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1 Introduction

The purpose of this paper is to analyze the effect of education on income distribution across the member states of the European Union. A microeconomic approach is used to understand the relationship between both variables. Since the enlargement of the EU, the income distribution gap between the rich and poor countries has widened as the developed countries in the EU are moving further ahead of the less developed. The introduction of the new member states ensured the inclusion of countries at different stages of development. Furthermore, the ability to move to different states within the EU, due to better opportunitites for higher living standard, may lastly decrease the income distribution across countries. Many may choose to migrate for higher earnings and improved education (Dauderstaedt 2010).

Policymakers mention education as a factor of decreasing income inequality, yet the relation between education and income distribution remains unclear. Previous studies mention the income distribution effect on education as a factor of growth (Farber S et.al 1989) and the wage differential based on education (Reilly 1991). Others have investigated the relationship between education and income inequality (Ram,1989). Yet the education level in different countries and its effect on national average disposable income and its distribution has not been discussed. We examine theories of the impact of education in income (Schultz 1961, 1963, 1975, 1981; Mincer 1958, 1974) in order to analyze the proposed hypothesis of the correlation between the education level and income distribution: how does the education level affect the average income and its distribution between the EU member states?

The advancement in technology requires specialized labor adequate to adapt to the change in sectorial development, hence the importance of education. The sectors demanding specialized laborers are increasing in proportion of the sectors that are not requiring specialization, as in service sector etc. High education leads to attractiveness within specific markets, depending on the degree achieved (Hummels et al. 2001). Compensations for educated citizens through higher wages than the non-educated are required to encourage others to fulfil their studies. People are willing to earn a costly degree due to promises of a better future. The productivity of the educated are assumed to be higher, hence the raised wage and decreasing income gap. It is understood that the

EU labour market is determined by the skills and qualifications of educated laborers (Schultz 1975).

Focus of this paper is on how the education level, included in human capital, affect the distribution of average disposable income across the EU. The assumption is that if education increases, "wage compression" occurs since more specialized laborers are available, hence increasing the wage of the ones with lower income, and decreasing the wage of the ones with higher income, leading to less income inequality (Knight & Sabot 1983).

The paper investigates these issues with a linear regression model which will offer the results necessary to understand the effect of education on the disposable income distribution. Cross- country panel data for all member countries of the EU is utilized between the period of 2005- 2009. The data required is provided by the official site of the European Union statistical base Eurostat.

2 Background

In the events of further enlargement of the European Union, different economical, political and social problems came into the lights to ensure the equality of all. The expansion widened the gap between the rich and poor across Europe (Fahey et al. 2003). Figure 2.1 shows the average disposable income in all EU member countries. The average income to spend on goods and service for an EU citizen in 2009 is 14600 euro. The high average income EU states as Luxembourg enjoy approximately more than ten times the size of the average Romanian income as shown in the graph below. Furthermore, the assumptions of poor and rich differs between most countries, as the citizen beneath the poverty threshold in Sweden may be suited as above middle class in Bulgaria etc

(Eurostat 2011)

