would have left at age 15 without the reform, which forced them to stay until age 16. As a consequence, the percentage of individuals who left at age 16 sharply increased as much as the percentage lost from school leavers at age 15 after the reform (i.e., the 1957 cohort). In this figure, we observe an increase in the number of years of schooling for individuals after the reform was implemented.

We consider risk aversion to be a function of education and other socio-demographic characteristics, such as gender and age, all of which are found to be correlated with risk aversion: women are more risk averse, and young people are less risk averse. We set the treatment status $Reform_i$ as a deterministic and discontinuous function of a covariate "date of birth" DOB_i.

$$Reform_i = \begin{cases} 1 & \text{if } DOB_i \text{ is after September 1957} \\ 0 & \text{if } DOB_i \text{ is before September 1957} \end{cases}$$

Therefore, potential outcomes can be described by a linear constant-effects model:

$$E[RA_{oi}|X_i] = \alpha + X_i\beta$$

$$RA_{1i} = RA_{0i} + \rho$$

where X_i is the vector of socio-demographic controls, such as gender, age, age^2, marital status, and the standard errors are clustered at the father's occupational (social status), the regional, and the school cohort level. Here, the level of risk aversion for those affected rises by ρ compared with the level of risk aversion for those not affected. This reasoning leads to the following regression:

$$RA_i = \alpha + X_i\beta + \rho Reform_i + \eta_i$$

This equation is the reduced form of the effect of education on risk aversion. In general,

the direction of causality between risk aversion and education is unclear. We frequently use risk aversion as an explanatory variable for individual education decisions, although one might argue that early education modifies individuals' risk aversion. Thus, we must investigate an exogenous effect that addresses the reverse causality issue of risk aversion on education. In our specification, we do not face an endogeneity problem; we use "Reform" as an instrument that varies exogenously with the policy change in 1972. Therefore, we can directly observe the effect of education on individual risk attitudes.

In the first stage, we observe the effect of the reform on education:

$$Edu_i = a + X_i b + cReform_i + \epsilon_i$$

In addition to using the reform dummy as an instrument for education, we use Regression Discontinuity Design (hereafter RDD) to evaluate the impact of the reform on risk aversion. With the reform in the compulsory schooling law, the cutoff date would be 1 Sep 1957. Using the cohort variable which is centered at 1 Sep 1957, we can estimate the RDD for the first stage and the reduced form specification. The first stage specification is, therefore, to look at the impact of the reform on the school leaving age:

$$Edu_i = \gamma_0 + \gamma_1 Reform_i + f(cohort_i - c) + \eta_i$$

where $f(cohort - c)$ is a quadratic function of the school cohort centered at the cutoff point c. $\hat{\gamma_1}$ would be the average causal effect of the reform on education. The reduced form model utilize the same variables on the self reported risk aversion:

$$RA_i = \theta_0 + \theta_1 Reform_i + f(cohort_i - c) + \mu_i$$

with $\hat{\theta_1}$ we observe the average causal effect of the reform on risk aversion. Using 2SLS,

we obtain the return to schooling on risk aversion by:

$$RA_i = \lambda_0 + \lambda_1 Edu_i + f(cohort_i - c) + \nu_i$$

where we can estimate the impact of education on risk aversion with $\hat{\lambda}$. I used With the IV_{2SLS} results, we are able to observe whether the general causal effect of risk aversion on educational choices is biased by endogeneity/reverse causality issues.

5 Results

Table 6: Instrumental Variable "Reform", Cohort 1945-1975

	Impact of the Reform on Education and Risk Aversion					
	First Stage School Leaving Age			Reduced Form Risk Aversion		
	Full	Edu_{low}	Edu_{high}	Full	Edu_{low}	Edu_{high}
Reform in 1972 (=1)	0.0222	0.295***	-0.295	0.112	0.208	-0.0109
	(0.216)	(0.048)	(0.337)	(0.101)	(0.134)	(0.173)
Observations	6513	3554	2959	6513	3554	2959
	Impact of Education on Risk Aversion					
	OLS: Risk Aversion			2SLS: Risk Aversion		
	Full	Edu_{low}	Edu_{high}	Full	Edu_{low}	Edu_{high}
School Leaving Age	-0.0538***	-0.0552	-0.0434***	5.051	0.704	0.0370
	(0.007)	(0.048)	(0.009)	(49.021)	(0.476)	(0.589)
Observations	6513	3554	2959	6513	3554	2959

Robust Standard errors obtained by clustering
at the regional, the father's occupational, and the school cohort level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 presents the results from the first-stage regression and the reduced form with the reform variable as the only instrument. The results from the first-stage regression are found in the first three columns. As expected, the reform slightly increased the number of years of schooling (although insignificant). To observe the effect in greater

detail, we selected two sub-samples based on education level. The column "Edu low" corresponds to those who have at most a high school diploma, whereas the column "Edu high" contains those with tertiary education. In the sub-sample analysis, the reform tends to more strongly affect those with lower levels of education. Clearly, this result ensues because the increase in compulsory schooling would not greatly affect those who would have pursued higher education in either case. The last three columns show the results for the reduced form. We use the reform variable to explain the level of risk aversion. The reform, which increased the number of years of schooling, also increases the level of risk aversion (although insignificant). This finding implies that more educated individuals are more risk averse. This result contrasts with the findings of other studies in which education has been shown to decrease risk aversion (Dohmen et al. (2005), Hryshko et al. (2011)). However, the sub-sample analysis is more interesting. Although the reform did not greatly affect those with higher education, the reform did affect those with lower education: they become more risk averse after the increase in the amount of compulsory schooling. From this result, we infer that the negative correlation between education and risk aversion is not always clear. The finding that education reduces risk aversion may only apply to those with higher education, because increases in lower education levels may in fact increase risk aversion.

