Does Education Foster Trust? Evidence from Compulsory Schooling Reform in the UK

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Abstract

Although many studies document that education and trust are positively correlated, few studies examine whether this correlation represents a causal effect. This paper fills in the gap with data from the British Social Attitudes Survey. Firstly, using the OLS method, this paper finds that education and the three measures of trust—trust in people, trust in politicians, and trust in government—are all positively and significantly correlated. Secondly, to examine whether this correlation represents a causal effect, this paper exploits exogenous variation in educational attainment induced by the compulsory schooling reform in 1972. The regression discontinuity estimates suggest that the effects of education on the three measures of trust are all small and statistically insignificant. The findings imply that the OLS estimates may suffer from omitted variable bias and the effects of education on trust may be small.

Key words: Education; Trust; RD Design; UK

JEL Codes: I26, I28, H52

1 Introduction

In many countries, an important goal of public education is to build trust (Glaeser et al., 2007), because trust facilitates cooperation and coordination among people and allows a society to avoid inefficient non-cooperative traps.[1] Many studies have investigated whether public education could improve trust (e.g.,Alesina and La Ferrara (2002); Helliwell and Putnam (2007); Nannestad (2008); Schoon et al. (2010); Oreopoulos and Salvanes (2011); Borgonovi (2012); Hooghe et al. (2012)). These studies typically use OLS regressions and find a positive correlation between education and trust, which seems to suggest that education could foster trust.

A major challenge facing researchers, however, is that educational attainment and trust could be driven by some common factors that are difficult to measure and control for. Firstly, personal ability or intelligence may affect both schooling attainment and trust. Secondly, individuals from better-educated families may achieve more schooling and are more likely to express trust towards others or government. Last but not least, people living in stronger communities may obtain more education and may find it easier to express trust towards others or government. If we do not address these potential omitted variable problems, we cannot draw any causal inferences between education and trust. Few studies have tried to address the endogeneity problem. An exception is Milligan et al. (2004), which uses compulsory schooling laws as IV for educational attainment to examine the effect of education on trust in other people and federal government in the US, as part of their larger study focusing on civic participation. Their estimated coefficient for trust in other people is only significant at the 10% significance level, while the coefficient for trust in government is insignificant even at the 10% significance level. The authors do not show

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[1]Trust is considered one of the two key measures of social capital (Putnam, 1995). An extensive literature has documented that trust promotes economic growth (Knack and Keefer, 1997; Zak and Knack, 2001; Algan and Cahuc, 2010) and financial development (Guiso et al., 2004, 2008). Also, trust supports a larger firm size by increasing decentralized decision making (Bloom et al., 2012). In addition, trust could reduce government regulation (Aghion et al., 2010). Trust, especially political trust, is crucial for political stability and government performance (Newton, 1997; Tavits, 2006). Last but not least, trust enhances subjective well-being (Helliwell, 2006; Helliwell and Wang, 2011).

the robustness of these results because their main interest is voting participation.[2]

Using data sets from the British Social Attitudes Survey, this study examines the association between education and trust with the OLS method and estimates the causal effect of education on trust with a Regression Discontinuity (RD) design. To conduct the RD design, this study exploits the compulsory schooling reform in the UK in 1972, which generated exogenous variation in educational attainment across birth cohorts. Although the OLS estimates suggest that education and the three measures of trust—trust in people, trust in politicians, and trust in government—are all positively and significantly correlated, the RD estimates indicate that the effects of education on the three measures of trust are all small and statistically insignificant. The results are robust when I use different sets of control variables, different bandwidths, and different ways to construct the dependent variables. The findings imply that the OLS estimates may suffer from omitted variable bias and the effects of education on trust may be small.

This study is related to two strands of literature. The first strand of literature explores the determinants of social capital (Alesina and La Ferrara, 2002; Welch et al., 2005; Schoon et al., 2010). The second strand of literature investigates the impact of education on trust and civic participation (Dee, 2004; Milligan et al., 2004; Helliwell and Putnam, 2007; Campbell, 2009; Oreopoulos and Salvanes, 2011; Borgonovi, 2012).

This paper develops as follows. Section 2 discusses the channels through which education can affect trust and introduces the background information for education in the UK; Section 3 describes the estimation strategy; Section 4 describes the data and gives the summary statistics; Section 5 examines the correlation between education and three measures of trust; Section 6 reports the RD estimation results; Section 7 checks robustness of the results; and the last section concludes the paper.

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[2]The authors investigate the effect of education on voting participation in the US and the UK. Although they find a strong effect of education on voting participation in the US, they fail to find a significant effect in the UK.

2 Background

In this paper, I investigate the effect of education on attitudinal trust, so I need to distinguish between attitudinal trust and behavioral trust first. Then I discuss the mechanisms through which education affects attitudinal trust. Lastly, I provide background information for education in the UK.

2.1 Attitudinal trust and behavioral trust

Broadly speaking, there are two kinds of measures for trust: attitudinal trust and behavioral trust. Attitudinal trust is survey-based, which relates to people's trusting attitudes towards others (politicians, or government); it usually relies on survey questions like "Generally speaking, would you say that most people can be trusted, or that you cannot be too careful in dealing with people?" Behavioral trust relates more to people's trusting behavior either in or out of laboratories. For instance, the amount of money sent by the "sender" in experimental trust games is a measure of behavioral trust.

I focus on attitudinal trust in this paper. Does attitudinal trust really predict trusting behavior? To answer this question, researchers need to connect surveys and experiments. Combining surveys and experiments conducted on Harvard undergraduates, Glaeser et al. (2000) find that answers to the trust questions predict the trustworthiness of the respondents, rather than their trusting behavior in the trust game.[3] In contrast, Alesina and La Ferrara (2002) find that some exogenous traumas or misfortune in the past year negatively affect respondents' trust towards others, suggesting that answers to the trust questions should not be a pure measure of the trustworthiness of the respondents.[4] In addition, by integrating behavioral experiments into representative surveys in a German study, Fehr et al. (2003) find that questions about respondents' trust towards others and their past trusting be-

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[3]Glaeser et al. (2000) may suffer from some weaknesses. As the authors have admitted, the number of observations is small and the standard errors are large. For example, their Tables 3 and 5 only have about 90 observations.

[4]If the answer to the trust question only captures the trustworthiness of the respondent, it should not be influenced by exogenous traumas or misfortune in the past year.

havior are good predictors of their future trusting behavior. They also find that none of the survey measures of trust predict subjects' trustworthiness in the experiment. The previous studies suggest that attitudinal trust is a reliable predictor of people's trusting behavior.

2.2 Education and attitudinal trust

Having discussed the difference between attitudinal trust and behavioral trust, now I discuss the mechanisms through which education may affect attitudinal trust—generalized trust and political trust.

