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Access to education and political candidacy: Lessons from school openings in Sweden



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Keywords:	How does availability of education affect who becomes a political representative? Theorists have pointed out
Education	that access to education is a key to a well-functioning democracy, but few empirical studies have examined how
Political representation	changes in the access to education influence the chances of becoming a politician. In this paper, we analyze the
	effects of a large series of school openings in Sweden during the early 20th century, which provided adolescents with better access to secondary education. We use administrative data pertaining to the entire Swedish popu-
	lation born between 1916 and 1945. According to our empirical results, the opening of a new lower secondary
	school in a municipality increased the baseline probability of running for political office by 10-20%, and the
	probability of holding office by 20–30%.

1. Introduction

How can democracies ensure that the most suitable persons become political representatives? For classical enlightenment liberals such as Montesquieu, Condorcet, and Mill, the expansion of public education was key to a well-functioning democracy. Equal access to education was pictured as the most effective means of ensuring that the most suited men, and later women, could stand as political candidates.

Thomas Jefferson's famous plan for the establishment of public education in his home state of Virginia provides a good example of this line of reasoning. Among other things, Jefferson called for the creation of public grammar schools at the county level, at which the most gifted students could continue their studies after primary school, and urged that the location of these schools should "be as central as may be to the inhabitants of the said counties" (Jefferson, 1984, p. 369). By increasing the availability of post-primary education, Jefferson hoped to improve and enlarge the pool of talent from which the ruling class, the natural aristocracy, would be drawn and could be trained (Carpenter, 2013, p. 4). The provision of good public schools in close proximity to the children's homes was thus vital for securing the prosperity of democracy.

Despite the fact that many theorists, such as Jefferson, have made strong assumptions about the positive democratic effects of expanded educational opportunities, few empirical studies have examined whether access to education during adolescence is related to the likelihood of becoming a politician as an adult. This study seeks to address this shortcoming in the previous literature by studying if a series of school openings in Sweden, that provided youth growing up in less urban areas with better access to secondary schooling, increased their likelihood of seeking political office later in life. More precisely, we examine how better access to education affects both the likelihood of running for, and winning, political office.

The present study thereby relates to the large literature studying the relationship between education and political participation. Most of this literature has focused on political acts that are undertaken by many citizens, such as voting, protesting, and signing petitions, i.e., the emphasis has been on various types of mass political participation (Kam & Palmer, 2008; Nie, Junn, & Stehlik-Barry, 1996; Persson, 2015; Sondheimer & Green, 2010; Wolfinger & Rosenstone, 1980). Much less attention has been devoted to rarer forms of political participation, such as running for, or holding, political office (but see Lindgren, Oskarsson, & Dawes (2017)). The most important reason for the absence of research on this issue is the lack of adequate data. Given that political candidates constitute such a small fraction of the overall population, it is usually not possible to study political recruitment using traditional representative surveys. Another factor complicating research in this area is the difficulty of disentangling the effect of education from the effect of all other factors that may influence both educational choices and political activity (Kam & Palmer, 2008).

In this paper, we seek to overcome these problems by analyzing the expansion of the public education system in Sweden using unique

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administrative data pertaining to the entire Swedish population born between 1916 and 1945. More precisely, we use a difference-in-differences approach to analyze how the establishment of lower secondary schools in municipalities that previously only had primary schools affected the chances of the children in these municipalities to run for or hold political office as adults. To the extent that Jefferson and others were correct in assuming that the provision of public schools in close proximity to the children's homes would enlarge the recruitment pool for political positions, we should expect to observe more politicians among the cohorts that were young enough to enroll in the new schools. This is indeed what we find. According to our empirical results, the opening of a new lower secondary school in a municipality increased the baseline probability of running for political office by 10–20%, while the probability of holding office increased by 20–30%.

The article is structured as follows. First, we briefly discuss previous research on the relationship between education and political participation. We then present the necessary context for understanding our empirical case. Finally, we describe the data and methods, and analyze the empirical results.

2. Education and political participation

What motivates citizens to run for office? According to Fox and Lawless (2005, 2014), individuals' potential interest in office-seeking can be summarized by the concept of "nascent ambition". Factors such as political socialization early in life, personality traits, and ideological motivation influence a person's nascent ambition. However, nascent ambition does not by itself determine whether a person runs for office. Whether one's nascent ambition develops into a political candidacy depends on how favorable the context is. Schlesinger (1966) labeled the context that potential candidates face as the "political opportunity structure". The opportunity structure determines whether a nascent ambition develops into an expressive ambition. Factors such as the number of open seats, and the partisan composition of the electorate, are characteristics of the opportunity structure that influence how hospitable the context is for potential candidates (Lawless, 2012).

A consistent finding in the research on political representation and legislative recruitment is that educational attainment is strongly related to the probability of running for, and holding, political office (Aberbach & Putnam, 1981; Carnes, 2013; Cotta & Best, 2007; Matthews, 1984; Norris, 1997). Sweden is no exception in this regard (Persson, Bäck, Vernby, & Wockelberg, 2009).

The findings in this literature relate to a more general discussion about the relationship between education and political participation (Persson, 2015). Scholars who argue that there is a causal link between education and political participation discuss two possible causal mechanisms. First, a 'cognitive pathway' may mediate an effect of education on political activity (Campbell, 2009). According to this view, education can increase civic skills and cognitive abilities (Condon, 2015; Jackson, 1995). These factors may, in turn, increase political efficacy and the nascent ambition to run for office, and thereby bring the positive consequences that Jefferson and others anticipated. Moreover, being educated may help a potential candidate appear more competitive (Card, 1999). In line with this logic, studies of leader competence routinely use education as a proxy for the skill level of candidates (Kotakorpi & Poutvaara, 2011). However, education may also influence an individual's position within the political opportunity structure. By increasing a person's social status, education can give access to networks that encourage participation, and increase the likelihood of getting recruited. In previous research on political participation, this is referred to as the 'positional pathway effect' (Campbell, 2009; Nie et al., 1996; Persson, 2014a; Tenn, 2005).¹

In the last decade, scholars have used increasingly sophisticated research designs to gauge whether political participation is causally related to educational attainment. The designs used include techniques such as matching (Henderson & Chatfield, 2011; Kam & Palmer, 2008; 2011; Mayer, 2011; Persson, 2014b), instrumental variable estimation (Berinsky & Lenz, 2011; Dee, 2004; Milligan, Moretti, & Oreopoulos, 2004), and field experiments (Sondheimer & Green, 2010). The methodological advances notwithstanding, the results from these studies point in different directions, and there is still no consensus on whether education causes political participation.

