

# Does Democracy promote Education?

An empirical study on the impact democracy has on education levels in a country.

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## **ABSTRACT**

The purpose of this paper is to examine if, and under what conditions, democracy promotes education. The investigation is based on theoretical models where the level of income, income inequality and ethnical fractionalization are assumed to affect the impact democracy has on the level of education in a country. Based on panel data, regression analyses are performed with the level of education as the dependent variable. For quality purposes two separate measurements are used for the democracy and education variables respectively. The empirical results support the relationship between secondary school enrollment rate and democracy while government spending on education shows little correlation with democracy. Further, the results indicate that low income levels in a country lowers the effect democracy has on education.

Keywords: Democracy, Education, Median Voter Theorem, Lipset Hypothesis, Political Imperfections, Regression Analysis

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## 1. INTRODUCTION

Democracy has spread over the world since the third wave of democratization started in the 1970s (Huntington, 1992). The transitions into democracy have taken different forms and been caused by different reasons. The subject is more topical than ever with the politics the USA has executed during the last decade in Iraq and Afghanistan under the command of George W. Bush. In the same way as many former colonies were introduced to democracy in the 1950s, the current world situation shows many cases where outside parties have pushed for a transition. The neoconservative view is characterized by the conviction that western style democracy is the superior form of political system (Fukuyama, 2006). It is however important to question if democracy always gains everyone in a country. As knowledge is a cornerstone in the democratic society, it is commonly argued that democracy favors education and knowledge.

Democracy is based on the idea that the citizens of a country should make the important decisions, hence they need to know what they shall make decisions about. Already Aristotle recognized that a functioning state needs educated people. He states that “...*the legislator should direct his attention above all to the education of youth, for the neglect does the constitution harm*” (Aristotle, 350BC, Politics, Book Eight, Part 1). Education promotes democracy since people can make better voting decisions and it is therefore a cornerstone in a functioning and stable democracy (Lipset, 1959). If autocracy is dictatorship by the rich, democracy can be described as dictatorship by the poor and middle class. Since education is the best way for parents to improve the chances of a better future for their children (Keefer et al. 2004) democracy should gain the level of education in a country (Besley et al. 2006).

**The purpose of this paper is to examine whether democracy has a positive impact on the level of education in a country.**

In chapter 2 the paper begins with giving a background to the subject and an overview of related literature to frame the question in a proper context. Chapter 3 gives a theoretical background followed by a data overview in chapter 4. Chapter 5 and 6 give a presentation of the utilized methodology and empirical results. Lastly, the paper is concluded and some final remarks are given.

## 2. BACKGROUND AND RELATED LITERATURE

As mentioned, section 2.1 gives a background to the topic of democracy and education. The first fundamental question to cover is whom democracy favors. This is followed by reasoning on whether education is important and why it is of greatest value for the poor. Section 2.2 covers previous research on democracy and on the relationship with the level of education. Three articles that cover the relationship is presented to give an overview of frequently used methods and the results they achieve.

### 2.1 Background

One of the greatest advocates of democracy is Nobel Prize winner Amartya Sen. He argues that “*Politically unfree citizens –whether rich or poor – are deprived of a basic liberty and of a fundamental constituent of good living*” (2004, p10). He also emphasizes that not only economic growth matters to people, and highlights that democracy provides a security to people by letting them hold the rulers accountable for their decisions. Thus politicians, who are elected by the people, have greater incentives to follow the desires of the voters in order to be reelected. This argument implies that democracy will mean better conditions for the poor, which Sen illustrates with the fact that there has never been a major famine in a democratic country (1999).

Moreover, education is valuable for parents as it gives their children better opportunities for a good future (Keefer et al. 2004). High quality teachers and closeness to school are therefore high priorities for low-income parents who cannot afford private schooling or send their children abroad. Since the lower and middle income classes constitute the majority of voters in a country, democratic societies should spend more money on schooling, and in the long run provide better education and achieve higher school attendance and literacy rates.

In line with Sen there is a trend in the related academic literature indicating that democracy favors the poor (Gradstein, 2002). Meltzer et al. (1981) believe that a majority ruled democracy will automatically improve the situation for the poor, while authoritarian regimes favor the elites.

However, a criticism to the surveys on democracy’s effect on the poor is that most datasets available are skewed. Ross (2006) claims that most successful non-democracies are

excluded from the surveys, the reason being that successful authoritarian regimes have little incentives to report data. Meanwhile, poorer authoritarian regimes report data in order to be entitled support from agencies such as World Bank, IMF or UNDP. Consequently most analyses conducted on the subject are based on skewed datasets and hence not fully reliable.

## **2.2 Related Literature**

There is an extensive amount of academic literature dedicated to the relationship between democracy and economic growth (Haan et al. 2005, Heliwell 1994, Przeworski et al. 1993). A different way to investigate how democracy affects a country is to study the relationship between democracy and human development. The literature on this subject is narrower, although there are a growing number of studies on the relationship between democracy and human health (Kudamatsu, 2009; Besley et al. 2006, Franco et al. 2004). The relationship between democracy and education is covered in several articles where the opposite direction is examined; if education raises the probability of democratization (Glaeser et al. 2006). There is however little research done on the effects democracy has on the level of education, where the method of studying one continent is most common. This is illustrated by a review of Stasavage (2005) who examines how multiparty elections affect educational spending in Africa. Another common method is to cover the impact democracy has on human development, including a measure of education as a dependent variable. Two articles using this approach in different ways are reviewed. Vollmer et al. (2009) examine democracy's impact on literacy rates and life expectancy, controlling for other variables that may affect the impact. Tsai (2006) studies the impact democracy has on educational opportunities and physical well-being in developing countries.

### **Government spending: Continent Study**

Stasavage (2005) studies the relationship between multiparty elections and governmental spending on education in Africa during the 1990s. Data for electoral competition is gathered from the Africa Research Program at Harvard University and data for government spending is compiled from the World Bank Development Indicators covering the time span 1980-1996. The issue of data availability is a problem that Stasavage considers when drawing conclusions. Stasavage performs OLS and fixed effect regressions, controlling for logged GDP, Aid, rate of rural population and rate of population under 15 years. The results indicate that many countries initiated steps towards democracy during the period for

the study and that the introduction of multiparty elections was positively correlated with higher levels of government spending on education and on redistribution (2005) He further showed that the increased educational spending was mainly directed towards primary school while the university funding was unaffected. In line with Stasavage, Brown and Hunter (1999) emphasize that democratic countries tend to spend more on education and health than autocracies in Latin America.

#### **Human Development: Literacy Rates**

Vollmer et al. (2009) study democracy's effect on non-income dimensions of human development. They measure human development as literacy rate and life expectancy. A cross-section time-series FGLS regression analysis is performed covering the period 1970-2003. The regressions include interaction variables to check for the impact income, inequality, fractionalization and literacy have on democracy's effect on human development. The authors reach the results that democracy has a positive impact on the literacy rate. Among the explanatory variables their results show that income level has a positive impact, inequality is not significant and ethnic fractionalization has a negative impact on the literacy rate. The interaction variables included are not significant, indicating that democracy has a positive impact on human development, independently of economic development, ethnic fractionalization and education.

#### **Human Development: Educational Opportunities**

Tsai (2006) studies the impact democracy has on human development in developing countries. He uses two separate categories for human development; physical well-being and educational opportunities. The educational opportunities indicator is measured as primary school enrollment rate, rate of completing fifth grade and secondary school enrollment rate. He performs least absolute error regressions to allow outliers less influence over the results. Tsai further examines the rate of change in human development, measured as the level of human development 1995 - 1998 compared to 1975-1984. Lastly he controls for government spending on education as a percentage of GNP. The results show that the levels of education were significantly and clearly higher in democracies than in autocracies. The correlation between secondary school enrollment rate and income level was positive and significant while government spending on education was small and weakly significant. Tsai found that autocracies had faster improvement in enrollment rates for primary and secondary school than the democratic and semi-authoritarian countries did,

although he recognizes that most autocracies started out at lower levels of enrollment rates, making it easier to achieve high improvement rates. Democracies and semi-authoritarian countries did spend more money on education, but the greater amounts spent did not result in greater educational achievements, indicating a greater focus on universities (2006).