2.2.1 Education and generalized trust

Generalized trust consists of two parts: the first part is belief or expectation of others' trustworthiness; the second part is preference, which may be related to risk aversion, altruism, etc. (see Sapienza et al. (2013)). Education could affect generalized trust through many channels. Firstly, teachers and schools encourage trust since it is pro-social behavior. Secondly, individuals can acquire knowledge and analytical thinking ability in schools (Oreopoulos and Salvanes, 2011), which can influence their calculation of others' trustworthiness. But the effect of critical thinking ability on trust is ambiguous. Last but not least, education can affect trust by changing individuals' social status.[5] But how social status affects trust is inconclusive. On the one hand, people in high social status may express more trust towards others because they are in more privileged positions in society. For instance, Hooghe et al. (2012) documents that personal occupational prestige is positively correlated with generalized trust. On the other hand, if people tend to keep a distance from undesirable realities, people in higher positions of society may place less trust in others. Indeed, Schilke et al. (2015) find that in social exchange games, subjects

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[5]It is well documented that education can improve individuals' income (e.g., Angrist and Krueger (1991); Card (1999, 2001); Oreopoulos (2006)) and promote their socioeconomic status (Oreopoulos and Salvanes, 2011). In Oreopoulos and Salvanes (2011), socioeconomic status is measured by occupation prestige, the probability of being unemployed, the probability of being a welfare recipient, etc.

with more power exhibit less perceptual and behavioral trust in others. To conclude, whether more schooling increases or reduces generalized trust depends on which effect dominates.

2.2.2 Education and political trust

Political trust is based on perception of the trustworthiness of the political system, while generalized trust relates more to face-to-face interactions with others. Thus, expressing political trust needs more abstract reasoning than expressing generalized trust (Hooghe et al., 2012). Firstly, education may affect political trust through "sorting". More schooling provides access to more privileged positions, which makes it easier for these "winners" to express trust in the political system (Newton, 1997; Campbell, 2009; Schoon et al., 2010; Hooghe et al., 2012). In addition, in well-established democracies, education helps individuals to understand the political system in a more profound way, so they are more likely to trust and support the political system (Hillygus, 2005; Huang et al., 2011). However, it is also possible that education reduces political trust if education makes individuals more critical.[6] Theoretically, the effect of education on political trust is ambiguous.

2.3 Education in the UK

I use the UK data in this study, because the data have an advantage—the large proportion of compliers makes it possible to estimate the average treatment effect for about a third of the population. In contrast, the proportion of people whose education was affected by changes in compulsory education laws is generally small in other countries.

In England and Wales, the school term starts in September and children need to enroll in a primary school when they reach age 5 by August 31. The British compulsory schooling law was changed twice in the last century. In 1947, the minimum school leaving age was raised from 14 to 15; in 1972, the minimum school leaving

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[6]As argued by Hooghe (2011), in well-established democracies, people do expect that there are critical citizens who display some kind of distrust in politicians.

age was raised from 15 to 16. I focus on the second reform in 1972 because the data contain very limited observations around the first reform. The second reform was approved by the House of Parliament on March 22, 1972 and implemented on September 1, 1972 (Statutory Instruments 1972 No. 444). This reform compelled students to stay in school until grade ten, sit for O-level examinations and obtain the Certificate of Secondary Education.[7]

According to the new compulsory schooling law, leaving full-time education before 16 is illegal. So we expect the proportion of people who left school by 15 would drop dramatically after the new compulsory schooling law came into effect. Figure 1 plots the proportions of people who left school by 15, 16, and 17 respectively for each year-of-birth cohort. It shows that the proportion of people who left school by 15 dropped from more than 30% to about 10% within two years, while the proportion of people who left school by 16 or 17 did not shrink much. The figure suggests the new compulsory schooling law indeed affected the school leaving decision of the cohorts born after 1957. For the cohort born in 1957, only those born after September were affected by the new law, so the proportion of people who left school by 15 did not drop significantly. Thus, the first affected cohort was born in 1958.[8]

3 Strategy

In this paper, I explore the correlation between education and trust with the OLS method first; then I examine whether this correlation represents a causal effect with a RD design. In this section, I discuss the RD identification assumptions and describe the estimation equations.

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[7]Enforcement of school attendance: If students are missing from school at compulsory schooling age, the parents may be prosecuted and may face a fine of up to 2,500 pounds, a community order, or a jail sentence up to three months.

[8]Ideally, I should use the month-year birth cohort, as suggested by Clark and Royer (2013). Unfortunately, the data do not contain any information about month of birth. Nevertheless, the year-of-birth cohort method still serves the purpose, just as it does in Oreopoulos (2006).

3.1 RD design

The RD design is appealing here since the change of compulsory schooling law in 1972 generated variation in educational attainment across the birth cohorts, and there is a clear cutoff—1958. The cohorts born after the cutoff were forced to stay in school for one more year, while those born before the cutoff were not. Assuming the cohorts just above the cutoff and just below the cutoff are comparable, we can use the outcome of observations just below the cutoff as the counterfactual for those just above the cutoff.

Local linear regressions provide a nonparametric method which can estimate the treatment effect consistently in a RD design (Hahn, Todd and Van der Klaauw, 2001). To conduct local linear regressions, I need to choose an "optimal" bandwidth and run linear regressions within the optimal bandwidth. Researchers have proposed several methods for choosing the optimal bandwidth, such as Ludwig and Miller (2007), Imbens and Kalyanaraman (2012), and Calonico, Cattaneo and Titiunik (2014) (CCT (2014) for short from here on). In this paper, I use the method of CCT (2014) to choose all optimal bandwidths.[9]

3.2 Estimation equations

I use the following equation to describe the relationship between educational attainment and attitudinal trust:

$$Y_{ict} = \gamma_0 + \gamma_1 E_{ict} + G(Z_{ic}, T_{ic}) + \gamma_2 X_{ict} + \mu_{ict}, \tag{1}$$

where Y_{ict} denotes attitudinal trust of individual i in cohort c at time t; E_{ict} denotes years of schooling for individual i in cohort c at time t; γ_1 is the parameter of interest; Z_{ic} is the assignment variable, which equals the respondent's year of birth minus 1958; T_{ic} is the "Reform" dummy, indicating whether an individual is subject

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[9]The three methods generate slightly different optimal bandwidths. But the choice of optimal bandwidth is not essential to the estimation, because I will use different bandwidths to check robustness.

to the new compulsory schooling law (T_{ic} equals 1 for cohorts born in and after 1958 and 0 otherwise); $G(Z_{ic}, T_{ic}) = b_1 Z_{ic} + b_2 T_{ic} \times Z_{ic}$, which allows for different trends on the two sides of the cutoff; X_{ict} represents observable characteristics of individual i (gender, age, ethnicity, region, etc.); μ_{ict} is the error term, capturing all unobservable factors which may affect attitudinal trust, such as intelligence, family background, and community characteristics.

I use the equation below to assess the impact of the compulsory schooling reform on individual educational attainment:

$$E_{ict} = \alpha_0 + \alpha_1 T_{ic} + F(Z_{ic}, T_{ic}) + \alpha_2 X_{ict} + \nu_{ict}, \tag{2}$$

similar to $G(Z_{ic}, T_{ic})$, $F(Z_{ic}, T_{ic})$ allows for different trends on the two sides of the cutoff; ν_{ict} is the error term, capturing all unobservable factors which may affect years of schooling, such as intelligence, family background, and community characteristics. If we run a simple OLS regression like equation (1), the estimated γ_1 may be biased, because E_{ict} and μ_{ict} are potentially correlated. To illustrate, a person growing up in a better-educated family may obtain more education and express more trust towards others. To address this endogeneity problem, we can use the "Reform" dummy T_{ic} as an instrument for educational attainment E_{ict}, because it is correlated with educational attainment E_{ict} but uncorrelated with the error term μ_{ict}.