Most of these studies have, however, focused on what we previously labeled mass participatory acts, such as voting, or attending demonstrations and political meetings. Studies with a credible identification strategy for estimating the causal effects of education on political acts such as running for, or holding, political office are still largely lacking. The study by Lindgren et al. (2017), which examined how a compulsory school reform launched in the 1950s affected the likelihood of political candidacy in Sweden, is, however, an important exception. The authors of that study showed that the compulsory school reform did not have any overall effect on the likelihood of running for office among the affected individuals. However, they also showed that the increased educational opportunities positively affected the likelihood of running for office among individuals from disadvantaged backgrounds. Although the current study is situated in the same national context, and focus on similar outcomes, there are nevertheless important differences between the two studies. Most importantly, the two studies examine the effects of different types of education. Whereas Lindgren et al. (2017) study the effects of lengthening compulsory schooling, this study examines the effects of improving access to non-compulsory education. In addition, the cohorts studied in this paper were born considerably earlier at a time when educational opportunities in Sweden were still limited. Consequently, the current study complements that of Lindgren et al. (2017) by studying the effects of changes in a different part of the educational distribution. Given that there are reasons to believe that the effects of interest may differ across various types of education, this is an important addition. One drawback of studying older cohorts, however, is that we lack information on family background, which means that we will not be able to analyze heterogeneous effects in the same way as Lindgren et al. (2017). We will return to the relationship between the findings in these two studies in the conclusion.

3. The expansion of Swedish education

At the beginning of the 20th century, the Swedish educational system was still of a very elitist nature. Education beyond the primary level, which then amounted to six years of mandatory schooling, was mostly a prerogative of the children of the upper echelons of the society. In 1905, an attempt was initiated to broaden access to post-primary education by splitting the existing secondary schools, the grammar schools, into two tiers (the lower and the upper secondary level). The pupils could then earn a lower secondary certificate (realskoleexamen) after nine years of schooling or an upper secondary certificate (studentexamen) after an additional three years.

From 1910, lower secondary education could be obtained from two types of schools; state-run grammar schools, mainly located in larger towns, and municipal middle schools. The latter type of schools were run by the municipalities, but were subject to inspection by central school authorities and received state grants to cover part of their costs. The pupils could enter the municipal middle schools after six years of primary school, i.e., typically at the age of 13, and qualify for a lower secondary certificate after four years of studies.

In 1927, a large school reform was implemented in an effort to improve and equalize access to secondary education. One important aspect of this reform was that it granted girls access to all state-run grammar schools, which they did not have before. Moreover, in order to provide better educational opportunities for children in rural areas, it

¹ See Persson (2015) for an extended overview of the literature on education and political participation.



Fig. 1. The expansion of secondary education for cohorts born 1905–1945. *Note:* The data on the number and the location of the lower secondary schools have been collected by the authors.

was also decided that a large number of municipal middle schools should be gradually transformed into state-run grammar schools. This latter decision marked the beginning of a new practice, in which new state-run lower secondary schools were developed out of pre-existing municipal middle schools. In the short term, the decision meant that the provision of secondary education became less dependent on local political support. In the longer term, the improved opportunities for converting municipal middle schools into state-run grammar schools increased the incentives for municipalities to establish municipal middle schools (by reducing the fiscal responsibilities of the municipalities).

During the 1930s and 1940s, the expansion of the lower secondary school system became the main instrument for increasing educational equality in Sweden. After years of internal debate, the ruling Social Democratic party had settled on what Lindensjö and Lundgren (2000) call an "elitist view of educational equality". That is, the aim of education policy should not be to force all children to attend the same school, but to provide all children with equal opportunities to attend different schools. A central strategy for realizing this goal was to support the establishment of new lower secondary schools in less urbanized areas of the country.

To judge from Fig. 1, these efforts were at least partly successful. The solid line shows how the number of municipalities with lower secondary schools increased during the first half of the 20th century. When the cohort born in 1905 was ready to enter secondary education (in 1918), lower secondary schools were available in 124 (out of 2500) municipalities, whereas that number had increased to 257 for the cohort born in 1945.²

As can be seen from the figure, the opening of these new schools greatly reduced the average distance to the nearest lower secondary school. When the children born in 1905 started lower secondary school, the average distance to the nearest school was almost 18 km. Forty years later, the corresponding figure was just over 6 km.

The opening of new schools, therefore, made secondary education considerably more accessible to pupils growing up outside the urbanized areas. Based on previous research, we should expect educational attainment to increase with better access to education, but the question to be answered here is if the school openings also affected the likelihood of children in these municipalities to pursue a political career as adults. That is, we will use the *timing* of school openings to try to determine whether education is causally related to political candidacy. Section 4 explains how we do this.

4. Empirical strategy

This study relates to a growing literature, initiated by Card (1995), that uses geographic differences in the accessibility of educational institutions as a source of exogenous variation (see Öckert (2012) for an overview). The basic idea underlying this approach is that children who live at a long distance from post-primary schools are less likely to continue further studies, since commuting (or moving) is costly in terms of time and money. A bulk of research has shown empirical support for this assumption (Card, 1995; Frenette, 2004; Holzer, 2009; Kjellström & Regnér, 1999; Oppedisano, 2011; Öckert, 2012).