### 2.3 Summary

There is little doubt about the value of democracy and the freedom and power it gives the citizens. A democratic society should give the low and middle class in a country more power and gain their needs since they form a majority. Public services such as education are of great value for those who cannot afford private alternatives. According to these arguments education should be prioritized in democracies. Empirical research has supported these lines of argumentation, but concern should be directed to the reliability and quality of the data that the papers are based on.

Three articles with different approaches were reviewed to give a picture of the related literature covering democracies impact on education. The authors agree that democratic countries show higher levels of education, whether measured as literacy rate, government spending on education or school attendance rate. This holds for analyses with or without high-income countries and covering only one continent or the whole world. The impact democracy has on education and the reasons behind it are however disputed. Vollmer et al. and Stasavage emphasized a positive correlation between democracy and education. In contrast, Tsai rather found that autocracies had faster improvement in enrollment rates than the democratic and semi-authoritarian countries did. Stasavage and Tsai both reached the results that democratic governments spend more money on education than autocracies. The composition of the higher level of educational spending is however not clear, Stasavage found that it was mainly directed to primary school while Tsai found that the money was allocated to universities. Vollmer et al. found that the impact of democracy on human development is independent of parameters such as income, inequality and ethnic fractionalization. Their dependent variable for education is measured as literacy rate. This parameter could be seen as a weakness since it needs longer time spans to be affected than enrollment rates since it measures the education level of the entire adult population.

This paper contributes to the existing research in the field by exploring the effect of democracy on education covering the whole world. Secondary school enrollment rate is



used as a proxy for education. This will allow for detecting changes on education quicker than literacy rates allows for. Still the quality of the schooling is controlled for as parents do not send their children to secondary school if the primary school was of bad quality. Furthermore, not only secondary school enrollment rates will be taken into account but also the government spending on education. In the next section a theoretical framework is outlined to give a foundation for formulating the hypothesis that shall be tested in the empirical study.

### 3. THEORETICAL FRAMEWORK

In order to explore the possible effects democracy<sup>1</sup> has on education it is crucial to establish a theoretical framework. The first part of the theoretical review will cover theories that explain how democracy affects education. This will be done by studying differences between autocracies' and democracies' incentives to invest in social services. As education is an important social service it is assumed to be covered in the theoretical argumentations concerning social services. The distributional aspects of democracy and the role of the poor are explained in the Median Voter Theorem. The second part of the theoretical review will cover parameters that may affect the impact democracy has on the level of education. The third part will cover the causality question related to the topic.

#### 3.1 Nature of Political Systems

Olson (1993) presents a theory of economic incentives in autocracies and democracies. Olson assumes that political leaders, whether democratically elected or dictatorial act opportunistic. An autocrat therefore has incentives to encourage high productivity in his country, as this enables him to collect more from the people for his own use. Hence the autocrat does have incentives to provide the people with social services if he predicts that this will gain the productivity and thereby his own wealth.

Even if democratically elected political leaders are just as interested in maximizing their own wealth the autocrat will extract more resources in tax than the democratic leaders will. The reason for this is that democratically elected politicians can reach the majoritarian support they need by promising greater wealth to a group of people. This group would suffer if the leaders extracted too large tax rates. The autocrat does not have any such restrictions since he needs to satisfy less people. Olson's theory argues that autocrats do not always extract more from the people, but the extracted money in democratic societies is shared by the inhabitants. He does however point out that it is most often not distributed very equally (Olson, 1993).

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<sup>1</sup> According to the UN Democracy Fund the core concepts of democracy are the process where people elect their governments in periodic, transparent, free and fair elections. There should be political parties that form an opposition and hold the governing party accountable as well as a definition of the terms and conditions for the democratic governance and rule of law. Human rights, freedom of expression, access to information and transparency are further requirements in a democratic society ([www.un.org/democracyfund/XSituatingDemocracy.htm](http://www.un.org/democracyfund/XSituatingDemocracy.htm)).

Moreover, a key difference between an autocratic and democratic society is the time horizon aspect. An autocrat has incentives to ensure investors and people that security and property rights are guaranteed for a long time horizon, since this promotes economic development. But since there is no independent judiciary that ensures who will succeed the dictator, a promise that stretches over long time is not credible. Autocrats are vulnerable to uncertainty about the future and this creates short-term views in autocratic societies. The time horizons for political leaders in democratic societies are often even shorter than the autocrats' since the terms are fixed at a few years. But the rule of law<sup>2</sup> ensures predictability of succession and thereby security of long term property rights and individual rights (Olson, 1993). If an autocrat is uncertain about the future or expects to be overthrown he will likely try to extract as much income as possible, ignoring long term investments in public services such as education.

The model of distributive politics implies that incumbents in democratic political systems will provide more public services than will autocrats. An autocrat often relies on support from a small group of supporters with strong personal incentives, while democratically elected leaders needs a large number of citizens supporting them with weaker personal incentives (Glaeser et al. 2006). It is therefore cheaper for an autocrat to direct money directly towards the small group of supporters and for a democratic leader it is less costly to provide public services than give the many citizens money directly (Mesquita et al 2002). Autocrats will only redistribute to the people for ideological reasons or to stay in power or increase his own wealth (Vollmer et al. 2009).

### **The Median Voter Theorem**

The Median Voter Theorem is a public choice model on majority decision-making. The theory rests on the assumptions that all voters have single peaked preferences on a single dimension. This is a great simplification when it applies to national governmental elections, but the theory may give some insight in majoritarian decision-making. The Median Voter Theorem argues that if every voter in the society chooses the candidate or party closest to his own preferences the candidate that is closest to the median voter will

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<sup>2</sup> Rule of law means that there is an impartial judiciary and that the law applies to everybody. This means that the government is restrained by the law. Furthermore, the law is public which creates predictability for the citizens on how the country functions (World Bank, <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTLAWJUSTINST/>, 26 November 2009)

win the election. The theorem argues that in equilibrium the government will maximize the welfare of the median voter (Rosen, 2005).

Meltzer et al. (1981) argue that the income distribution in countries is skewed to the right. This means that the income of the median voter is lower than the income of the mean voter. In their argumentation they assume that the only governmental activities are redistribution and taxation and that voters are fully informed. These assumptions will lead to a government size that is optimal to the decisive individual. This individual could be a voter, a dictator or a marginal member of an elitist junta. In a country with universal suffrage and majority rule the mean voter is decisive. According to the median voter theorem, the level of redistribution and public services will be the level that is optimal to the median voter. Since the income redistribution in countries is skewed to the right social services which benefit the poor should be extensive in democracies (Meltzer et al. 1981).

### **3.2 Parameters that Affect the Impact Democracy has on Education**

This section will give a framework to variables that may affect the impact democracy has on the level of education. The Lipset Hypothesis outlines how the income level may affect the results of democracy. Political imperfections are presented as a possible explanation to the functioning of democracy.

#### **The Lipset Hypothesis**

Lipset argues that wealth in a country, meaning a low amount of real poor people, is a prerequisite for a functioning democracy. This is because only then could the mass intelligently choose responsible and democratic leaders (1959). The Lipset Hypothesis is empirically supported by Benhabib et al, who show that democracy has higher representation and is more stable in developed countries (2006). The authors explain this fact with richer countries having more to lose on introducing autocracy. In a high income country the richest will value freedom over authoritarian regimes that promise lower tax rates. Hence, democracy survives in richer countries. On the other hand, if you are poor in a low-income country, the value of more money might exceed the value of freedom. According to a UNDP report (2004) the majority asked in a survey in Latin America said that they would prefer autocracy to democracy if it means improving their economic situation (Ross, 2006).

### Imperfections on the Political Market

As presented above the Median Voter Theorem says that the median voter is decisive and since the income distribution in most countries is skewed to the right there should be great spending on social services such as education to the benefit of poor. Keefer et al. argue that this model does not hold and point out that there is not more redistribution in countries with high levels of income inequality. The number of countries that have competitive elections has risen dramatically during the 1990s and a great proportion of these new voters have low incomes. The introduction of elections does however not necessarily affect the poor positively; often the governments do not focus on policies that affect the poor. Keefer et al. argue that the theorem does not hold due to imperfections on the political market. Since public services such as education are most sensitive to those imperfections, the poor will be affected to a greater extent. They present three political imperfections that may affect the extent to which democracy favors the poor (2004).