If we substitute equation (2) to equation (1), we can get the reduced form relationship between the compulsory education reform and attitudinal trust:

$$Y_{ict} = (\gamma_0 + \gamma_1 \alpha_0) + \gamma_1 \alpha_1 T_{ic} + (\gamma_1 F(Z_{ic}, T_{ic}) + G(Z_{ic}, T_{ic}))$$
$$+ (\gamma_1 \alpha_2 + \gamma_2) X_{ict} + (\gamma_1 \nu_{ict} + \mu_{ict}) \tag{3}$$

If the reform indeed raised women's schooling, then $\alpha_1 > 0$, which implies that the sign of $\gamma_1 \alpha_1$ is the same as γ_1. Moreover, the ratio of the estimate $\widehat{\gamma_1 \alpha_1}$ from equation (3) to the estimate $\widehat{\alpha_1}$ from equation (2) provides a consistent estimate of γ_1. In practice, this can be implemented by a two-stage least square (2SLS) approach, in

which the reform dummy is used as an instrumental variable for schooling, E.

I compute the optimal bandwidth h_E^* and h_Y^* for equations (2) and (3), separately. As suggested by Imbens and Lemieux (2008), we can choose the smaller one as the common bandwidth for equations (2) and (3), i.e., $h^* = min(h_E^*, h_Y^*)$. Here, the 2SLS estimate of γ_1 captures the Local Average Treatment Effect (Imbens and Angrist, 1994) on the compliers, who would stay in school till age 16 if required by the law and leave school at 15 otherwise.

3.3 Identification assumption

The key RD assumption is that the conditional expectations of the potential outcomes are all continuous at the cutoff point. Then we can attribute any discontinuities we find to the causal effect of the compulsory schooling reform. This assumption implies: (1) all predetermined variables, observable or unobservable, are continuous at the cutoff; (2) individuals cannot fully manipulate the assignment variable—year of birth.

I take two steps to check the validity of the assumption. Firstly, I check the continuity of the observable predetermined variables. If the observable variables are continuous at the cutoff, we believe the unobservables are also continuous at the cutoff. I examine the continuity of four observable variables: the proportion of females, the proportion of Asians, the proportion of blacks, and age at the survey. We cannot find any discontinuity at the cutoff point for these variables, as shown in Figure 2. I would like to check the continuity of other predetermined variables, such as parental education. Unfortunately, such information is not available in the data sets. Secondly, I check whether there is manipulation by checking the density of the assignment variable. Figure 3 shows that the density is quite symmetric on the two sides of the cutoff, indicating there is no manipulation at all.

4 Data

The British Social Attitudes (BSA) survey series began in 1983, which was designed to produce annual measures of attitudinal movements. The survey is conducted by *NatCen Social Research*—a leading center for independent social research in Britain. The data contain information about demographic characteristics, behavior patterns, and political attitudes.

The BSA has been conducted every year since 1983, except in 1988 and 1992 when core funding was devoted to the British Election Study series. The survey waves 1983–1985, 1989–1990, 1993, 1995, and 1999 are not used in the estimations because none of the three trust questions are asked in these surveys. Besides, the 1991 survey is not used as it contains no information about respondents' ethnicity, although it contains the trust questions. In addition, the 2011 survey is not used, since the trust questions it contains are completely different from those in the other surveys. All of the other available surveys, displayed in Table A1, are used in the study.

4.1 Measures of trust

The measure of trust in people is derived from a survey question: "Generally speaking, would you say that most people can be trusted, or that you cannot be too careful in dealing with people?" There are two options to the question: *(1) Most people can be trusted; (2) Cannot be too careful in dealing with people.* A dummy variable is constructed with 1 representing *Most people can be trusted.*

The measure of trust in politicians is derived from the question: "How much do you trust politicians of any party in Britain to tell the truth when they are in a tight corner?" There are four options: *(1) Just about always; (2) Most of the time; (3) Only some of the time; (4) Almost never.* The proportions of respondents who choose the four options are about 1%, 7%, 39%, and 53% respectively. To make the results more interpretable, a dummy variable is constructed, which equals 1 if the respondent chooses one of the first three options. Thus, the outcome variable "trust

in politicians" means respondents trust that politicians would tell the truth at least some of the time.

Similarly, trust in government is derived from a survey question: "How much do you trust British governments of any party to place the needs of the nation above the interests of their own political party?" The options are exactly the same as above. The proportions of respondents who choose the four answers are about 2%, 22%, 51%, and 25% respectively. A dummy variable is constructed, which equals 1 if the respondent chooses one of the first three answers. Thus, the outcome variable "trust in government" means the respondents trust government at least some of the time.

4.2 Measure of educational attainment

In the survey, educational attainment is measured by the age at which individuals left full-time education. There are five categories: (a) 15 or under; (b) 16; (c) 17; (d) 18; (e) 19 or over. To calculate their years of schooling, I treat the age at which they left school as 15, 16, 17, 18, and 19 for the five categories respectively. Then their completed years of schooling equal the age at which they left school minus five. Although this measure of educational attainment is not perfect, it will not bias the estimates, since the RD estimates capture the effects on the compliers who postponed their school leaving age from 15 to 16 due to the new compulsory schooling law.

4.3 Summary statistics

The original sample consists of 36,481 observations. Using the method of CCT (2014), I get that the optimal bandwidth is 6 years.[10] Hence, I keep the cohorts born between 1952 and 1963 in the sample, which has 7,680 observations. After dropping 345 observations with missing information, I obtain the baseline sample with 7,335 observations. Table 1 shows the summary statistics of this sample. On

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[10]The optimal bandwidths for years of schooling, trust in people, trust in government, and trust in politicians are 6, 9, 9, and 9 respectively. For convenience, we can use the smallest one as the common optimal bandwidth, as suggested by Imbens and Lemieux (2008).

average, about 46% of the respondents claim that most people can be trusted; 47% of them trust that the politicians would tell the truth at least some of the time; and 73% of them trust that the governments would place the needs of the nation above the interests of their own party at least some of the time. The average years of schooling are 11.8. About 54% of the respondents are subject to the new compulsory schooling law. The proportion of females is about 54.5%, implying that women may be a little bit over-sampled in the survey. The average age of the respondents is about 46. About 3.2% of the respondents are Asian origin, 2.7% are black origin, and the remaining 94% are white origin. About 85% of the respondents are in England, 9% of them are in Scotland, and the remaining 6% are in Wales.

5   Association between education and trust

In this section, I explore the association between education and trust. I divide the subjects into five groups according to their school leaving age: (a) 15 or under; (b) 16; (c) 17; (d) 18; (e) 19 or over. Then I plot the average levels of trust for the five groups and report the results in Figure 4. The figure indicates that people with higher level of education tend to express higher level of trust and this pattern holds for all of the three measures of trust.

