



Long-lasting effects of indoctrination in school: Evidence from the People's Republic of Poland[☆]

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ABSTRACT

This paper studies the effect of communist indoctrination in school on labour force participation and human capital investments. Specifically, we evaluate the impact of a reform in Poland that revoked political indoctrination in school in the mid-1950s, while leaving the rest of the curriculum unchanged. To overcome endogeneity concerns, we exploit cut-off birth dates for school enrolment that exhibit variation in the level of exposure to the reform. We find that a reduction in school indoctrination increased the probability of finishing secondary and tertiary education, and expanded labour force participation about 50 years down the line.

1. Motivation

To date, more than 3 billion people worldwide live under the rule of autocrats.³ Autocratic regimes restrict the freedom of their compatriots and, to ensure regime survival, they often draw on repression and mass surveillance (Acemoglu and Robinson, 2005; Davenport, 2007; Arendt, 1951; Davenport and Armstrong, 2004), with lasting negative consequences in terms of development goals (Lichter et al., 2020; Acemoglu et al., 2020; Nikolova et al., 2019). A recurrent instrument to reduce political dissidence and nurture regime loyalty is the use of indoctrination in schools to instil obedience and consolidate a set of beliefs to be accepted uncritically (Anderson, 1994; Gerovitch, 2007). However, while school indoctrination can serve as a short-term tool to improve trust in government (Cantoni et al., 2017), the repression of individual sense of agency and critical thinking that encompasses educational systems in autocratic regimes may exert adverse long-lasting impacts on the long-term welfare of individuals (Gorodnichenko and Roland, 2011a,b).

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This paper investigates the long-term effects of school indoctrination on human capital accumulation and labour force participation. To this end, we assess the impact of a reform that removed Marxism–Leninism indoctrination from the school system of the former People’s Republic of Poland in the 1954/55 school year. The remainder of the curriculum and system of education remained unaltered by the reform.

To estimate the causal effects of the education reform, we use census data and exploit the variation in exposure to the reform induced by individuals’ dates of birth. More specifically, we compare those who were born a few weeks ahead of or after the annual cutoff date for starting school every year. In communist Poland, children turning 7 before December 31st of a given calendar year were enrolled in school starting from September of the same year. Thus, among individuals who were already in school when the reform was implemented, those born just after the cut-off date to initiate school in a given year (January to March), were exposed to one additional year of post-reform education relative to individuals who were born in the last weeks of the previous calendar year (October to December), despite being only a few weeks younger.

To net out the effect of exposure to one additional year of post-reform education from the effect of starting school at an older age, or from seasonality effects in the month of birth, we use a difference-in-differences strategy comparing individuals born just before and after the cut-off date among two groups of people. The first group includes individuals who were already enrolled in compulsory education at the time of the reform. For these individuals, being born in the first quarter of the year led to one additional year of post-reform education during compulsory education relative to those individuals born in the last quarter of the previous calendar year. The second group includes individuals who initiated school after the introduction of the reform. These group of individuals, were born in the first quarter of the year or in the last quarter of the previous calendar year, and pursued all their education in the post-reform educational system.

The results show that revoking political indoctrination in school exerted a positive effect on human capital attainment and labour force participation nearly 50 years later. We find that, relative to a year of education in the pre-reform (indoctrinating) education system, exposure to a year of post-reform education (that had abolished political indoctrination) increased the probability of completing secondary education, tertiary education, and labour force participation by 1.69, 1.15, and 1.42 percentage points, respectively. We interpret these estimates as strong evidence for the negative effects of Marxism–Leninism indoctrination on human capital investments and labour force participation. The main conclusions of the study are robust to the use of an alternative dataset, and a battery of robustness and placebo tests.

We then explore what potential mechanisms are driving the latter results. While we cannot perfectly disentangle which mechanisms channel the effect, our results suggest that exposure to the school reform in Poland led to a change in individuals’ sense of agency, which has been documented to improve economic outcomes (Gorodnichenko and Roland, 2012, 2011b; Viinikainen et al., 2010).

The reform was implemented in September 1954 by a communist regime that survived until the late 1980s, and changed the values that had guided the educational system during the Stalinist period. The reform removed the contents dedicated to political indoctrination, which had consequences for the grading of pupils’ school performance. Although the grading rules remained the same in the new school system, political activities such as Stalin-themed recitation competitions or contents explicitly praising the importance of obedience to the Soviet regime and adherence to Marxist–Leninist values were removed from schools. The new curriculum was also less partisan regarding individual agency and Western cultural contents, and children becoming members of communist youth organisations were no longer rewarded with better grades. More importantly, the assignments and tasks on which students were evaluated increased the importance of scholarly performance as opposed to demonstrations of the regime’s support. By removing political indoctrination from both school curricula and grading, the reform encouraged students to shift their efforts into scholarly activities. All things considered, the reform replaced a curriculum that encouraged and reinforced passivity, fear, collectivism, obedience, and subordination with one that encouraged ambition, curiosity, critical thinking, and self-direction.

A crucial feature of our natural experiment is that the change in the educational system introduced by the reform was limited to the indoctrination contents in the curriculum and, as a result, also in the grading system. In other words, not only ideological contents and activities were removed from the school curriculum, but also any participation in these activities, alongside uncritical demonstrations of dedication to Marxism–Leninism, which were no longer academically rewarded. The rest of the school curriculum, evaluation system, and number of compulsory years of school remained the same. Nonetheless, abolishing political indoctrination in schools resulted however in three hours less of schooling per week and the time liberated was not substituted with instruction of other subjects. Hence, we examine whether the reduction in the instruction time could be driving the effects of the reform, we document no evidence supporting this hypothesis.

The closest paper to ours is Fuchs-Schündeln and Masella (2016). Using an identification strategy based on school entry cut-off dates in East Germany, Fuchs-Schündeln and Masella (2016) show that exposure to an additional year of education in the post-communist education system exerted a positive effect on both human capital accumulation and income relative to a year of education in the school system of the communist Democratic Republic of Germany. To the best of our knowledge, this is the only paper examining the causal effects of communist education. However, we believe our study makes two contributions relative to Fuchs-Schündeln and Masella (2016).

Firstly, we take into consideration that communist and non-communist education systems are different above and beyond their ideological focus (e.g. focus on technical and physical education, homework load, or approach to religion, among others). The paper by Fuchs-Schündeln and Masella (2016) does not disentangle the effect of indoctrination from other features of communist education, or other changes that may arise with broader school reforms in the context of a newly incepted country after the II World War, which was the case of the post-communist education reform in East Germany. In contrast, the Polish natural experiment that we use in this study allows examining the effect of a reform that abolished political indoctrination in schools in the 1950s. This is a

unique setting to identify the effects of Marxist-Leninist indoctrination and, especially, to disentangle its effect from other aspects of communist education. While the Polish reform also took place in a time of profound changes, the empirical strategy used and the reform examined in our paper exhibit some key advantages relative to other settings. Namely, they allow to isolate the effect of indoctrination from other features of communist education, and even other changes that may arise with broader school reforms.

Secondly, most studies assessing the effect of communist institutions focus on East Germany (see for example [Alesina and Fuchs-Schündeln, 2007](#); [Lichter et al., 2020](#); [Fuchs-Schündeln and Masella, 2016](#)). Our study focuses on Poland instead, a country closer to the Union of Soviet Socialist Republics (USSR) and, at the time, with considerably less exposure to Western culture than East Germany.

We contribute to different strands of the literature. Firstly, existing literature has documented that exposure to communist regimes can exert detrimental welfare consequences. Previous studies have investigated the role of different instruments used by autocratic regimes, including mass surveillance or the education system ([Abadie et al., 2015](#); [Lichter et al., 2020](#); [Fuchs-Schündeln and Masella, 2016](#)). This paper adds to this literature by specifically isolating the role of political indoctrination in school, one of the potential mechanisms that could contribute to explaining the adverse effects of exposure to communism, and communist education, on welfare. Furthermore, our study expands the geographical focus by investigating a policy reform in Poland, which adds to the existing research on the effects of communism which so far refers primarily to East Germany.

Secondly, the article extends the growing literature that investigates several aspects of school curriculum that shape the long-term effects of education ([Görlitz and Gravert, 2018](#); [Rose and Betts, 2004](#); [Bernheim et al., 2001](#); [Benavot, 1992](#); [Arold, 2022](#)). We show that both the school curricula contents and grading exert long-lasting consequences on human capital accumulation and labour market outcomes.

Finally, this article adds to the growing body of evidence on the long-term consequences of values and attitudes ([Gorodnichenko and Roland, 2011a,b, 2012](#); [Hansen, 2013](#); [Granato et al., 1996](#); [Aspachs-Bracons et al., 2008](#)). Previous evidence has shown that communist education systems (and, more generally, communist regimes) successfully instil certain attitudes and values ([Cantoni et al., 2017](#); [Alesina and Fuchs-Schündeln, 2007](#)). While we cannot perfectly identify all the specific mechanisms driving the effect of the reform, our results suggest that the promotion of individual agency could explain its beneficial effects on crucial welfare determinants, such as labour force participation and human capital accumulation.

The main values promoted by Marxism–Leninism are collectivism and anti-capitalism. Whilst Marxism–Leninism does not demote education and labour force participation, it promotes obedience to the regime and the repression of individual agency, which may ultimately affect these outcomes ([Gorodnichenko and Roland, 2011a,b](#)). The promotion of obedience and demotion of individual sense of agency are standard features of school systems in autocratic regimes ([Diwan and Vartanova, 2020](#)). Thus, the suggestive evidence regarding the role of values associated with individual agency presented in this paper opens the debate as to whether political indoctrination in schools in other autocratic regimes could lead to similar detrimental effects.

The structure of the paper is the following. Section 2 discusses the institutional setting. Section 3 describes the data and Section 4 introduces the empirical strategy and discusses its validity. Section 5 presents the main results of the study and Section 6 examines what potential mechanisms could be driving the effects of the reform. Section 7 examines the robustness of the main results to different placebo and empirical checks. Section 8 concludes.

2. The education system in Poland

2.1. The education system in Poland before the 1954/55 reform

The Republic of Poland gained political independence in 1918 and efficiently introduced free compulsory education lasting seven years throughout the entire country by 1920 ([Kurian, 1988](#)). In September 1938, the school year that free compulsory education was inceptioned, already 91.2% of children aged 7 were enrolled in primary education and compliance with compulsory education was 90.6% ([Mauersberg, 1996](#)). After 1939, both the Nazis and Soviets occupying Polish lands introduced their educational settlements. However, during the post-war period, Poland, as a member of the Soviet bloc, adopted a communist education model based on free compulsory education in secular public schools tightly controlled by central level authorities.

Education played a crucial role in Soviet regimes by stimulating the transmission of socialist values, aiming at the construction of the “new Soviet man” ([Anderson, 1994](#); [Gerovitch, 2007](#); [Hoisington et al., 2000](#)). To achieve this goal, Marxist-Leninist ideological content was efficiently introduced into Polish schools all the way from the school year 1948/49 ([Jankowiak, 2001](#)) when 98.9% of children aged 7–10 complied with compulsory education laws ([Mauersberg and Walczak, 2005](#)).⁴ Schools served as means of indoctrination aimed at diminishing individual agency, instilling obedience and the values of subordination, atheism, anti-religion, and anti-capitalism ([Jarosz, 1998](#)). The school curriculum reflected these values by illustrating school knowledge with examples of communism superiority and capitalistic exploitation, as well as elements of ‘historical materialism’.⁵ Moreover, the value of high culture (referred to as bourgeois) was diminished, Western pop culture was absent, and local folklore culture had a substantial presence in school curricula (e.g. music in art classes and dance in physical education). Obligatory reading lists (e.g. including books by Dickens, Twain, Sienkiewicz or Orzeszkowa, among others) comprised entirely of books that emphasised inequality,

⁴ The instability of education system in early-1940s and physical destruction of schools’ staff and infrastructure in the mid-1940s hardly lends the opportunity to examine effects of the introduction of ideological indoctrination to Polish schools.

⁵ For example, in primary school, pupils heard about an American millionaire who bequeathed his wealth, accumulated through the exploitation of workers, to his dog, while many children in his neighbourhood lived in starkly depicted poverty ([Wagner, 2018](#)).

poverty, and immorality of capitalist relations rooted in competition rather than cooperation (Jędrych, 2014). All school subjects contained explicit praise of the USSR in general and of Stalin in particular. General school assemblies praising Marxism–Leninism were organised regularly during school hours, in which active or passive participation was compulsory for all students.

