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The Role of Education in Shaping Voter Turnout: Evidence from Portugal

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Abstract

This study explores the relationship between education and voter turnout in Portugal, contributing to the literature on the non-monetary returns to education. Research on this topic remains limited in the Portuguese context, despite its growing relevance as electoral participation has been steadily declining. Using data from The International Social Survey Programme (ISSP) covering the 2002, 2005, and 2011 parliamentary elections, this study investigates how an additional year of education influences voter turnout. Using an Instrumental Variable (IV) approach, the findings indicate a positive causal relationship between education and voter turnout, with each additional year of education increasing the likelihood of voting by 5.1 percentage points. Regarding heterogeneity, the estimate of education's impact on voter turnout is higher for females and is strongest among younger individuals.

Keywords: Voter Turnout, Education, Compulsory Schooling, Private Returns, Non-Monetary Returns

O Impacto da Educação na Participação Eleitoral: Evidências de Portugal

Madalena Rocha de Oliveira Almeida Latino

Resumo

Este estudo explora a relação entre a educação e a participação eleitoral em Portugal, com o objetivo de contribuir para a literatura sobre os retornos não-monetários da educação. A investigação sobre este tema é limitada no contexto português, apesar da sua crescente relevância, uma vez que a participação eleitoral tem vindo a diminuir e a escolaridade média a aumentar. Utilizando dados do International Social Survey Programme (ISSP), que abrangem eleições legislativas de 2002, 2005 e 2011, este estudo investiga de que forma um ano adicional de escolaridade influencia a participação eleitoral. Ao usar o Modelo de Variáveis Instrumentais (IV), os resultados indicam que a educação tem um efeito causal positivo na participação eleitoral, onde cada ano adicional de escolaridade aumenta a probabilidade de votar em 5.1 pontos percentuais. No que diz respeito à heterogeneidade, a estimativa do efeito da educação na participação eleitoral é mais elevada entre as mulheres e mais forte entre os indivíduos mais jovens.

Palavras-chave: Participação Eleitoral, Educação, Escolaridade Obrigatória, Retornos Não-Monetários

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1. Introduction

Does education increase voter turnout? Education generates an impact on skills that affect not only the individual itself. Blundell, Dearden, and Sianesi (2001) categorize the returns to education into private, social, and labor productivity returns. Private returns can be further classified into monetary benefits, such as the impact on earnings, and non-monetary, including reduced crime rates, improved health, and greater civic engagement.

Extensive research has examined the returns to education. The impact of education on labor market productivity and earnings has been well established in the literature, with studies by Rosenzweig, M. R. (1995), Acemoglu, D., & Angrist, J. (2000), and Moretti, E. (2004), showing the positive impact of education on earnings and labor productivity. Card (1995) and Angrist and Krueger (1991) have established a causal relationship between education and earnings by exploiting distance to college and quarter of birth, respectively. Similarly, Oreopoulos (2006) used compulsory schooling laws to investigate the causal impact of increased education on earnings. These studies show that exogenous variations in education, driven by these factors, led to increased wages. However, the returns to education go beyond the financial gains.

Schooling stimulates a wide range of individual capacities. By fostering critical thinking, analytical and social skills, and long-term thinking (Oreopoulos and Salvanes (2011)), education provides individuals with tools to make better decisions, contributing to a more informed and engaged society. As individuals attain higher levels of education, they develop their cognitive and analytical skills. More educated individuals surround themselves with individuals with similar levels of education and social standing, where the debate about politics and civic responsibility is more frequent. This interaction helps shape an individual's perception of voting and the environment, leading to a stronger sense of civic responsibility and political engagement. Since more educated individuals are more likely to consume news and engage in political debates, they are also more likely to engage in civic activities, including the electoral process.

As a non-monetary return to schooling, the relationship between education and voter participation has been explored both by economists and politicians. Wolfinger and Rosenstone (1980) identified education as the main difference between individuals who vote and those who don't, highlighting the positive correlation between education and voter turnout. Dee (2003) demonstrated that education has a statistically significant effect on most measures of civic

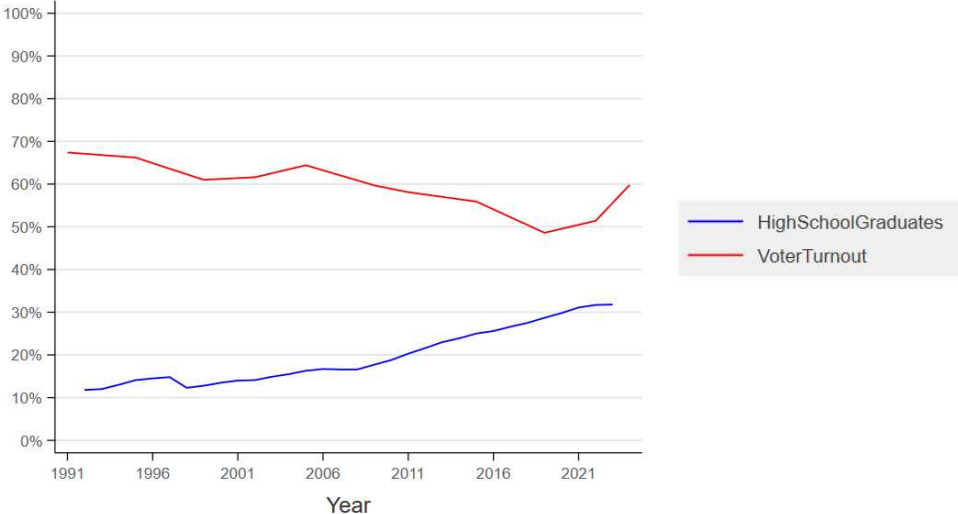
engagement and Milligan, K., Moretti, E., & Oreopoulos, P. (2004) found a strong impact of schooling on voting in the United States, however, in the United Kingdom, it had little effect on voting. Similarly, Harka, E., & Rocco, L. (2022) studied these two variables in the context of Italy and found that they are negatively correlated, with this correlation being stronger in more economically developed areas.

While Portugal has seen significant increases in educational attainment over the recent decades, voter turnout has declined and remained low. This divergence challenges the common expectation that higher education leads to greater political engagement.

Over the past few decades, education in Portugal has undergone significant transformations. In 1931, the illiteracy rate among children aged 7 to 11 was 73.1%. To address this, several programs were implemented, focusing on building new infrastructures, training teachers, and enforcing compulsory schooling laws. These efforts improved access to education and helped achieve the goal of significantly reducing the illiteracy rate. By 2021, the illiteracy rate had dropped to just 3.1%. School attainment rates have increased across all levels of education, with the mean years of schooling rising from 4.3 in 1975 to 10.8 in 2021.

Despite this rise in educational attainment, voter turnout has been decreasing. In Portugal’s first free elections, on April 25, 1975, the voter turnout rate was 91.5%. Since then, abstention has steadily increased, peaking in 2019, when only 48.6% of eligible voters participated in the elections.

Figure 1: Trends in Voter Turnout and High School Attainment in Portugal



Source: Computed using data from PORDATA.
 Note: This graph shows the trends in Voter Turnout and High School Attainment in Portugal.

Aiming to understand this decline, some authors explored the underlying factors influencing voter turnout in Portugal. Freire and Magalhães (2002) found that the decline in voter turnout reflects a lack of interest, confidence, and a misalignment with the available political options. Similarly, Canas (2004) argued that dissatisfaction with the government and a general disinterest in political matters contribute to this decline. In the study on the impact of individual incentives for electoral participation, Perea, E. A. (2002) found that, in Portugal, individual resources such as education and income are statistically insignificant. Education and income do not significantly influence the likelihood of participating in elections. Additionally, Carvalho (2023) found that factors such as age, income, and population density influence voter abstention rates, with older individuals, wealthier groups, and areas with higher crime rates generally showing lower rates of abstention.

This research explored the causal link between education and voter turnout in Portugal using data on voter participation from the 2002, 2005, and 2011 Portuguese parliamentary elections, aiming to investigate how an additional year of education influences the likelihood of electoral participation. To address potential omitted variable bias arising from unobserved factors influencing educational outcomes, an Instrumental Variable (IV) approach will be employed. As is standard in literature, compulsory schooling laws - reflecting reforms in mandatory education and exogenous to individual educational outcomes - will be used as an instrument for years of education to address the endogeneity bias.

The results for the unconditional LPM estimation of education on voter turnout showed a negative relationship between these two variables (-0.31 percentage points), which increased to 1.04 percentage points once individual-level characteristics were accounted for, highlighting the importance of controlling for these factors, in particular age. Further analysis, focused on addressing endogeneity, revealing a positive causal effect of education on voter turnout, with an additional year of schooling increasing the probability of voting by 5.1 percentage points. The point estimate for education on voter turnout is higher for females than males. Additionally, the effect of education is most pronounced among younger individuals (18-30), with an increase in the probability of 2.5 percentage points, gradually weakening to 0.46 percentage points for individuals aged 45-65. Marital status and employment significantly shape electoral participation, with married and employed individuals being more likely to vote.