Distance to educational institutions has also been used in order to test the effects of education on various societal outcomes. For instance, Currie and Moretti (2003) used availability of colleges in a woman's home county as an instrument to test the effect of maternal education on the health of newborn children. Frenette (2009) studied how the establishment of new universities affected geographical mobility and employment, and Duflo (2001) exploited school constructions in Indonesia during the 1970s to show that educational expansion led to an increase in wages. Finally, and more closely related to the current study, Dee (2004) examined how proximity to junior and community colleges affected voter turnout and civic attitudes.

A criticism of the attempts to apply this approach to cross-sectional data is that schools are not allocated in a random manner. Children growing up close to schools may be systematically different from those brought up in more distant places (Cameron & Taber, 2004; Carneiro & Heckman, 2002; Frenette, 2009). For instance, if well-educated parents are more likely to settle in places where post-primary schools are located, an observed correlation between school proximity and educational attainment could potentially be driven by family background. To mitigate this risk, some studies have instead utilized time-varying data to estimate the impact of school openings (Currie & Moretti, 2003; Frenette, 2009; Oppedisano, 2011).

In close correspondence with these latter studies, our empirical analysis will rely on the following empirical specification:

 $^{^{2}}$ Here we assume that the starting age of lower secondary school was 13 years, although pupils in the state-run grammar school entered the lower secondary level at the age of 10 before the reform in 1927.

$$Y_{icm} = \gamma S_{cm} + \beta' X_{icm} + \Gamma' W_{cm} + \delta_c + \eta_m + \epsilon_{icm}, \tag{1}$$

where Y is the dependent variable in question for an individual i from birth cohort c that grew up in municipality m. In the analysis, we focus on two main outcomes: a dummy indicator for running for political office, and a dummy indicator for winning office. In order to test the extent to which school openings affected the individuals' educational choices, we will also present results for two additional outcomes: years of schooling, and a dummy indicator for having some post-primary education.

The variable *S* denotes our preferred indicator of school availability/proximity. For the main analysis, this will be a dichotomous measure indicating the existence of a lower secondary school in the home municipality when an individual finished primary school, but we will also use the distance to the nearest lower secondary school as a robustness check. As the specification includes both cohort and municipality specific effects (δ and η), we obtain a difference-in-difference set-up, where the effect of school availability is identified from the timing of school openings.

To justify this approach, it can be noted that the opening of a new school in a municipality was often preceded by a long and complicated political process involving actors from different levels of the political system. Among other things, the establishment of a new school required the existence of local political entrepreneurs, the availability of suitable school buildings, and the approval of the National Board of Education. Consequently, whereas both the local demand for education and municipal finances were important factors affecting the decision to open up a lower secondary school in a municipality, we believe that the exact timing of school openings was subject to considerable random fluctuation.

Yet, since we utilize a difference-in-difference set-up, our identification rests on the common trend assumption, i.e., we have to assume that in the absence of any school openings, the trends in education and political candidacy would have followed the same paths in the municipalities in which a lower secondary school was established as in those where no such schools were opened. This assumption may fail to hold if other factors that affect educational attainment and political candidacy change at the time of the school opening. Assume for instance that particular municipalities, for some reason, experienced a greater shift in the socioeconomic composition of different cohorts than others, and that this affected the demand for education. To the extent that the location of new lower secondary schools was determined by the local demand for education, meaning that new schools were more likely to be located in areas with increasing demand, this could invalidate the common trend assumption.

To mitigate this risk, the specification in Eq. (1) allows for timevarying controls. Above all, W includes controls for various municipal characteristics, e.g., municipality-level voter turnout, vote shares for the largest parties, and the size of the electorate. These indicators are measured at the time an individual was old enough to leave primary school.³ An alternative means for addressing this problem is the use of municipality specific time trends. As argued by Wolfers (2006), the inclusion of such trends can, however, come at the cost of controlling away the reform effect of interest, especially in cases where it takes some time for a reform to reach its full potential. A reasonable compromise, preferred by many scholars, is therefore to control for prereform rather than overall trends in the data (Holmlund, 2007; Kleven, Landais, Saez, & Schultz, 2014). We will follow this approach and construct municipal trends by extrapolating estimated trends for the pre-opening years to the post-opening period. This assures that our municipality specific trends do not accidentally capture the reform effect of interest.

5. Data

We will study how education supply affects political candidacy by looking at openings of lower secondary schools occurring between 1935 and 1955. For practical reasons, we will sometimes refer to municipalities where a school was opened as 'treated' municipalities, and those were no schools were opened as 'controls'. The main reason for starting with the openings in 1935 is data availability, but beginning there also reduces the risk that the effect of openings is conflated with the process of women gaining access to the public grammar schools (as mentioned above, women had restricted access prior to 1928). The end date of 1955 is due to the decision to implement a new comprehensive school system in Sweden in the 1950s. The initiation of this school reform signaled the gradual dismantling of the old system with a lower secondary stage, which meant that very few new lower secondary schools were opened after the mid-1950s, and it is thus not feasible to continue to study the effects of school openings after this point. Moreover, all cohorts that were affected by the compulsory school reform are excluded from the analysis.

To keep the analysis as clean as possible, we will use municipalities which lacked upper secondary schools during the entire study period as a control group. This means that we will drop all municipalities that established upper secondary schools before 1935 from the analysis.⁴

The new lower secondary schools that opened during our study period were all of the four-year type, which meant that pupils could transfer to these schools after six years in primary school. We should thus assume that the pupils were 13 years old when entering these schools. However, since the minimum school-leaving age was 14, it seems likely that the opening of a new school also affected the schooling decisions of the 14 years olds.⁵ We will therefore consider an individual as treated by the school opening if he or she was aged 14 or less the year a secondary school opened in the home municipality.⁶