2.2. The 1954/55 school reform

The education reform examined in this paper drastically and almost instantaneously abolished political indoctrination in school.⁶ Starting from the 1954/55 school year, indoctrination was revoked from courses of Polish, Russian, history, constitution, mathematics, chemistry, biology, geography, astronomy, logic, and physical education in all schools in Poland (Dobosiewicz, 1971). Once education ceased to be mainly the way of “inculcating in the young generation a Marxist-Leninist world view”, the grading of pupils performance was to a larger degree dictated by their knowledge and skills, whereas before, a declared system of beliefs was a substantial factor in the pupils’ assessment (Cary, 1976).⁷ As a result of the changes introduced by the reform, the school environment altered from one repressing individual agency and rewarding obedience, collectivism, and subordination to the new one, where self-direction, critical thinking, and some individualism were allowed (Ignaczak et al., 2019).

Examples of changes in the new educational curriculum include, among others, the removal of ideological activities such as Stalin-themed recitation competitions, mathematical relations no longer had to be illustrated with the number of Soviet army soldiers, physical education classes ceased to be an explicit way of shaping students’ bodies accordingly to ideological expectations of Soviet authorities, and less attention was paid to books representing Marxist-Leninist literature in class (Tomasik, 2016). An anecdote that illustrates some of these changes occurred when the Minister of Education addressed the pupils as individuals in direct words ‘beloved children, dear youth’⁸ in his speech opening the 1954/55 school year, while year earlier he had treated them as the members of Soviet organisations and spoken in communist jargon⁹ (Wagner, 2018). With the end of Stalinism, the education system continued to criticise capitalist relations explicitly but was no longer subjected to direct Marxist-Leninist indoctrination. The reform made education less partisan regarding religion, individualism, and Western cultural contents (Dobosiewicz, 1971), and shifted focus towards knowledge transmission and skills formation.

School indoctrination and the formation of values is not only defined by values taught explicitly in textbooks, but also by the grading system in place. Children willing to become members of communist youth organisations were no longer rewarded with better grades in school. In the reformed system, children’s performance was assessed based on academic outcomes to a substantially greater degree than before, when participation in ideological activities was part of the school curriculum. While efforts put into education paid off for students in the new educational system, the uncritical participation in ideological activities was rewarded most before the reform (Świda-Ziemba, 1998). On top of that, students were no longer punished for a lack of explicit enthusiasm towards communism, and assignments allowed for responses formulated with children’s own words (instead of repeating formulas to be learned by heart), giving them slightly more freedom of expression (Krzywicki, 1955). After the reform, children were allowed to be unpolitical individual creatures (Stańczyk, 2019) rather than encouraged to join the communist collective youth (Zysiak, 2016). The classrooms had more space for individual development, curiosity, and ambition.

Finally, the reform reduced the overall number of school hours from 29 to 26 per week. Such teaching time reduction resulted entirely from the removal of indoctrination contents. No other changes were introduced in the school curricula, school year duration, or the number of compulsory years of education (Dobosiewicz, 1971). In Section 4 we discuss whether the main conclusions of the study could be driven by the reduction in the number of school hours and we find evidence suggestive that this is not the case.

3. Data

The main analysis is conducted using the 2002 Polish census database. The 2002 Polish census wave collected crucial demographic and socio-economic information for the first time since the collapse of the communist regime in 1989. The population data collection was implemented in less than three weeks during the spring of 2002 and was addressed to both temporary and permanent residents as well as those temporarily abroad. However, the census database available online and used in this study provides information on a random sample of 3,823,596 individuals living in Poland. Unfortunately, the Polish censuses conducted in 1978, 1988, and 2011 are not included in the analysis because they do not provide information on the month and year of birth.¹⁰ The main advantage of the 2002 census is its large sample size. However, the census lacks information on income and values, although it provides information on labour force participation and educational attainment.

⁶ A critique of the influence of Marxism–Leninism on the Polish education system was initiated in 1952. The Magazine *Nowa Kultura* published an article entitled ‘Letter to Miecia’ in the form of a fictional letter from a student, complaining about the history class to the Minister of Education. This article sparked a discussion in two other influential journals, which eventually led to the Ministry of Education announcing changes to the curriculum in May 1954, to be implemented starting from the 1954/55 school year.

⁷ Cary (1976) gives examples of assignments such as “Tell about the fight of communist parties against revisionism, dogmatism, and sectarianism” or “Why is our motherland called socialist?” A proper answer to an assignment was scripted by the state officials to be learned by heart and repeated uncritically by pupils.

⁸ Originally ‘*Kochane dzieci. Droga młodzieży*’; authors’ own translation from Polish to English.

⁹ ‘Science leaders, members of the Society of Polish Youth, scouts, pupils of all schools’ (originally ‘*Przodownicy nauki, zetempowcy, harcerze, uczniowie wszystkich szkół*’; authors’ own translation from Polish to English).

¹⁰ Since year and month of birth are not reported in these census waves, we cannot construct the measure of exposure to the reform that is required in our difference-in-differences strategy.

Table 1

Descriptive statistics: Analytical sample for the analysis of the 1954/55 reform (Census data).

Source: 2002 Polish census.

	N	Mean	Standard deviation (for non-dummy variables)	Min	Max
Female	200,706	0.52	–	0	1
Age	200,706	53.91	2.48	50	59
Birth year	200,706	1948	2.48	1943	1952
Secondary educ.	200,706	0.38	–	0	1
Tertiary educ.	200,706	0.15	–	0	1
Work	198,200	0.47	–	0	1

Note: The table presents descriptive statistics for the analytical sample. The latter includes individuals born between October 1943 and March 1952 in the months of October, November, December, January, February and March.

The main analytical sample includes only individuals born between October 1943 and March 1952. As discussed later, the identification strategy relies on variation that arises from comparing individuals born within a few weeks from the cut-off date to start school every year, which is December 31st. Thus, our primary analytical sample includes only individuals born between October 1st and March 31st of the following calendar year. Individuals born every year between April 1st and September 30th are excluded in order to conduct comparisons between individuals born within a maximum of six months. We examine in Section 7 the robustness of the results to include in the analytical sample individuals born in different months with reassuring results. Furthermore, we exclude individuals born before October 1943 in order to ensure that individuals in our sample were younger than 60 at the time of the census (i.e. spring 2002) and, therefore, not retired.¹¹ Finally, we also exclude individuals born after March 1952 to ensure that individuals in our sample are not affected by subsequent school reforms that occurred during their compulsory education.

Table 1 displays the summary statistics for the analytical sample in the 2002 census. The age of the individuals in the sample ranges between 50 and 59, 38% have completed secondary education, and 15% have completed tertiary education. Only 47% of the individuals in the analytical sample were employed when the survey was implemented. The share of labour force participation among individuals aged between 50 and 59 in the sample is indeed low for both men (53%) and women (41%). While early retirement is unfeasible for men before the age of 60 and very limited for women, the share of active individuals falls at a constant rate from the age of 46 years. This decline in labour force participation for individuals older than 45 is explained by the widespread concessions of disability pensions in the 1990s and before (Rzońca and Wojciechowski, 2008; Czerwec, 2009). While lack of labour force participation could be partially reflecting some population on disability pensions rather than other forms of inactivity or unemployment, this does not confound our estimates of interest. This is the case because individuals born in the first quarter of the year do not have any explicit benefit regarding access to disability pensions relative to those born in the last quarter of the previous calendar year.

While the main analysis relies on information from the 2002 census, we re-estimate in Appendix A the effects of the reform using the 1998, 1999, and 2000 waves of the Polish Household Budget Survey (HBS).¹² The main drawback of the HBS data is that the sample of individuals born within the period of interest is substantially smaller than in the census data. On the other hand, contrary to the census, the HBS databases include information on household income. Furthermore, we use information on values from three waves of the Diagnoza Społeczna survey conducted in 2011, 2013, and 2015 to explore what mechanisms could be driving the effects of the reform.¹³

4. Empirical strategy

In this section, we describe the difference-in-differences (DiD) strategy used to estimate the effects of the reform implemented in 1954/55 that revoked political indoctrination in school.

The effect of interest is estimated by exploiting the variation in the exposure to the reform over two dimensions. The first one is the different exposure to the reform of individuals born in the last quarter of the year or the first quarter of the following calendar year. In Poland, children start compulsory education in September of the calendar year when they turn seven years old, with the cut-off date thus being December 31st. Therefore, despite being born only a few weeks or months later, individuals born in the first quarter of any calendar year (January to March) begin school nearly one year after those born in the last quarter of the previous calendar year (between October and December). The latter implies that, for those who were already enrolled in compulsory education at the time the reform was put into place, people born in January through March were subject to one more

¹¹ Early retirement before the age of 60 was sparse. This is discussed in detail below in the paper.

¹² The available HBS waves implemented before 1998 and between 2001 and 2010 lack information on the birth date which is necessary to construct the measure of exposure to the reform and conduct our difference-in-differences analysis.

¹³ These were the only waves of the Diagnoza Społeczna survey with information on year and month of birth, which is necessary to construct the variable that measures exposure to the reform and estimate the effects of the reform. We also considered the use of the Polish sample of cross-national surveys that include information on values such as the European Social Survey (ESS), the Generations and Gender Survey (GGS), and the Life in Transition Survey (LIST). However, the lack of information on the month of birth prevented us from using these databases.

year of education under the post-reform educational system than people born in October through December of the preceding year. As explained in the previous section, individuals born between April 1st and September 30th are excluded from the sample in order to be able to conduct meaningful comparisons between individuals born within a maximum of a six-month period. Section 7 reports evidence of the robustness of our estimates to the inclusion of individuals born in different months with reassuring results.

Importantly, those born in the final quarter of the year begin school earlier than children born in the first quarter of the subsequent year. Due to the possibility that earlier school start times will have longer-lasting, more widespread effects on labor and educational outcomes through maturity (see for example Black et al., 2011 and Balestra et al., 2020), the differences between individuals born before and after the cut-off date cannot be exclusively attributed to an additional year of exposure to the post-reform educational system.

To net out the effect of starting school at an older age from the effect of one additional year of education under the post-reform educational system, we add a second source of variation in exposure to the reform. We compare the differences between those born in the first quarter of the year and those born in the last quarter of the previous calendar year across two samples of individuals. The first sample includes individuals born between October 1943 and March 1947. These individuals were already enrolled in compulsory education when the reform was implemented in September 1954 and, for them, being born between January and March implies one additional year of education under the reformed education system relative to those born between October and December of the previous calendar year. The second sample includes individuals born between October 1947 and March 1952. These individuals started school after the reform was introduced in September 1954. Therefore, in such a sample, individuals born in the first quarter of the year or the last quarter of the previous calendar year are equally exposed to the reformed education system. In other words, the individuals in the second sample were unexposed to the pre-reform educational system regardless of their month of birth. By comparing the effect of being born in the first quarter of the year relative to being born in the last quarter of the previous calendar year across both samples, we net out maturity effects from the effect of one additional year of education under the reformed educational system. Figs. B.1–B.3 in Appendix B show the number of years of education under the post-reform educational system during compulsory education by year of birth.

Formally, we estimate the following difference-in-differences equation:

$$\begin{aligned} Outcome_{i,s} = & \delta_0 + \delta_1 Q1_{i,s} \times Inschool_s + \delta_2 Q1_{i,s} \\ & + \gamma_s + X_{i,s} + u_{i,s} \end{aligned} \quad (4.1)$$

where the variable *Outcome* measures the human capital and labour market outcome of individual *i* born in half-year *s*. Because the analytical sample only includes individuals born within three months from December 31st every year (between October and March of the following year), the half-year *s* indicates the 31st of December of reference. For example, those individuals born between October 1st, 1947 and March 31st, 1948 belong to the same half-year of reference. Equally, individuals born between the 1st of October 1948 and the 31st of March 1949 also belong to the same half-year, and so on. *Q1* is a dummy variable equal to 1 if the individual is born between January and March, the first quarter of the year, and 0 if the individual is born between October and December of the previous calendar year. *In school* is a dummy variable that indicates whether the individual belongs to a half-year that is already in compulsory school when the reform was implemented in September 1954 and 0 if the individual is young enough to start school after the introduction of the education reform examined. Among the group of individuals already in school at the time of the reform, those born in Q1 received one additional year of education after the reform relative to those born in Q4 of the previous calendar year. However, in the group of individuals that enrolled in school after the implementation of the reform, all were equally exposed to the post-reform education system regardless of their exact birth date. γ_s is a vector of half-year fixed-effects and $X_{i,s}$ is a vector of individual-level control variables. The parameter of first interest in the analysis is the interaction term δ_1 , which measures the causal effect of an additional year of exposure to the post-reform educational system with a revoked political indoctrination relative to a year of education in the pre-reform educational system during compulsory education. If indoctrination harms human capital and labour force participation, the effect of the education reform measured by the coefficient δ_1 would have a positive sign.