It should be noted that the R-squared values of all regressions are relatively low, suggesting that voter turnout is a complex phenomenon likely influenced by factors not accounted for in this study, such as interest in politics and satisfaction with the government.

This dissertation contributes to the literature on the impact of education on voter turnout. To my knowledge, this study is the first to establish a causal relationship between education and voter turnout in Portugal. While research on the determinants of declining voter turnout in the country remains limited, this study helps to fill that gap by providing empirical evidence on the role of education in shaping electoral engagement. By enriching the existing literature, these findings contribute to a broader understanding of the factors influencing political engagement in Portugal.

The dissertation is organized as follows: Section 2 summarizes the main findings in the research on the returns to education and the determinants of voter abstention. Section 3 provides historical context on elections and educational context in Portugal. Section 4 describes the data used, the cleaning procedures, and provides a data description. Section 5 details the empirical model and methodology used in the study. Section 6 presents the results on the impact of education on voter abstention, while Section 7 conducts robustness checks. Finally, Section 8 concludes.

2. Literature Review

Education is essential not only for individual growth but also serves as a crucial driver of economic development and poverty reduction. Psacharopoulos (1985) measured the effect of education on economic growth and found that a significant share of the growth of national income is due to the education of the labor force.

Economists have been estimating the returns to schooling since the late 1950s. Blundell, Dearden, and Sianesi (2001) have defined and categorized the returns to education into three categories: labor productivity returns, measuring the increase in individual welfare beyond earnings; private returns, which reflect the increase in earnings and employment prospects; and social returns, which emphasize the benefits that others gain from an individual's education. Private returns can further be divided into monetary returns, such as the impact on earnings, and non-monetary, which include benefits such as improved health, reduced crime, and enhanced political engagement.

Authors such as Bishop (1992), Acemoglu, D., & Angrist, J. (2000), and Moretti, E. (2004), have studied the relationship between education and labor productivity and found that higher levels of education are associated with increased labor productivity.

Research on the returns to education primarily focus on the monetary private returns of schooling, where the individual returns are often expressed as a proportional wage increment. Many economists, such as Becker (1962), Porath (1967), and Mincer (1958 and 1974), have explored these monetary returns to investments in education. A key contribution to this field was Mincer's earnings function, introduced in 1958 and 1974, which explains earnings as a function of schooling and has been used as the baseline in several studies, such as Psacharopoulos (1981), Angrist and Krueger (1991), Becker (1993), Blundell, R., Dearden, L., & Sianesi, B. (2001), Gunderson, M., & Oreopoulos, P. (2020). Patrinos and Montenegro (2013) discussed the returns to education worldwide, focusing on schooling levels and income groups. Using individual income data, the authors estimated schooling returns and found that the returns are higher at the tertiary level, regardless of the income group. Mincer (1974) estimates that the returns to education are slightly higher for females than males. Card (1995) established the causal effect of education on earnings, using proximity to college as an exogenous determinant of education, and found that growing up near a college has a strong positive impact on education and earnings. Similarly, Oreopoulos (2006) used school leaving

laws, finding that raising the minimum school leaving age substantially increased completed years of schooling, which consequently raised wages. The effect was stronger in the United Kingdom than in Canada.

Focusing on Portugal, Reis and Campos (2017) have explored the evolution of private returns to schooling in the country. In the late 1980s, individuals with middle school education experienced an increase in earnings close to those with tertiary education, especially among females. Over time, this premium has declined, bringing Portugal's pattern in line with those observed in other developed countries.

While education is often associated with an increase in earnings, its benefits go beyond the monetary level. The magnitude of the non-monetary benefits of education is hard to define and quantify. Nevertheless, economists such as Meghir, Palme, and Simeonova (2012), Lleras-Muney (2005), Loncher and Moretti (2004), and Milligan, Moretti, and Oreopoulos (2003), among others, have explored the social impact of education across various domains such as health, crime, and political behavior. However, despite the efforts of economists to uncover the non-financial gains from education, these benefits remain challenging to measure.

The investigation of the factors influencing voter turnout has been widely explored in academic literature. The "civic participation" theory suggests that as the individual increases his educational level, the resulting growth in civic knowledge and skills leads to greater political involvement.

Wolfinger and Rosenstone (1980) tried to understand the characteristics of the people who vote and found a strong correlation between voting rates and years of education. Only 38% of the individuals with less than 5 years of schooling voted, while 69% of those with 12 years of education participated in the elections. Among individuals who attended college, regardless of degree completion, the voter turnout ranged from 79% to 91%. On the other hand, Tenn (2007) found that an additional year of schooling has a minimal impact on voter turnout (0.4 percentage points), likely because the effects of education are delayed and only become evident after individuals have completed their studies.

Examining how civic skills support electoral participation, Verba, Schlozman & Brady (1995) considered years of education and vocabulary scores as measures of these skills. They found that as individuals acquired more education, their average number of civil skills increased significantly, with college graduates showing roughly five times the average skills of those who

did not complete high school. With a coefficient of 0.145 for years of education, their model demonstrated a positive relation between schooling and political activity.

Limited reading and comprehension skills are recognized as a barrier to political engagement. Blais and Dobrzynska (1998) considered the degree of illiteracy as a potential socio-economic variable affecting turnout. They found that, regardless of the level of economic development level, voter turnout is affected by the illiteracy rate. Although the correlation between these two variables is moderate (-0.52), the authors suggest that literacy directly affects turnout.

Research conducted in the United States (Milligan, Moretti, and Oreopoulos, 2003) demonstrated a positive causal impact of education on voter participation, indicating that high school graduates in the U.S. are 28.8 percentage points more likely to vote. In contrast, for Britain the effect was not statistically significant. Harka and Rocco (2019) explored this relationship in Italy and found different outcomes. Using Ordinary Least Squares (OLS) estimation, their results suggested that an additional year of average education is associated with a 1.1 percentage points increase in voter turnout. However, when employing the Instrumental Variable estimation, the results revealed the opposite: one additional year of education reduces voter turnout by 7.2 percentage points. The authors suggest that the negative causal impact may be explained by the fact that more educated people may choose to abstain from voting as a means of expressing their discontent and dissatisfaction with politics.

In addition to education, there are other potential factors influencing voter turnout. Downs (1957) created the Rational Behavior Model¹, where several variables can determine the level of participation in the electoral process. Jackman (1987) identified compulsory voting and the electoral system as two drivers of voter turnout. Studies on compulsory voting consistently show its positive impact; Jackman (1987), Blais and Carty (1990), and Franklin (2004) found that mandatory voting increases voter turnout by 10 to 15 percentage points, depending on its enforcement. Powell (1982) considered the impact of a country's development and found that voter turnout tends to be higher in more economically developed countries. In turn, Smets and Van Han (2013) analyzed socioeconomic variables such as gender, race, and income. While

¹ In the Rational Behavior Model, the act of voting involves both costs and benefits. The costs associated with voting include, among others, the need to acquire information about the candidates and the required travel to vote. On the other hand, the benefits include the realization of the individual's preferred candidate's success and the possibility to live in a democracy.

gender and race did not show a statistically significant effect on turnout, income appears to affect electoral participation positively.

Focusing on Portugal, Freire and Magalhães (2002) investigated the factors contributing to the decline in voter turnout. Initially, they argued that this decrease should not necessarily be seen as negative since it can reflect the country's political stabilization and the growing trust of the individuals. However, after the analysis, the authors concluded that this decline reflects a lack of interest, confidence, and a misalignment with the available political options. Additionally, Canas (2004) argued that Portuguese people do not feel satisfied with the government's approach and lack interest in political matters.

Carvalho (2023) examined the influence of socioeconomic factors on voter abstention rates in Portugal. The study considered variables such as population density, age, gender, education, and economic indicators, including individual earnings and purchasing power. Regarding parliamentary elections, the findings indicate that abstention rates tend to be lower among older individuals, higher-income groups, and in areas with higher crime rates *per* 1000 inhabitants. In contrast, for municipal elections, only population density was found to have a significant impact on abstention rates.

3. Institutional Context – Portugal

3.1 Voting and Registration

In order to understand the institutional context in which voting decisions are made, this section provides some details on voting and registration in Portugal.

After forty years of authoritarian regime, on April 25, 1974, Portugal initiated a wave of democratization. This process, known as the Carnation Revolution (*Revolução dos Cravos*), marked the end of a regime under the Estado Novo regime and was one of the most significant moments in Portuguese history.