Furthermore, I run OLS regressions to check the correlation between education and trust. Firstly, I examine the association between education and trust in people and report the results in Panel A of Table 2. "Cohort trend" is included in all regressions. In regression (1), only "years of schooling" is added. In regression (2), "female" dummy is added. In regression (3), "age" and "age squared" are added. In regression (4), "Asian" and "Black" dummies are added. In regression (5), "England" and "Scotland" dummies are added to control for regional fixed effects. In regression (6), a dummy for each survey year is added to capture any year-specific factor that potentially affects attitudinal trust. Across all regressions, the estimated coefficients for years of schooling range between 0.07 and 0.08, and they are all significant at the 1% significance level, suggesting that one additional

year of schooling is associated with an 8 percentage points increase in the probability of trusting people.

Secondly, I check the correlation between education and trust in politicians and display the results in Panel B of Table 2. Across all of the regressions, the estimated coefficients for years of schooling are significant at the 1% significance level, and the magnitudes are around 0.04, indicating that one additional year of schooling is associated with a 4 percentage points increase in the probability of trusting politicians.

Lastly, I check the correlation between education and trust in government and report the results in Panel C of Table 2. In all of the regressions, the estimated coefficients for years of schooling are significant at the 1% significance level, and the magnitudes are around 0.04. The results imply that one additional year of schooling is associated with a 4 percentage points increase in the probability of trusting government.

To summarize, I find that educational attainment is positively and significantly correlated with both generalized trust and political trust. These findings are consistent with those in previous studies (e.g., Alesina and La Ferrara, 2002; Milligan et al., 2004; Helliwell and Putnam, 2007; Nannestad, 2008; Schoon et al., 2010; Oreopoulos and Salvanes, 2011; Borgonovi, 2012; Hooghe et al., 2012).

6 RD estimation results

In this section, I examine whether the association between education and trust represents a causal effect with a RD design.

6.1 First stage

Now we look into the effect of the 1972 compulsory schooling reform on individual educational achievement. I plot average years of schooling for each cohort from 1952 to 1963 and fit linear trends on either side of the cutoff to capture the relationship

between years of schooling and birth cohort in Figure 5. We can see there is a significant jump in average years of schooling at the cutoff and the magnitude is about 0.25 years.[11] This discontinuity in educational attainment can be attributed to the effect of the compulsory schooling reform.

Table 3 shows the estimation results for the first stage. Linear cohort trends are included in all of the six regressions. In column (1), only the "Reform" dummy is added into the regression; in column (2), the "Female" dummy is added; in column (3), "Age" and "Age squared" are added; in column (4), "Asian" and "Black" dummies are added to control for ethnicity; in column (5), "England" and "Scotland" dummies are added to control for any possible region heterogeneity; in column (6), the "Survey year" dummies are added. Across all of the columns, the estimated coefficients for the "Reform" dummy are significant at the 1% significance level and the magnitudes are around 0.25. The results suggest that the compulsory schooling reform increased years of schooling of the affected cohorts by about 0.25 years on average.

6.2   Second stage

In this subsection, I examine the effects of education on the three measures of trust: trust in people, trust in politicians, and trust in government. If the three measures are perfectly correlated, I do not need to examine the effects separately. Thus, I check the correlations between the three measures of trust first. The correlation between trust in people and trust in government is 0.1; the correlation between trust in people and trust in politicians is also 0.1; and the correlation between trust in government and trust in politicians is 0.45. We can see the correlation between generalized trust and political trust is weak, while the correlation between the two measures of political trust is much stronger.

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[11]Because many students would stay in school beyond age 16 regardless of the reform, this discontinuity is much smaller than one. The other studies that investigate this reform have reached similar results. For example, Clark and Royer (2013) find that the reform increased average years of education by 0.353 years, and Grenet (2013) finds that the reform increased average years of education by 0.309 years for women and by 0.267 years for men.

6.2.1 Trust in people

Now I investigate the effect of education on trust in people. Figure 6 shows the relationship between trust in people and year-of-birth cohorts. The vertical axis denotes the proportion of people who claim that most people can be trusted. Linear trends and 95% confidence intervals are fitted within the optimal bandwidths on the two sides of the cutoff separately. There is no remarkable discontinuity in the proportion of people who trust others at the cutoff.

Furthermore, I estimate the effects of education on trust in people, using the 2SLS method, and display the results in Panel A of Table 4. I add control variables in the same way as I do in Table 2. Across all of the six columns, the magnitudes of the estimated coefficients for years of schooling range between 0.12 and 0.17. The magnitudes are not negligible if we compare them to the mean, which is about 0.46. However, none of the estimates are significantly different from 0 at the 10% significance level. Here we find that the effects of education on generalized trust are statistically insignificant.

6.2.2 Trust in politicians

First, I investigate the effect of education on trust in politicians visually. Figure 7 shows the relationship between trust in politicians and birth cohorts. For birth cohorts 1952–1963, the proportion of people who trust in politicians ranges between 0.43 and 0.52. Linear trends and 95% confidence intervals are fitted within the optimal bandwidth on either side of the cutoff. There is no evident discontinuity in trust in politicians at the cutoff, and the 95% confidence intervals overlap at the cutoff.

Moreover, I estimate the effects of education on trust in politicians, using the 2SLS method, and report the results in Panel B of Table 4. Across all of the columns, none of the estimated coefficients for years of schooling are significant at the 10% significance level, and the magnitudes range from -0.03 to -0.01. The results do not suggest any significant effect of education on trust in politicians.

6.2.3 Trust in government

Now I explore the effects of education on trust in government. Figure 8 shows the relationship between trust in government and birth cohorts. For the cohorts born between 1952 and 1963, the proportion of people who trust in government ranges from 0.70 to 0.76. Linear fits and 95% confidence intervals are plotted on either side of the cutoff. There is no evident discontinuity at the cutoff, and the confidence intervals overlap with each other at the cutoff.

Also, I estimate the effects of education on trust in government, using the 2SLS method, and display the results in Panel C of Table 4. Across all of the columns, the estimated coefficients for years of schooling are insignificant, and the magnitudes range from -0.06 to -0.03. The results do not suggest that more schooling improves trust in government.

7 Robustness

7.1 Estimation with different bandwidths

I check whether the results are sensitive to the bandwidth choice. Specifically, I check the robustness of the effects by using different bandwidths in the regressions. The results are shown in Table 5. In column (1), the "optimal" bandwidth 6 years is used for comparison. From column (2) to column (5), the bandwidths used are 9, 8, 7, and 5 years respectively. I cannot use a bandwidth smaller than 5, because in that case I will have very few observations, which may result in imprecise estimates.

First, I check the robustness of the first stage results and display the results in Panel A of Table 5. The estimated effects are all statistically significant at the 1% or 5% significance level, and the magnitudes range between 0.16 and 0.25. We find that the first stage results are not sensitive to the choice of bandwidths.

Then I check the robustness of the effects on trust in people and report the results in Panel B. Across all of the regressions, none of the estimated effects are statistically significant, and the magnitudes range between -0.06 and 0.14. The 2SLS

estimates do not support that education has positive and significant effects on trust in people.