Firstly, **lack of information** about how the politicians perform impedes the voters to hold politicians accountable and punish those who are governing badly. This will lead to higher levels of rent-seeking<sup>3</sup> among politicians instead of providing services to the people. Putting this in the context of education, the reason why the quality of schooling is not a preferred target by many politicians is the difficulty to measure and hence it is hard to take credit for. Furthermore, the time horizons are long, schooling needs a few years to show results; it is not until literacy is achieved that the positive results from improved education can be noticed. By that time the politician who introduced the education program may no longer be in office. Governments generally prefer spending money on targeted programs rather than on maintenance and hence building a new school in a certain area are more interesting for a politician than spending money on restoring the existing ones in other areas (Keefer et al. 2004).

Secondly, **social fragmentation** makes voters loyal to politicians from a certain group. Ethnical, religious and linguistic belongings affect the voting behavior to a great extent. Citizens that base their voting decision on such grounds are less able to hold their politicians accountable and will often stay loyal to the politician or political party even if they perform poorly. Polarized voting should affect the levels of social services negatively

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<sup>3</sup> Rent-seeking: diversion of economic resources for the benefit of political decision makers (Keefer, 2005. p6).

since the political focus is turned towards other matters (Keefer et al. 2004). Alesina et al. (2003) show that democracy is inversely related to ethnic fractionalization. They argue that ethnic fragmentation lowers the positive impact democracy has on the level of education, since it is harder for a government to introduce social services. In less fractionalized countries the democratic rule is stronger since there are fewer conflicts to take into account.

Thirdly, **political promises lacking credibility** makes the incumbents safer in their positions and this will increase their rent-seeking. If voters are not able to monitor if good quality social services are provided, politicians are likely to spend less on such posts. If voters are aware of the difficulty in monitoring the politicians, they will not believe in politicians who make pre-election promises on providing more and better social services. When political promises lack credibility the elections become less efficient in holding incumbents accountable, and it becomes difficult for newcomers to enter the political market. Furthermore, when promises of better social services are not credible politicians will be better off promising a smaller group of voters more. This is referred to as the “patron-client” relationship in the literature (Keefer et al. 2004).

These imperfections on the political market make it less likely that the voters elect responsible governments (Keefer et al. 2004). The need to constantly chase voters for the upcoming elections may create inefficient politicians and force them to short term solutions. This can lead to inefficient governments where important investments, which give no quick results, are neglected and cheap ways to buy voters are prioritized.

### **3.3 Causality**

There is a strong correlation between the level of education and democracy (Glaeser et al. 2006). Education raises the probability that people support democratic ideals and institutions (Kamens, 1988). The explanation for why education promotes democracy is according to Lipset that it broadens people’s minds, restrains them from joining extremist leaders and increases the capacity to vote rationally (1959). Higher educated people are more likely to be active citizens and participate politically; hence there is a positive relation between introduced compulsory schooling and voter turnout. Democracies with a high level of education are more enduring than democracies with low levels of education

(Glaeser et al. 2006). The effect education has on democracy means that there is a causality question. This relationship will be further discussed in the method section.

### 3.4 Summary

Democracy allows citizens to choose the leaders who offer the best governing. It also enables them to hold the politicians accountable and punish those who are governing badly. Providing education for their children is the best way for poor parents to improve the chances of a better future for their children. Therefore schooling is expected to be high on the political agenda in democratic countries.

Autocrats and democratically elected leaders are both assumed to act out of self-interest. Both types of leaders would therefore have incentives to provide education if they believe that it gains the productivity and thereby their own wealth. However, an important difference between the types of political systems is that there is no independent judiciary to guarantee the succession or the security of the autocrat. An autocrat who does not expect to stay in office for a long time will likely not prioritize long term investments such as education. The implication of the Model of Distributive Politics is that autocrats often relies on small groups of supporters and is therefore able to compensate them directly. Meanwhile, democratically elected leaders need a broader group of supporters and it will therefore be less costly to provide public services than compensating each individual citizen. The Median Voter Theorem implies that in a democratic country the median voter is decisive. Since the income distribution in most countries is skewed to the right, social services such as education should be prioritized in democracies.

These theoretical arguments speak for democracy having a positive impact on the level of education and on the government spending on education. However, there are factors that influence the extent to which democracy affects the level of education. The Lipset Hypothesis implies that a certain level of income is a prerequisite for a functioning democracy. Accordingly, a rich country values freedom higher than poor countries where many people struggle for survival.

Imperfections on the political market may hinder the functioning of the median voter being decisive and consequently make it less likely that voters elect responsible governments. Lack of information about the politicians' performances and focus on ethnical, religious or regional political matters contributes to irresponsible politicians being elected.

Consequently, less money is directed towards public services, such as education, to the benefit of the poor.

Based on the theoretical arguments presented above, I expect democracy to give higher school enrollment rates and greater government expenditure directed towards schooling. I further expect that the level of income, income inequality and social fragmentation affect how democracies perform in providing schooling. From these lines of argument the following hypotheses can be concluded:

*Hypothesis 1: Democratic countries promote education more than non-democracies do.*

*Hypothesis 2: Social fragmentation lowers the impact democracy has on the level of education.*

*Hypothesis 3: The greater the income inequality, the greater impact democracy has on the level of education.*

*Hypothesis 4: Low income level in a country will have a negative effect on democracy's impact on education. Lower income level means that there is less to redistribute.*

The listed hypotheses will be tested in an empirical model. The next section presents the data that used for this purpose.



## 4. DATA

To investigate the hypothesis of the paper the theoretical arguments presented in chapter 3 are applied on empirical data. The first section in this chapter presents the variables and data availability. The following section gives an overview of the data and relates it to the hypothesizes.

### 4.1 Data Availability

The study covers the period 1975-2005, providing data in 5 year intervals. As the paper studies the impact democracy has on the level of education it is crucial to include only self-governing states. The UN list of member nations, consisting of 193 countries is therefore utilized to select the sampling population for the study. Full overview of data availability is shown in Table 1.

The dependent variable in the regression is the level of education in a country. Two different measurements of this parameter will be used; government spending on education and secondary school enrollment rate. The government spending on education includes public and private schools, administration and subsidies for students. This expenditure is presented as percent of total government spending or as percent of GDP. The primary advantage for calculating education spending as a percentage of total government spending is that it is not affected by changes in relative prices in the economy and therefore simply reflects the priority of education from the government. Both measures are used in the regressions. The secondary school enrollment rate is presented as the ratio between the total number of students enrolled, independent on age, to the total number of children in the age group that corresponds to the secondary level of schooling. Consequently, figures greater than 100 percent are possible. Data for both educational variables are collected from the World Bank Development Indicators and averages for every 5 years are computed.

The independent variable in focus for this paper is the level of democracy. It is not obvious how to measure the level of democracy since many different factors can be included in such an index. In order to optimize credibility of the dataset two separate democracy indexes will be used. The first is the GASTIL index, produced by Freedom House, which is a non-governmental organization that has rated the freedom and democracy in countries

since 1973. Countries are given two separate scores on political rights and civil liberties respectively. Each index is scaled from 1 to 7, where lower scores represent higher degrees of freedom. The average score is computed for each country and based on the following scale a freedom status is provided. Average scores between 1 and 2.5 means that the country is rates as “Free”, between 3 and 5.5 is rates as “Partly Free” and between 5.5 and 7 is “Not Free”. (After 2003 the ratings where changed to “Partly Free” requiring scores between 3 and 5). The dataset covers between 149 and 189 countries for each year in the period covered in this study. In order to make the Freedom house rankings comparable in the regressions I will convert “Not Free” to 1, “Partly Free” to 2 and “Free” to 3.