The Revolution restored Portuguese citizens' fundamental rights and freedoms, and one year later, the country held its first free elections. For the first time, men and women over the age of 21 were able to vote freely. In this context, despite the relatively low levels of education in the country, the voter turnout in the elections reached 91.53%, highlighting the importance of a free and democratic state to society. These elections were for the Constituent Assembly, which led to the creation of the Constitution of the Portuguese Republic. Drafted following the

revolutionary movement, this document inaugurated a new era of democracy, freedom, and rights for the Portuguese people.

The political transformation, marked by the end of 48 years of dictatorship and the consolidation of democracy, granted Portuguese citizens the right to vote freely in all elections, including the Presidential, Parliamentary, Municipal, and, years later, for the European Parliament.

In this context, the structure of elections in Portugal is highlighted by the Presidential elections, in which the head of the country, the President of the Republic, is elected every five years. Parliamentary elections are held every four years to elect the members of the Assembly of the Republic. Municipal elections, which focus on local governance, also take place every four years. European Parliament elections occur every five years to elect the Portuguese representatives in the European Parliament.

Before 2008, individuals had to actively register themselves in the electoral process to be eligible to vote. However, in 2008, a new law was introduced to simplify and modernize the registration process. The Electoral Registration Law outlines the rules for voter registration, making it an automatic process for all citizens over 18, whether they live in Portugal or abroad, as long as they hold a Portuguese Citizen's Card.

3.2 Education

Throughout its history, Portugal has experienced various political regimes, and, in the last decades, has seen a notable rise in educational attainment. During the Constitutional Monarchy (1820-1910) and Republican (1910-1926) periods, aiming to expand educational access, new infrastructures were built. However, this initiative had limited success, as school attendance remained low. At the time of the Republic's proclamation on October 5, 1910, three out of four individuals were still unable to read or write.

In March 1911, elementary education became mandatory for all children of both genders aged between 7 and 14 in Portugal. This primary education was structured into three levels – elementary, complementary, and superior – spanning a total of 3 years. By 1931, the illiteracy rate among children aged 7 to 11 was 73.1%, showing the limited effect of this education policy on illiteracy rates.

In 1940, under the dictatorial regime, the government approved the Centennial Plan (Plano do Centenários), a 10-year investment program to increase the number of primary schools in

the country and training teachers. As a continuation of the Centennial Plan, the Popular Education Plan (Plano de Educação Popular) was created. This program sought to boost literacy among children and adults, reorganize educational assistance, and establish adult education courses. In 1956, two years after the introduction of this program, a new compulsory schooling law was enacted, extending compulsory schooling to four years for boys. This law was extended to girls four years later. At that time, school enrollment steadily increased. In 1950, the number of students enrolled in secondary education was 85,545, rising to 209,701 by 1960. This growth underscores the effectiveness of the education policies in improving access to education. In 1964, Law 45810 increased compulsory schooling to 6 years.

Despite the development of education policies in the country, the illiteracy rate remained over 25% in 1970. It was only after the end of the dictatorial regime that significant improvements in education occurred. Aiming to achieve equal opportunities for all students and democratization in education, the Basic Law of the Educational System (Lei de Bases do Sistema Educativo) was established in 1986, setting the principles and structure of the educational system, along with the objectives for each level of schooling. This law lowered the school entry age to 6 years and extended compulsory education to 9 years. Years of schooling increased again in 2009, from 9 to 12.

Portugal made significant progress in reducing illiteracy and increasing educational attainment across all levels. In 2021, only 3.1% of the population was illiterate, compared to the 75% in 1970. Significant shifts have also been observed in both educational attainment and gender disparities, with attainment rates rising across all levels of education. In 1970, the percentage of individuals with a college degree was 0,5% for females and 1,5% for males. Over time, a notable shift occurred, with females surpassing males. By 2021, the percentage of women with a college degree increased to 23%, while for men, it reached 18%. In 1992, 11,8% of the population had high school as the highest level of education, whereas by 2021, this rate had risen to 31,1%. These results reflect the positive educational transformation that Portugal has undergone.

Table 1 describes the implemented compulsory schooling laws, including the years of mandatory schooling and the first cohorts affected.

Table 1: Legislation on compulsory schooling

Year of implementation	Years of mandatory schooling	First cohort affected
1911	3 years	Boys and girls born after 1904
1956	4 years	Boys born in or after 1950
1960	4 years	Girls born in or after 1953
1964	6 years	Boys and girls born in or after 1957
1986	9 years	Boys and girls born in or after 1980
2009	12 years	Boys and girls born in or after 1998

Source: *Diário da República*.

Note: This table is based on the table presented in Portugal, P., Reis, H., Guimarães, P., & Cardoso, A. R. (2024).

4. Data

Like most empirical literature, this study relies on individual self-reported voting. Using surveys from The International Social Survey Programme (ISSP), it examines the impact of education on self-reported voter turnout across Portuguese parliamentary elections held in 2002, 2005, and 2011. The study focuses on these three election years due to limited data availability in the ISSP.

The surveys were collected through face-to-face interviews, with participants pre-contacted by telephone, using a random sample from the Portuguese population. They cover various topics and include comprehensive demographic information on the respondents.

The sample sizes range from 854 to 3553 per survey. The combined data set has 12,120 observations of adults aged 18 or older and includes information on several variables, such as

age, gender, marital status, years of education, working status, and voting behavior. The weights provided in this dataset were not adjusted to the main variables of interest of this study – years of education and voter turnout. Since they were created to correct for other demographic factors, they were not considered in the analysis.

4.1 Data Cleaning

The variables used for each individual were the following: age, gender, marital status, years of education, working status, and whether the individual voted in the last elections. To account for differences in the variables across surveys, the data was harmonized between surveys.

In addition to these variables, others were created using the dataset. Based on the variable *Age* and *SurveyYear*, the variable *BirthYear* was generated. The variable that accounts for the working status of the individuals had varying classifications depending on the year of the survey, so it was harmonized. By harmonizing this variable, five categories were created: 1) Employed, 2) Unemployed, 3) Student, 4) Retired, and 5) Other. The category other includes housewives, and disabled individuals, among others.

To account for Portugal’s mandatory schooling laws, the variable *CompulsorySchooling* was created based on the years these laws were implemented and the individual’s birth year. The variable has five categories: 1) 3 years, 2) 4 years for Males, 3) 4 years for Females, 4) 6 years, and 5) 9 years. A category for 12 years of compulsory schooling was not created, as this sample does not include individuals born in or after 1998.

The sample is restricted to the population above 18 years old, as this is the minimum legal voting age in Portugal.

4.2 Descriptive Statistics

Table 2 provides a detailed description of each of the variables in the dataset used in this work. To provide an overview, Table 3 and Table 4 present descriptive statistics for the variables used to estimate the impact of education on voter abstention. These two tables provide a foundation for analyzing key trends in education, voter behavior, and demographic characteristics. This analysis explores how these variables interact. Table A1 and Table A2 in the Appendix report the same descriptive statistics, by survey year. The sample covers individuals from 18 to 91 years old, allowing for the examination of voter turnout behaviors across multiple life stages.

Table 2: List of Variables and Variables Description

Variable	Description
Vote	Indicator variable equal to 1 if the individual reported voting in the most recent election and 0 otherwise.
YearsEducation	Total number of years of formal education completed by the individual.
Age	Age of the individual at the time of the election.
BirthYear	Year in which the individual was born.
Female	Gender of the individual, equal to 1 if female and 0 if male.
Married	Marital status of the individual, equal to 1 if married and 0 otherwise.
SurveyYear	Year in which the survey was conducted.
ElectionYear	Year of the election.
WorkingStatus	Categorical variable characterizing the occupational status of the individual: 1) Employed, 2) Unemployed, 3) Student, 4) Retired, and 5) Other
CompulsorySchooling	Categorical variable indicating the compulsory schooling law applicable to the individual: 3, 4, 6, or 9 years.

Source: Computed using data from ISSP.

Note: This table presents the variables under analysis along with their detailed descriptions.

Table 3: Descriptive Statistics

Variables	Observations	Mean	Std. Dev.	Min	Max
Vote	12137	.721	.448	0	1
YearsEducation	12129	8.107	5.112	0	24
Age	12137	50.018	17.823	18	91
Female	12137	.585	.493	0	1
Married	12137	.595	.491	0	1

Source: Computed using data from ISSP.

Note: This table presents the descriptive statistics for the dummy and continuous variables under analysis.

Table 4: Working Status by Gender

Variable	Females	Males
WorkingStatus (%)		
Employed	52.06%	60.41%
Unemployed	10.96%	9.47%
Student	3.20%	3.14%
Retired	20.57%	24.59%
Other	13.21%	2.39%

Source: Computed using data from ISSP.