Panel C displays the robustness of the effects on trust in politicians. Across all of the regressions, the estimated effects vary from -0.03 to 0.01, and none of the estimates are significant at the 10% significance level. The results here do not suggest that education has positive and significant effects on trust in politicians.

Panel D shows the robustness of the effects on trust in government. Across all of the regressions, none of the effects are significant at the 10% significance level, and the magnitudes range from -0.07 to -0.01. The results do not support that education has positive and significant effects on trust in government.

To summarize, the results in Table 5 suggest that the estimated effects are not sensitive to the bandwidth choice.

7.2   Investigating two reforms together

There were two compulsory education reforms in the UK in the 20th century: the first one increased the school leaving age from 14 to 15 in 1947, and the second one raised the school leaving age from 15 to 16 in 1972. By investigating the effects of the two reforms together, we can address the concern that the baseline estimates are driven by the special socioeconomic conditions around the second reform. The first cohort affected by the first reform was born in 1933, so I plot the average years of schooling and average levels of trust for birth cohorts 1925–1975 in Figure 9. We can see that the average education level has increased substantially for the cohorts born between 1925 and 1975. If more schooling indeed encourages individuals to trust in people (politicians, or government), we should observe a corresponding increase in the level of trust in people (politicians, or government) around the two reforms. The figure shows, however, that the level of trust in people (politicians, or government) has not experienced any remarkable increase around the two reforms.[12]

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[12]For birth cohorts 1925–1975, the average years of schooling have increased from 10.5 to 12.5, with a mean of 11.5 and a standard deviation of 0.52; the level of trust in people fluctuates around 0.45, with a standard deviation of 0.03; the level of trust in politicians fluctuates around 0.46, with a standard deviation of 0.03; the level of trust in government fluctuates around 0.74, with a

To summarize, we do not find any significant effects of education on trust when we examine the effects of the two reforms together.

7.3   An alternative way to construct the dependent variables

In section 4, I construct a dummy variable for trust in politicians and another one for trust in the government. The original question has four possible answers, and I code the first three with a 1 and the remaining with a 0. To check whether the results are sensitive to the way I construct the dependent variables, here I use an alternative way to construct the dependent variables: I code the first two answers as 1 and the remaining as 0. I re-run all regressions, using the alternative way of coding. First, I check the association between education and trust in politicians (government) and display the results in Table A2. Then I estimate the effects of education on trust in politicians (government), using the 2SLS method, and report the results in Table A3. Lastly, I check the robustness of the effects by using different bandwidths in the regressions and report the results in Table A4. The results are similar to those of the baseline estimations, indicating that the results are not sensitive to the method of coding the dependent variables—trust in politicians and trust in government.

8   Conclusion

This paper investigates the association between education and trust and examines whether this association represents a causal effect. The OLS estimates suggest that education and the three measures of trust—trust in people, trust in politicians, and trust in government—are all positively and significantly correlated. To examine whether this correlation represents a causal effect, this paper exploits exogenous variation in schooling caused by the raising of school leaving age in the UK in 1972. The 2SLS estimates indicate that the effects of education on the three measures of trust are all statistically insignificant. The standard errors of the 2SLS estimates

standard deviation of 0.02.

are large, possibly because the sample size is not large enough. If I had more observations, I would likely get smaller standard errors. Nevertheless, the reduced-form estimates have much smaller standard errors and they also suggest that the effects of education on trust may be small.[13] Hence, the confidence intervals for the 2SLS and reduced-form estimates could potentially rule out large effects of education on trust, and they suggest that education may have, at best, small effects on trust. Moreover, the results are robust when I add different sets of control variables, use different bandwidths, and use different ways to construct the dependent variables. Also, the results are unlikely to be driven by the special socioeconomic conditions around the reform in 1972. The difference between the OLS and RD estimates implies that the OLS estimates may suffer from omitted variable bias and researchers might need to interpret the relationship between education and trust with caution.

The RD design in this paper has some limitations. First, the RD estimates rely on comparisons between cohorts born just before and just after the cutoff point, and we need to assume *all other* factors are continuous at the cutoff point. Although I have checked the continuity of some predetermined variables, I cannot exclude all factors that may have changed discontinuously at the cutoff point. Second, the RD estimates capture the LATE effects on the compliers, and the effect on the compliers may be different from that on the average person in the population. Hence, I cannot exclude the possibility that education has an impact on the trust of the non-compliers. Also, the exogenous variation in schooling is at the secondary school level, so I cannot exclude the possibility that education at a different level could affect trust.

In the literature, education is considered one of the most important predictors of trust and social capital (Helliwell and Putnam, 2007; Nannestad, 2008; Borgonovi, 2012). Most of these studies, however, use the OLS method, which cannot generate

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[13]I regress the measure of trust directly on the "reform" dummy and a full set of control variables to get the reduced-form estimates, and the estimation equation is given in equation (3). For trust in people, the estimated coefficient is 0.030, and the robust standard error is 0.029. For trust in politicians, the estimated coefficient is -0.008, and the standard error is 0.030. For trust in government, the estimated coefficient is -0.014, and the standard error is 0.024.

reliable causal inferences. It is possible that the positive correlation between education and trust only reveals the fact that individuals with higher intelligence, born in better-educated families, or growing up in richer communities obtain more schooling and express more trust towards others (politicians, or government) as well.

Education may affect trust in people through its impact on people's trustworthiness. When the average level of education increases in a society, people in that society could potentially become more trustworthy. If people perceive that others in the society become more trustworthy than before, they may express more trust towards others. In that case, education could foster trust, and we could observe a positive correlation between education and trust in people across regions or countries.[14] But it is not the case in the UK. As shown in Figure 9, although the average education level has increased substantially for the cohorts born between 1925 and 1975, the level of trust in people (politicians, or government) has not experienced any remarkable increase. Hence, the visual evidence shown in Figure 9 is against the argument that education may affect trust through its impact on people's trustworthiness. In conclusion, the estimates of this study imply that increasing people's years of schooling may not be an effective way to improve the level of trust in a society.

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[14]Thanks to the anonymous referee for providing this insightful argument.

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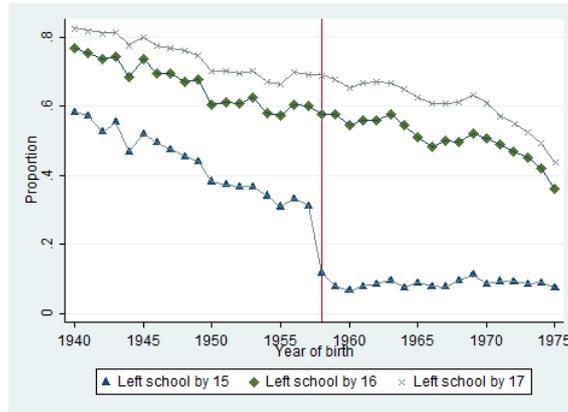
Figure 1: The impact of the compulsory schooling reform in 1972

Notes: The horizontal axis represents year-of-birth cohort. From bottom to top, the three lines represent the proportions of people who left school by age 15, 16, and 17 respectively. Each dot represents the mean of a cohort. The vertical line denotes the cutoff 1958.