4.1. Testing identification assumptions

Unlike in standard difference-in-differences designs, the correct identification of the effects of the reform does not rely on the parallel trends condition. Rather, the key assumption in our design is that the pure effect of being born in the first quarter of the calendar year relative to being born in the last quarter of the previous calendar year is the same under the pre-reform and post-reform education systems, in terms of the outcomes explored.

We test the main identification condition for education outcomes by comparing the effect of being born in Q1 relative to being born in Q4 of the previous calendar year across the two samples. The first sample includes only individuals who pursued all their education in the pre-1954 reform educational system (i.e. individuals born between 1926 and 1930).¹⁴ The second sample includes only individuals who started their education after the introduction of the reform (i.e. individuals born between 1947 and 1952). These individuals pursued all their education in the post-reform educational system. This analysis cannot be conducted for labour market outcomes because nearly all individuals born before 1930 were retired from work in 2002 when the data were collected.

¹⁴ The vast majority of them had completed their education by the time the 1954/55 reform was introduced.

Table 2
Placebo effect: The effect of being born in the first quarter of the year across different educational systems.

	(1)	(2)	(3)	(4)
	Secondary educ.	Tertiary educ.	Labour force part.	Ln income p/c
<i>Panel A: Educated only before 1954/55 reform vs. only post-1954/55 reform using Census</i>				
Q1 × Only pre-1954 individuals	0.0025 (0.0045)	0.0041 (0.0032)		
Q1	0.0074** (0.0030)	0.0013 (0.0022)		
Observations	187,030	187,030		
Cut-off of reference FE	YES	YES		
Sex	YES	YES		
Cut-off of reference FE	YES	YES		
<i>Panel B: Educated only during communism vs. only after communism using HBS</i>				
Q1 × Only educated in communism	−0.0179 (0.0118)	−0.0003 (0.0116)	−0.0124 (0.0105)	−0.0113 (0.0167)
Q1	0.0150 (0.0094)	0.0012 (0.0104)	−0.0069 (0.0085)	0.0141 (0.0135)
Observations	26,674	26,674	26,728	26,427
Sex	YES	YES	YES	YES
Cut-off of reference FE	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES
Age	YES	YES	YES	YES

Note: The analysis reported in Panel A assesses whether the effect on education of being born in the first quarter of the year relative to being born in the last quarter of the previous calendar year is different in the pre-1954/55 reform educational system and in the post-1954/55 reform educational system. The former includes individuals who completed their education before the 1954/55 reform (aged at least 23 in January 1954) and the latter includes individuals who initiated education after the introduction of the 1954 reform. The dataset used for this analysis is the 2002 Polish census. Effects on labour force participation cannot be estimated since individuals who completed their education before the 1954/55 reform were already retired when the census was implemented in 2002. The analysis reported in Panel B assesses whether the effect of being born in the first quarter of the year relative to being born in the last quarter of the previous calendar year is different for individuals who completed their education before the fall of communism (aged at least 23 in January 1989) and for individuals that started education after the 1989/90 post-communism educational reform. The dataset used for this analysis is the HBS rounds 2011–2017. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Next, we complement our analysis by checking whether the effect of being born in the first quarter of the year is the same for individuals only exposed to the communist education system, and individuals only exposed to the post-communist education system introduced after the collapse of the Peoples Republic of Poland in 1989 (using HBS data). Specifically, we compare such effect for individuals born between 1982 and 1986 (who started school after the post-communist school reform) and individuals born between 1961 and 1965 (who had completed all their education when the post-communist reform was introduced).

The results of these two analyses are reported in Table 2. The difference in the effect of being born in the first quarter across education systems is identified by the difference-in-differences parameter. The small and statistically insignificant coefficient reported in Panel A suggests that the effect of being born in the first quarter of the year on educational outcomes is very similar for individuals only exposed to the pre-1954 educational system and the post-1954 educational system. Furthermore, the results reported in Panel B reveal that the effect of being born in the first quarter of the year does not seem to be different for individuals only exposed to post-communist education and for those only exposed to communist education. These results reveal that the pure effect of being born in the first quarter of the year does not vary across education systems in Poland, suggesting that the main identification condition of our analysis holds.

An additional concern with our analysis is the incorrect assignment of individuals to their first school year. That would increase the measurement error of the Q1 variable and thus bias downwards the estimates of interest. The latter might happen also in the case of grade repetition or late school enrolment. While grade misassignment is uncommon in the 1950s in Poland (Mauersberg, 1996), we lack information on grade repetition. Therefore, our estimates should be interpreted as intention-to-treat estimates and a lower bound for the treatment effect on the treated, which does not threaten the main conclusions of the study.

5. Results

Fig. 1 shows the evolution of human capital outcomes and labour force participation by year of birth for individuals born in Q1 and born in Q4 of the previous calendar year using the census data. Overall, the figure suggests that individuals born in the first quarter of the year have better educational and labour outcomes than those born in the last quarter of the previous calendar year.

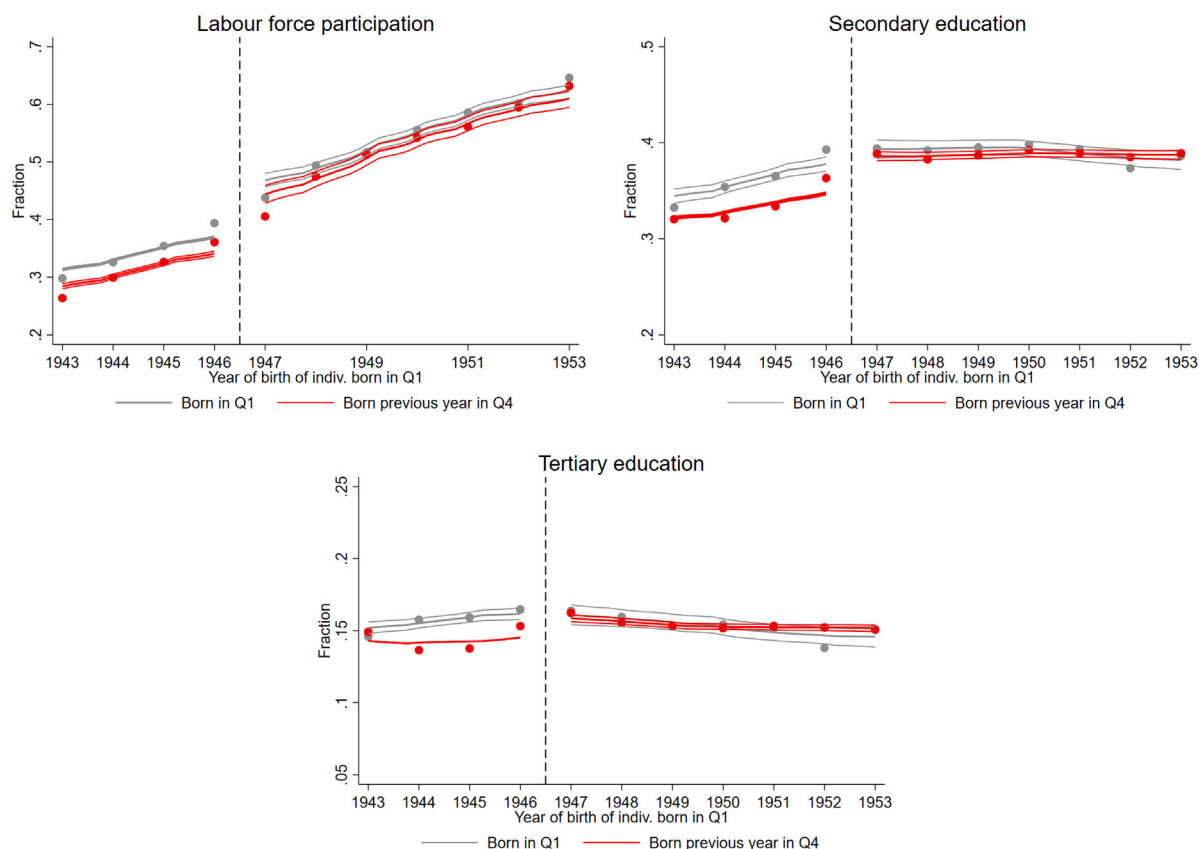


Fig. 1. Human capital and labour force participation for individuals born in the first quarter of the year and the last quarter of the previous calendar year. *Note:* The graphs compare the evolution of labour force participation, the share of individuals that completed secondary and the share of individuals that completed tertiary education for those born in the first quarter of the year and for those born in the last quarter of the previous calendar year. The year indicated in the X-axis refers to the year of birth for those born in the first quarter and to the year of birth + 1 for those born in the last quarter of the previous calendar year. Lines represent fits from a local polynomial with a bandwidth of 1 and 95% confidence intervals. *Source:* 2002 Polish census.

The difference between individuals born in these two quarters is however larger for the generations born before 1947, for which being born in the first quarter of the year implies an additional year of exposure to the reform relative to those born in the last quarter of the previous calendar year. This pattern suggests a beneficial (positive) effect of the 1954/55 reform (which removed political indoctrination in schools) on labour force participation and human capital accumulation.¹⁵

The estimated effects of the 1954/55 reform that removed political indoctrination in school are reported in Table 3. The results show that an additional year of education under the reformed educational system during the compulsory education period increases the probability of finishing secondary education, tertiary education, and increases labour force participation later in life relative to a year of education in the pre-reform educational system. Specifically, an additional year of education under the post-1954 education system increases the probability of completing secondary education and university by 1.6 (an increase of 4.2% relative to the sample mean) and 1.3 percentage points (an increase of 8.7%), respectively. The estimated effect of an additional year of education under the post-reform education system on labour force participation in 2002 is 1.5 percentage points (an increase of 3.2%).¹⁶

In Appendix C, we examine the heterogeneous effects of the reform by different dimensions. First, we explore whether the effects of the reform on human capital investments and labour force participation are different for men and women. The results are reported

¹⁵ A more detailed graph showing the differences between those born in the first quarter of the year and those born in the last quarter of the previous calendar year by year of birth is reported in Fig. F.1 in Appendix.

¹⁶ A relevant question is whether the increase in labour force participation 50 years after the reform is welfare-enhancing. In principle, labour force participation in older age might not be welfare-enhancing for specific jobs, especially if the alternative is paid retirement. However, it is important to note that all individuals in the analytical sample are younger than 60 and therefore do not qualify for retirement. Furthermore, only a small share of the Polish households surveyed in the Diagnoza Społeczna declared having savings (Czapinski, 2011). In this context, we believe it is unlikely that not working is welfare-enhancing for most blue-collar jobs. Furthermore, evidence has shown that working longer can prevent cognitive decline (Bonsang et al., 2012).

Table 3
Effect of the 1954/55 reform on education and labour force participation (Census data).

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
Q1 × In school	0.0142*** (0.0047)	0.0169*** (0.0047)	0.0115*** (0.0035)
Q1	0.0140*** (0.0031)	0.0080*** (0.0030)	0.0017 (0.0022)
Observations	198,200	200,706	200,706
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effects of an additional year of exposure to the post-reform educational system on labour force participation, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the pre-reform educational system during compulsory education. *Source:* The 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

in Panel A of [Table C.1](#) and suggest that the effect of the reform on labour force participation is almost identical for men and women. However, we find that the effects of the reform on human capital accumulation are larger for women.¹⁷

Second, we investigate whether the effects of the reform are more pronounced in the western regions of Poland, which witnessed significant forced migration from the Kresy regions following World War II. Recent evidence documents that forced migration heightened preferences for education and increased human capital investments in the descendants of those migrants ([Becker et al., 2020](#)). Our findings, as reported in Panel B of [Table C.1](#), reveal that the impact of the reform on labour force participation is approximately two times larger in regions affected by forced migration after WWII, although this difference is not statistically significant. On the other hand, we do not observe any meaningful difference in terms of the reform's impact on education between regions with and without forced migration.

Third, we assess the effects of the reform by grade level. The results of these analyses should be taken with caution as the estimates are notably noisier. Overall, the results reported in [Table C.2](#) show that while the beneficial effect of exposure to an additional year of post-reform education in terms of labour force participation is larger for children in the initial grades, the beneficial effect in terms of the probability of finishing secondary and tertiary education is larger for children in later grades.