Consequently, the first individuals affected by the openings in 1935 were born in 1921, whereas the first cohort affected by the openings in 1955 was born in 1941. A problem with this is that there can be a difference of more than 20 years between treated and untreated cohorts within a municipality, which raises concerns about the comparability of the groups. To mitigate this problem we limit our focus to individuals that were between 10 and 19 years old during the year the school was opened in the affected municipalities. That is, we use a five-year window around the first affected cohort in these municipalities. For instance, if a new school was opened in 1935, the first cohort included would be born in 1916 (aged 19 in 1935), and the last cohort included would be born in 1925 (aged 10 in 1935). For municipalities in which a new school opened in 1936, we include the cohorts born between 1917 and 1926, and so on. Since our sample is restricted to individuals that were affected by school openings between 1935 and 1955, the youngest cohort included would be born in 1945 (aged 10 in a municipality in which a lower secondary school was established in 1955). Thus, in the affected municipalities, our sample consists of individuals born between 1916 and 1945, with the restriction that they should be born within five years of the first affected cohort in the municipality. For the other municipalities - in which no school was opened during the study period - we instead include all individuals born between 1916 and 1945 in the sample.⁷

 $^{^{3}}$ In addition, *X* in Eq. (1) captures pre-determined individual characteristics such as gender and immigration background. See the Appendix for more details on all variables included in the empirical models.

⁴ However, in the Appendix we show that we obtain very similar results if we instead use the municipalities that had lower secondary schools prior to 1935 as the control group.

 $^{^5}$ In Fig. A2 in the Appendix, we present empirical evidence that indicates that this was indeed the case.

⁶ We code home municipality according to the municipal borders of 1960, which means that we have 1029 municipalities in our data.

⁷ To keep the assignment of treatment and control status as clean as possible, the small number of municipalities that opened a lower secondary school between 1956 and 1959 were excluded from the analysis.

To obtain information on our main dependent variables, we matched the individuals in our sample with the Register of Nominated and Elected Candidates. The register contains information on all nominated and elected candidates in the ten parliamentary, county council, and municipal elections in the period 1982–2014 (information on candidacy earlier than 1982 is not available in the registers).⁸ Based on the information in this register, we construct two outcome measures: a dummy indicator for having run for office at least once during the ten elections, and a corresponding dummy indicator for getting elected.

Two things are worth noting with respect to these outcome measures. First, the variation in our measures of running for and winning political office is largely driven by candidates at the municipality level. who make up approximately 80% of the total number of cases. Second, the older cohorts included in our data were already quite old during the first election for which we have data. For instance, those born in 1916 were 66 years old in 1982. It is, therefore, important to note that political candidates in Sweden are often rather old. Looking at the elections from 1982-2014, we can see that nomination probabilities at age 65 are comparable to those at age 35 (see Fig. A1 in the Appendix). With that said, the probability of being nominated is, indeed, substantively lower for the oldest cohorts in our data. Whereas the overall nomination probability is about 1.5% for the oldest treated cohort, i.e., those born in 1921, the corresponding figure is three times as large for those born in the mid-forties. However, these differences in levels should not affect our school opening estimates, since the cohort specific effects included in Eq. (1) will absorb any differences between cohorts. When interpreting our results it is, nevertheless, important to remember that they will capture the long-run, rather than the short-run, effect of improved educational opportunities.

We also matched the individuals in the sample to administrative registers with information on demographic characteristics and educational attainment.⁹ Moreover, to mitigate the risk that our results are driven by changes in municipality-specific factors, we also control for a set of time-varying factors including municipality-level voter turnout, vote shares for the main parties, and the size of the electorate the year the individuals turned 13.¹⁰

Finally, to measure school openings, we gathered information on the location of all lower secondary schools in Sweden during the period 1905 to 1966 using several official sources.¹¹ As mentioned above, an individual is defined as exposed to the school opening if he or she was aged 14 or less during the year a secondary school opened in his or her home municipality. Unfortunately, information on the individuals' current home municipalities is only available from the censuses of 1960 and onwards. Therefore, we need to proxy the home municipality at the time of the school opening. For individuals born between 1932 and 1945, and whose parents can be identified via the Multi-Generation Registry, we use information on the parents' home municipality, according to the census of 1960, on the assumption that the parents did not move to a new municipality after the child turned 14. For the older individuals, for which we lack parental information, we instead use their birth municipality and assume that they did not move to a new municipality before they turned 14.¹²

In the period from 1935 to 1955, the number of municipalities with lower secondary schools increased from 175 to 252, i.e., schools became available in 77 additional municipalities. Fig. 2 illustrates the geographical distribution of the lower-secondary schools that were established before and after 1935. As can be seen, there were new schools opened in most parts of the country, although openings were slightly more common in northern Sweden. The 77 municipalities that received a lower-secondary school between 1935 and 1955 were located in 21 different counties, i.e., it was only in 4 out of 25 counties that there were no treated municipalities. For the individuals living in the municipalities that received a new school, the distance to the nearest school was reduced by more than 30 km as a result of the openings (see Fig. A3 in the Appendix).

Table 1, finally, reports descriptive statistics separately for the whole sample of individuals included in the main analysis (column 1), the candidates (column 2), and those elected (column 3). As can be seen, about 3% of our sample ran for office at least once during the period 1982–2014, and 1% was elected. By comparing across columns, we can see that politicians in these generations are slightly younger, better educated, less often immigrants, and more likely male than the population as a whole. From the lower part of the table, we can see that the individuals in the three groups seem to have been brought up in rather similar municipalities.

6. Empirical results

Our initial analyses will proceed in two steps. First, we provide a simple graphical illustration of how the openings of new schools relate to educational attainment and political activity, and then we move on to the regression analysis.

Fig. 3 displays the trends in educational attainment and political activity in treated (solid lines) and control (dashed lines) municipalities.¹³ In the treated municipalities all individuals who were below age 15 at the time of the school opening had access to lower secondary schooling in their home municipality, whereas those 15 or older had to travel outside their home municipality to attend lower secondary education.