Figure 2: Balancing check

Notes: The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included. The vertical line denotes the cutoff 1958. The top left panel checks the continuity of the proportion of females; the top right panel checks the continuity of the proportion of Asians; the lower left panel checks the continuity of the proportion of blacks; the lower right panel checks the continuity of age at the survey.
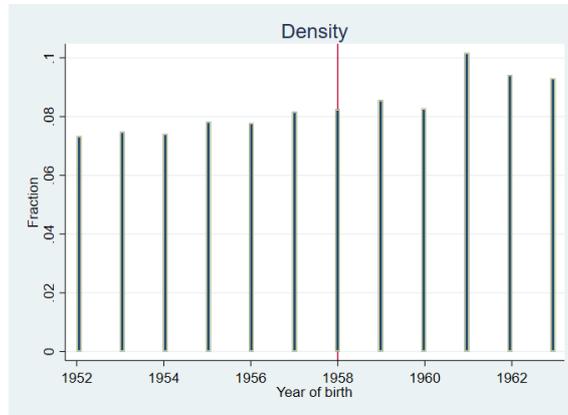
Figure 3: The density of the assignment variable

Notes: The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included. The vertical line denotes the cutoff 1958.

Figure 4: Educational attainment and trust

Notes: The subjects are divided into five groups according to the age at which they left school: (a) 15 or under; (b) 16; (c) 17; (d) 18; (e) 19 or over. The three measures of trust are trust in people, trust in politicians, and trust in government.

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Figure 5: The impact of the reform on educational attainment
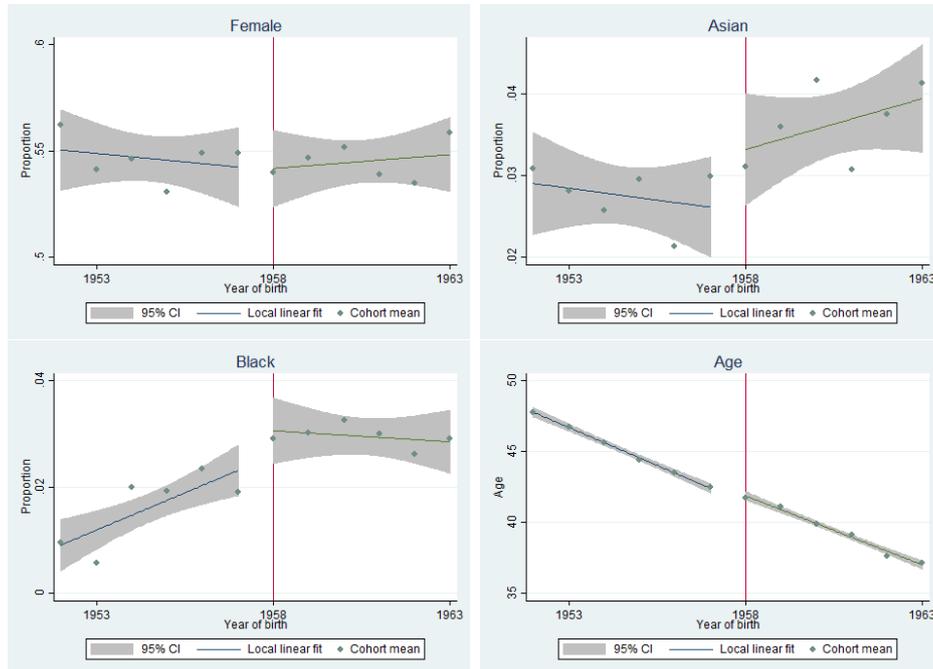
Notes: The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included. The vertical line denotes the cutoff 1958. Fitted values of local linear regressions and 95% confidence intervals are plotted within the chosen bandwidths. Each dot represents the mean of a cohort.
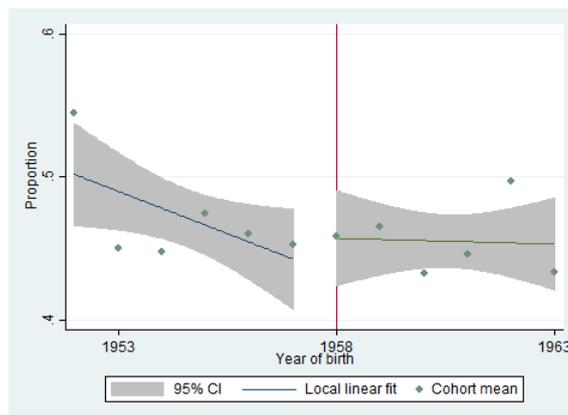
Figure 6: The impact of the reform on trust in people

Notes: The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included. The vertical line denotes the cutoff 1958. Fitted values of local linear regressions and 95% confidence intervals are plotted within the chosen bandwidths. Each dot represents the mean of a cohort.
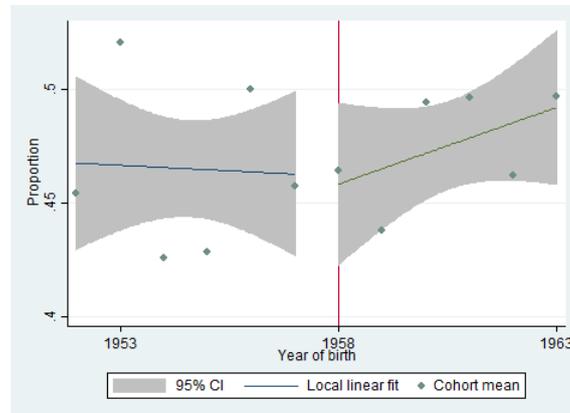
Figure 7: The impact of the reform on trust in politicians

Notes: The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included. The vertical line denotes the cutoff 1958. Fitted values 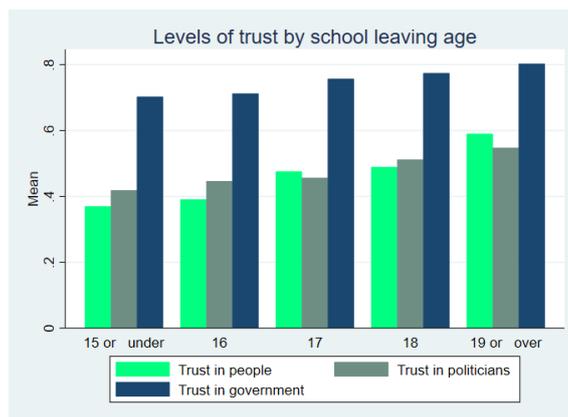of local linear regressions and 95% confidence intervals are plotted within the chosen bandwidths. Each dot represents the mean of a cohort.
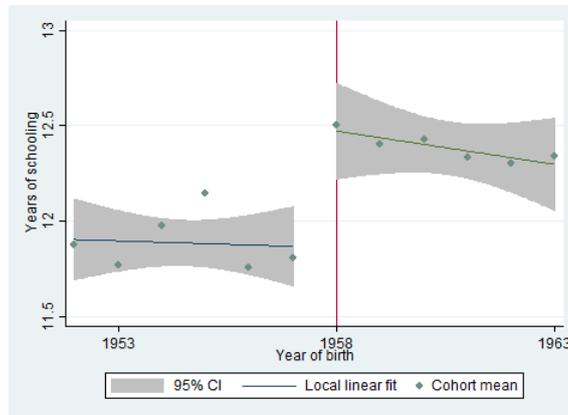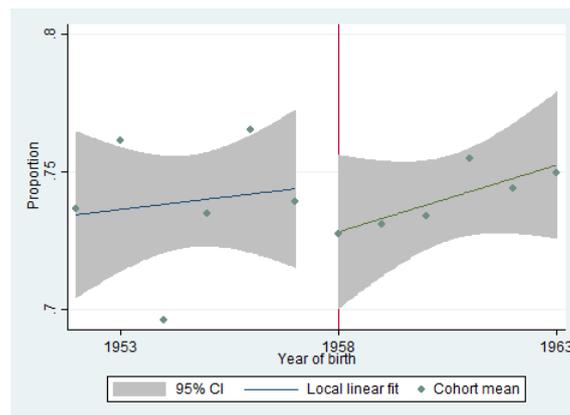