6. Mechanisms

This section discusses two potential mechanisms that could be driving the beneficial effects of the reform documented above in the paper.¹⁸ First, we examine whether the effects on human capital accumulation and labour force participation might be driven by the reform affecting a broad set of values and attitudes. Stalinism may have had an impact on values like agency and individualism that ultimately influence judgments about the accumulation of human capital and labor force participation, even though it was not an ideology that was against work or education. For completeness of the analysis, we also examine in [Appendix D](#) the effects of the reform on other values, social capital, and political outcomes. Secondly, we test whether the effects might be driven by the reduced instruction time (by three teaching hours per week). In a context where teaching quality might be low, and parents might be more effective in raising offspring human capital, reducing instruction time might improve human capital investments and labour force participation.

While we provide evidence consistent with the hypothesis that the results are driven by an increased individualism and agency after the reform, we cannot rule out other mechanisms, such as teachers' motivation, that we cannot examine empirically.

6.1. Individualism and sense of agency

Previous studies showed that individualism is a crucial driver of economic development ([Gorodnichenko and Roland, 2011a, 2012, 2011b](#); [Viinikainen et al., 2010](#)). In this set of studies, individualism is defined as the conviction that people should take care of themselves, as evidenced by the emphasis placed on freedom, independence, self-reliance, competitiveness, and personal action.

¹⁷ The differential effects of the reform on education by gender might be influenced by various factors. Firstly, the effect of the reform on values might be different for men and women. While the results should be interpreted with caution due to limited statistical power, we examine the effects of the reform on values for men and women and find limited support for this hypothesis (results are available upon request to the authors). Secondly, the results are consistent with higher returns to education in terms of labour force participation for women. This is documented for post-communist Poland by [Myck et al. \(2009\)](#). However, we lack studies that examine education returns during the communist era in Poland. Further research is necessary to gain a deeper understanding of the diverse effects of the reform on education based on gender.

¹⁸ While we cannot disentangle the effect of removing indoctrination from the educational curriculum from the effects of changes in the grading that accompanied this change (e.g. participation in ideological activities was no longer rewarded with better grades), we believe both components are inseparable parts of any school indoctrination system.

Table 4
Effect of the 1954/55 reform on self-direction and agency.

	(1) Dependence on authorities	(2) Self-reliance	(3) Dependence on others	(4) Dependence on destiny
Q1 × In school	−0.0500* (0.0271)	0.0969** (0.0472)	0.00290 (0.0379)	0.0272 (0.0487)
Q1	−0.0496 (0.0735)	0.118 (0.0898)	−0.145 (0.0915)	0.231** (0.104)
Mean	0.0783	0.597	0.260	0.419
Observations	1789	1789	1789	1789
Cut-off of reference FE	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES
Age	YES	YES	YES	YES
Sex	YES	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effect of an additional year of exposure to the post-reform educational system on self-direction and agency outcomes relative to a year of education in the pre-reform educational system during compulsory education. All dependent variables are dichotomous variables. *Source:* The analysis uses the 2011, 2013, and 2015 rounds of the Diagnoza Społeczna survey. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

It is plausible that Polish people in the late 1940s and early 1950s, whose predominant and constant emotion could have been fear of being a victim of Stalinist authorities for no specific reason (Diner, 2004), were focused on doing only what they were instructed, and nothing else. The pre-reform school system reflected these values. However, the 1954/55 reform changed the school curriculum and grading enhancing critical thinking, ambition, and self-direction to a greater degree. Children were rewarded for their academic skills rather than for their participation in political activities or obedient behaviour. As a result, the appreciation of one's own independent role in decision-making arguably had more chances to be internalised. These attitudes are relevant for enhanced willingness to put effort into more ambitious educational and professional choices over the entire life course.

To examine the effects of the reform on individualism and self-agency, we rely on three rounds of the Diagnoza Społeczna survey conducted in 2011, 2013, and 2015 which provide information on self-agency and individualism as well as the necessary information to build our measure of exposure to the reform.¹⁹ The survey includes questions about agency and independence from authorities which have been used in previous studies to measure the effect of individualism on development outcomes (Gorodnichenko and Roland, 2011a, 2012, 2011b; Viinikainen et al., 2010).

The results of the effects of the reform are reported in Table 4. Estimates suggest a significant effect of the 1954/55 education reform by increasing the propensity towards personal responsibility and decreasing the perceived influence of authorities. The sense of greater agency and independence from authorities appears to be associated with the ability to shape one's own destiny, which aligns with the observed increases in labour market participation and human capital attainment.

In Appendix D, we exploit additional information on values, attitudes, and other outcomes included in the Diagnoza Społeczna for completeness of the analysis. Specifically, we explore the effects of the reform on beliefs about the most important things in life, the characteristics of the desired job, social capital, and political outcomes. Many of these analyses are estimated with very small sample sizes due to the high number of missing values and the fact that not all the questions are included in each survey wave. Thus, the results should be interpreted with caution and most of the estimates remain small and statistically insignificant. However, taken together, the results suggest that individuals more exposed to the policy are more career-oriented. These results can be interpreted in the light of previous evidence that highlights the importance of individualism and agency for development (Gorodnichenko and Roland, 2011a, 2012, 2011b; Viinikainen et al., 2010).

In the Appendix E, we test further whether the results are driven by indoctrination or other pillars of communist education by examining the effect of the education reform that followed the fall of the communist regime in Poland in 1989. While this reform removed standard features of communist education systems such as the importance of physical education, it expand the teaching of foreign languages and religion, and decentralised school governance. The educational curriculum in the last decade of the Peoples Republic of Poland was *de facto* free of Marxist-Leninist ideology (Mader, 1988). The analysis shows that this reform, which did not affect political indoctrination but rather focused on other aspects of communist education, had a surprisingly limited effects on labour force participation and human capital investments. We interpret this result as additional evidence that political indoctrination in school is the primary driver of the documented effects of the 1954/55 reform on labour force participation and human capital accumulation.

6.2. Reduction in instruction time

While the rest of the curriculum remained the same, removing political indoctrination in school entailed a reduction in the total school instruction time from 29 to 26 h per week in the first seven grades. In this subsection, we examine whether the beneficial

¹⁹ Detailed information on the Diagnoza Społeczna survey is reported in Appendix D.

Table 5
Effect of the 1974/75 reform that reduced instruction time.

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
Q1 × In school	0.0021 (0.0042)	−0.0056 (0.0045)	−0.0113*** (0.0036)
Q1	−0.0064** (0.0030)	0.0114*** (0.0032)	0.0108*** (0.0026)
Observations	191,412	196,232	196,232
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-difference estimates of the effect of an additional year of exposure to the educational reform implemented in 1974/75 that shortened the instruction time removing the classes in 6 Saturdays per school course relative to a year of education in the pre-reform educational system. Source: 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

effects of the reform were driven by the reduction in instruction time. While the length of time at school may affect educational outcomes, the broad existing theory points that, if any, the effect of reducing instruction time varies from null to negative. Numerous empirical studies assessing the effects of reforms increasing instruction time (Barrios-Fernandez and Bovini, 2021; Parinduri, 2014; Huebener et al., 2017; Lavy, 2010), reducing instruction time (Kikuchi, 2014), or increasing the length of school year (Pischke, 2007) support the latter conclusion. One may argue however that it is feasible that in contexts that combine long instruction times with poor quality education, a reduction in instruction time could improve school outcomes, particularly if parents are educated enough and substitute poor quality instruction time at school with effective learning at home. This is however unlikely in our setting for different reasons. Firstly, while less beneficial than in developed countries, none of the studies conducted in developing countries or settings with poor quality of education show a negative effect of increasing instruction time (see for example Barrios-Fernandez and Bovini, 2021; Parinduri, 2014; Lavy, 2010). Secondly, the reduction of instruction time from 29 to 26 h per week remains below the average instruction time in Western countries. It is unlikely that the reform increases human capital investment by relieving children from very long and exhausting schooling hours. Finally, in a context in which the level of education of parents is low,²⁰ it is unlikely that schooling outcomes improve through parents substituting effectively time in school with instruction at home.

We conduct the following analysis to examine further the hypothesis that the effect of the reform could be driven by the reduction in instruction time. To this end, we assess the effect of the introduction of free Saturdays in schools in communist Poland, which resulted in reduced instruction time. While all Saturdays were school days in the early 1970s, six Saturdays were removed from the school calendar starting from the school year of 1974/75. We estimate the effects of this reform using the same empirical approach described in Section 4.²¹

The effects of this analysis are reported in Table 5. The estimates reveal that the reform that reduced the instruction time did not seem to have any significant effect on labour force participation and on the probability of completing secondary education. However, we find a negative effect on the probability of completing tertiary education.

The effects of our empirical exercise, as well as those found in previous studies, suggest that any effects of reducing instruction time are likely to be negative. Therefore, if there is any bias present, the estimates we provided in the previous section for the effects of the 1954/55 reform should be interpreted as a lower bound for the true effect of revoking political indoctrination in the schooling system. This, however, does not alter the main conclusions of the study.

7. Robustness checks

This section summarises the results of a battery of robustness checks, which are reported in detail in Appendix.

First, in the Appendix A we report the evidence testing whether the effect of the 1954/55 reform holds when using the HBS data from rounds 1998, 1999, and 2000 instead of the census data. The results of the analysis using this source of data are reported in Table A.1. Our results support, overall, the conclusions yielded by the main analysis of the paper, showing that an additional year

²⁰ In the census data, only 15.8% and 5.6% of adults equal or older than 25 at the time of the reform in 1954 had secondary studies and tertiary education, respectively.

²¹ To estimate the effect of the 1974/75 reform that reduced annual instruction time by six Saturdays, we compare the difference between those born in the first quarter of the year and those born in the last quarter of the previous calendar year across two samples of individuals. The first sample includes individuals born between October 1963 and March 1967. These individuals were already in compulsory education when the reform was implemented. For these individuals, being born between January and March implies one additional year of education under the education system with fewer days of school relative to those born between October and December of the previous calendar year. The second sample includes individuals born between October 1967 and December 1971. These individuals initiated school already after the reform. Thus, all individuals in this sample are exposed to the same number of years of compulsory education under the post-reform educational system regardless of whether they were born between January and March or between October and December of the previous calendar year. By comparing the effect of being born in the first quarter of the year relative to being born in the last quarter of the previous calendar year across both samples, we net out maturity effects from the effect of one additional year of education under the education system with reduced instruction time.

of education under the post-reform educational system increased tertiary education attainment, labour force participation, and also income per capita in later life.

Second, we examine the robustness of our results to alternative definitions of the analytical sample. In the main analysis, we include individuals born within three months of the cut-off date and we exclude those born between April 1st and September 30th. In this section, we test the robustness of the results to the inclusion of individuals born within one month, two months, and four months from December 31st every year. The results of these analyses are reported in Table F.1 of Appendix F. While the magnitude of the effects varies slightly, the results show that the main conclusions are robust to alternative definitions of the analytical sample. We also examine the robustness of the results to removing from the analytical sample those individuals born within one month away from the cut-off date, namely those born in January and December. In other words, we re-estimate the main specification using only individuals born in October, November, February, and March. This analysis would be particularly relevant if those born in December and January are more likely to be assigned to an incorrect school year. The results of this analysis are reported in Table F.2 in Appendix F and show nearly identical results to the main estimates.

Third, we conduct a placebo check falsely setting the reform's introduction date in the school year 1962/63 rather than in 1954/55. The false date is selected so that both falsely exposed and unexposed individuals within the relevant window started school after the 1954/55 reform and were already out of tertiary education by September 1989 when the post-communist education reform was implemented.²² The results of this falsification analysis are reported in Table F.3 in Appendix F showing no effects of the placebo reform on human capital or labour market outcomes.

Fourth, Table F.4 reports the results of a placebo analysis setting as a false cut-off on June 31st rather than on December 31st. This placebo analysis compares individuals born in the second and the third trimester every year. Among this sample of individuals, those born in the second and third trimesters of the year are equally exposed to the reform. Reassuringly, the estimates reported in the table confirm null effects in this placebo check.

Fifth, we re-estimate the results reported in Table F.5 in Appendix F clustering the standard errors at the year of birth level and using wild bootstrapping techniques in order to account for the small number of clusters (Cameron et al., 2008). While more conservative, the estimates remain statistically significant at conventional confidence levels. We also retrieve similar and re-assuring results in Table F.6 when we estimate the main regression including region of residence fixed effects.²³ We address another potential concern, namely whether our estimates are driven by forced migration after the II World War following Becker et al (2020). Table F.7 reports the effects both including and excluding regions exposed to forced migration, and suggest consistent and comparable estimates, which only labour market participation exhibiting a slightly weaker effect size and significance.