Note: The table presents the weighted percentage of each working status by gender.

This sample captures a wide range of ages, so it is expected that educational attainment varies across individuals. As mentioned in Section 3.2, Portugal implemented several reforms in the education system, leading to an increase in the number of mandatory schooling years, and reaching a mean years of schooling of 8.1. The voter turnout in the sample is 73.1% in 2002, 73.4% in 2005, and 69.4% in 2011, while the real participation rates were 61.60%, 64.40%, and 58.10%, respectively. Although the sample turnout is consistently higher, it follows the same trend as the real rates – increasing from 2002 to 2005 and declining in 2011.

Table 5: Correlation between Vote, YearsEducation and Age

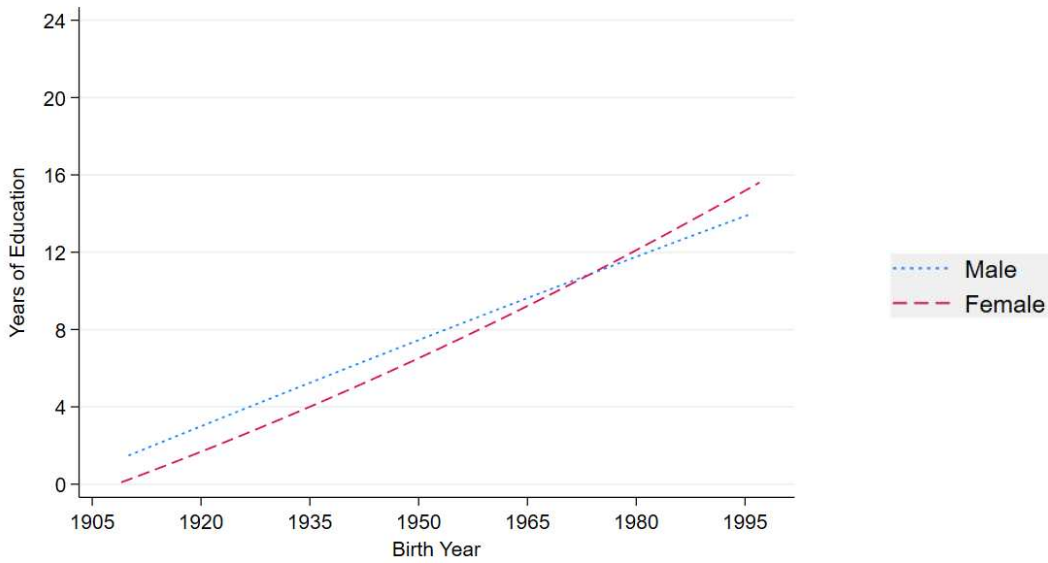
Variables	Correlation
Vote and YearsEducation	-0.036 (0.000)
Vote and Age	0.190 (0.000)
YearsEducation and Age	-0.570 (0.000)

Source: Computed using data from ISSP.

Note: This present table shows the correlations between the variables Vote, YearsEducation and Age.

Table 5 shows the correlations between the main variables used in the study. It indicates that there is a weak negative relationship between *Vote* and *YearsEducation*, suggesting that higher educational attainment is not strongly associated with an increase in the likelihood of voting. On the other hand, *Age* exhibits a positive correlation with *Vote*, suggesting that older individuals are more likely to participate in the elections, reflecting the political context of the country. The strong negative correlation between *Years of Education* and *Age* reflects the impact of compulsory schooling laws in Portugal, which have led to higher educational attainment among younger generations.

Figure 2: Years of Education by Birth Year and Gender.



Source: Computed using data from ISSP.

Note: This graph plots the quadratic relationship between Years of Education and Birth Year by Gender in Portugal

Figure 2 illustrates the relationship between years of schooling and birth year for both females and males. A clear positive correlation between these two variables is observed, suggesting an increase in educational attainment among the younger cohorts. The difference between the two trends for males and females highlights a gender gap, with males generally having more years of education than females in older age groups. However, this pattern is changing for younger cohorts, suggesting that educational opportunities have expanded over time, particularly benefiting younger generations, and reducing gender disparities in access to education.

5. Empirical Model and Methodology

The model used in this study is inspired by the econometric frameworks developed by Milligan, Moretti, and Oreopoulos (2003) and Harka and Rocco (2019).

To estimate the determinants of voter abstention, the following model will be used:

$$Y_{it} = \alpha_0 + \alpha_1 Educ_{it} + \alpha_2 X_{it} + \varepsilon_{it}$$

where Y_{it} represents the self-reported voting, which is a dummy variable that takes the value of 1 if the individual i voted in the parliamentary elections in year t and 0 otherwise. The explanatory variables in this model are $Educ_{it}$, representing the years of education, and X_{it} , which captures characteristics of the individual such as age, gender, marital status, and working

status. The coefficient α_1 is the parameter of interest, measuring the impact of an additional year of schooling on voting behavior. The main regressions control for survey year-fixed effects.

This model will be estimated using a Linear Probability Model. Additionally, a Probit estimation will be computed as a robustness check of the results.

There are unobservable characteristics, not included in the model, such parental socioeconomic status, that may affect an individual's voting behavior and are correlated with educational attainment. To address this issue, compulsory schooling laws will be used as an instrument.

5.1 Compulsory Schooling Laws as an Instrumental Variable

For Compulsory Schooling Laws to be a valid instrument, they must satisfy three conditions. First, they must be relevant, meaning they should influence the probability of attaining more years of education. Second, the instrument must be exogenous, i.e. uncorrelated with the error term. Additionally, it should affect voter turnout exclusively through its impact on years of education.

Reforms in the educational system in Portugal increased attainment rates across all levels of education and, consequently, reduced the illiteracy rate. The introduction of laws requiring students to study longer than they might have otherwise chosen led to exogenous variations in education, resulting in an overall increase in average educational attainment.

Mandatory schooling laws have been widely used in literature as an instrument to estimate the returns to education. Acemoglu and Angrist (2000) estimated the impact of compulsory schooling laws on education, and the results showed that these laws increased educational attainment. Oreopoulos (2006) found that the gains from these laws were very large. For the United States, Angrist and Krueger (1991) found that compulsory schooling laws effectively increase the number of years of education completed. Similarly, Black, Devereux and Salvanes (2005) observed the same impact in Norway².

² The authors found that the nine-year reform had significant impact in increasing the average years of education. Two years before its implementation, 12% of the individuals had less than nine years of schooling. After the reform, this percentage dropped to 3%.

Using compulsory schooling laws as an instrument, an Instrumental Variable (IV) regression will be performed to estimate the causal effect of education on voter turnout.

The first stage of the IV estimation model is the following:

$$Educ_{it} = \gamma_0 + \gamma_1 CompulsorySchooling_{it} + \gamma_2 X_{it} + \gamma_s + \mu_{it}$$

where $Educ_{it}$ denotes the years of education for individual i at time t . $CompulsorySchooling_{it}$ is the instrumental variable, which represents the compulsory schooling law affecting individual i , and X_{it} is a set of control variables that captures individual characteristics such as age, gender, marital status, and working status. γ_s controls for survey year-fixed effects.

In the second stage, the predicted years of education from the first stage are used to estimate the effect of education on voter abstention:

$$Y_{it} = \beta_0 + \beta_1 \widehat{Educ}_{it} + \beta_2 X_{it} + \theta_s + \varepsilon_{it}$$

where Y_{it} is a binary variable indicating whether the individual i voted (1) or not (0) in the election in year t , and \widehat{Educ}_{it} represents the fitted value of the first stage. The control variables X_{it} remain consistent with those in the first stage. θ_s controls for survey year-fixed effects.

6. Effect of Education on Voter Turnout

The analysis begins with a simple specification to investigate the impact of education on political engagement in Portugal, which will be expanded throughout this work.

Table 6 shows three LPM regressions. The first regression aims to capture the unconditional effect of education on voter turnout. The second approach, including *Age*, allows for a more accurate interpretation, as it controls for age-related differences in voting behavior. The main specification includes additional variables such as *Female*, *Married*, and *WorkingStatus*, along with a control for survey-year fixed effects. These variables capture a broader range of demographic factors that may affect voter turnout.

The first column of Table 6 indicates that, without accounting for other potential factors that may influence voting behavior, there is a negative relationship between education and voting behavior. The estimated coefficient suggests that, for each additional year of schooling, an individual's probability of electoral participation decreases by 0.31 percentage points. This

negative relationship may seem counterintuitive, as higher educational attainment is typically associated with better informed decisions and greater civic engagement. However, this aligns with the reality of Portugal. As discussed in Section 4.2, older individuals tend to have lower levels of education and are generally more likely to vote. This trend can be associated with the fact that Portugal was a young democracy, and older individuals, who lived through the transition from dictatorship to democracy, were particularly motivated to participate in the electoral process. Therefore, this negative relationship likely reflects age effects.