The second dataset for democracy is the POLITY IV index. The index was developed by Ted Robert Gurr and it is a project that codes the authority characteristics in countries. It is currently produced by Center for Systemic Peace in conjunction with the Center for Global Policy. There is a dataset specially developed to suit time series analysis, named Polity 2, which will be used in the regression analysis. It consists of a combination of two datasets, ranking the level of democracy and autocracy respectively. The countries are graded on a negative 10 to 10 scale, where the lowest numbers represent fully institutionalized autocracies and high numbers are fully institutionalized democracies. The dataset measures democracy on three main characteristics; competitiveness of participation and open and free elections, institutional constrains on the exercise of power and civil liberties to all citizens. The greater span of scores, compared to the Freedom House ratings, enables smaller changes in political systems to show in the data. The number of countries available are however smaller in the Polity IV dataset, mainly due the exclusion of countries with less than 500.000 inhabitants.

Three control variables are included in the regressions in order to check if they affect the impact democracy has on the level of education as well as checking for direct impacts on the dependent variable. A set of dummy variables will also be used in the analysis. The included explanatory variables are income, income inequality and social fractionalization.

The income variable is included in the regression measured as GDP per capita in constant \$US 2000, and it is given in thousands. Data is available from the World Bank and average levels of GDP per capita are computed for every five years in the period 1975 to 2005. The

data coverage is extensive, between 122 and 181 countries are reported for each 5 year period.

As a proxy for income inequality in a country the Gini Coefficient is used. The greater the Gini Coefficient the greater the income inequality. The maximum value is one, which corresponds to one person receiving all income whereas zero, the lowest possible value, refers to all income earners receiving the same income. The Gini Coefficient is converted to percentage, between zero and 100, in the regression analysis. Data is collected from the World Bank Development Indicators. Since the data available from the World Bank is very limited before 1985, the dataset has been complemented with Gini values compiled by Deininger and Squire. The dataset is available at the World Bank website<sup>4</sup> and only the values ranked as “high quality” are used. When both datasets cover the same year an average is computed. The two datasets values seem to fit very well when there is overlapping, indicating that they can be seen as good complements. The data covering income inequality is however not extensive and even with the complementary data the number of countries in each 5 year period is between 43 and 102.

Furthermore, a dataset covering ethnical fractionalization is used as a proxy for social fractionalization. It is produced by Alesina et al. (2003) and ranges countries between zero and one. The score reflects the probability for two randomly chosen individuals from a country belonging to different ethnic groups, hence the higher the score the more ethnically fractionalized country. Data is collected over a great span of years (from 1979 to 2001) and from a wide range of national and international sources. Each country has only one value registered for the time period covered. Alesina et al. argue that in cross-country regressions covering 30 year horizons the ethnical score can be assumed to be consistent. Over longer periods different fertility rates across groups may change the ethnical fragmentation score. Changes in definitions of ethnical groups could also change the scores, but this factor is also assumed to be small enough to be ignored over a 30 year time horizon.

Finally, a set of dummy variables is included in the regressions. Dummies for each year in the study are included to control for time trends. Dummies for high-income countries and middle-income countries are included based on the World Bank categorization. Furthermore regional dummies are included to control for neighboring effects and

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<sup>4</sup> <http://go.worldbank.org/NUMCJERM60>, 17 August 2009

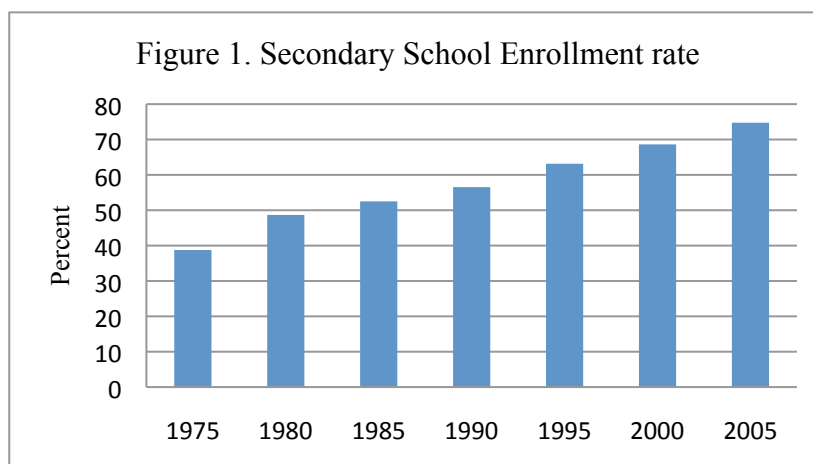
historical background. Regional belonging is collected from the World Bank categorization. A special dummy for former Soviet states is also included.

A summarization of the data is displayed in Table 1. For each variable the following summary is presented; the number of observations, the variable means, standard deviation, minimum value and maximum value. A correlation matrix shows that there is not a high degree of multicollinearity. The results are displayed in Appendix 1.

<b>Table 1. Variable Summary</b>	N	Mean	St. Dev	Min	Max
School	1136	57,94	34,02	0,60	156,48
Gov spend (% of tot gov.spend)	898	14,72	5,45	0,598	35,64
Govspend(% of gdp)	954	4,52	2,93	0,42	49,52
Democracy (Freedomhouse)	1173	2,07	0,82	1	3
Democracy (Polity 2)	1026	0,74	7,27	-10	10
GDP/capita (in thousands)	1126	5250,88	8305,50	0,736	52857,8
Gini	525	40,03	9,67	19,4	74,33
Ethnic Fractionalization	1281	0,44	0,26	0	0,93

## 4.2 Data Overview

In Figure 1 the secondary school enrollment rate is described over time. A clear positive development has occurred since the beginning of the period. The other measurement of educational level; governmental spending on education, does not show the same positive trend. The percentage of the total amount of government spending has been constant over time (see Figure 2).



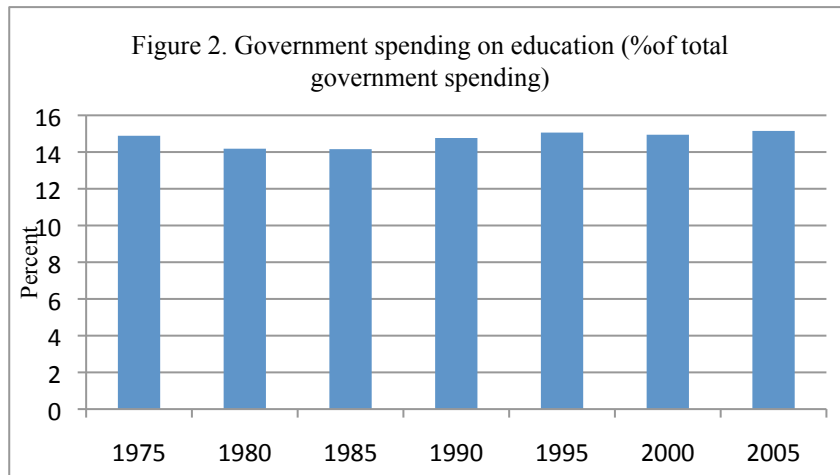
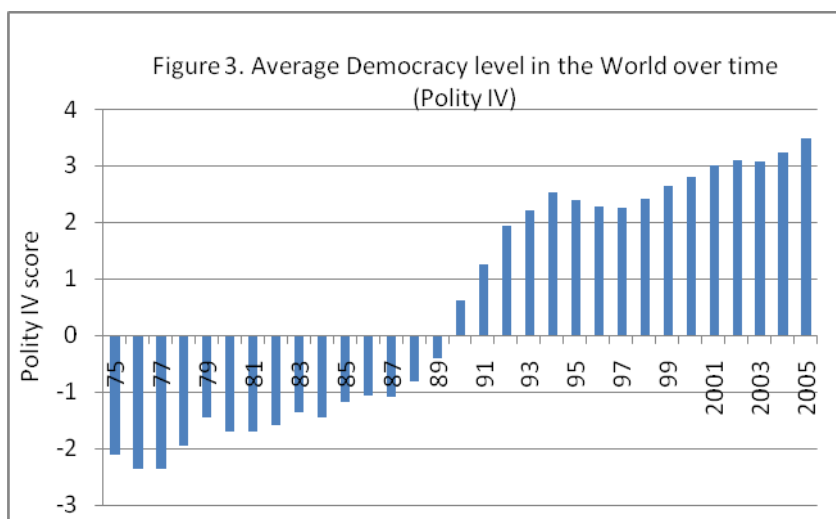


Figure 3 shows changes in the world average democracy score over time. Despite some backdrops there is a clear positive trend over time. The same trend is present in the Freedom House dataset for democracy.