Finally, one potential threat for the interpretation of the coefficient as identifying the effect of the reform on labour force participation is that it might be affected by early retirement. The Polish public pension system was progressively reformed during the 1990s, which made retirement before the age of 65 for men and 60 for women very hard (Góra, 1999; Góra et al., 2008). Before the retirement reform, women aged 55 or above were eligible for early retirement if they had worked for more than 30 years. For men, retirement before the age of 60 (the age threshold in the analytical sample) was not possible, except for agricultural workers. The results reported in Table C.1 show strong labour market effects of the 1954/55 education reform for urban men for whom retirement before the age of 60 was not possible. The latter result suggests that the main results of the study are unlikely driven by differential early retirement among individuals born in the first quarter and the last quarter of the previous calendar year.

8. Conclusion

At its peak, one-third of the world's population lived in communist countries (Eberstadt, 2003). While most of these regimes collapsed in the late 1980s and early 1990s, Marxist-Leninist doctrines continue to inspire various autocratic governments, including China, North Korea, Cuba, Laos, and Vietnam, where approximately 1.6 billion people currently reside.

Although there were numerous differences between education systems in communist and Western Europe (e.g. access to non-public schools, length of the school day, homework load, etc.), this paper documents evidence of the long-term effects on labour force participation and human capital accumulation of a fundamental feature of communist education, namely political indoctrination in school. More specifically, we exploit unique evidence from an education reform implemented in mid-1950s Poland, which removed political indoctrination from schools while leaving the rest of the curriculum unchanged. We focus on the effects of repealing the Marxist-Leninist content in the curriculum and evaluation system, which arguably was intended to promote collectivist values, and reward uncritical obedience to ensure the survival of the regime, alongside penalising individual self-direction. Our results provide evidence of the long-lasting adverse effects of political indoctrination in schools on education and labour force participation almost five decades later. While we cannot definitively identify all the mechanisms driving these effects, we find evidence that the reform fostered values related to individual sense of agency. These values have been associated with economic well-being in previous

²² It is not straightforward to set a placebo date in which individuals remain unexposed (or equally exposed) to other education reforms. The school year 1962/63 is the purest placebo date as individuals who initiated school between 1957 and 1968 were not exposed to post-communist education during their educational life.

²³ We did not include in the main specification region fixed-effects or a dummy indicating whether the individual lives in an urban area, because this information is only available at the time of the survey in 2002. On the other hand, we lack information on the region of residence at the time of the reform or birthplace, which would have been ideal. Because the region of residence in 2002 might be affected by the reform, including region of residence fixed-effects may create a bad control problem. Nonetheless, the results reported in Table F.6 show that the estimates of interest hardly change when the regression is estimated with region of residence fixed-effects.

Table A.1
Effect of the 1954/55 reform using the HBS dataset.

	(1)	(2)	(3)	(4)
	Secondary educ.	Tertiary educ.	Labour force part.	Ln income p/c
Q1 × In school	0.0135 (0.0134)	0.0173* (0.0089)	0.0264** (0.0132)	0.0331** (0.0161)
Q1	−0.0113 (0.0093)	−0.0155** (0.0060)	0.0005 (0.0088)	−0.0203* (0.0111)
Observations	22,203	22,203	22,284	22,091
Cut-off of reference FE	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES
Age	YES	YES	YES	YES

Note: This table reports the difference-in-difference estimates of the effect of an additional year of exposure to the post-reform educational system on labour force participation, income, the probability of completing secondary education and the probability of completing tertiary education relative to a year of education in the pre-reform educational system. *Note:* 1998–2000 rounds of the HBS. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

studies (Slomczynski et al., 1981; Gorodnichenko and Roland, 2011a). Our results are also consistent with earlier studies indicating that the absence of critical and aesthetic discourse in education hinders the instillation of values of self-direction (Torbert, 1978), which in turn is associated with a stronger perception of marketability and a propensity to consider changing jobs (Hall et al., 2018).

A final question of primary interest is whether political indoctrination in non-communist autocratic regimes would yield similar negative effects. While more research is needed to convincingly address this question, the fact that the detrimental effects of Marxist-Leninist indoctrination appear to be linked to the suppression of individual agency may lend credence to the notion that, although autocratic regimes' suppression of critical thought may allow for short-term regime survival, it eventually undermines economic performance over the long run (Diwan and Vartanova, 2020; Dahlum and Knutsen, 2017).

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

[Source files \(Original data\)](#) (Google Drive)

Appendix A. Analysis of the effects of the 1954/55 school reform using the HBS data

In this appendix, we examine the effects of the 1954/55 reform using information from the Polish Household Budget Survey (HSB) instead of the 2002 census. We use in this analysis those rounds of the HBS that include data on month of birth: 1998, 1999, and 2000.²⁴ The main drawback of the HBS data is that the analytical sample in this dataset is substantially smaller than in the census data. On the other hand, the HBS databases include information on household income, which is not available in the Census dataset.

The results of the analysis are reported in Table A.1. The estimates reveal that, relative to a year of education under the pre-reform educational system, an additional year of education under the post-reform educational system increases the probability of finishing tertiary education by 1.7 percentage points, per capita income by 3%, and raises the probability of labour force participation nearly 50 years later by 2.7 percentage points. These findings align with those obtained when estimating the impacts of the 1954/55 reform using the 2002 census data.

On the other hand, unlike the analysis conducted with the census data, we do not observe any statistically significant effect of the reform on the probability of completing secondary education when using the HBS data, although the coefficient shows the expected positive direction. One possible explanation for this divergent result is the notably smaller sample size used in the analysis with the HBS datasets. This reduction in sample size diminishes statistical power, leading to increased standard errors.

Appendix B. Exposure to the post-1954/55 reform educational system by year of birth

The figures in this appendix show the number of years of compulsory education in the post-reform educational system for the individuals included in the main analytical sample by year of birth.

²⁴ The waves of the HBS conducted before 1998 and between 2001 and 2010 lack information on month of birth. Without this information, we cannot construct the measure of exposure to the reform that is used in the difference-in-differences analysis.

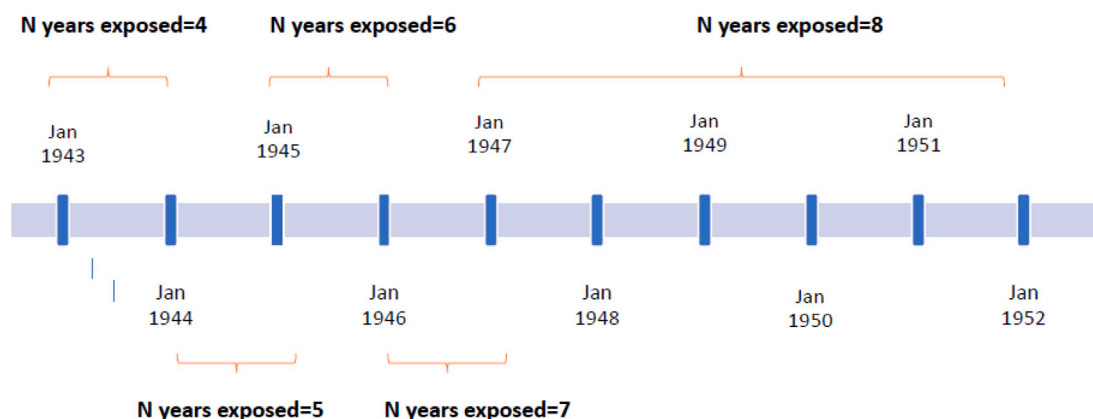


Fig. B.1. Year of birth and years of compulsory education in the post-reform educational system. *Note:* The figure shows the number of years of compulsory education in the post-reform educational system by year of birth.

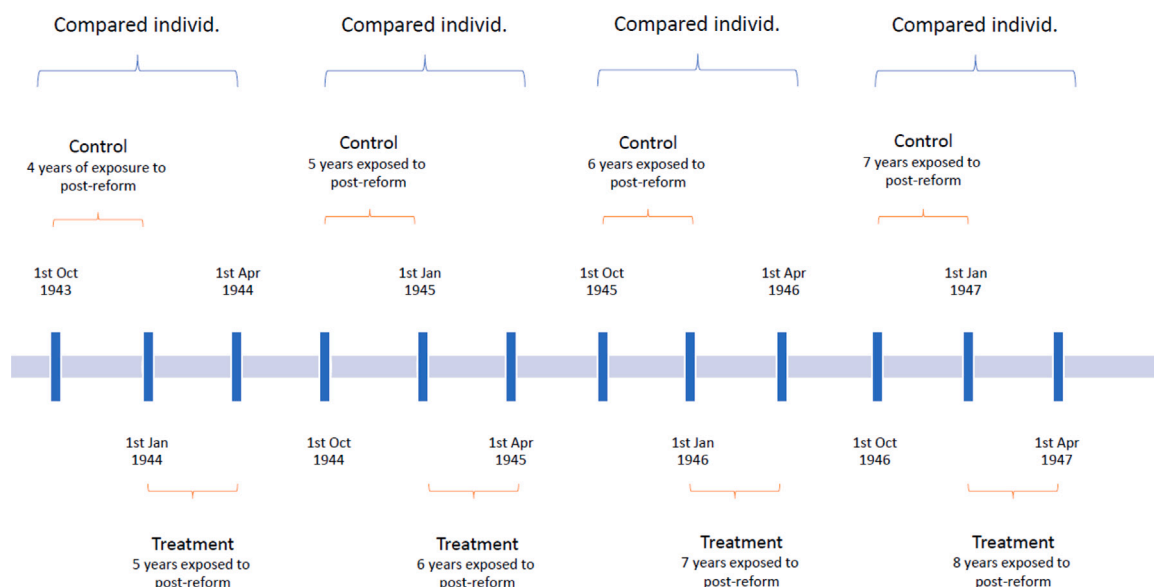


Fig. B.2. Years of compulsory education in the post-reform educational system for individuals who were already in school when the reform was implemented (born between 1943 and 1947). *Note:* The figure shows the number of years of compulsory education in the post-reform educational system by year and month of birth for individuals who were already in school when the reform was implemented in the school year 1954/55. The number of years of compulsory education both before and after the reform was 8.

Appendix C. Heterogeneous effects of the reform

In this appendix, we examine the heterogeneous effects of the reform by different dimensions. To explore the heterogeneous effects, we expand the main difference-in-difference specification by adding a triple interaction between the variable indicating whether the individual is born in the first quarter of the year (*Q1*), the variable indicating whether the individual was in school when the reform was implemented (*In School*), and the variable representing the dimension for which we intend to explore the heterogeneous effects (*Heterogeneity Dimension*). Additionally, the specification includes two more interactions: *In School* \times *Heterogeneity Dimension* and *Q1* \times *Heterogeneity Dimension*.