Figure 8: The impact of the reform on trust in government

Notes: The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included. The vertical line denotes the cutoff 1958. Fitted values of local linear regressions and 95% confidence intervals are plotted within the chosen bandwidths. Each dot represents the mean of a cohort.
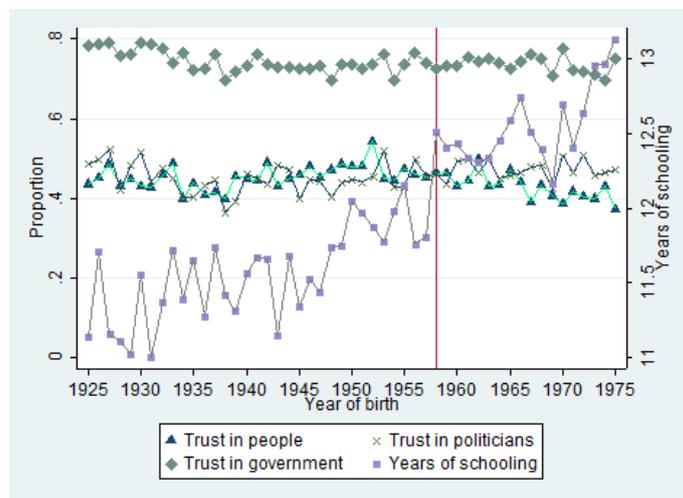
Figure 9: The levels of trust and education: birth cohorts 1925–1975

Notes: Subjects born between 1925 and 1975 are included. The vertical line denotes the cutoff 1958. There are two vertical axes: the left axis denotes the proportions of subjects who trust in people (politicians, or government); the right axis denotes average years of schooling.

Table 1: Summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Trust in people	5,231	0.463	0.499	0	1
Trust in politicians	4,762	0.471	0.499	0	1
Trust in government	5,632	0.733	0.442	0	1
Years of schooling	7,335	11.76	1.449	10	14
Reform	7,335	0.540	0.498	0	1
Female	7,335	0.545	0.498	0	1
Age	7,335	44.55	7.542	23	61
Asian	7,335	0.0322	0.176	0	1
Black	7,335	0.0267	0.161	0	1
England	7,335	0.854	0.353	0	1
Scotland	7,335	0.0941	0.292	0	1
Year of birth	7,335	1958	3.454	1952	1963
Survey year	7,335	2002	6.699	1986	2013

Notes: The table shows the summary statistics for the sample used in the baseline estimation. The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included in the sample.

Table 2: The association between education and attitudinal trust (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Education and trust in people					
Years of schooling	0.0730***	0.0731***	0.0734***	0.0761***	0.0763***	0.0774***
	(0.0046)	(0.0046)	(0.0046)	(0.0046)	(0.0046)	(0.0046)
Observations	5,231	5,231	5,231	5,231	5,231	5,231
	Panel B: Education and trust in politicians					
Years of schooling	0.0445***	0.0445***	0.0441***	0.0441***	0.0439***	0.0441***
	(0.0049)	(0.0049)	(0.0049)	(0.0050)	(0.0050)	(0.0050)
Observations	4,762	4,762	4,762	4,762	4,762	4,762
	Panel C: Education and trust in government					
Years of schooling	0.0397***	0.0396***	0.0391***	0.0387***	0.0388***	0.0410***
	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
Observations	5,632	5,632	5,632	5,632	5,632	5,632

Notes: Subjects born between 1952 and 1963 are included in the sample. "Cohort trend" is included in all regressions. In regression (1), only "Years of schooling" is added. In regression (2), "female" dummy is added. In regression (3), "age" and "age squared" are added. In regression (4), "Asian" and "Black" dummies are added. In regression (5), "England" and "Scotland" dummies are added. In regression (6), survey year dummies are added. Robust standard errors are in parentheses. Significance levels are: ***, $p<0.01$; **, $p<0.05$; *, $p<0.1$.

Table 3: The effects of the reform on educational attainment (OLS)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
			Years of schooling			
Reform	0.2658***	0.2657***	0.2643***	0.2444***	0.2414***	0.2464***
	(0.0670)	(0.0670)	(0.0658)	(0.0613)	(0.0607)	(0.0591)
Female		0.0019	0.0014	0.0110	0.0107	0.0131
		(0.0226)	(0.0231)	(0.0226)	(0.0222)	(0.0223)
Age			0.0453**	0.0397*	0.0401*	0.0667
			(0.0204)	(0.0218)	(0.0219)	(0.0413)
Age squared			-0.0005*	-0.0004	-0.0004	-0.0007
			(0.0002)	(0.0002)	(0.0003)	(0.0005)
Asian				0.9644***	0.9554***	0.9598***
				(0.1473)	(0.1459)	(0.1502)
Black				0.3616***	0.3526***	0.3562***
				(0.0828)	(0.0802)	(0.0818)
England					0.1331**	0.1374**
					(0.0549)	(0.0556)
Scotland					0.1073	0.1108
					(0.0899)	(0.0940)
Survey year	No	No	No	No	No	Yes
Cohort trend	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,335	7,335	7,335	7,335	7,335	7,335

Notes: The optimal bandwidth is 6, so subjects born between 1952 and 1963 are included in the regressions. The"Reform" dummy equals 1 if an individual is subject to the new compulsory schooling law. Cohort trend includes the assignment variable Z (year-of-birth cohort) and its interaction with the "Reform" dummy T. Robust standard errors are in parentheses. Significance levels are: ***, $p<0.01$; **, $p<0.05$; *, $p<0.1$.