To account for age effects, *Age* was added to the model. Including *Age* (Column 2), the point estimate for *Years of Education* becomes positive. Compared to the unconditional model, the shift in the sign of the point estimate for education highlights the importance of including age as a variable in the analysis.

By including other individual-level characteristics (Column 3), such as gender, marital status, and working status, the point estimate for *Years of Education* increased slightly. This model estimates that each additional year of education raises the probability of voting by 1.04 percentage points. For instance, an individual with high school completed is 12.48 percentage points more likely to vote than someone with no formal education, controlling for all the other factors.

Focusing on the other variables in this framework, gender proved to be statistically insignificant, indicating no notable differences in voting behavior between women and men. On the other hand, marital status appears to influence voting behavior, with married individuals being, on average, 9.60 percentage points more likely to vote, considering all other factors constant. *WorkingStatus* proved to be significant in the model, and it is possible to conclude that among all categories considered, employed individuals are most likely to participate in the electoral process. For example, an unemployed individual is 7.77 percentage points less likely to vote compared to an employed individual, controlling for age, gender, marital status, and education.

Table 6: LPM estimation of the effect of education on voter turnout

VARIABLES	(1) Vote	(2) Vote	(3) Vote
YearsEducation	-0.00309*** (0.000780)	0.00949*** (0.000913)	0.0104*** (0.000930)
Age		0.00633*** (0.000280)	0.00688*** (0.000348)
Female			0.00616 (0.00822)
Married			0.0960*** (0.00826)
WorkingStatus			
<i>Unemployed</i>			-0.0777*** (0.0145)
<i>Student</i>			-0.147*** (0.0250)
<i>Retired</i>			-0.0592*** (0.0126)
<i>Other</i>			-0.0518*** (0.0156)
Constant	0.746*** (0.00738)	0.328*** (0.0200)	0.278*** (0.0235)
Survey year-fixed effects	-	-	✓
Observations	12,129	12,129	12,120
R-squared	0.001	0.044	0.072

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: The dependent variable is *Vote*. Column (1) reports the LPM results for the unconditional effect of education on voter turnout. Column (2) accounts for age-specific differences in voting behavior. Column (3) shows the full specification, including demographic variables, while controlling for survey year-fixed effects.

The full specified model yields a low R-squared value. The control variables used in this study – age, gender, marital status, working status and education – explain for only 7.20% of the variation in electoral behavior. The low R-squared value suggests that electoral participation is a complex phenomenon shaped by many other factors not accounted for in this model, such as political interest and trust in government.

To control for endogeneity issues, an IV approach was employed. Table 7 shows the first stage of the IV estimation, in which *Compulsory Schooling Laws* are used as an instrument for *Years of Education*.

Table 7: First-stage of the IV estimation of the effect of education on voter turnout

	(1) YearsEducation
Age	-0.140*** (0.006)
Female	-0.416*** (0.081)
Married	-0.615*** (0.081)
WorkingStatus	
<i>Unemployed</i>	-1.686*** (0.123)
<i>Students</i>	-0.154 (0.182)
<i>Retired</i>	-1.024*** (0.131)
<i>Other</i>	-2.187*** (0.127)
CompulsorySchooling	
<i>4 years (Male)</i>	-0.072 (0.230)
<i>4 years (Female)</i>	-0.117 (0.211)
<i>6 years</i>	0.428** (0.182)
<i>9 years</i>	0.057 (0.276)
Constant	15.836*** (0.375)
Survey year-fixed effects	✓
Observations	12,120
R-squared	0.368
F-Test (instrument)	5.0755 (0.0004)

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Computed using data from ISSP.

Note: This table presents the results of the first stage of the IV estimation. The dependent variable is *YearsEducation* and the instrumental variable is *CompulsorySchooling*. Control variables are age, gender, marital status, and working status. The F-test for the instrument is 5.08 and the p-value is 0.0004. The regression includes survey year-fixed effects. The Wald F statistic Cragg-Donald weak identification test is 5.197, which is below the Stock-Yogo weak ID critical values for 10% maximal IV relative bias, 10.27.

The F-statistic for this instrument is 5.08, with a p-value of 0.0004. Although the F-statistic falls below the conventional rule-of-thumb, the p-value indicates strong statistical significance.

Moreover, the existing literature³ has consistently validated mandatory schooling laws as a reliable instrument for years of education.

Table 8: Second-stage of the IV estimation of the effect on education on voter turnout

	(1) Vote
YearsEducation	0.051** (0.026)
Age	0.013*** (0.004)
Female	0.022* (0.014)
Married	0.120*** (0.018)
WorkingStatus	
<i>Unemployed</i>	-0.008 (0.047)
<i>Students</i>	-0.130*** (0.027)
<i>Retired</i>	-0.015 (0.031)
<i>Other</i>	0.039 (0.060)
Constant	-0.381 (0.418)
Survey year-fixed effects	✓
Observations	12,120
F-Test (instrument)	5.0755 (0.0004)

Robust standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Computed using data from ISSP.

Note: This table presents the result of the second stage of the IV estimation. The dependent variable is self-reported voting, which takes the value of 1 if the individual voted in the elections and 0 otherwise. The key explanatory variable is the predicted years of education from the first stage, while control variables remain consistent with those used in the first stage. The regression includes survey year-fixed effects.

The F-test for the instrument is 5.08 and the p-value is 0.0004. The regression includes survey year-fixed effects. The Wald F statistic Cragg-Donald weak identification test is 5.197, which is below the Stock-Yogo weak ID critical values for 10% maximal IV relative bias, 10.27.

Table 8 presents the second stage of the IV estimation. This estimation shows education's positive causal effect on voting behavior. The point estimate for *Years of Education* is 0.051, and it is significant at the 5% level, suggesting that an additional year of schooling increases the probability of voting by 5.1 percentage points.

³ See Section 4 for more a more detailed discussion of the literature on compulsory schooling laws.

Using an IV approach increases the point estimate of education compared to the LPM. This increase may reflect higher marginal returns to education than the average returns for those affected by the instrument. In particular, compulsory schooling laws tend to have a greater impact on individuals with lower initial education levels, as they are induced to attend more years of schooling than they otherwise would have, leading to higher marginal returns.

The coefficients for age, gender, marital status, and working status remain statistically significant. *Age* continues to positively affect voting and marital status remains a strong predictor of electoral participation. Controlling for all other variables, the probability of voting for employed individuals is not statistically different from that of unemployed individuals.

6.1 Heterogeneity

This chapter aims to further investigate the relationship between education and voter turnout by examining potential differences across gender and age groups.

6.1.1 Gender

To explore whether education plays a differential role in shaping political engagement for females and males, the previous LPM regression was re-estimated, separating the analysis by gender. In Table 9, Column 1 presents the regression results for females, while Column 2 presents the corresponding results for males.

The LPM estimate for *Years of Education* is positive and statistically significant for both genders, with a slightly stronger effect for females. Each additional year of education increases the likelihood of voting by 1.12 percentage points for females and 0.93 percentage points for males. This suggests that education has a stronger effect on increasing voter turnout among females than males.

Age and marital status are positively associated with voting, with this relationship being statistically significant for both genders. The effect of age on voter turnout is slightly stronger for females, whereas marital status appears to have a greater impact on males. As concluded earlier, employed individuals are the most likely to participate in elections compared to other professional statuses. However, being a *Student* or *Retired* has a stronger negative impact on the likelihood of voting for females than males, highlighting that these statuses affect female voting behavior more significantly.

Table 9: LPM estimates of the effect of education on voter turnout by gender

VARIABLES	(1) <i>Female</i> Vote	(2) <i>Male</i> Vote	(3) <i>Full sample</i> Vote
YearsEducation	0.0112*** (0.00126)	0.00931*** (0.00139)	0.0104*** (0.000930)
Age	0.00701*** (0.000471)	0.00666*** (0.000542)	0.00688*** (0.000348)
Female	-	-	0.00616 (0.00818)
Married	0.0872*** (0.0108)	0.110*** (0.0145)	0.0960*** (0.00844)
WorkingStatus			
<i>Unemployed</i>	-0.0814*** (0.0184)	-0.0733*** (0.0237)	-0.0777*** (0.0145)
<i>Student</i>	-0.208*** (0.0311)	-0.0603 (0.0415)	-0.147*** (0.0250)
<i>Retired</i>	-0.0706*** (0.0172)	-0.0472** (0.0187)	-0.0592*** (0.0126)
<i>Other</i>	-0.0527*** (0.0173)	-0.0766* (0.0452)	-0.0518*** (0.0156)
Constant	0.294*** (0.0315)	0.267*** (0.0330)	0.278*** (0.0235)
Survey year-fixed effects	✓	✓	✓
Observations	7,097	5,023	12,120
R-squared	0.071	0.080	0.072

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: The dependent variable is *Vote*. This table presents the LPM estimation results for the effect of education on voter turnout, where Column (1) reports the results for females and Column (2) for males. Column (3) presents the estimate of the full sample. All regressions include survey year fixed effects.