We test for heterogeneous effects of the reform across three dimensions. First, we investigate whether the impacts of the reform on human capital investments and labour force participation are different for men and women. The results of this analysis are reported in Panel A of Table C.1. The results of the analysis suggest that the effect of the reform on labour force participation is

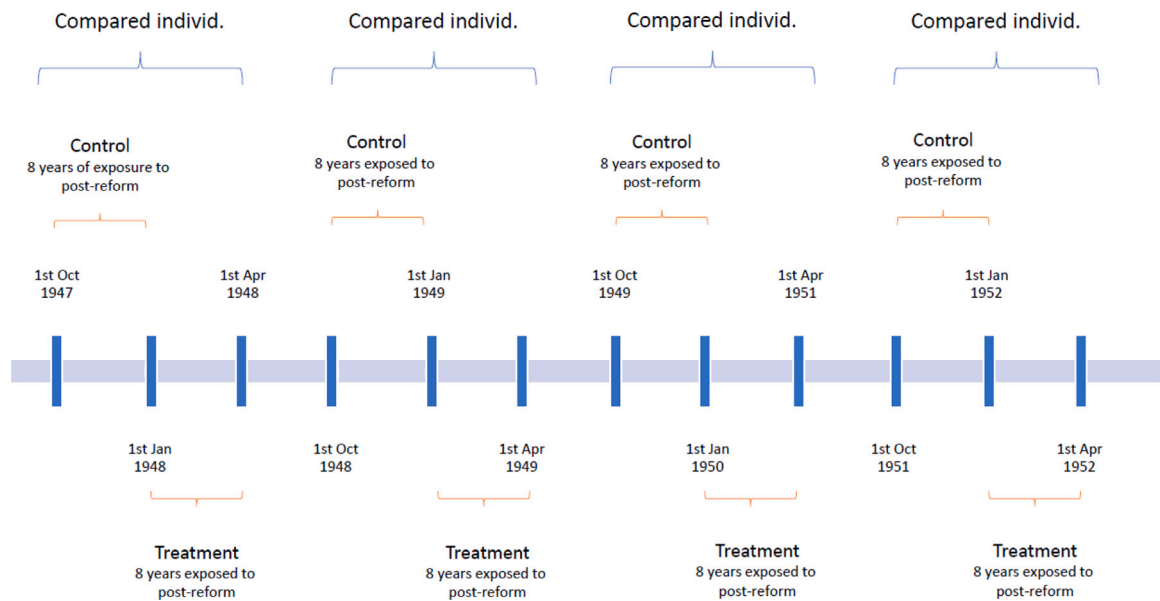


Fig. B.3. Years of compulsory education in the post-reform educational system for individuals who started school after the reform was implemented (born between 1947–1952). *Note:* The figure shows the number of years of compulsory education in the post-reform educational system by year and month of birth for individuals who initiated school after the reform was implemented in the school year 1954/55. The number of years of compulsory education both before and after the reform was 8.

nearly identical for men and women. On the other hand, we find that the effects of the reform on human capital accumulation are larger for women.²⁵

Second, we investigate whether the effects of the reform are more pronounced in the western regions of Poland, which witnessed significant forced migration from the Kresy regions following World War II. Recent evidence documents that forced migration heightened preferences for education and increased human capital investments in the descendants of those migrants (Becker et al., 2020). Our findings, as reported in Panel B of Table C.1, reveal that the impact of the reform on labour force participation is approximately two times larger in regions affected by forced migration after WWII, although this difference is not statistically significant. On the other hand, we do not observe any meaningful difference in terms of the reform's impact on education between regions with and without forced migration.

Third, we assess the effects of the reform by grade level. The results of these analyses should be taken with caution as the estimates are notably noisier. Overall, the results reported in Table C.2 show that while the beneficial effect of exposure to an additional year of post-reform education in terms of labour force participation is larger for children in the initial grades, the beneficial effect in terms of the probability of finishing secondary and tertiary education is larger for children in later grades.

Appendix D. Effects of the reform on attitudes, values, and other outcomes

In the main manuscript, we examine the effects of the reform on self-agency and individualism. In this appendix, we assess the impacts of the reform on other values, attitudes, and outcomes. For this, we rely on three rounds of the Diagnoza Społeczna survey conducted over a random sample of individuals aged at least 16 and living in Poland.²⁶ The survey was implemented first in the early 1990s aiming to provide insights into the ongoing socioeconomic changes in Polish society, which required frequent and substantial revisions of the questionnaire. Starting from 2000, the survey was conducted bi-annually collecting data on individual preferences, social capital, and political outcomes, which we use to examine the potential mechanisms through which the effects of the reform on labour force participation and human capital operate. Our analytical sample includes three rounds of the Diagnoza

²⁵ The differential effects of the reform on education by gender might be influenced by various factors. Firstly, the effect of the reform on values might be different for men and women. While the results should be interpreted with caution due to limited statistical power, we examine the effects of the reform on values for men and women and find limited support for this hypothesis (results are available upon request to the authors). Secondly, the results are consistent with higher returns to education in terms of labour force participation for women. This is documented for post-communist Poland by Myck et al. (2009). However, we lack studies that examine education returns during the communist era in Poland. Further research is necessary to gain a deeper understanding of the diverse effects of the reform on education based on gender.

²⁶ More information about the Diagnoza Społeczna can be found at <http://www.diagnoza.com/index-en.html>.

Table C.1

Heterogeneous effects of the 1954–55 reform by gender and by whether the individual lives in a region that experienced forced migration after World War II (2002 Census):

Panel A: Results by gender				
	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.	(4) Labour force part. (Urban only)
$Q1 \times \text{In school} \times \text{Female}$	0.0002 (0.0090)	0.0166* (0.0090)	0.0147** (0.0067)	0.0022 (0.0110)
$Q1 \times \text{In school}$	0.0127* (0.0069)	0.0071 (0.0065)	0.0034 (0.0048)	0.0112 (0.0085)
Observations	198,200	200,706	200,706	133,252
Cut-off of reference FE	YES	YES	YES	YES
Panel B: Results by living in a region with forced migration				
	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.	
$Q1 \times \text{In school} \times \text{Forced migration region}$		0.0083 (0.0091)	0.0013 (0.0090)	−0.0018 (0.0068)
$Q1 \times \text{In school}$		0.0081 (0.0070)	0.0155** (0.0068)	0.0122** (0.0052)
Observations		198,200	200,706	200,706
Cut-off of reference FE		YES	YES	YES

Note: This table reports the heterogeneous effects of the reform on labour force participation, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the pre-reform educational system during compulsory education. Panel A reports the heterogeneous effects by gender and Panel B reports the heterogeneous effects by whether the individual lives in a region affected by forced migration after II World War. To examine the heterogeneous effects, we expand the baseline difference-in-differences specification by adding a triple interaction between $Q1 \times \text{In school} \times \text{Female}$ in Panel A and $Q1 \times \text{In school} \times \text{Forced migration regions}$ in Panel B. *Female* and *Forced migration regions* are dummy variables equal to 1 if the individual is a woman and if the individual lives in a region with forced migration. We also include $Q1 \times \text{Female}$, *Female* and $\text{In school} \times \text{Female}$ in Panel A and $Q1 \times \text{Forced migration}$, *Forced migration* and $\text{In school} \times \text{Forced migration}$ in Panel B. *Source:* 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table C.2

Effect of the 1954/55 reform by grade.

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
$Q1 \times \text{4th grade}$	0.0108 (0.008)	0.0261*** (0.008)	0.0199*** (0.006)
$Q1 \times \text{3rd grade}$	0.0112 (0.008)	0.0256*** (0.008)	0.0204*** (0.006)
$Q1 \times \text{2nd grade}$	0.0169** (0.008)	0.0232*** (0.008)	0.0103* (0.006)
$Q1 \times \text{1st grade}$	0.0164** (0.007)	−0.0008 (0.007)	0.0003 (0.005)
$Q1$	0.0140*** (0.003)	0.0080*** (0.003)	0.0017 (0.002)
Observations	198,200	200,706	200,706
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the heterogeneous effects of an additional year of exposure to the post-reform educational system relative to a year of education in the pre-reform educational system by grade. The outcome variables examined include labour force participation, the probability of completing secondary education, and the probability of completing tertiary education. *Source:* 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Spółeczna survey, implemented in 2011, 2013, and 2015. These were the only rounds of the survey that include information on the year and month of birth of the interviewees, which is essential information to construct our measure of exposure to the reform.²⁷

²⁷ The survey round conducted in 1995 includes also information on year and month of birth. However, the 1995 round differs with respect to the design of the questionnaire and hardly includes any comparable question. Therefore, we only use in our analysis the data from the 2011, 2013, and 2015 rounds of the Diagnoza Społeczna Survey, which provide harmonised information for a large set of individual values.

Table D.1
Effect of the 1954/55 reform on beliefs about important things in life.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Work	Money	Health	Integrity	Respect	Children	Marriage	Friends	Optimism
Q1 × In school	0.0380 (0.0358)	0.0221 (0.0410)	−0.0172 (0.0422)	0.0465 (0.0306)	0.0129 (0.0266)	0.0639 (0.0485)	0.0213 (0.0490)	−0.0175 (0.0199)	−0.0136 (0.0283)
Q1	0.301* (0.166)	0.502*** (0.0695)	−0.231 (0.185)	−0.0104 (0.0247)	−0.162* (0.0899)	0.0102 (0.198)	0.0464 (0.198)	−0.0750 (0.0674)	−0.147 (0.0897)
Observations	1791	1791	1791	1791	1791	1791	1791	1791	1791
Cut-off of reference FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Age	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sex	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effect of an additional year of exposure to the post-reform educational system on beliefs about important things in life relative to a year of education in the pre-reform educational system during compulsory education. All dependent variables are dichotomous variables. Source: The analysis uses the 2011, 2013, and 2015 rounds of the Diagnoza Społeczna survey. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table D.2
Effect of the 1954/55 reform on desired job characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Social esteem	Independence	Personal development	Professional promotion	Stress free	Employment stability	Convenient hours	Proper wage
Q1 × In school	0.205*** (0.0690)	0.0847 (0.121)	−0.0350 (0.0806)	0.0131 (0.0146)	−0.0575 (0.129)	−0.0228 (0.136)	0.0129 (0.0902)	−0.0903 (0.132)
Q1	−0.0714** (0.0345)	−0.233*** (0.0593)	0.0115 (0.0303)	−0.0224 (0.0181)	0.242*** (0.0602)	−0.266*** (0.0610)	−0.135*** (0.0457)	0.176*** (0.0582)
Observations	360	360	360	360	360	360	360	360
Cut-off of reference FE	YES	YES	YES	YES	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES	YES	YES	YES	YES
Age	YES	YES	YES	YES	YES	YES	YES	YES
Sex	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effect of an additional year of exposure to the post-reform educational system on desired job characteristics relative to a year of education in the pre-reform educational system during compulsory education. All dependent variables are dichotomous variables. Source: The analysis uses the 2013 and 2015 rounds of the Diagnoza Społeczna survey. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

We examine the effects of the reform on four different categories of outcomes: beliefs about more important things in life, job preferences, political attitudes and preferences, and social capital outcomes. The results of the Diagnoza Społeczna survey should however be interpreted as suggestive due to limited statistical power. While the surveys are nationally representative, we only include in the analytical sample individuals born between October 1943 and March 1952. Furthermore, not all outcomes are collected in every survey. The sample size is even smaller for some outcomes that were only collected in one round of the survey or for a specific subsample of the general population.

We start examining the effects of the reform on beliefs about what things are the most important in life. The results of this analysis are reported in Table D.1. All the estimates are statistically indistinguishable from zero although, taken together, the direction of the coefficients suggests that the reform could have made individuals more career-oriented (work, money). The effects of the reform on the value of relations are less clear, with coefficients changing signs for the importance of friends, children, or marriage.

Table D.2 reports the estimates of the effects of the reform on desired job characteristics for the subsample of individuals who were working at the time of the interview. Therefore, although the analytical sample comprises two waves, the sample is particularly small in these analyses. Nonetheless, the results show a positive and statistically significant effect of the reform on the perception that individuals hold jobs that are socially esteemed or highly respected. This can be treated as an indication that a professional career is more likely to fulfil individual ambitions. The rest of the coefficients are much smaller and statistically indistinguishable from zero at conventional confidence levels.

The estimates reported in Table D.3 show the effects of the reform on political outcomes. The results suggest a positive effect of the reform that reduced indoctrination on the probability of voting for the left-wing party SLD and no effects on support for left-wing views. While the former result could be consistent with a backlash effect of communist indoctrination on the probability of voting for left-wing parties (Sieklicki, 2006), it is important to consider that the effects on these outcomes are estimated using very small and selected sample sizes.²⁸ We also explore the effects of the reform on views of the transition process that transformed the Polish People's Republic into a liberal democracy. While the coefficient of interest is negative, indicating that individuals exposed to reform are more critical of the regime transformation process, the estimates are statistically indistinguishable from zero at conventional confidence levels.

²⁸ For example, only a small fraction of participants responded to the voting question.

Table D.3
Effect of the 1954/55 reform on political outcomes.

	(1) SLD party (left-wing) voter	(2) Left-wing views	(3) Successful transformation
Q1 × In school	0.211*** (0.0774)	0.359 (1.040)	−0.0325 (0.0327)
Q1	−0.0906* (0.0513)	0.870 (0.723)	−0.0605** (0.0281)
Observations	123	106	1417
Cut-off of reference FE FE	YES	YES	YES
Year of survey FE	YES	YES	YES
Age	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effect of an additional year of exposure to the post-reform educational system on political outcomes relative to a year of education in the pre-reform educational system during compulsory education. Three outcome variables are examined: the probability of declaring voting for the left-wing SLD Party, the probability of declaring having left-wing views, and the probability of believing the transition process that followed the fall of the communist regime was a successful process. *SLD party voter* and *Successful transformation* are dichotomous variables. The values of the variable *Left-wing views* range between 0 (extreme right-wings views) and 10 (extreme left-wings views). *Source:* The analysis uses the 2011, 2013, and 2015 rounds of the Diagnoza Społeczna survey. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table D.4
Effect of the 1954/55 reform on social capital (membership of different organisations).