Table 4: The effects of education on attitudinal trust (2SLS)

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Effects on trust in people					
Years of schooling	0.1207	0.1343	0.1448	0.1624	0.1651	0.1439
	(0.1274)	(0.1285)	(0.1275)	(0.1396)	(0.1402)	(0.1363)
Observations	5,231	5,231	5,231	5,231	5,231	5,231
	Panel B: Effects on trust in politicians					
Years of schooling	-0.0122	-0.0130	-0.0084	-0.0187	-0.0202	-0.0304
	(0.1068)	(0.1077)	(0.1054)	(0.1168)	(0.1178)	(0.1169)
Observations	4,762	4,762	4,762	4,762	4,762	4,762
	Panel C: Effects on trust in government					
Years of schooling	-0.0583	-0.0599	-0.0254	-0.0353	-0.0355	-0.0534
	(0.0905)	(0.0911)	(0.0885)	(0.0968)	(0.0973)	(0.0960)
Observations	5,632	5,632	5,632	5,632	5,632	5,632

Notes: Subjects born between 1952 and 1963 are included in the sample. "Cohort trend" is included in all regressions. In regression (1), only "Years of schooling" is added. In regression (2), "female" dummy is added. In regression (3), "age" and "age squared" are added. In regression (4), "Asian" and "Black" dummies are added. In regression (5), "England" and "Scotland" dummies are added. In regression (6), survey year dummies are added. Robust standard errors are in parentheses. Significance levels are: ***, $p<0.01$; **, $p<0.05$; *, $p<0.1$.

Table 5: Robustness of the effects: alternative bandwidths (2SLS)

	(1)	(2)	(3)	(4)	(5)
Bandwidths (years)	6	9	8	7	5
Panel A: The effect of the reform on years of schooling					
Reform	0.2464***	0.1564**	0.1927***	0.2264***	0.2182***
	(0.0591)	(0.0682)	(0.0570)	(0.0561)	(0.0625)
Observations	7,335	11,174	9,862	8,605	6,114
Panel B: The effect of education on trust in people					
Years of schooling	0.1439	0.0893	0.0832	0.1268	-0.0556
	(0.1363)	(0.1881)	(0.1639)	(0.1500)	(0.1765)
Observations	5,231	7,951	7,008	6,114	4,340
Panel C: The effect of education on trust in politicians					
Years of schooling	-0.0304	-0.0066	-0.0055	-0.0181	0.0136
	(0.1169)	(0.1212)	(0.1192)	(0.1119)	(0.1313)
Observations	4,762	7,327	6,469	5,630	3,987
Panel D: The effect of education on trust in government					
Years of schooling	-0.0534	-0.0098	-0.0302	-0.0598	-0.0715
	(0.0960)	(0.1034)	(0.0971)	(0.0944)	(0.1191)
Observations	5,632	8,621	7,621	6,660	4,713

Notes: Different bandwidths are used in regressions (1) to (5). In regression (1), the "optimal" bandwidth 6 is used. In regressions (2) to (5), the bandwidths used are 9, 8, 7, and 5 respectively. The control variables in all regressions are "female" dummy, age, age squared, "Asian" and "Black" dummies, "England" and "Scotland" dummies, and survey year dummies. Robust standard errors are in parentheses. Significance levels are: ***, p<0.01; **, p<0.05; *, p<0.1.

Table A1: Survey waves used in the study

	Number of observations			
Survey year	Age left school	Trust in people	Trust in politicians	Trust in government
1986	334	0	0	334
1987	315	0	0	315
1994	237	0	236	235
1996	259	0	259	256
1997	296	292	291	290
1998	444	441	440	439
2000	496	493	492	491
2001	241	0	0	241
2002	458	454	457	456
2003	686	0	684	678
2004	182	182	0	0
2005	649	642	647	642
2006	209	207	207	207
2007	820	818	206	207
2008	863	863	0	0
2009	242	238	240	238
2010	181	181	180	180
2012	206	203	206	206
2013	217	217	217	217
Total	7335	5231	4762	5632

Notes: The table shows the survey waves used in the study and the number of observations for the main variables. The number of observations is 0 in some cases, meaning the trust question was not asked in that survey year.

Table A2: The association between education and trust: an alternative coding (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Education and trust in politicians					
Years of schooling	0.0084***	0.0085***	0.0087***	0.0073***	0.0073***	0.0078***
	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)	(0.0028)
Observations	4,762	4,762	4,762	4,762	4,762	4,762
	Panel B: Education and trust in government					
Years of schooling	0.0242***	0.0243***	0.0243***	0.0228***	0.0228***	0.0247***
	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
Observations	5,632	5,632	5,632	5,632	5,632	5,632

Notes: The dependent variable, *trust in politicians* (*government*), is a dummy, which equals 1 if a respondent always or most of the time trusts politicians (government). "Cohort trend" is included in all regressions. In regression (1), only "Years of schooling" is added. In regression (2), "female" dummy is added. In regression (3), "age" and "age squared" are added. In regression (4), "Asian" and "Black" dummies are added. In regression (5), "England" and "Scotland" dummies are added. In regression (6), survey year dummies are added. Robust standard errors are in parentheses. Significance levels are: ***, p<0.01; **, p<0.05; *, p<0.1.

Table A3: The effects of education on trust: an alternative coding (2SLS)

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Effects on trust in politicians					
Years of schooling	0.0355	0.0387	0.0373	0.0328	0.0337	0.0249
	(0.0566)	(0.0574)	(0.0560)	(0.0614)	(0.0619)	(0.0609)
Observations	4,762	4,762	4,762	4,762	4,762	4,762
	Panel B: Effects on trust in government					
Years of schooling	-0.0300	-0.0244	-0.0028	-0.0140	-0.0166	-0.0177
	(0.0830)	(0.0831)	(0.0824)	(0.0897)	(0.0903)	(0.0877)
Observations	5,632	5,632	5,632	5,632	5,632	5,632

Notes: The dependent variable, *trust in politicians* (*government*), is a dummy, which equals 1 if a respondent always or most of the time trusts politicians (government). "Cohort trend" is included in all regressions. In regression (1), only "Years of schooling" is added. In regression (2), "female" dummy is added. In regression (3), "age" and "age squared" are added. In regression (4), "Asian" and "Black" dummies are added. In regression (5), "England" and "Scotland" dummies are added. In regression (6), survey year dummies are added. Robust standard errors are in parentheses. Significance levels are: ***, p<0.01; **, p<0.05; *, p<0.1.

Table A4: The effects on trust: alternative coding and different bandwidths (2SLS)

	(1)	(2)	(3)	(4)	(5)
Bandwidths (years)	6	9	8	7	5
Panel A: Effects on trust in politicians					
Years of schooling	0.0249	-0.0789	-0.0368	-0.0184	0.0083
	(0.0609)	(0.0687)	(0.0628)	(0.0580)	(0.0686)
Observations	4,762	7,327	6,469	5,630	3,987
Panel B: Effects on trust in government					
Years of schooling	-0.0177	-0.1165	-0.0966	-0.0516	-0.0807
	(0.0877)	(0.1074)	(0.0970)	(0.0876)	(0.1129)
Observations	5,632	8,621	7,621	6,660	4,713

Notes: The dependent variable, *trust in politicians* (*government*), is a dummy, which equals 1 if a respondent always or most of the time trusts politicians (government). Different bandwidths are used in regressions (1) to (5). In regression (1), the "optimal" bandwidth 6 is used. In regressions (2) to (5), the bandwidths used are 9, 8, 7, and 5 respectively. The control variables in all regressions are "female" dummy, age, age squared, "Asian" and "Black" dummies, "England" and "Scotland" dummies, and survey year dummies. Robust standard errors are in parentheses. Significance levels are: ***, $p<0.01$; **, $p<0.05$; *, $p<0.1$.