Both democracy variables are lagged one time period, which corresponds to five years. This is to give democracy time to impact the level of education. The income variable, measured as GDP/capita in constant \$US 2000 will be included in the regressions in logarithmic form. The reason for this is its exponential shape detected in the data overview. When the natural logarithm is used the span of the variable becomes smaller which makes it less sensitive to extreme values and independent of units. The Gini variable is given in percentage and the ethnic fractionalization variable lies between zero and one. In some regressions dummy variables are included to control for year effects or regional effects.

The variables will be denoted as follows in the regressions:

DEMO (FH) = Freedom House Democracy index, lagged one time period

DEMO (P2) = Polity 2 Democracy index, lagged one time period

School = Secondary school enrollment rate

Gov/GDP = Government spending on education as percent of GDP

Gov/Tot = Government spending on education as percent of total government spending

GDP = Log of GDP/capita in constant \$US 2000

Gini = Gini Coefficient

Ethnic = Ethnical fractionalization

### 4.3 Summary

To explore the impact democracy has on education in an empirical analysis, data was collected for the variables that were relevant for the hypotheses. In order to give the regressions reliability two and three separate indexes were used for democracy and education respectively.

The data overview shows that democracy has spread throughout the world over the last 30 years. The secondary school enrollment rates have also increased but the percentage of government spending spent on education does not display a clear trend.

In the next section the methodology for the empirical analysis is presented.

## 5. METHODOLOGY

To investigate the relationship between democracy and education a regression analysis is performed with education as the dependent variable and the level of democracy as explanatory. Since the level of education is assumed to depend on a number of variables in addition to democracy a multiple regression analysis is performed. In the first section the data is handled and the appropriate method is chosen based on data tests. The following section presents specifications for the models that is used.

### 5.1 Method Choice

The dataset contains information about the differences between countries. It furthermore contains information on how the variables have changed over time, giving the data time series information. This combination of cross sectional and time series data is named panel data, which can be expressed as

$$y_{it} = \alpha + \beta' X_{it} + \gamma z'_{it} + \varepsilon_{it}, \quad (1)$$

where  $i=1, \dots, N$  denotes individuals (in this paper countries) and  $t=1, \dots, T$  denotes time (in this paper five year intervals).  $X'$  denotes a vector of independent variables and  $\alpha$  is a constant. Using panel data has several advantages. As a consequence of combining time series and cross sectional data there is more data to analyze and hence a greater variability. It further allows for heterogeneous countries (Harris et al, 2005). However, the structure of panel data also brings complications and errors that need to be addressed. Since there is missing data for countries in certain years the panel dataset in this study is unbalanced.

The Classical Linear Regression Model (CLRM) is based on a set of assumptions concerning disturbances. Two of these assumptions are of relevance to study when dealing with panel data. Firstly, in the CLRM the variance of the error term  $\varepsilon$  is constant for all  $i$ :

$$V(\varepsilon_i) = \sigma^2 \quad (2)$$

When this assumption is violated it is called heteroskedasticity, which means the variance is unequal. This implies that the conditional distribution of each level of education corresponding to a given democracy score does not have the same variance. This violation is very common in cross sectional data since the countries included are of different sizes and income levels resulting in scale effects being present (Gujarati. 2006). To detect

whether there is heteroskedasticity in the dataset a Breusch-Pagan test is performed (Thomas. 2005). The null hypothesis says that the variance for the error term is zero. When this is true there are no random effects. The results from the test are shown in Appendix 2. The significant result in the test (p-value= 0.000) indicates that the null hypothesis should be rejected, suggesting that the dataset is heteroskedastic.

Secondly, in the CLRM there is no autocorrelation between error terms  $\varepsilon_i$  and  $\varepsilon_j$ :

$$\text{Cov}(\varepsilon_i, \varepsilon_j) = 0 \text{ for all } i \neq j \quad (3)$$

(Thomas. 2005, Gujarati. 2006). If this assumption is violated, and the error terms are related, meaning there is a relation between the error term in the current time period and in the previous period, this is called autocorrelation. In the context of this paper it means the disturbance term related to one year in a specific country is not influenced by, or related to any other year's disturbance term for the same country. The First-order Auto Regressive Process models autocorrelation as:

$$\varepsilon_t = \rho\varepsilon_{t-1} + u_t, \quad (4)$$

where the error term in time period  $t$  depends on its own value in the previous time and on a random error term  $u_t$ . The extent to which the past error term affects the current error term is reflected in the coefficient of autocorrelation,  $\rho$ . This coefficient can take on values between -1 and 1, where the value zero reflects no autocorrelation. The problem with related error terms is that the regression analysis tends to show too high  $R^2$  values, too low standard errors and too high significance to the  $\beta$  coefficients. The assumption of no serial correlation is commonly violated in time series data. A Durbin Watson test is performed to check if there is autocorrelation in the dataset. The Durbin-Watson statistic lies between zero and four; where the values zero and four correspond to perfect correlation and the value two corresponds to no autocorrelation. Durbin and Watson have provided upper and lower critical values for the d-statistic as recommendations for determining whether there is autocorrelation (Thomas. 2005, Gujarati. 2006). Since the Durbin Watson test does not hold for lagged variables, the regression uses a non-lagged democracy variable. The results of the test are shown in Appendix 3. The value of the Durbin Watson statistic is below one, indicating that there is autocorrelation present in the dataset.



The tests for heteroskedasticity and autocorrelation through the Breusch-Pagan test and the Durbin-Watson test respectively have shown that both are present. With autocorrelation and heteroskedasticity the OLS estimators are still consistent and unbiased, however they are inefficient and standard errors are likely to be biased (Gujarati. 2006). To handle the autocorrelation and the heteroskedasticity present in my panel dataset I will use a data transformer and then apply OLS to the transformed data. This will be done by using Generalized Least Squares (GLS) (Gujarati, Thomas).

## 5.2 Summary

Based on the hypotheses drawn in the theory section I expect the following results in the empirical data:

*Hypothesis 1: Democratic countries promote education more than non-democracies do.*

The democracy variable is expected to have a positive coefficient in the regressions.

*Hypothesis 2: Social fragmentation lowers the impact democracy has on the level of education.*

The interaction variable between democracy and ethnical fractionalization is expected to be negative.

*Hypothesis 3: The greater the inequality the greater impact democracy has on the level of education.*

The interaction variable between democracy and income inequality is expected to be positive.

*Hypothesis 4: Low income level in a country will have a negative effect on democracy's impact on education, as low income level means that there less to redistribute.*

Income is expected to have a positive coefficient in the regressions. I also expect the middle and high income dummies to have positive coefficients.

In the next section the model specifications are outlined and the results presented.

## 6. MODEL SPECIFICATIONS AND RESULTS

A GLS random effects model is performed followed by the same regression specifications but with fixed effects. Further, a model where interaction variables are included is presented. Lastly, to handle the question of causality between democracy and education a cross lagged model is used.

All regressions are performed in the econometric software Stata. The  $R^2$  values indicate the percentage of the variation in the dependent variable that can be attributed to variations in the independent variables. In the tables a 90% significance level is indicated by (\*), a 95% significance level is indicated by (\*\*) and a 99% significance level is indicated by (\*\*\*)

### 6.1 GLS, Random Effects Model

The model takes the form

$$\text{Education}_{it} = \alpha_{it} + \beta_1 \text{Democracy}_{i(t-1)} + \beta_2 [\text{Log}(\text{GDP})_{it}] + \beta_3 \text{Gini}_{it} + \beta_4 \text{Ethnic}_i + \varepsilon_{it}. \quad (5)$$

The Ethnic Fractionalization variable does not have a time indicator since each country has the same value for the entire period in the study.

Firstly the school enrollment rate depending on democracy is investigated. This is followed by the same regressions but using government spending as independent variable. Both regression sets are performed twice using Freedom House index in the first and Polity 2 index in the second.

#### School Enrollment Rate as Dependent Variable

In the first regression secondary school enrollment rate is the dependent variable and democracy and income are independent. Step by step other variables and dummies are included. Results are displayed in Table 2.