	(1) Sport club	(2) Professional association	(3) Political party	(4) Charity	(5) Trade union	(6) Hobby	(7) Dwelling community	(8) Ecological organisation	(9) Social club	(10) Religious organisation	(11) Knowledge popularisation	(12) Local government	(13) Other
Q1 × In school	0.124* (0.0745)	−0.0721 (0.0492)	0.161* (0.0867)	0.120 (0.0767)	0.104 (0.0992)	−0.169 (0.121)	0.138* (0.0819)	−0.000393 (0.0745)	−0.0257 (0.155)	0.0807 (0.187)	−0.0152 (0.153)	0.141 (0.0947)	−0.102 (0.147)
Q1	−0.0512 (0.0451)	0.0604 (0.0460)	−0.0884 (0.0671)	−0.123** (0.0601)	−0.0665 (0.0896)	0.0936 (0.0852)	−0.125** (0.0590)	−0.000330 (0.0659)	0.0397 (0.0995)	−0.0833 (0.117)	0.100 (0.0857)	−0.0196 (0.0617)	0.0129 (0.105)
Observations	118	118	118	118	119	119	119	118	120	121	118	119	120
Cut-off of reference FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Age	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sex	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effect of an additional year of exposure to the post-reform educational system on membership of different organisations relative to a year of education in the pre-reform educational system during compulsory education. All dependent variables are dichotomous variables. *Source:* The analysis uses the 2015 round of the Diagnoza Społeczna survey. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Finally, we use information on participation in different organisations collected in the 2015 wave to examine the effects of the reform on social capital. The results are presented in Table D.4. The estimates show that the reform increased the probability of participating in a neighbourhood organisation, political party, and sports club. On the other hand, we do not find significant effects of the reform on participation in other social organisations. The results are consistent with previous evidence that suggests exposure to communism and STASI's mass surveillance decreased social capital and generalised trust (Lichter et al., 2020; Costa-Font and Nicińska, 2023).

Appendix E. The impact of the post-communist education reform (1989/90)

This appendix examines the effects of the education reform that followed the free and democratic parliament elections that took place in June 1989 after the collapse of the communist regime in Poland. The reform, implemented starting in the 1989/90 school year, decentralised schooling, provided alternatives to public education (including religious and private schools), and eliminated Russian as a compulsory foreign language, as well as communist civic education, from the curricula (Lopez and Marlow-Ferguson, 2002; Szczepanek, 2018; Szebenyi, 1992). The reformed education system prioritised the teaching of foreign languages (especially Western European languages), introduced a new program in civic education (Janowski, 1999), and granted teachers substantial freedom in the choice of curricula contents, allowing for the development of innovative educational programmes (Szczepanek, 2018).

However, already in 1981, the growing power of *Solidarność*,²⁹ an anti-communist social movement, affected the school curricula (Mader, 1988) and increased security of teachers' employment. Many teachers supported or joined *Solidarność* (Bochwic, 2000). The conflict between communist authorities and school pupils supported by their parents was open in the 1980s (Janowski,

²⁹ *Solidarność* was the largest independent trade union in Poland. Founded in 1980, the trade union grew rapidly into a social movement gathering ten million members. It was instrumental in weakening the communist regime in Poland, leading to free parliamentary elections in 1989 and in consequence to the collapse of communism (Goddeeris, 2008).

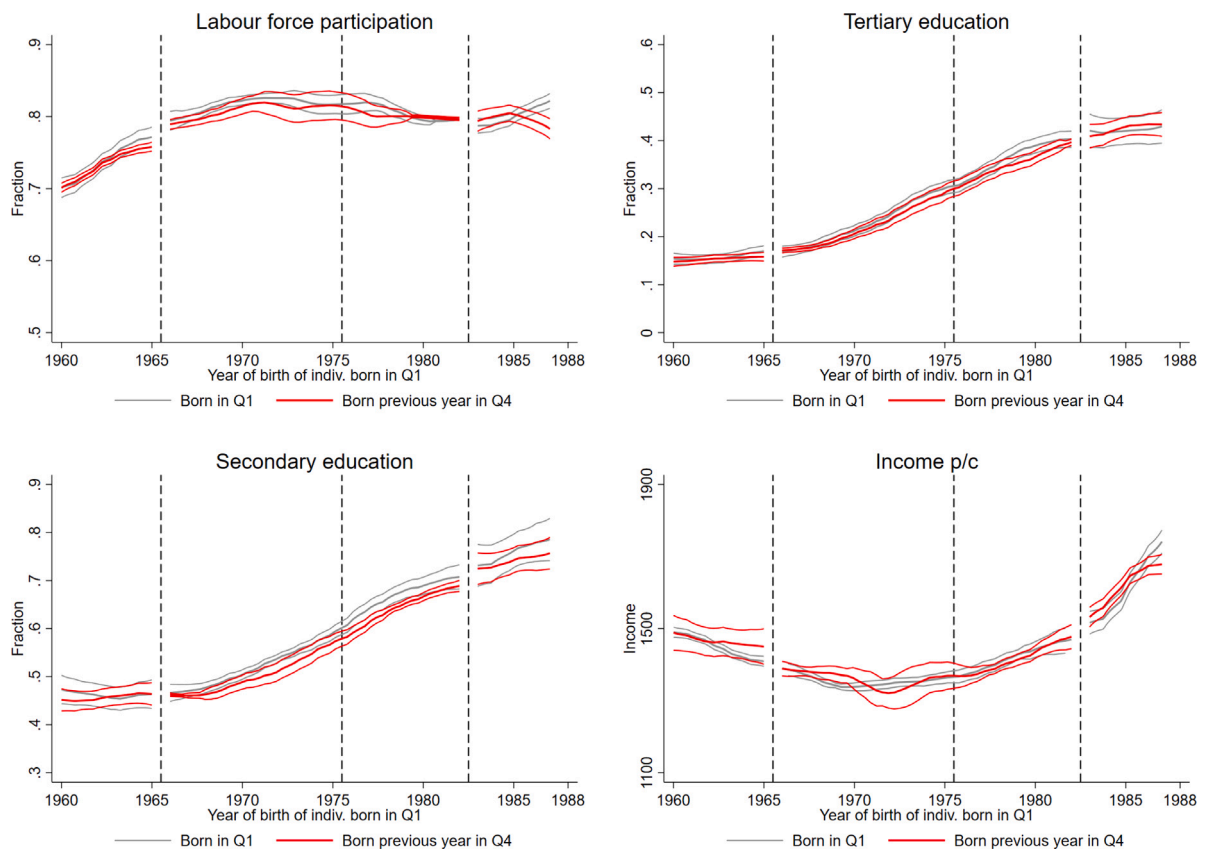


Fig. E.1. Human capital and labour market outcomes for individuals born in the first quarter of the year and the last quarter of the previous year. *Note:* The graphs are built using data from rounds 2011–2017 of the HBS survey. They compare labour force participation, probability of completing tertiary and secondary education, and income for individuals born in the first quarter of the year and those born in the last quarter of the previous calendar year. The year indicated in the X-axis refers to the year of birth for those born in the first quarter of the year or to the year of birth +1 for those born in the last quarter of the previous calendar year. Lines represent fits from a local polynomial with a bandwidth of 1.

Table E.1

Descriptive statistics: Analytical sample for the analysis of the 1989/90 reform (HBS dataset).

	N	Mean	Standard deviation (for non-dummy variables)	Min	Max
Female	40,455	0.51	–	0	1
Age	40,455	34.21	2.90	30	42
Birth year	40,455	1980	2.87	1976	1988
Secondary educ.	40,347	0.68	–	0	1
Tertiary educ.	40,347	0.37	–	0	1
Work	40,455	0.80	–	0	1
Income p/c	40,100	1456.81	1102.84	0	25,000

Source: The table presents descriptive statistics for the analytical sample. The latter includes individuals born between October 1976 and March 1988 in the months of October, November, December, January, February, and March. *Source:* HBS waves 2011–2017.

1992). The last time the Minister of Education referred to school communities in the inauguration speech as ‘comrades’³⁰ was in 1979 (Wagner, 2018). Abucewicz (2009) argues that the increasing role of liberal values in the Polish education system and its management was present throughout the 1980s. The late 1980s in Poland were relatively free from indoctrination (Janowski, 1999).³¹ The courses aimed at instilling communist ideology “were almost unanimously made light of by all concerned, that

³⁰ Originally ‘towarzysze’; authors’ own translation from Polish to English.

³¹ In spite of the authorities’ efforts to intensify communist indoctrination after the end of martial law in 1983 (Wagner, 2018).

Table E.2
Effect of the post-communist education system in Poland (HBS dataset).

	(1) Secondary educ.	(2) Tertiary educ.	(3) Labour force part.	(4) Ln income p/c
Q1 × In school	0.0081 (0.0106)	0.0069 (0.0115)	0.0147 (0.0094)	−0.0004 (0.0152)
Q1	0.0185** (0.0093)	0.0077 (0.0103)	−0.0050 (0.0084)	0.0103 (0.0134)
Observations	40,347	40,347	40,455	40,100
Cut-off of reference FE	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES
Age	YES	YES	YES	YES
Sex	YES	YES	YES	YES

Note: This table reports the effects of an additional year of exposure to the post-communist educational system on labour force participation, per capita income, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the communist education system during compulsory education. *Source:* HBS waves 2011–2017. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table E.3
Effect of an additional year of exposure to post-communist post-compulsory education.

	(1) Secondary educ.	(2) Tertiary educ.	(3) Labour force part.	(4) Ln income p/c
Q1 × In school	0.0295*** (0.0106)	0.0098 (0.0086)	−0.0061 (0.0087)	0.0156 (0.0141)
Q1	−0.0015 (0.0077)	0.0040 (0.0057)	0.0078 (0.0067)	0.00670 (0.0104)
Observations	35,082	35,082	35,146	34,689
Cut-off of reference FE	YES	YES	YES	YES
Sex	YES	YES	YES	YES
Year of survey FE	YES	YES	YES	YES
Age	YES	YES	YES	YES

Note: This table reports the effects of an additional year of exposure to the post-communist educational system on labour force participation, per capita income, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the communist education system during post-compulsory education. *Source:* HBS 2011–2017. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

is, students, teachers, and parents. These subjects, introduced in the late 1960s, received no respect and were considered to be unnecessary and unimportant” as Janowski (1999) reports. In sum, the education reform of 1989/90 had little impact on the indoctrination at school in Poland.

For the main analysis of this reform, we rely on seven rounds of the Polish Household Budget Survey (HBS) that collected yearly information between 2011 and 2017.³² We employ the same empirical strategy used in the main analysis of the paper comparing individuals born in the first and in the last quarter of the previous calendar year across two samples. The first sample includes individuals born between 1976 and 1982. These individuals were in compulsory school at the time of the 1989/90 reform and, therefore, were exposed at least to one year of education under the pre-reform communist education system. For these individuals, those born in the first quarter of the year were exposed to one additional year of post-communist education relative to those born in the last quarter of the previous calendar year. The second sample includes individuals born between 1982 and 1988. These individuals started school after the collapse of the communist regime in Poland and, therefore, their level of exposure to the reform is the same regardless of whether they were born in the first quarter of the year or in the last quarter of the previous calendar year. In order to reduce the potential noise caused by a later entrance into the labour market of individuals who invest more in their human capital, we restrict the analysis to individuals who were at least 30 by the time of the survey. The 2002 Census data cannot be used to examine the effect of the reform because most of the individuals in relevant cohorts were too young to even have finished tertiary education by 2002.

Table E.1 provides summary statistics for the analytical sample used in the analysis of the 1989/90 reform conducted using the HBS data. The age of the individuals in the sample ranges between 30 and 42 at the time of the survey, and 37% of them have completed tertiary education. 80% of the individuals in the analytical sample have a job, and 68% completed secondary education. The mean monthly per-capita income is 1457 zloties (approximately 413 USD).

Fig. E.1 shows the evolution of human capital outcomes and labour force participation by year of birth in the past for individuals born in Q1 and in Q4 of the previous calendar year using the HBS data. Most individuals born before 1966 should

³² HBS is a household budget survey collecting data over a representative sample of Polish households on household incomes, expenditures, and living conditions, as well as selected socio-economic characteristics of individual household members. Although the survey dates back to the 1950s, its design has undergone substantial changes in the 1990s and 2000s. Rounds 2003–2010 do not include information on month of birth and therefore cannot be used in the analysis of the effects of the reform.