Table A5 in the Appendix shows the first stage of the IV estimation, where Column 1 shows the estimates for females and Column 2 for males. The estimates for the first stage are consistent with those reported previously.

Table 10 displays the results of the second stage of the IV regression, where vote is regressed on the previous estimation for years of education, along with the control variables.

Table 10: Second-stage IV estimates of the effect of education on voter turnout by gender

VARIABLES	(1) <i>Female</i> Vote	(2) <i>Male</i> Vote
YearsEducation	0.0758* (0.0448)	0.0296 (0.0301)
Age	0.0176** (0.00733)	0.00905** (0.00362)
Married	0.142*** (0.0399)	0.121*** (0.0233)
WorkingStatus		
<i>Unemployed</i>	0.0377 (0.0855)	-0.0392 (0.0557)
<i>Student</i>	-0.126* (0.0655)	-0.0756 (0.0461)
<i>Retired</i>	0.00868 (0.0584)	-0.0230 (0.0402)
<i>Other</i>	0.0855 (0.0981)	-0.0266 (0.0863)
Constant	-0.800 (0.759)	-0.0388 (0.455)
Survey year-fixed effects	✓	✓
Observations	7,097	5,023

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: This table presents the result of the second stage of the IV estimation. Column 1 shows the estimates for females, while Column 2 presents the estimates for males. The dependent variable is individual voting behavior, and the key explanatory variable is the predicted years of education from the first stage. Control variables are consistent with those used in the first stage. The regression includes survey fixed effects.

When *Compulsory Schooling Laws* are used as an instrument for *Years of Education*, the estimated impact of schooling on electoral participation increases for both genders. However, the coefficient is only statistically significant for females at the 10% level, and it is no longer statistically significant for males. In addition to this increase in the point estimate, the difference between women and men also widens: an additional year of schooling is associated with a 7.58 percentage point increase in the likelihood of voting for females, compared to 2.96 percentage points for males.

Historically, education has played a transformative role in political engagement in Portugal. Before the 25th of April 1974, female participation in the elections was severely restricted, and the expansion of education in the post-revolutionary period may have contributed to increasing electoral participation among women. By providing greater political awareness and civic knowledge, education helped counteract traditional gender roles that had previously limited

women's involvement in public affairs. Moreover, given that women had been deprived of voting rights for decades, it is reasonable to expect that once they gained the right to vote, they would be more likely to exercise it. However, despite this historical context, the estimates in this study need to be interpreted with caution, as they do not allow for a definitive conclusion on whether education has a different impact on electoral participation for males and females.

6.1.2 Age

Having explored gender differences, the focus now turns to age groups. This analysis examines how the impact of education on voter turnout differs across four age cohorts⁴: 18-30, 30-45, 45-65, and 65-92. This approach helps to determine whether the influence of education on political engagement varies depending on age.

Table 11 provides the LPM estimation of how education influences the probability of voting across different age cohorts in Portugal. The IV estimation is not performed for these age groups due to the nature of the instrument, which is based on birth year. When the sample is divided into smaller age groups, the instrument captures individuals from the same category, undermining its validity. Additionally, since *Compulsory Schooling Laws* rely on birth cohort variations, their interpretation within these narrower age segments becomes less clear, making IV estimation unfeasible in this specification.

In the 18-30 age group, education has the strongest positive effect on voting behavior. The LPM coefficient for *Years of Education* (0.0250) is the highest among all cohorts and statistically significant at the 1% level, indicating that each additional year of education increases the likelihood of voting by 2.50 percentage points in this group. For individuals aged 30-45, the effect of education remains positive but diminishes in magnitude, with each additional year of education making an individual 1.07 percentage points more likely to vote. An individual aged 35 with 9 years of education is 9.63 percentage points more likely to vote than an individual of the same age with no formal schooling.

As individuals age, the impact of education on voter participation weakens, likely due to the growing influence of other factors. Among those aged 45-65 and 65-92, education still positively affects voting (0.46 percentage points and 0.88 percentage points per additional year,

⁴ The age groups were created to capture distinct life stages, such as young adults, mid-career individuals, and retirees, each with unique socio-economic circumstances that may affect both their education and political engagement.

respectively), but the impact is significantly smaller compared to younger cohorts. This suggests that while education remains a relevant factor in voting decisions, it declines as individuals age. The weaker effect of education on voter turnout among older generations may reflect the lasting impact of the Carnation Revolution.

Table 11: LPM estimates of the effect of education on voter turnout by age group

VARIABLES	(1) <i>Age group</i> 18-30 Vote	(2) <i>Age group</i> 30-45 Vote	(3) <i>Age group</i> 45-65 Vote	(4) <i>Age group</i> 65-92 Vote	(5) <i>All age</i> <i>groups</i> Vote
YearsEducation	0.0250*** (0.00292)	0.0107*** (0.00173)	0.00462*** (0.00145)	0.00881*** (0.00199)	0.0104*** (0.000928)
Age	-	-	-	-	0.00690*** (0.000346)
Female	-0.0315 (0.0219)	0.0254 (0.0163)	0.00689 (0.0138)	-0.0249 (0.0174)	0.00621 (0.00822)
Married	0.113*** (0.0254)	0.0929*** (0.0177)	0.0687*** (0.0155)	0.0436*** (0.0165)	0.0958*** (0.00843)
WorkingStatus					
<i>Unemployed</i>	-0.171*** (0.0347)	-0.0981*** (0.0282)	-0.0137 (0.0220)	0.0202 (0.0421)	-0.0777*** (0.0145)
<i>Student</i>	-0.195*** (0.0293)	0.0273 (0.145)	0.117 (0.0822)	0.249*** (0.0306)	-0.147*** (0.0250)
<i>Retired</i>	0.631*** (0.0361)	-0.209* (0.112)	0.0546*** (0.0168)	-0.00608 (0.0264)	-0.0593*** (0.0126)
<i>Other</i>	-0.0631 (0.0584)	-0.0511 (0.0412)	-0.00794 (0.0219)	-0.0139 (0.0340)	-0.0519*** (0.0156)
Constant	0.330*** (0.0458)	0.558*** (0.0301)	0.675*** (0.0254)	0.746*** (0.0348)	0.278*** (0.0234)
Survey year-fixed effects	✓	✓	✓	✓	✓
Observations	2,046	3,207	4,011	2,856	12,131
R-squared	0.088	0.038	0.023	0.024	0.072

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: The dependent variable is Vote. This table presents the LPM estimation for the effect of education on voter turnout by age group. Column (1) reports the coefficients for individuals aged 18 to 30 years. Column (2) presents results for individuals aged from 30 to 45 years. While Column (3) covers individuals aged 45 to 65 years and Column (4) those aged 65 to 92 years old. Column (5) presents the results for the full sample, including all age groups. All regressions include survey year fixed effects.

Table 11 shows a negative and significant relationship between being a female and voting for the youngest (18-30) and oldest (65-92) age groups, indicating that women in these groups are less likely to vote than men. Marital status plays an important role in voting behavior, as *Married* individuals are more likely to vote across all age groups. Being a *Student* is associated

with lower voter turnout, particularly among younger individuals. On the other hand, *Retirees* are more likely to vote, with the effect being the strongest in the 45-65 age group.

The R-squared value decreases as the age cohorts become older. In the 18-30 age group, the model explains 8.8% of the variation in voting behavior, whereas, in the 65-92 age group, this explanatory power diminishes significantly to 2.4%. This highlights the importance of incorporating additional variables into the model to enhance its explanatory power and provide a more nuanced understanding of the factors shaping voter turnout.

After accounting for potential age differences, education shows a significantly stronger influence on voter turnout in younger cohorts, particularly among individuals aged 18-30. In contrast, the effect of education weakens as individuals age, with its influence diminishing for older cohorts (45-65 and 65-92). These results suggest that, while education remains a relevant factor in shaping electoral participation, its influence declines with age.

7. Robustness Check

To ensure the robustness of the findings, a regression using the election year instead of the survey year was performed. By including election year as a robustness check, the analysis verifies whether the observed relationship between education and turnout remains consistent across different model specifications.