In line with our expectations, we observe a clear trend shift in educational attainment when a new school is opened. For the preopening cohorts (those 15 years and older), individuals growing up in treated municipalities, had on average 0.1 more years of schooling (the upper left graph) and were one percentage point more likely to pursue some form of post-primary education (the upper right graph). For the post-opening cohorts, the corresponding figures are about 0.2 years, and 2.5 percentage points, respectively. Taken at face value, these graphs thus suggest that the opening of a lower secondary school in a municipality increased average years of education by 0.1 years and the likelihood of attending post-primary education by around 1.5 percentage points.

Although the data for the political outcomes are more noisy there is evidence of a similar trend shift for these outcomes as well. The shift is particularly pronounced for the probability of getting elected to political office (the lower right graph). For the pre-opening cohorts, the probability of getting elected is virtually the same for individuals

⁸ All three elections – the national and the two regional (county- and municipal-level) elections – are held simultaneously in September every three (until 1994) or four (after 1994) years. The data for the 1980s were collected by Olle Folke and Johanna Rickne.

⁹ See the Appendix for additional details on these registers and variables.

¹⁰ We use political indicators as year-by-year indicators of socioeconomic development at the municipal level are only available for more recent timeperiods. However, previous research has shown that aggregate level turnout and party vote share in Sweden are highly correlated with more direct measures of socioeconomic development (Elinder, 2010). To create the year-by-year indicators, we interpolated turnout, vote shares and electorate size between the election years.

¹¹ We thank Maya Santimano for helping us obtain this information. In the Appendix we provide further details on the construction of the school indicator.

 $^{^{12}}$ Using data from the 1960 census to study early age mobility for the cohort born in 1947, we find that two-thirds remain in their municipality of birth, and four-fifth in their county of birth, at the age of 13.

¹³ To deal with the fact that the schools were opened in different years in different municipalities, we first constructed separate graphs for each opening year (1935–1955), which were then aggregated into one graph by proportional weighting of the averages in the individual subgraphs. The weights assigned to each subgraph represent the number of individuals used to construct that subgraph so that subgraphs based on more individuals were weighted more heavily.



Fig. 2. Municipality map.

growing up in treated and control municipalities, but for the postopening cohorts, the probability of winning political office is between 0.1–0.3 percentage points higher among those growing up in the treated municipalities. The pattern is admittedly somewhat less clear with respect to running for office (the lower left graph), but if we are prepared to disregard the observation for those that were 13 years old at the time of the school opening as a partial outlier, we see that the differences in nomination probabilities between individuals growing up in treated and control municipalities were decreasing in the preopening period, and increasing in the post-opening period.

The simple graphical evidence reported in Fig. 3 is thus consistent with the view that the opening of new schools helped to boost both educational attainment and political activity. The graphs also lend some credibility to the crucial parallel trend assumption underlying our difference-in-difference approach. It is only for the running for office outcome that this assumption appears somewhat dubious. It is important to note, however, that the probability of running for office was increasing at a slightly faster rate in the control municipalities during the pre-opening period. Thus, if anything, the simple difference-in-difference model is likely to underestimate the effect of school openings on the likelihood of running for office. This being said, we will, however, also attempt to address this problem by controlling for time-varying municipal characteristics, as well as municipality specific trends estimated on pre-opening data.¹⁴

Table 1	
Descriptive	statistics

	All	Nominated	Elected
Individual level variables			
Birth year	1930.0	1934.2	1934.4
	(8.8)	(7.9)	(7.7)
Female (%)	50.3	33.8	30.0
	(50.0)	(47.3)	(45.8)
Immigrant background (%)	1.5	2.3	2.4
	(12.0)	(14.8)	(15.2)
Years of schooling	9.1	10.7	11.0
	(2.7)	(3.1)	(3.2)
Post-primary education (%)	35.6	58.1	62.7
	(47.9)	(49.3)	(48.4)
Nominated (%)	3.3	100.0	99.8
	(17.9)	(4.8)	(0.0)
Elected (%)	1.0	28.5	100.0
	(9.7)	(45.2)	(0.0)
Municipality level variables measured at age 13			
Voter turnout (%)	72.6	74.3	74.5
	(8.2)	(8.0)	(8.0)
Size of electorate (1000s)	3.1	3.1	3.2
	(1.8)	(1.8)	(1.9)
Vote share – Right party (%)	14.6	14.0	13.6
	(9.1)	(8.1)	(7.8)
Vote share – Liberal party (%)	15.3	17.2	16.4
	(9.6)	(10.2)	(9.6)
Vote share – Center party (%)	23.8	23.5	23.3
A V · · ·	(13.7)	(13.5)	(13.6)
Vote share - Social democrats (%)	41.6	41.2	42.4
	(14.7)	(14.4)	(14.5)
Vote share – Communist party (%)	5.8	5.2	5.6
	(8.9)	(8.6)	(9.0)
School in municipality (%)	2.4	3.2	3.4
	(15.4)	(17.7)	(18.1)
Observations	1,186,396	39,438	11,282

Notes: Entries are means, SD in parentheses.

7. Difference-in-difference results

Table 2 presents the results from a set of OLS regression models. To make sure that the openings had the expected effect on educational attainment, the upper two panels display results from models in which years of schooling and a dummy for post-primary education are regressed on a dummy indicating school availability. The two lower panels provide the results for the political outcomes. All models include controls for gender and immigration status and the standard errors allow for clustering at the municipality level.

Starting with the first column of the table, which reports results from a regression controlling for birth-year and municipality-fixed effects, we find that the opening of a lower secondary school in a municipality increased total schooling by 0.13 years, and increased the probability of obtaining at least some type of post-primary education by 2.1 percentage points.¹⁵ However, as discussed in the Empirical strategy section, the key assumption underlying our identification strategy is that no other important municipal factors affecting the outcomes of interest change around the time of the school opening. To investigate the validity of this assumption, we control for a set of time-varying factors in column 2, including municipality-level voter turnout, vote shares for the main parties, and the size of the electorate the year

¹⁴ To construct these trends, we regress the outcome of interest on a full set of municipality and cohort fixed effects, as well as a linear interaction term

⁽footnote continued)

between municipality and cohort. In order to obtain sufficient precision, we include all pre-opening cohorts born 1916–1945 when estimating these trends. ¹⁵ The magnitude of these effects are comparable to the estimates reported in Holmlund (2007) regarding the impact of the large Swedish compulsory school reform implemented in the 1950s and 1960s. This reform, which, among other things, extended compulsory schooling from seven to nine years, led to an average increase in schooling amounting to 0.19 years, and a one percentage point higher probability of obtaining at least some post-compulsory education.