The second panel in Table 6 presents the comparison between the OLS estimations and the IV_{2SLS} estimations. In the full sample analysis, OLS yields a negative and strongly significant coefficient for the effect of education (years of schooling), which is consistent with what is generally found in other studies and suggests that risk aversion is a determinant of education. However, from this correlation, we cannot determine whether education decreases risk aversion because of possible endogeneity or reverse causality issues. By contrast, IV_{2SLS} suggests the opposite direction of correlation: the number of years of schooling increases risk aversion. Education here is instrumented by the reform variable and the season of birth, and a positive coefficient is then found. This finding is stronger and significant only for those with lower education: with OLS, the effect

of education is negative, whereas with IV_{2SLS}, the effect is positive. In general, risk aversion is negatively correlated with education for those with lower education. However, the causal effect of education on risk aversion via the instrument-variable method is positive. From this result, we can infer that the effect of risk aversion on the choice of education level for those with lower education may be even higher than the OLS coefficient because there is an opposite direction for the education effect on risk aversion. Therefore, when we use risk aversion as an explanatory variable for education choice, the coefficient might be underestimated (biased toward zero). This result may support the use of risk aversion as an explanatory variable for educational choices because we might still insist that risk aversion affects decision making, although the effect is biased. Again, the results are different for those with higher education, who were less affected or unaffected by the reform. Although the results present an interesting figure, only using the reform variable as the one instrument may not give the clear significance as the cohort effects may intervene the impact of treatment. Therefore, we conduct RDD using the cohort as a rating variable which is centerd at the cutoff date 1 Sep 1957.

Figure 2: Cohort Average School Leaving Age, by Education

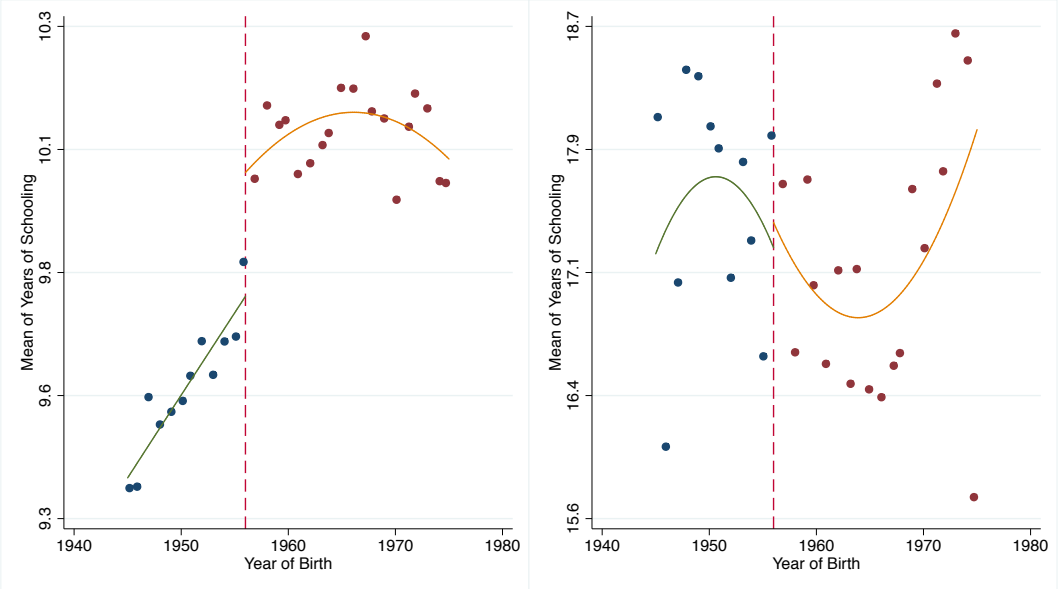
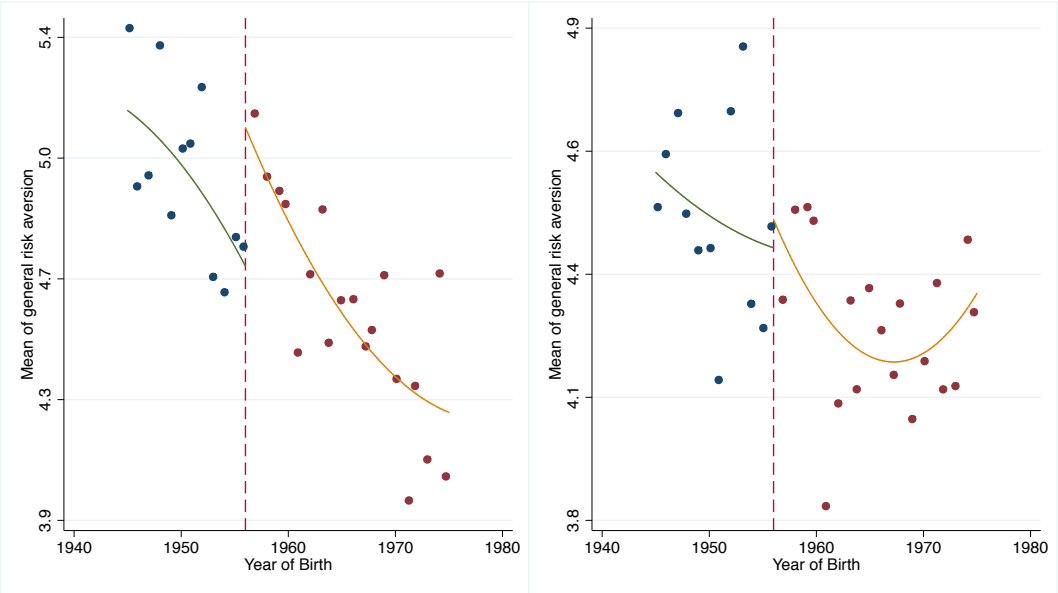