Table F.1

Effect of the 1954–55 reform using different time windows to select the analytical sample (Census data).

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
<i>Panel A: 1 month window</i>			
First month of year × In school	0.0193** (0.0083)	0.0282*** (0.0082)	0.0079 (0.0062)
First month of year	0.0131** (0.0054)	0.0092* (0.0052)	0.0105*** (0.0039)
Observations	65,917	66,724	66,724
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES
<i>Panel B: 2 months window</i>			
First two months of year × In school	0.0126** (0.0058)	0.0197*** (0.0058)	0.0126*** (0.0043)
First two months of year	0.0150*** (0.0038)	0.0091** (0.0037)	0.0042 (0.0028)
Observations	129,159	130,826	130,826
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES
<i>Panel C: 4 months window</i>			
First four months of year × In school	0.0146*** (0.0040)	0.0139*** (0.0040)	0.0100*** (0.0030)
First four months of year	0.0052* (0.0026)	0.0037 (0.0026)	−0.0015 (0.0019)
Observations	265,677	268,979	268,979
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effects of an additional year of exposure to the post-reform educational system on labour force participation, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the pre-reform educational system during compulsory education. Each panel uses a different sample in which the analytical sample is defined by whether the individual is born within one, two, or four months from the cut-off date each year (December 31st). *Source:* The 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table F.2

Effect of the 1954–55 reform excluding from the analytical sample individuals born in December and January every year.

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
Q1 × In school	0.013** (0.006)	0.011** (0.006)	0.013*** (0.004)
Q1	0.014*** (0.004)	0.007** (0.004)	−0.003 (0.003)
Observations	132,283	133,982	133,982
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effects of an additional year of exposure to the post-reform educational system on labour force participation, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the pre-reform educational system during compulsory education. The analytical sample uses individuals born within three months from the cut-off every year (December 31st) but excluding those born in January and December. These are arguably individuals with a higher probability of misassignment of the degree of exposure to the reform. *Source:* The 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

have completed their compulsory schooling before the introduction of the post-communist education system in 1989/90. If they undertook post-compulsory education, individuals born between 1966 and 1975 were exposed to at least one year of education under the post-communist education system. Individuals born between 1976 and 1982 were exposed to at least a year of post-communist education during their compulsory schooling. Finally, individuals born after 1982 started school after the introduction of the post-communist education system.

The figure suggests that, although the educational attainment and labour market outcomes have in general improved over time, these outcomes have evolved very similarly for individuals born in Q1 or in Q4 of the previous calendar year since the 1960s. The latter indicates that the post-communist education reform had no large effects on labour market outcomes or human capital investments.

Table F.3
Effects of a placebo reform in 1962/63.

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
Q1 × In school	0.0029 (0.0039)	−0.0050 (0.0040)	−0.0021 (0.0030)
Q1	0.0042 (0.0027)	0.0058** (0.0028)	0.0016 (0.0022)
Observations	257,632	261,729	261,729
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effects of an additional year of exposure to a false reform in 1962. *Source:* The 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table F.4
Placebo analysis comparing individuals born in the second and third quarter of the same calendar year.

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
Q2 × In school	−0.004 (0.004)	0.005 (0.004)	0.003 (0.003)
Q2	−0.006** (0.003)	−0.003 (0.003)	−0.003 (0.002)
Observations	197,081	199,517	199,517
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-difference estimates of the effect of a placebo analysis assessing the effect of being born in the second quarter of the year relative to those born in the third quarter of the same year for cohorts in school at the time of the reform and not yet in school at the time of the reform. Individuals born in Q2 and Q3 within the same calendar year are equally exposed to the reform. *Source:* 2002 Polish census. Robust standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table F.5
Effect of the 1954–55 reform that removed ideology from educational curriculum (2002 Census): Wild bootstrapped standard errors clustered at the running variable level.

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
Q1 × In school	0.0142*** (0.003) [0.013]	0.0169*** (0.005) [0.099]	0.0115** (0.004) [0.068]
Observations	198,200	200,706	200,706
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effect of an additional year of exposure to the post-reform educational system on labour force participation, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the pre-reform educational system during compulsory education. *Note:* 2002 Polish census. Wild-bootstrapped standard errors based on 999 replications and Rademacher weights are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The estimated effects of the 1989/90 education reform are reported in [Table E.2](#) and reveal that the effect of a higher degree of exposure to the post-communist education system has statistically insignificant effects on human capital investments and labour market outcomes. While the coefficients measuring the effect of an additional year of exposure to post-communist education in Poland on the probability of completing secondary and tertiary education are small, the magnitude of the coefficient measuring the effect on labour force participation is sizeable, although statistically insignificant. Therefore, the latter results should be interpreted with caution, as the absence of statistical significance could be a result of limited statistical power due to the smaller sample size in the HBS database.

The lack of effect of the post-communist school reform in Poland contrasts with the beneficial effects of exposure to post-communist education in East Germany found in [Fuchs-Schündeln and Masella \(2016\)](#). One potential explanation for the different results could be that we are focusing on compulsory years of education (primary education and the initial years of secondary education), while [Fuchs-Schündeln and Masella \(2016\)](#) concentrate on secondary education. To make results more comparable, we also estimate the effect of exposure to an additional year of non-compulsory secondary education in the post-communist education system on human capital and labour market outcomes. In this analysis, we only include individuals who were old enough to have

Table F.6

Effect of the 1954/55 reform on education and labour force participation (Census data): With region of residence fixed effects.

	(1) Labour force part.	(2) Secondary educ.	(3) Tertiary educ.
Q1 × In school	0.0119*** (0.0030)	0.0157** (0.0050)	0.0106** (0.0038)
Q1	0.0120*** (0.0027)	0.0075*** (0.0012)	0.0013 (0.0008)
Observations	198,200	200,706	200,706
Cut-off of reference FE	YES	YES	YES
Sex	YES	YES	YES
Region of residence FE	YES	YES	YES

Note: This table reports the difference-in-differences estimates of the effects of an additional year of exposure to the post-reform educational system on labour force participation, the probability of completing secondary education and the probability of completing tertiary education relative to a year of education in the pre-reform educational system during compulsory education. The specification includes region of residence fixed effects.

Source: The 2002 Polish census. Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05,

* p < 0.1.

Table F.7

Effect of the 1954/55 reform (using Census data): regions with and without forced migration.

	(1) Labour force part.	(2) Labour force part.	(3) Secondary educ.	(4) Secondary educ.	(5) Tertiary educ.	(6) Tertiary educ.
Q1 × In school	0.0151** (0.0062)	0.0086 (0.0071)	0.0197*** (0.0063)	0.0130* (0.0070)	0.0116** (0.0046)	0.0113** (0.0053)
Q1	0.0113*** (0.0041)	0.0132*** (0.0046)	0.0074* (0.0040)	0.0073 (0.0045)	0.0040 (0.0029)	−0.0024 (0.0034)
Observations	108,073	90,127	109,272	91,434	109,272	91,434
Cut-off of reference FE	YES	YES	YES	YES	YES	YES
Sex	YES	YES	YES	YES	YES	YES
Sample: Regions with forced migration	YES	NO	YES	NO	YES	NO

Note: This table reports the difference-in-difference estimates of the effect of an additional year of exposure to the post-reform educational system on labour force participation, the probability of completing secondary education, and the probability of completing tertiary education relative to a year of education in the pre-reform educational system during compulsory education. The effects are estimated separately for regions with forced migration after World War II as described in Becker et al. (2020) and without forced migration. Note: 2002 Polish census. Robust standard errors are reported in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

completed tertiary education before the 1989/90 reform (those born between 1962–1965) and individuals still in post-compulsory education when the 1989/90 reform was implemented (individuals born between 1972 and 1975). The results of this analysis are reported in Table E.3. The estimates of the effects of exposure to an additional year of post-communist education during non-compulsory secondary school are small and statistically indistinguishable from zero at conventional confidence levels except for secondary education.³³

These results reassure the hypothesis that, unlike in East Germany, the education system that was in place in the 1980s in Poland did not have a strong negative effect in terms of human capital investments and labour market outcomes relative to post-communist education. We interpret these results in a context in which ideological indoctrinating contents in the Polish school curriculum in the 1980s were very limited.

Appendix F. Additional tables and graphs

See Fig. F.1 and Tables F.1–F.7

Appendix G. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.euroecorev.2023.104641>.

³³ To make estimates more comparable, we use individuals aged at least 24 when the reform was introduced. Most of these individuals were too old to be attending secondary or tertiary education when the reform was introduced, and as a result, their level of exposure to the reform is not influenced by their quarter of birth.

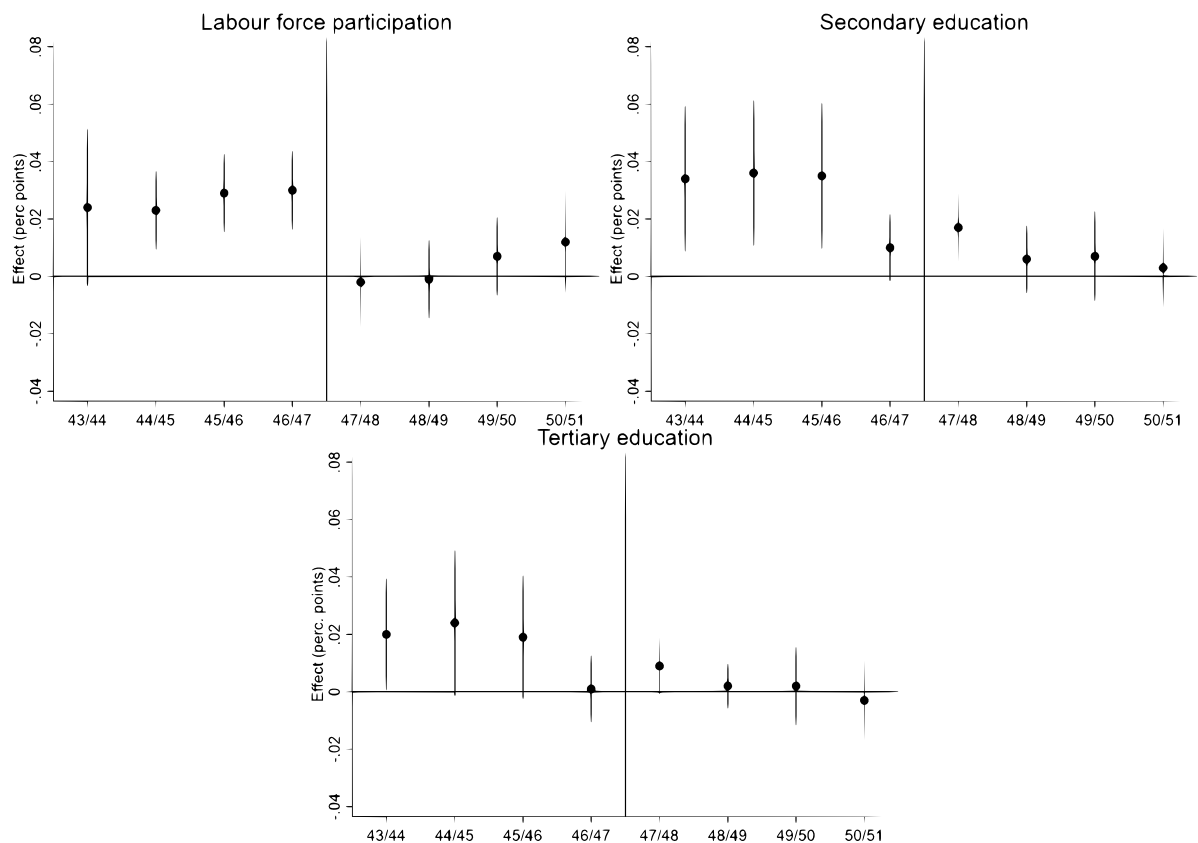


Fig. F.1. Effect of being born in Q1 relative to being born in Q4 of the previous calendar year by year of birth. *Note:* Figure reports the estimates of the effect of being born in Q1 relative to being born in Q4 of the previous year by year of birth. For those born between 1947 and 1951, all individuals are equally exposed to the reform regardless of their month of birth. For those born between 1943 and 1947, those born in Q1 have an additional year of exposure to the post-reform education system relative to those born in Q4 of the previous year. Data used is the 2002 Polish census.

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