Fig. 3. Pre- and post-opening trends. Note: Solid lines denote the development in municipalities where a lower secondary school was opened and the dashed lines the development in municipalities where no schools were opened.

 Table 2

 The effect of school openings on educational attainment and political participation.

	(1)	(2)	(3)
Panel A. Years of schooling			
School in municipality	0.13***	0.11***	0.09**
	(0.03)	(0.03)	(0.04)
Panel B. Post-primary educat	ion		
School in municipality	2.10***	1.74***	1.44***
	(0.45)	(0.45)	(0.62)
Panel C. Nomination			
School in municipality	0.28*	0.32**	0.52***
	(0.15)	(0.15)	(0.21)
Panel D. Election			
School in municipality	0.19**	0.19**	0.30**
	(0.09)	(0.09)	(0.10)
Municipal controls	Yes	Yes	Yes
Municipal trends	No	No	Yes
Observations	1,186,396	1,186,396	1,186,396
% Nominated	3.32	3.32	3.32
% Elected	0.95	0.95	0.95

Notes: Results from OLS regressions. All models include controls for sex, immigration background, municipality-fixed effects, and birth-year fixed effects. The two models on nomination and election also include a control for the seatsto-voters ratio. Municipality controls include voter turnout, size of the electorate, vote shares for the Communist party, the Social democrats, the Center party, the Liberal party, and the Right party, measured at the time the individuals were 13. Standard errors, shown in parentheses, allow for clustering at the municipality level. ***/**/* indicate significance at the 1/5/10% level.

the individuals turned 13. It is comforting to note that the effect of school availability decreases only slightly as the municipality-level controls are added to the models.

Nonetheless, it could still be the case that trends in other unobserved variables affect our estimates. In Column 3, we therefore add (predicted) municipality specific trends to the data. As can be seen, the estimated effects decrease somewhat when relaxing the common trend assumption, but they still remain of substantive importance and statistically significant. To judge from these results, the opening of a new lower secondary school increased overall educational attainment by about a month, and increased the probability of pursuing post-compulsory education by close to 1.5 percentage points.

Even more importantly, the results presented in panels C and D of Table 2 indicate that the openings also had a long-term impact on political candidacy in the elections between 1982 and 2014. In order to simplify interpretation, the effects are presented in terms of percentage points and the baseline probabilities (in percentage points) for standing as a candidate and winning office are provided at the bottom of the table. We also include a linear control for the ratio of municipality assembly council seats to the size of the electorate in the individual's current home municipality among the regressors.¹⁶ The reason for controlling for this variable is that we want to adjust for the fact that the size of local assemblies does not increase proportionally to the size of the electorate (Dancygier, Lindgren, Oskarsson, & Vernby, 2015). Consequently, if obtaining more education makes it more likely that an individual moves to a larger municipality with a smaller seats-to-voters ratio as an adult, and therefore has a lower chance of both standing as a candidate and winning office, we do not want this to affect our school opening estimates.

Looking first at the estimates for the probability of standing as candidate we find a positive and statistically significant effect of school availability. The opening of a new secondary school in the municipality is estimated to increase the probability of being nominated for political office by about 0.3 percentage points. This effect increases somewhat when adding municipal level controls (column 2) and municipal trends (column 3) to the model. The estimated effects reported in columns 1–3, correspond to a relative increase of 10–15% when compared

¹⁶ The seats-to-voter ratio is measured as the average ratio for an individual across the nine local elections between 1982 and 2010. Note that the number of seats in different municipalities are very stable over time and are primarily determined by population size.

to the average nomination probability.¹⁷

Turning to the estimates for winning office we find even larger effects. To judge from the results in columns 1–3 the opening of a new secondary school is estimated to have increased the likelihood of getting elected to political office by 0.2–0.3 percentage points, which represents an increase of 20–30% of the baseline probability for this outcome.¹⁸

To judge from these results, the opening of a lower secondary school in a municipality seems to have increased the likelihood of becoming a politician later in life among the cohorts that were young enough to enroll in the new school. The size of the effect may seem small at first glance, but an increase in the average probability of nomination and election by 10–30% is in fact quite substantial.

8. Additional analyses

The results presented above support the idea that education is conducive to political candidacy. However, before drawing any firm conclusions, we need to further assess the sensitivity of these findings.

The most important modeling assumption invoked in the analysis is the previously discussed common trend assumption. Although the simple descriptive analysis presented in Fig. 3 provided some tentative support for the tenability of this assumption, it nevertheless warrants some additional attention.

In Table 3, we therefore add a large number of pre-opening lags to our main specification (year t - 1 is used as the reference category). The coefficients of these lags will indicate whether the outcomes of interest followed different trajectories in the treated and control municipalities even before the schools were opened. We estimate the model both without (columns 1a and 2a), and with (columns 1b and 2b) municipal trends.

As can be seen, the coefficients of the pre-opening lags do not show any systematic pattern, and they fail to reach conventional levels of statistical significance. Moreover, the point estimates of the school availability indicator are only marginally affected by the inclusion of the pre-opening lags, although the coefficients for the effects on nomination turn statistical insignificant due to the decrease in statistical precision. At the bottom of the table, we report the p-values for a test of the joint significance of the pre-opening lags. In none of the models can we refute the null hypothesis that the coefficients of the lags are all equal to zero. We find similar results for the educational outcomes (see Table A9 in the Appendix).

The previous analysis also rests on a number of other modeling assumptions that we examine in Table 4. For instance, we have assumed the 14-years olds to be affected by the school openings, despite the standard enrollment age for lower secondary school being 13. In columns 1a and 2a of the table, we show that the results remain very similar if we exclude the 14-years olds from the analysis.