<b>Table 2. GLS random effects</b>								
Dependent Variable: Secondary School enrollment rate								
	1	2	3	4	5	6	7	8
<i>Constant</i>	32,540***	41,889***	66,450***	70,551***	39,256***	35,919***	51,711***	58,532***
DEMO (FH)	3,811***		2,72**		-1,210		4,020***	
DEMO(P2)		1,084***		1,047***		0,029		1,026***
GDP	4,169***	3,545***	4,076***	3,335***	1,814***	1,491***	3,643***	3,067***
Gini			-0,566***	-0,466***	-0,357***	-0,308	-0,238*	-0,155
Ethnic			-15,690**	-17,914***	-17,183***	-18,398***	-4,683	4,345
1985					4,111**	4,396**		
1990					9,722***	10,027***		
1995					14,947***	16,619***		
2000					23,749***	23,031***		
2005					27,061***	26,406***		
Sub Saharan Africa							-18,314***	-20,599***
Latin America							-10,653***	-13,209***
Former Soviet States							26,481***	24,481***
South Asia							-6,819	-10,232*
High Income					45,427***	46,777***		
Middle Income					21,704***	23,027***		
R <sup>2</sup>	0,594	0,606	0,631	0,622	0,723	0,696	0,722	0,740
N	849	768	416	421	416	421	416	421

The impact of democracy on school enrollment rate is positive and significant on all specifications but when the year and income level dummies are included. The coefficients for Freedom House are smaller than for the Polity 2 index for all regressions but number 5 and 6 where the results are not statistically significant. The reason for the differences in size of the coefficients could be explained by that the Polity 2 index spans from -10 to 10 while the Freedom House only spans from 1 to 3. The sign of the coefficients can however be compared. To interpret the democracy coefficient in specification (2), it means that a one-point increase in the democracy score is associated with a 1,084 percentage units raise in the school enrollment rate.

As expected the estimated coefficient on logged GDP/capita is positive and significant for all specifications indicating that income level has a positive impact on secondary school enrollment rate. Since the income variable is included in logged format the interpretation of the coefficient will be  $\Delta y = (b/100) \Delta \%x$ . A one percent increase in GDP/capita is

associated with an increase in school enrollment rate with somewhere between 1, 5 to 4, 2 percent units depending on the regression specification.

When the Gini and ethnic fractionalization coefficients are added the number of observations decline. As expected from the hypotheses the income inequality and ethnic diversity coefficients are negatively related to school enrollment rates. The Gini data is included in the regression as percentage and the interpretation of the coefficient should be  $\Delta y = b\Delta x$ . An increase in the Gini coefficient with one percentage unit is associated with a decrease in school enrollment rate with about 0, 5 percentage units.

The year dummies are significant and greater for each year, supporting the trend shown in the data overview that democracy has increased throughout the world since 1975. The regional dummies show that the sub-Saharan Africa and the Latin America coefficients have greatly negative and significant signs while the Former Soviet states are highly positive and significant. To illustrate, a country in Sub-Saharan Africa is associated with 18,3 to 20,6 percentage points lower enrollment rate than a country outside the region, depending on which democracy index that is used. The positive and significant High-Income and Middle-Income dummies show that there is a clear difference in school enrollment rates between high and low income countries as well as between middle and low-income countries. This supports the expectations from the hypothesis that very low-income level is a hinder for redistribution and thus for education in a country.

The  $R^2$  values for all specifications suggest that the model is useful. The two different democracy indexes give consistent coefficient directions and significance levels.

### **Government Spending on Education as Dependent Variable**

As a second measure of the education in a country government spending on education is used. There are two different ways of measuring government spending, either as percentage of total government spending or as percentage of GDP. Firstly the government spending on education as a percentage of GDP is the dependent variable and democracy as independent variable. This is followed by the same regression only changing dependent variable to government spending on education as percentage of total government spending. As in the previous section, each set of regressions is performed twice, once for each democracy index. Results are displayed in Table 3.

Dependent Variable:	Gov/GDP	Gov/Tot	Gov/GDP	Gov/Tot	Gov/GDP	Gov/Tot	Gov/GDP	Gov/Tot
	1	2	3	4	5	6	7	8
<i>C</i>	3,694***	15,118***	4,070***	15,153***	2,968***	10,656***	3,572***	11,487***
DEMO (FH)	0,206	-0,041			0,217**	0,787		
DEMO (P2)			0,029**	0,006			0,052***	0,01
GDP	0,077**	-0,056	0,053	-0,068	0,119***	0,022	0,080***	0,066
Gini					0,010	0,063*	0,007	0,0256
Ethnic					-0,374	3,466*	-0,219	4,941**
R <sup>2</sup>	0,037	0,008	0,029	0,007	0,127	0,088	0,103	0,073
N	748	682	679	622	386	348	391	353

The R<sup>2</sup> values for all regressions are very low, indicating that independent variables explain little of the variation in government spending on education. Furthermore, the sizes of the coefficients are much lower than the regressions with school enrollment rate as dependent variable. The size and direction of the coefficients for the independent variables are similar whether government spending on education is measured as percent of GDP or as percent of total government spending. The only exception is the ethnic variable, which shows small and negative, but insignificant, values for the percent of GDP while positive, greater and significant values for government spending of total spending.

Based on the results so far, I draw the conclusion that democracy is not a good explanatory variable for government spending on education. The following regressions will therefore use only school enrollment rate as a dependent variable.

## 6.2 Fixed Effects Model

The random effects regressions performed and displayed in Tables 2 and 3 studied the levels of the variables included rather than the changes in the variables. I also want to observe the differences in education level between different countries depending on democracy. Therefore a fixed effects model will be used. This means that each country is given a separate intercept, hence functioning as a dummy variable (Harris et al. 2005). The downside of using such a method is the number of freedom values decreases greatly when the number of countries is large and the number of observation time points is low. This may result in low significance values and inefficient estimates.

To control if the dataset is suitable for using fixed effects a Hausman test is performed. The null hypothesis is that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If the null hypothesis is rejected, indicated by significant P-value and Prob>chi2 smaller than 0.05, then it is suitable to use the fixed effects regression analysis. The results from the Hausman test, shown in Table 4, indicate that the fixed effects model is suitable for the data material.

<b>Table 4. Hausman test: Fixed – Random</b>			
Ho: Difference in coefficients not systematic			
	Fixed	Random	Difference (F-R)
Democracy (P2)	1,065	1,047	0,018
Income	2,572	3,335	-0,763
Gini	0,113	-0,466	0,579
Prob>chi2 = 0,0000			

In order to control for country specific factors I perform the same regressions as in Table 2, but change it from random to fixed effects. The results are displayed in Table 5.

<b>Table 5. GLS fixed effects</b>						
Dependent Variable: Secondary School Enrollment Rate						
	1	2	3	4	5	6
C	39,264***	46,311***	37,370***	42,645***	51,273***	45,660***
DEMO (FH)	2,439**		1,898		-2,026**	
DEMO (P2)		1,004***		1,065***		-0,098
GDP	2,981***	2,325***	3,485***	2,572***	0,813*	0,595
Gini			0,07	0,112	-0,128	-0,060
Ethnic			dropped	dropped	dropped	dropped
Year					Yes	Yes
R <sup>2</sup>	0,593	0,597	0,528	0,506	0,115	0,085
N	849	768	416	421	416	421

Studying the first four regressions the R<sup>2</sup> values show robust results. The democracy coefficients are positive and for most specifications significant. They do however give lower coefficients in the fixed effects regressions than the random effects regressions, indicating that the effect of democracy on education is greater across countries than it is within countries. The income coefficients are positive and significant with similar size as the random effects regressions. It is interesting to note that the Gini coefficients are small

and insignificant, opposed to the results from the random effects regressions where they showed negative and in most regressions highly significant results. This suggests that the effect of inequality on education is strong across countries whereas changes within a country give little effect. The variable for ethnic fractionalization is dropped in the fixed effects regressions since there is only one observation for each country. The same holds for the regional dummies and for the income level categories. In the last two regression specifications year dummies are added. The model is no longer robust and the coefficients are small and insignificant.