Table 12 presents the LPM estimation with individual-level characteristics and election year. Accounting for period-specific effects of elections slightly reduces the point estimate for *Years of Education* when compared to the estimation that controls for survey year fixed effects. Using the election year, the results indicate that each additional year of schooling increases the probability of voting by 1.02 percentage points, while the effect is slightly higher (1.04 percentage points for each additional year) when controlling for survey year fixed effects. The impact of age and marital status on voting behavior increases slightly, gender remains statistically insignificant, and the impact of professional categories is similar in both specifications.

The independent variables explain 6.9% of the variation in voter behavior. This R-squared value is similar, though slightly lower, to that of the model with controls for survey year-fixed effects, indicating that time-specific effects related to the survey year have a greater impact on electoral participation than those related to the election period.

Table 12: LPM estimates of the effect of education on the probability of voting in Portugal using Election Year

VARIABLES	(1) Vote
YearsEducation	0.0102*** (0.000930)
Age	0.00693*** (0.000348)
Female	0.00694 (0.00823)
Married	0.0972*** (0.00845)
WorkingStatus	
<i>Unemployed</i>	-0.0733*** (0.0144)
<i>Student</i>	-0.145*** (0.0250)
<i>Retired</i>	-0.0624*** (0.0126)
<i>Other</i>	-0.0534*** (0.0157)
Constant	0.279*** (0.0229)
Election year-fixed effects	
	✓
Observations	12,120
R-squared	0.069

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: This table presents the LPM estimation of the impact of education on voter abstention. The regression includes all control variables, such as age, gender, marital status and working status, as well as election year fixed effects.

Table A10 in the Appendix and Table 13 provide the first and second stage of the IV regression, controlling for election year-specific fixed effects. Employing an IV regression addresses the endogeneity bias.

The LPM estimation previously indicated a positive and statistically significant relationship between education and electoral participation. The IV estimation yields a higher coefficient; however, it is not statistically significant at conventional levels, with a p-value close to 0.15. This suggests that we need to be cautious when interpreting these results and the need for further research.

Table 13: Second-stage IV estimates of the effect of education on the probability of voting in Portugal

	(1) Vote
YearsEducation	0.031 (0.023)
Age	0.010*** (0.003)
Female	0.015 (0.013)
Married	0.109*** (0.016)
WorkingStatus	
<i>Unemployed</i>	-0.038 (0.042)
<i>Students</i>	-0.138*** (0.026)
<i>Retired</i>	-0.039 (0.029)
<i>Other</i>	-0.006 (0.055)
Constant	-0.057 (0.379)
Election year-fixed effect	✓
Observations	12,120
R-squared	0.033
F-Test (instrument)	5.500 (0.0002)

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Computed using data from ISSP.

Note: This table presents the result of the second stage of the IV estimation. The dependent variable is self-reported voting, and the key explanatory variable is the predicted years of education from the first stage. Control variables are consistent with those used in the first stage. The regression includes election fixed effects.

The F-test for the instrument is 5.5 and the p-value is 0.0002. The regression includes survey year-fixed effects. The Wald F statistic Cragg-Donald weak identification test is 5.639, which is below the Stock-Yogo weak ID critical values for 10% maximal IV relative bias, 10.27.

8. Conclusions

Voter turnout has been declining across democratic countries, including Portugal. However, significant gaps remain in understanding the factors driving this trend, particularly the role of education in shaping electoral participation. This dissertation aimed to contribute to the existing literature by examining the impact of educational attainment on voter participation in Portugal.

The empirical analysis used data from ISSP to explore this relationship. This data, collected through surveys in 2003, 2004, 2006, 2008, 2012, and 2013, covers various topics, including information on the Portuguese parliamentary elections held in 2002, 2005, and 2011. The analysis employs the Linear Probability Model, addressing potential endogeneity bias through an Instrumental Variable approach.

The main analysis indicates a positive causal effect of education on voter turnout, with each additional year of schooling increasing the probability of voting by 5.1 percentage points. Including survey year-fixed effects allows for a more detailed analysis, yielding higher explanatory power. The robustness of these findings was tested by controlling for election year-fixed effects, resulting in an estimate for education of 3.1. Although it is not statistically significant at the 10% level, the p-value is close to 0.15, indicating that the relationship may be similar; however, this result must be interpreted with caution. Analyzing the effect by gender, the point estimate for education is higher for females than males. Across age groups, the effect proved to be more pronounced in the younger cohorts (18-30 years), with this influence gradually diminishing in older groups.

Despite these findings, all regressions revealed low R-squared values, implying that there are likely other important factors influencing electoral participation that were not included in the analysis.

Regarding the limitations of the analysis performed in this dissertation, one of the main limitations is that there are only three parliamentary elections – 2002, 2005, and 2011 – under analyse, which may restrict the ability to capture long-term trends or account for variations in voting behaviour across different political and economic contexts. Notably, voter turnout has declined since the last election included in the study, highlighting the importance of performing this analysis with more recent data.

Additionally, the sample size is relatively small and uses data collected between 2003 and 2013, which may overrepresent individuals with lower levels of education, as it does not fully represent the upward trend in educational attainment in Portugal over the past decade.

Future research should incorporate more quantitative and qualitative variables, such as political interest, political spectrum, voting motivation, and trust in government, to gain a more comprehensive understanding of the relationship under study. This was not possible in this study since the dataset is a compilation of multiple surveys.

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Appendix

Table A1: Descriptive Statistics by survey year

	Observations	Mean	Std.Dev.	Min	Max
2003					
Vote	2581	.727	0.445	0	1
YearsEducation	2573	8.005	5.128	0	24
Age	2581	48.699	18.046	18	90
Female	2581	.587	0.492	0	1
Married	2581	.601	0.490	0	1
WorkingStatus	2579	2.272	1.546	1	5
2004					
Vote	1523	.737	0.440	0	1
YearsEducation	1523	7.856	5.043	0	22
Age	1523	49.176	17.807	18	90
Female	1523	.586	0.493	0	1
Married	1523	.613	0.487	0	1
WorkingStatus	1522	2.231	1.533	1	5
2006					
Vote	3553	.745	0.436	0	1
YearsEducation	3553	7.509	5.044	0	24
Age	3553	49.584	18.477	18	91
Female	3553	.597	0.491	0	1
Married	3553	.606	0.489	0	1
WorkingStatus	3547	2.191	1.542	1	5
2008					
Vote	963	.694	0.461	0	1
YearsEducation	963	8.701	5.215	0	24
Age	963	49.478	18.094	18	91
Female	963	.589	0.492	0	1
Married	963	.61	0.488	0	1
WorkingStatus	963	2.114	1.486	1	5
2012					
Vote	2663	.716	0.451	0	1
YearsEducation	2663	8.678	5.117	0	24
Age	2663	52.362	16.672	18	91
Female	2663	.582	0.493	0	1
Married	2663	.586	0.493	0	1
WorkingStatus	2663	2.072	1.340	1	5
2013					
Vote	854	.624	0.485	0	1
YearsEducation	854	8.906	4.989	0	24
Age	854	50.617	16.898	18	91
Female	854	.537	0.499	0	1
Married	854	.513	0.500	0	1
WorkingStatus	854	2.218	1.487	1	5

Source: Computed using data from ISSP.

Note: This table presents the descriptive statistics for dummy and continuous variables, by survey year.

Table A2: Working status by gender and survey year

Variable	Females	Males
2003		
WorkingStatus (%)		
Employed	49.97%	62.38%
Unemployed	6.94%	6.85%
Student	3.70%	4.13%
Retired	23.13%	25.14%
Other	16.26%	1.50%
2004		
WorkingStatus (%)		
Employed	52.35%	63.81%
Unemployed	5.72%	5.24%
Student	3.25%	3.49%
Retired	24.55%	26.35%
Other	14.13%	1.11%
2006		
WorkingStatus (%)		
Employed	56.11%	62.97%
Unemployed	7.26%	2.95%
Student	3.06%	3.09%
Retired	19.42%	27.49%
Other	14.14%	3.51%
2008		
WorkingStatus (%)		
Employed	56.08%	63.38%
Unemployed	8.29%	7.07%
Student	4.06%	5.30%
Retired	16.93%	23.74%
Other	14.64%	0.51%
2012		
WorkingStatus (%)		
Employed	47.45%	52.96%
Unemployed	23.82%	23.34%
Student	3.23%	1.71%
Retired	16.85%	18.94%
Other	8.65%	3.05%
2013		
WorkingStatus (%)		
Employed	50.33%	58.48%
Unemployed	11.33%	10.13%
Student	0.87%	2.03%
Retired	26.80%	26.58%
Other	10.68%	2.78%

Source: Computed using data from ISSP.

Note: The table presents the weighted percentage of each working status by gender and survey year.