Figure 3: Cohort Average Risk Aversion, by Education



Figures 2 and 3 show the average school leaving age and the average risk aversion with the quadratic fitted values for each cohort by education. There is a clear increase before and after the reform. These figures provide a graphical evidence that there is a jump at the cutoff point for the school leaving age and the risk aversion for those with lower education, while it is rather vague to define a jump for those with higher education. In other words, individuals with lower education were the most strongly affected by the reform. In this reason, using RDD would give clearer picture of the impact of the reform on our variables of interest.

Table 7 presents the results from RDD. We examine samples to determine whether there is a local average treatment effect of the education reform on risk aversion. Compared to the specification with only one instrument (the reform variable), now the reform has a significant impact on risk aversion. For those with lower education, the reform clearly increased the level of risk aversion by 0.4 points. The reform seems to have no impact for those with high education as expected.

Table 7: Regression Discontinuity Design, Cohort 1945-1975

	Impact of the Reform on Education and Risk Aversion					
	First Stage School Leaving Age			Reduced Form Risk Aversion		
	Full	Edu_{low}	Edu_{high}	Full	Edu_{low}	Edu_{high}
Reform in 1972 (=1)	0.385	0.252***	0.168	0.273*	0.431**	0.0635
	(0.283)	(0.060)	(0.420)	(0.157)	(0.182)	(0.240)
Observations	6513	3554	2959	6513	3554	2959
	Impact of Education on Risk Aversion					
	OLS: Risk Aversion			2SLS: Risk Aversion		
	Full	Edu_{low}	Edu_{high}	Full	Edu_{low}	Edu_{high}
School Leaving Age	-0.0538***	-0.0552	-0.0434***	0.368*	0.245	0.238
	(0.006)	(0.048)	(0.009)	(0.220)	(0.407)	(0.254)
Observations	6513	3554	2959	6513	3554	2959

Robust Standard errors obtained by clustering
at the regional, the father's occupational, and the school cohort level.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

6 Conclusion

We have conducted an empirical analysis to investigate the effect of education on risk aversion. The correlation between risk aversion and education has been widely studied, but the direction of causality nonetheless remains unclear. Researchers who have attempted to use risk aversion to explain education decisions have found that education is negatively correlated with risk aversion: the more risk averse an individual is, the earlier she quits school. However, there are concerns regarding endogeneity or reverse causality, suggesting that education *per se* may influence the formation of individual risk aversion. To address these potential problems, we consider British reform under the 1972 Education Act and use this reform as an instrument for education because it exogenously increased the amount of compulsory schooling by one year. We conducted IV_{2SLS} and RDD analyses to investigate the causal effect of education on risk aversion.

We found that a one-year increase in compulsory schooling has a positive effect on

risk aversion. We can infer from this result that education may increase risk aversion, which contrasts with previous findings in the literature. However, the result is clear only for those with lower education. The reform did not have a significant effect on the risk aversion of those with higher education, which makes sense because these individuals would have pursued higher education with or without the reform. Our findings thus depart from the conventional wisdom that education reduces risk aversion (Dohmen et al. (2005), Hryshko et al. (2011)). We suggest that the effects of higher and lower levels of education may differ in this respect. The negative coefficient we found for the effect of education on the risk aversion of those with higher education suggests that tertiary education may diminish risk aversion by offering illumination and knowledge regarding how to manage risk, whereas increased early education may increase risk aversion by making individuals more aware of the risks they face.

Finding a positive effect for education on risk aversion may encourage the use of risk aversion as an explanatory variable for educational choice. Although the coefficient on risk aversion is biased, we can still argue that there is an effect because the coefficient is also underestimated. In other words, because the potential reverse causality issue is in the direction that reduces the size of the effect toward zero, we can rely on the sign of the risk aversion effect on education.

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