### 6.3 Interaction Variables

A third model is applied, adding interaction variables between democracy and the other independent variables. This allows investigating how the variables affect the impact democracy has on the level of education. The model with interaction variables takes the form;

$$\text{Education}_{it} = \alpha_t + \beta_1 \text{Demo}_{i(t-1)} + \beta_2 [\text{Log}(\text{GDP})_{i(t-1)}] + \beta_3 \text{Gini}_{i(t-1)} + \beta_4 \text{Ethnic}_i + \beta_5 \text{Demo}_{i(t-1)} * [\text{Log}(\text{GDP})_{i(t-1)}] + \beta_6 (\text{Demo}_{i(t-1)} * \text{Gini}_{i(t-1)}) + \beta_7 \text{Demo}_{i(t-1)} * \text{Ethnic}_i + \varepsilon_{it}. \quad (6)$$

The three different interaction variables are used in separate regression sets. The results are displayed in Table 6. The regressions are performed with random effects since a fixed effects model does not allow inclusion of the ethnic fractionalization variable.

<b>Table 6. GLS random effects</b>						
Dependent Variable: Secondary School Enrollment Rate						
	1	2	3	4	5	6
<i>C</i>	36,108***	40,483***	53,893***	71,080***	61,104***	70,351***
DEMO (FH)	1,329		8,773*		5,309**	
DEMO (P2)		0,711***		0,420		1,298***
GDP	3,067***	3,568***	4,051***	3,345***	4,054***	3,346***
Gini			-0,257	-0,471***	-0,572***	-0,480***
Ethnic			-15,569**	-18,486***	-3,699	-16,972**
DEMO*GDP	0,576***	0,086***				
DEMO*Gini			-0,149	0,015		
DEMO*Ethnic					-0,576	-0,599
R <sup>2</sup>	0,604	0,606	0,634	0,617	0,631	0,620
N	849	768	416	421	416	421

The interaction variables are interpreted as school enrollment rate depending on changes in democracy and the level of income. The first two regressions include democracy, GDP and their interaction variable. The small but positive and significant interaction coefficients indicate that increases in the school enrollment rate due to democracy are stronger in countries with higher income. In the following four regressions the Gini and Ethnic Fractionalization variables are included as well as the interaction variables for Democracy-Gini and Democracy-Ethnic Fractionalization respectively. None of these interaction variables are statistically significant indicating that the effect of democracy on education is not dependent on circumstances such as income inequality and ethnic fractionalization. This contradicts the implications of the median voter theorem, rather indicating that democracy itself is sufficient to promote education.

#### 6.4 Cross Lagged Model

The causality between education and democracy is not obvious as discussed in the theoretical section. To control if the assumed impact of democracy on education exists a cross lagged model is applied. This means that the dependent variable is included as an independent variable in lagged form. The model takes the form:

$$\text{Education}_{it} = \alpha_{it} + \beta_1 \text{Education}_{(t-1)} + \beta_2 \text{Democracy}_{(t-1)} + \varepsilon_t. \quad (7)$$

In this model the level of education is explained by the level of democracy in the previous period and controls for the level of education in the previous period. The level of education in one period could not have affected the level of democracy in a previous period. This means that the model should exclude all effects from education on democracy (Lindgren, 2006). The results are shown in Table 7.



<b>Table 7. GLS random effects</b>				
Dependent variable: Secondary School Enrollment Rate				
	1	2	3	4
C	3,822***	6,961***	4,796*	7,285***
School (lagged)	0,952***	0,953***	0,891***	0,881***
DEMO (FH)	1,730***		1,094*	
DEMO (P2)		0,163***		0,150**
GDP			0,620***	0,642***
Gini			0,029	0,027
Ethnic			-0,663	-1,006
R <sup>2</sup>	0,935	0,938	0,934	0,938
N	869	782	402	406

The large R<sup>2</sup> values in the model show a strong correlation between the education level at one point of time and in the previous period. The democracy coefficients are positive and significant, but smaller than in the random effects regressions. The significant results suggest that the expected causality from democracy to education is robust.

## 6.5 Summary

In order to examine the relationship between democracy and education a number of regressions have been performed. Each regression was completed twice using two separate democracy indexes. The first set of regressions was based on a random effects model with secondary school enrollment rates as dependent variable. The model gave robust results. The democracy coefficients were positive and statistically significant for all specifications but when the year and income group dummies were added. The income variable showed positive and highly significant results and the income inequality and ethnic variables were negative and in most specifications significant. When the same set of regressions was performed with government spending on education as dependent variable the results were no longer robust. The coefficients were very small and insignificant and it could be concluded that it was not a good model.

The fixed effects model with secondary school enrollment rate as dependent variable showed robust results. The democracy coefficients were positive and for most specifications significant. A comparison to the results in the random effects model suggests that democracy's effect on education is vaster across countries than within. The inequality coefficients were, in contrast to the random effects model, small and insignificant,

indicating that the effect of inequality on education matter to a greater extent across countries. When the year dummies were included in the regressions the results were no longer robust and the coefficients are small and insignificant.

A model where interaction variables were included was performed. The interaction variable between democracy and income level was small but positive and significant. This suggests that increases in secondary school enrollment rates due to democracy are stronger in countries with higher income. The interaction variables for democracy-inequality and for democracy–ethnic fractionalization were both insignificant. This indicates that the democracy’s impact on education is not heavily dependent on circumstances such as inequality and ethnic fractionalization.

Lastly, a cross-lagged model was performed to handle the question of causality. The positive and significant coefficients for democracy, even after including the dependent variable in lagged form, suggest that democracy has an effect on education.

The next section provides a discussion on the data materials and the empirical results followed by concluding remarks.

## 7. DISCUSSION

The empirical model tested the impact democracy has on education. The panel data set contained a lot of information both over time and across countries. The number of observations was high and the use of two separate democracy indexes as well as two different measurements of education increased the quality of the study. Although the number of observations was high there were many countries excluded from the data set. Particularly after including the Gini and Ethnic Fractionalization variables the data became limited. Questions concerning the randomness of the missing data are of relevance when interpreting the empirical results. Some poor countries are more likely to report data in order to be entitled aid and loans while non-democratic countries that are more isolated are less keen on reporting.

Another concern regarding the empirical performance is the quality of the variables. Secondary school enrollment rates are used as a dependent variable, but the actual attendance rates would have given a truer picture as the enrollment rates may be exaggerated. Unfortunately such data was too limited to be used in the analysis.

The diversity in measurement of education in a country enriched the analysis. While the secondary school enrollment rates gave the expected results the regressions with government spending on education as dependent variable proved to be a bad model. This seemed surprising at first. A possible explanation is that in a low-income country initial increases in income may raise the spending on education. But with high-income levels in a country there might already be great resources allocated to education, making it possible to allocate more resources towards other public services.

Another explanation to why democracy and income are bad explanatory variables to the rate of government spending on education could be the political ideology in a country. Independent of if a country is democratic or autocratic, rich or poor, countries prioritize public services differently. To illustrate; the USA have high democracy scores and are among the richest countries in the world. The Gini coefficient for the US indicates great inequality. According to the theory the circumstances are right to create high levels of education. The enrollment rates in the USA are high but the government spending on education as percentage of total government spending is below world average and

measured as percentage of GDP it is only slightly above world average. Priority and ideology are possible explanations as the military is an important post in the US state budget and private schooling is common. The ideology influence is further illustrated by high levels of education in the Former Soviet states. The dummy in the regressions shows greatly negative and significant results for this group of countries. There are 14 Former Soviet states that report data, and they all show enrollment rates above 82% compared to world average on 75%.

Theoretical models give a simplified picture of the reality. The arguments above point out the difficulty in using cross-country and time series analysis. Countries differ greatly in many aspects, which make it difficult to compare them. It is a balance to choose the right amount of variables to include in the regressions. By including more control variables the number of observations declines and the significance in specific coefficients decreases. The risk of multicollinearity becomes greater. Meanwhile it is important to be aware of the diversity of components that impact the variables in the analysis. Country characteristics such as population density and demography may impact the influence democracy has on education. Great land areas may make it more complicated and expensive to provide schooling. A young country population means that there are less people in the work force and more people in need of schooling. Furthermore, colonial history may affect the priority of education. Some colonial powers introduced schooling while others did not have such focus. Furthermore, the number of democratic years in a row may impact the performance of democracy since it means more experience and more developed institutions.