To examine the sensitivity of our results with respect to the decision to measure access to education at the municipality level, columns 1b and 2b present results when school availability is instead measured at the parish level (on average, a municipality included 2–3 parishes). That is, the school indicator now takes on the value of 1 for individuals having access to a lower secondary school in their home parish, and the municipality fixed effects have been replaced by parish fixed effects. As can be seen, this change does not affect the substantive findings.

Selective mobility constitutes another potential threat to our identification strategy, i.e., if more resourceful and politically active parents

Table 3	
Results with pre-opening lags	

	Nomination		Election	
	(1a)	(1b)	(2a)	(2b)
School in municipality	0.37	0.46	0.25*	0.30**
	(0.29)	(0.32)	(0.14)	(0.15)
Lag t - 2	-0.10	-0.18	0.10	0.04
	(0.38)	(0.35)	(0.17)	(0.17)
Lag t - 3	-0.05	-0.14	0.03	-0.03
	(0.31)	(0.29)	(0.17)	(0.16)
Lag t – 4	0.08	-0.05	-0.06	-0.14
	(0.34)	(0.33)	(0.17)	(0.16)
Lag t — 5	0.30	0.11	0.24	0.13
	(0.31)	(0.24)	(0.18)	(0.16)
Municipal controls	Yes	Yes	Yes	Yes
Municipal trends	No	Yes	No	Yes
P-value lags	0.54	0.75	0.41	0.53
Observations	1,186,396	1,186,396	1,186,396	1,186,396

Notes: Results from OLS regressions. All models include controls for sex, immigration background, seats-to-voters ratio, municipality-fixed effects, and birth-year fixed effects. Municipality controls include voter turnout, size of the electorate, vote shares for the Communist party, the Social democrats, the Center party, the Liberal party, and the Right party, measured at the time the individuals were 13. Standard errors, shown in parentheses, allow for clustering at the municipality level. ***/**/* indicate significance at the 1/5/10% level.

tend to locate in municipalities with better educational opportunities, this could bias our results. In an attempt to mitigate this problem, columns 1c and 2c present results from a two-stage least-squares (2SLS) model, where municipality of birth is used as an instrument for home municipality at age 13. This should considerably reduce the problem of selective mobility, as it requires parents to be very far-sighted and have information on the location of the new schools more than 10 years before they were first opened (which does not appear particularly likely). It is thus comforting to note that the 2SLS results, were school availability in the municipality of birth is used as an instrument for school availability in the home municipality at age 13, are well in accordance with those of our main specification.¹⁹

Yet, it may still be the case that better access to education is more important for some groups than for others. In particular, there is plenty of evidence that factors such as gender and family background may affect both educational investments and the various returns from these investments (Lindgren, Oskarsson, & Persson, 2019). In Table 5, we therefore present the results from some simple heterogeneity analyses.

The first two columns of the table display separate effects by gender. The results show that the positive effect of school openings on political candidacy is almost entirely driven by the male subset of the sample.

Unfortunately, we lack information on parental characteristics for most individuals in our sample, which precludes separate analyses by individual family background. Instead, we present separate results for individuals growing up in working-class parishes (column 3), and non-working class parishes (column 4). A working-class parish is defined as a parish with an above average share of blue-collar workers.²⁰ As can be seen, the effect of school openings seems to be concentrated to individuals growing up in parishes dominated by blue-collar workers. This could suggest that it is only among individuals from disadvantaged social-backgrounds that improved educational opportunities increased

 $^{^{17}}$ Alternatively, we may relate the size of these effects to the difference in the nomination probability for males and females, which in this sample is about 2 percentage points. That is, the school opening effect is about 20–25% of the gender effect.

¹⁸ This amounts to approximately one third of the gender difference in election probabilities, which in this sample is approximately 0.7 percentage points.

 $^{^{19}\,\}rm{Similar}$ robustness checks for educational attainment are presented in Table A10 in the Appendix.

²⁰ More precisely, the classification is based on occupational information in 1960 for those born between 1910–1915 (who are too old to be included in our analysis). If the share of blue-collar workers among these cohorts is above (below) average this parish is classified as a working (non-working) class parish. Farmers and self-employed persons are excluded when calculating these shares.

Table 4

Robustness checks.

	Nomination	Nomination			Election		
	(1a)	(1b)	(1c)	(2a)	(2b)	(2c)	
School	0.61***	0.55**	0.53**	0.29***	0.29**	0.28***	
	(0.23)	(0.22)	(0.21)	(0.11)	(0.12)	(0.10)	
Municipal controls	Yes	Yes	Yes	Yes	Yes	Yes	
Municipal trends	Yes	Yes	Yes	Yes	Yes	Yes	
Including 14 year-olds	No	Yes	Yes	No	Yes	Yes	
School location	Mun.	Parish	Mun.	Mun.	Parish	Mun.	
Estimator	OLS	OLS	2SLS	OLS	OLS	2SLS	
Observations	1,180,637	1,186,396	904,849	1,180,637	1,186,396	904,849	

Notes: Results from OLS regressions. All models include controls for sex, immigration background, seats-to-voters ratio, and birth-year fixed effects. Model (1) includes municipality fixed effects, model (2) parish fixed effects, and (3) municipality of birth fixed effects. Municipality controls include voter turnout, size of the electorate, vote shares for the Communist party, the Social democrats, the Center party, the Liberal party, and the Right party, measured at the time the individuals were 13. Standard errors, shown in parentheses, allow for clustering at the municipality/parish level. ***/**/* indicate significance at the 1/5/10% level.

Table 5

Opening effects by gender and parish.