Table A3: Probit estimates of the effect of education on the probability of voting in Portugal

VARIABLES	(1) Vote	(2) Vote	(3) Vote
Age		0.0191*** (0.000906)	0.0210*** (0.00114)
Female			0.00548 (0.0260)
Married			0.290*** (0.0260)
WorkingStatus			
<i>Unemployed</i>			-0.211*** (0.0417)
<i>Student</i>			-0.358*** (0.0677)
<i>Retired</i>			-0.165*** (0.0436)
<i>Other</i>			-0.147*** (0.0491)
YearsEducation	-0.00928*** (0.00232)	0.0297*** (0.00302)	0.0339*** (0.00321)
Constant	0.663*** (0.0226)	-0.589*** (0.0620)	-0.754*** (0.0741)
Survey year-fixed effect	✓	✓	✓
Observations	12,129	12,129	12,120

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: This table present the probit estimations for the effect of education on the probability of voting in Portugal. Column (1) presents the unconditional effect of education on voter turnout. Column (2) controls age-related differences in voting behavior. Column (3) shows the full specification, including demographic and situational variables. All regressions control for survey year-fixed effects.

Table A4: Marginal Effects of Probit estimates of the effect of education on the probability of voting in Portugal

VARIABLES	(1) Vote	(2) Vote	(3) Vote
Age		0.0062*** (0.000275)	0.0066*** (0.00034)
Female			0.00172 (0.00818)
Married			0.09144*** (0.00808)
WorkingStatus			
<i>Unemployed</i>			-0.067*** (0.0138)
<i>Student</i>			-0.1185*** (0.0241)
<i>Retired</i>			-0.0522*** (0.0139)
<i>Other</i>			-0.0463*** (0.0158)
YearsEducation	-0.00311*** (0.00078)	0.0096*** (0.00096)	0.01070*** (0.00099)
Constant	0.721*** (0.00407)	0.721*** (0.00398)	0.721*** (0.00392)
Survey year-fixed effect	✓	✓	✓
Observations	12,129	12,129	12,120

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: This table present the marginal effects of the probit estimations for the effect of education on the probability of voting in Portugal. Column (1) presents the marginal effects of the unconditional effect of education on voter turnout. Column (2) controls age-related differences in voting behavior. Column (3) presents the effect for the full specification, including demographic and situational variables. All regressions control for survey year-fixed effects.

Table A5: First-stage IV estimates of the effect of education on voter turnout by gender

VARIABLES	(1) <i>Female</i> YearsEducation	(2) <i>Male</i> YearsEducation
Age	-0.159*** (0.00696)	-0.110*** (0.00948)
Married	-0.864*** (0.101)	-0.628*** (0.145)
WorkingStatus		
<i>Unemployed</i>	-1.805*** (0.155)	-1.632*** (0.203)
<i>Student</i>	-1.037*** (0.227)	1.045*** (0.280)
<i>Retired</i>	-1.168*** (0.167)	-1.116*** (0.210)
<i>Other</i>	-2.080*** (0.143)	-2.406*** (0.348)
CompulsorySchooling		
<i>4 years (Female)</i>	-0.135 (0.222)	-
<i>4 years (Male)</i>	-	-0.159 (0.264)
<i>6 years</i>	0.323 (0.222)	0.520* (0.315)
<i>9 years</i>	0.0149 (0.344)	0.118 (0.463)
Constant	16.56*** (0.464)	14.46*** (0.623)
Survey year-fixed effects	✓	✓
Observations	7,097	5,023
R-squared	0.421	0.295

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: This table presents the results of the first stage of the IV estimation by gender. The dependent variable is *YearsEducation* and the instrumental variable is *CompulsorySchooling*. Additional explanatory variables such as age, marital status, and working status were used. The regression controls for survey year-fixed effects.

Table A6: Probit estimates of the effect of education on the probability of voting in Portugal by gender

VARIABLES	(1) Vote	(2) Vote
Age	0.0210*** (0.00152)	0.0208*** (0.00182)
Married	0.263*** (0.0336)	0.323*** (0.0438)
YearsEducation	0.0361*** (0.00429)	0.0304*** (0.00487)
WorkingStatus		
<i>Unemployed</i>	-0.220*** (0.0529)	-0.204*** (0.0689)
<i>Student</i>	-0.535*** (0.0870)	-0.123 (0.108)
<i>Retired</i>	-0.195*** (0.0576)	-0.137** (0.0676)
<i>Other</i>	-0.141*** (0.0547)	-0.243* (0.131)
Constant	-0.700*** (0.0997)	-0.807*** (0.107)
Survey year-fixed effect	✓	✓
Observations	7,097	5,023

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: The dependent variable is *Vote*. This table presents the probit estimation results for the effect of education on voter turnout, where Column (1) reports the results for females and Column (2) for males. Both regressions include survey year-fixed effects.

Table A7: Marginal Effects of the Probit estimates of the effect of education on the probability of voting in Portugal by gender

VARIABLES	(1) Vote	(2) Vote
Age	0.0067*** (0.00046)	0.0065*** (0.00054)
Married	0.0832*** (0.0105)	0.1003*** (0.0134)
YearsEducation	0.0114*** (0.00134)	0.00946*** (0.00149)
WorkingStatus		
<i>Unemployed</i>	-0.0705*** (0.0175)	-0.0645*** (0.02256)
<i>Student</i>	-0.184*** (0.0325)	-0.0381 (0.0345)
<i>Retired</i>	-0.0621*** (0.0186)	-0.0426** (0.0212)
<i>Other</i>	-0.044** (0.0175)	-0.078* (0.0440)
Constant	0.719*** (0.00513)	0.724*** (0.00604)
Survey year-fixed effect	✓	✓
Observations	7,097	5,023

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: The dependent variable is *Vote*. This table presents the marginal effects of the probit estimation results for the effect of education on voter turnout, where Column (1) reports the results for females and Column (2) for males. Both regressions include survey year-fixed effects.

Table A8: Probit estimates of the effect of education on the probability of voting in Portugal

VARIABLES	(1) Vote
Age	0.0210*** (0.00114)
Female	0.00738 (0.0259)
Married	0.292*** (0.0259)
WorkingStatus	
<i>Unemployed</i>	-0.198*** (0.0415)
<i>Student</i>	-0.354*** (0.0674)
<i>Retired</i>	-0.174*** (0.0435)
<i>Other</i>	-0.152*** (0.0491)
YearsEducation	0.0330*** (0.00319)
Constant	-0.738*** (0.0720)
Election year-fixed effects	✓
Observations	12,120
Marginal effect (YearsEducation)	0.0104356*** (0.0009953)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: The dependent variable is *Vote*. This table presents the probit estimation results for the effect of education on voter turnout, accounting for election year-fixed effects.

Table A9: Marginal Effect of the Probit estimates of the effect of education on the probability of voting in Portugal

VARIABLES	(1) Vote
Age	0.0066*** (0.00034)
Female	0.0023 (0.00819)
Married	0.0924*** (0.00809)
WorkingStatus	
<i>Unemployed</i>	-0.063*** (0.0137)
<i>Student</i>	-0.117*** (0.0241)
<i>Retired</i>	-0.0552*** (0.0140)
<i>Other</i>	-0.0481*** (0.0159)
YearsEducation	0.0104*** (0.00099)
Constant	0.721*** (0.0039)
Election year-fixed effects	✓
Observations	12,120

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Computed using data from ISSP.

Note: The dependent variable is *Vote*. This table presents the marginal effects of the probit estimation results for the effect of education on voter turnout, accounting for election year-fixed effects.

Table A10: First-stage IV estimates of the effect of education on the probability of voting in

Portugal

	(1) YearsEducation
Age	-0.137*** (0.006)
Female	-0.410*** (0.082)
Married	-0.607*** (0.081)
WorkingStatus	
<i>Unemployed</i>	-1.655*** (0.122)
<i>Student</i>	-0.103 (0.184)
<i>Retired</i>	-1.054*** (0.130)
<i>Other</i>	-2.202*** (0.127)
CompulsorySchooling	
4 years (Male)	-0.007 (0.231)
4 years (Female)	-0.113 (0.212)
6 years	0.506*** (0.181)
9 years	0.178 (0.276)
Constant	15.605*** (0.373)
Election year-fixed effects	✓
Observations	12,120
R-squared	0.365
F-Test (instrument)	5.500 (0.0002)

Robust standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Computed using data from ISSP.

Note: This table presents the results of the first stage of the IV estimation. The dependent variable is *YearsEducation* and the instrumental variable is *CompulsorySchooling*. Additional explanatory variables such as age, marital status, and working status were used. The regression controls for election year-fixed effects.

The F-test for the instrument is 5.5 and the p-value is 0.0002. The regression includes survey year-fixed effects. The Wald F statistic Cragg-Donald weak identification test is 5.639, which is below the Stock-Yogo weak ID critical values for 10% maximal IV relative bias, 10.27.