An interesting observation from the data is that there are two types of non-democratic countries that still have very high secondary school enrollment rates. Former Soviet states such as Tajikistan, Kyrgyz Republic, Moldova, Kiribati, Uzbekistan and Azerbaijan show low inequality scores but low income levels. The other group of countries with low democracy scores but high education levels is oil exporting countries in the Persian Gulf. They range high on the world income list, have high enrollment rates but very low democracy scores. An immediate explanation would be the richness in oil. However, explaining the good performances in the Persian Gulf by resource density is too simplified. There are several examples of countries rich in resources that do not follow the same pattern, illustrated by countries such as Congo, Colombia, Iran, Nigeria and Venezuela.

The discussion above shows on the complexity of the issue. The ideology and politics in a country are perhaps more decisive for the education spending in a country than the political institutions. The importance of political ideology for the education level in a country is an interesting topic for future research.

## 8. CONCLUSION

Democracy requires the citizens to elect their leaders and make choices about which representative they believe will promote their interest. Education enables people to make better voting decisions and to hold the government accountable. In a majoritarian voting system the low and middle income citizens represent a great percentage of the population and hence have great influence over the election results. As education is the best way for parents to improve their children's chances of a better future, it is expected that democratic countries will put high priority on schooling. This paper has examined whether democracy has a positive impact on education in a country.

The theoretical models used in the paper imply that democracy promotes education more than non-democratic countries do. It further argues that income inequality increases the effect democracy has on education, and social fragmentation is expected to have a negative effect on the performance of democracy. Lastly, low income in a country decreases the impact democracy has on education, as there is less resources to redistribute.

Whether democratic countries promote education more than non-democracies do was tested empirically. The results depend largely on how the level of education is measured. When secondary school enrollment rate is used, the democracy coefficients are positive and statistically significant with only few exceptions. The results suggest a strong correlation between democracy and education independently of which democracy index that is used, supporting the theory that democracy has a positive impact on education.

When education is measured as government spending on education, as percent of either GDP or total government spending, the results are no longer robust. This suggests that the variables included are not providing a good explanation to variations in the rate of government spending on the level of education in a country. These results are similar to Tsai's who found that school enrollment rates and rate of completing school were positively related to democracy while government spending on education gave small and weakly significant results (2006). This stands in contrast to Stasavage, who found that democracy is associated with higher levels of government spending in African countries during the period 1980-1996 (2005).

The median voter theorem implies that in very unequal societies the poor will be in great majority and they will demand more education for their children. Meanwhile ethnical fractionalization in countries will make democracy less efficient according to the theoretical arguments of political imperfections. While there were direct and negative effects from both inequality and ethnical fractionalization on education the interaction variables were not significant. This shows that there is no clear support for inequality and ethnical fragmentation having an impact on the performance of democracy.

According to the theoretical arguments, low-income levels have a negative effect on democracy's impact on education. This was supported by the empirical results and further emphasized through the positive and significant dummies for high and middle-income levels respectively. Furthermore, the great and highly significant regional dummies indicate that neighbor effects and country specifics are of importance.

To summarize, the results from the empirical testing support the relationship between democracy and education when it is measured as secondary school enrollment rate. It further supports the theory that low income levels in a country lowers the effect democracy has on education since there is less to redistribute. Income inequality and social fragmentation do however not have clear affects on the impact democracy has on education.

There are several papers that present empirical results that show on how education promotes democracy. The theoretical argumentation and the empirical results from this paper do not contradict these arguments. It rather proposes that the causality is present in both directions. If democracy promotes education and education in its turn promotes democracy the two parameters reinforce each other.

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## 9. APPENDIX

### Appendix 1. Correlaation Matrix

```
. correlate school fh gdp gini ethnic high_income middle_total south_asia soviet sub_saharan_af
> rca latin_america__caribbea
(obs=469)
```

	school	fh	gdp	gini	ethnic	high_i~e	middle~l	south_~a	soviet
school	1.0000								
fh	0.4633	1.0000							
gdp	0.6030	0.5141	1.0000						
gini	-0.3689	-0.0542	-0.3463	1.0000					
ethnic	-0.4679	-0.2874	-0.4081	0.2923	1.0000				
high_income	0.5746	0.4949	0.8077	-0.4651	-0.4436	1.0000			
middle_total	-0.0451	-0.1035	-0.4433	0.3637	0.0859	-0.6401	1.0000		
south_asia	-0.1742	-0.1055	-0.1550	-0.1406	-0.0134	-0.1391	0.0459	1.0000	
soviet	0.2602	-0.1107	-0.1545	-0.1855	0.0106	-0.1296	0.1320	-0.0734	1.0000
sub_sahara~a	-0.6143	-0.2978	-0.3127	0.2681	0.5123	-0.2975	-0.2673	-0.1204	-0.1570
latin_amer~a	-0.0195	0.2047	-0.1339	0.5622	0.0124	-0.2994	0.4678	-0.1212	-0.1580
	sub_sa~a latin_~a								
sub_sahara~a	1.0000								
latin_amer~a	-0.2591	1.0000							

```
. correlate govspendgdp fh gdp gini ethnic high_income middle_total south_asia soviet sub_saha
> ran_africa latin_america__caribbea
(obs=439)
```

	govspe~p	fh	gdp	gini	ethnic	high_i~e	middle~l	south_~a	soviet
govspendgdp	1.0000								
fh	0.2812	1.0000							
gdp	0.3281	0.5017	1.0000						
gini	-0.0954	-0.0647	-0.3480	1.0000					
ethnic	-0.1827	-0.2639	-0.3975	0.3092	1.0000				
high_income	0.2820	0.4794	0.8001	-0.4734	-0.4355	1.0000			
middle_total	-0.0304	-0.1195	-0.4591	0.4161	0.0951	-0.6642	1.0000		
south_asia	-0.2408	-0.1400	-0.1766	-0.1576	-0.0064	-0.1606	0.0519	1.0000	
soviet	0.1001	-0.1082	-0.1675	-0.1920	0.0201	-0.1459	0.1722	-0.0811	1.0000
sub_sahara~a	-0.0583	-0.3064	-0.3139	0.2512	0.4919	-0.3097	-0.2236	-0.1264	-0.1563
latin_amer~a	-0.1561	0.1821	-0.1506	0.5697	0.0397	-0.3208	0.4830	-0.1309	-0.1619
	sub_sa~a latin_~a								
sub_sahara~a	1.0000								
latin_amer~a	-0.2524	1.0000							

### Appendix 2. Breusch Pagan Lagrange Multiplier test.

```
. xttest0
```

Breusch and Pagan Lagrangian multiplier test for random effects

```
school[country2,t] = Xb + u[country2] + e[country2,t]
```

Estimated results:

	Var	sd = sqrt(Var)
school	951.9629	30.8539
e	120.7319	10.98781
u	236.3274	15.37294

Test: Var(u) = 0

```
chi2(1) = 161.88
Prob > chi2 = 0.0000
```

### Appendix 3. Durbin Watson Test.

Dependent Variable: SCHOOL

Method: Panel EGLS (Cross-section weights)

Date: 10/20/09 Time: 15:52

Sample (adjusted): 1980 2005

Periods included: 6

Cross-sections included: 155

Total panel (unbalanced) observations: 808

Linear estimation after one-step weighting matrix

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	56.88593	0.598010	95.12544	0.0000
POLITY2(-1)	2.600554	0.079946	32.52881	0.0000

#### Weighted Statistics

R-squared	0.567625	Mean dependent var	81.50362
Adjusted R-squared	0.567089	S.D. dependent var	65.25034
S.E. of regression	28.56721	Sum squared resid	657765.0
F-statistic	1058.123	Durbin-Watson stat	0.307181
Prob(F-statistic)	0.000000		

#### Unweighted Statistics

R-squared	0.283608	Mean dependent var	57.31225
Sum squared resid	663014.6	Durbin-Watson stat	0.174179