	Gender		Parish type	
	Women	Men	WC	Non-WC
Panel A. Nomination				
School in municipality	0.16	0.87***	0.68*	0.38*
	(0.20)	(0.34)	(0.39)	(0.23)
Panel B. Election				
School in municipality	0.19*	0.40**	0.51**	0.17
	(0.11)	(0.15)	(0.17)	(0.12)
Municipal controls	Yes	Yes	Yes	Yes
Municipal trends	Yes	Yes	Yes	Yes
Observations	596,812	589,584	686,348	497,764

Notes: Results from OLS regressions. All models include controls for sex, immigration background, seats-to-voters ratio, municipality-fixed effects, and birth-year fixed effects. Municipality controls include voter turnout, size of the electorate, vote shares for the Communist party, the Social democrats, the Center party, the Liberal party, and the Right party, measured at the time the individuals were 13. Standard errors, shown in parentheses, allow for clustering at the municipality level. ***/**/* indicate significance at the 1/5/10% level.

the likelihood of seeking political office. This result is well in line with those reported in Lindgren et al. (2017).²¹

To judge from these results, the establishment of new lower-secondary schools may thus have been somewhat of a double-edge sword with respect to representational equality. While the improved educational opportunities may have helped reduce the underrepresentation of individuals from working-class homes, they may actually have spurred an increase in the representational gender gap.

Another important, and somewhat related issue concerns the causal mechanisms underlying the effect of school openings on political activity. As discussed in the literature review, previous research has emphasized two mechanisms by which education may lead to increased political activity; a cognitive pathway through enhancing civic skills and cognitive abilities, or an indirect positional pathway via social status.

Unfortunately, the administrative data we have used so far do not include any information on potential mechanisms mediating the relationship between education and political participation. Instead, we have used complementary survey data to examine whether there are any important differences in levels of several measures of the cognitive pathway (political interest, political news consumption and political knowledge) and the positional pathway (connection to different political networks) between individuals who only attended seven years of compulsory schooling, and those whose highest attained education corresponds to a lower secondary degree.

For reasons of space, the results from these analyses are presented in the Appendix (see Table A8). The results show that, irrespective of the measure used, the average score for those who completed lower secondary school is higher compared to those who only attended primary school. Hence, bearing in mind that this is correlational evidence, the estimates reported suggest that the positive effect of acquiring a lower secondary degree on political candidacy may have been mediated both through a positional and a cognitive pathway. However, since the evidence is strictly correlational we cannot rule out the possibility that a host of factors may confound the relationship between educational attainment and the different indicators of the cognitive and positional pathways. These results should be therefore be considered as suggestive, but only tentative.

9. Conclusion

For a long time, political theorists have discussed the importance of education for a well-functioning democracy that succeeds in electing the most suitable citizens as political leaders. Thomas Jefferson even went as far as considering "an educated public as a bastion against the encroachment of an overzealous government" (Carpenter, 2013, p. 1). However, little is known regarding the actual consequences of implementing an educational system that resembles Jefferson's vision of better access to education for political representation. Empirical studies have rarely focused on the causal impact of education on political candidacy.

The unique Swedish register data provides us with an exceptional opportunity to perform such analyses, but the case under study is also relevant outside the Swedish context, as most industrialized countries experienced a strong educational expansion during the 20th century, and are likely to have had a somewhat similar development.

By exploiting the variation in time of establishment of Swedish lower secondary schools between 1935 and 1955, and using data on the full Swedish population, we show that being subject to the educational expansion increases individuals' probability of running for office later in life by 0.3–0.5 percentage points, and their chances of winning a seat by 0.2–0.3 percentage points. Given that the baseline probabilities for candidacy status and winning office are about 3 and 1%, respectively, the effects should be considered substantial.

How can it be explained that this study finds significant and considerable effects from education, while a number of studies on political participation (Berinsky & Lenz, 2011; Kam & Palmer, 2008) have failed to do so? One reason might be that we study political candidacy, and that education effects are stronger in this area than for less demanding forms of participation. Nie et al. (1996) suggest that the influence of education on participation in difficult and competitive acts is primarily

²¹ Similar heterogeneity analyses for educational attainment are presented in Table A11 in the Appendix.

mediated by the positional pathway, i.e. social network status. For competitive forms of political participation recruitment and contacts are important in a manner that is not the case for easier, individualistic acts of participation, such as boycotting, signing petitions, or voting. Thus, to the extent the education effect runs through a positional pathway, we should expect stronger effects on political candidacy than on, for example, voting.

Another feature of this study is that we study variation in a part of the educational distribution that is usually not studied. While most previous studies have focused on the effects of college, we study lower secondary education. Although this is a form of education at a lower level than what is usually examined, it should be remembered that this was an exclusive form of education during the period in focus. It was an elite education that was acquired at a relatively early age, and it is possible that students are more impressionable during these years than later in life (Persson et al., 2016; Sears & Funk, 1999).

It is also important to note that this study has examined the effects of better access to secondary, non-compulsory schools. This, we argue, is one of the main reasons why our findings differ somewhat from the results reported in a recent and related study by Lindgren et al. (2017). The authors of that study show that a large school reform launched in Sweden during the 1950s, which lengthened compulsory schooling, did not have any average effect on the likelihood of running for office among the affected individuals. However, this lack of an overall effect concealed decisive heterogeneities, such that the reform had a positive effect on political candidacy among individuals from disadvantaged social backgrounds, while the effect was negative among those with high-status parents. As a consequence, despite the zero average impact, the compulsory school reform served to decrease the social bias of elected assemblies. In contrast, we have shown that the expansion of non-compulsory secondary education had an overall positive effect on both running for, and winning, political office. However, our rudimentary heterogeneity analyses show that the findings appear to mainly be driven by persons from working-class municipalities - a finding that echoes well with the results presented in Lindgren et al. (2017).

What are the wider implications of our results? We believe that the results are not only of historical interest, but also have important implications for the functioning of existing democracies. In particular, the results are relevant to those countries that have not yet supplied sufficient opportunities for their citizens to acquire education at the lower secondary level. In these countries, better access to education can help expand the pool of potential political leaders, and provide proper training for the most suitable individuals.

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Supplementary material

Supplementary material associated with this article can be found, in the online version, at 10.1016/j.econedurev.2019.02.002

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