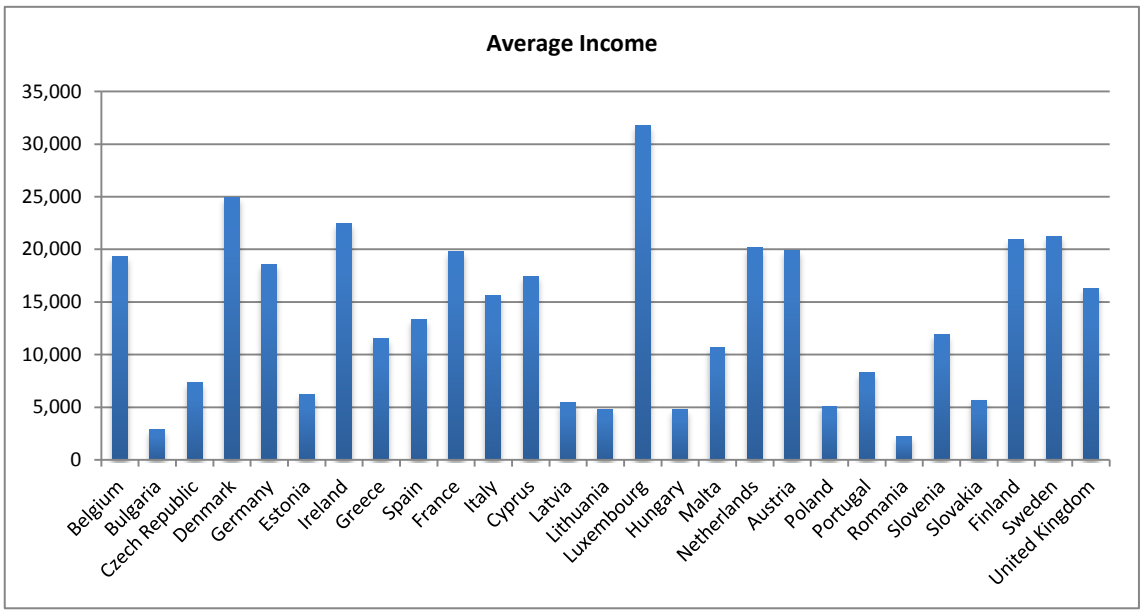

Figure 2.1 Average income across the EU in 2009 (Eurostat 2011)

The level of educated citizens available in the regions could explain the increasing gap of income distribution. Human capital is understood as the availability of educated labor force, through education and experience in the working field. It is the attributes and knowledge possessed by laborers to enhance production of goods and services, and increase the economic value of the state or firm (Sullivan 2003).

While much of this research focuses on the relationship between the education level and income distribution, it is significant to mention the link between education and growth.

The economic growth can be measured as the relative change of the value of all goods and services produced in a country. It is a source to higher income which enables the inhabitants to enjoy increased living standards and more freedom in consumption. Important factors such as savings, population growth and human capital affect the performance of a country. Economic growth is strongly associated with education and training, where the former is the essence of this paper. Higher education within the working field increases the level of income recieved. The distribution of income differs across the EU member states. The income gap in countries like Portugal and Greece is significiantly higher than in the higher average income states such as Sweden, Germany and Norway. In accordance with Schultz (1963), an increase in education level will narrow the gap of the income distribution, due to its effect on the different income receivers within the population. The rich will earn less due to "wage compression", and the poor will enjoy higher wages, due to more specialization within their field of interest (Knight & Sabot 1983). The reasons and policy implications will be discussed further in the theoretical framework.

3 Theoretical framework

The theoretical framework in this paper covers education which is one of the main components of the human capital and its effect on the income distribution. The income distribution and economic performance has become a key area of research in economics. The framework includes an extension of the correlation between the education and the income distribution across the EU. Considering the theoretical predictions about this relationship, the paper will look for empirical evidence based on cross-country data set.

The spread of the income distribution is determined by the level and distribution of schooling, it can be reduced with higher education levels across the whole population. Economic growth increases with higher education level, which in turn decreases the gap of income (Schultz 1963).

3.1 Income Level

The income in this paper includes the sum of all taxable and tax free income minus taxes and negative transferals. The affection of various variables on income distribution are discussed by multiple authors. There exist many theories on how income is affected, with regards to social, heritage, regional and cultural backgrounds. Income levels are often determined by previous generations due to receival of heredity and contacts in the fields of work (Checchi 2000). Social status and economic wealth is descended from a generation to another. According to Cooper (1998), poor and wealthy families are stabilized within their social statue and level of income, as they are trapped at these levels for at least a generation. Families belonging to the average income earners are more affected by the fluctuations of the market, as some may earn more or less and belong eventually to another income community, depending on their achievements, in less than a generation. This is acknowledged in the paper, hence the significance of education on income distribution is the essence of it. Education is considered the main source for enhanced productivity and "skills deepening" (Williamson 1991).

The average income level differs between the European Union members, shown in Figure 2.1. Luxembourg has a much higher average income (31800) than Romania (around 2000 Euros). It is evident that the countries in Eastern Europe are at the bottom of the scale regarding income average, shown in Figure 2.1, mainly due to new inclusion within the EU. The average income of the rich in these member states may equal the average income of average earners in France, Germany, Great Britain etc. (Eurostat 2011).

The paper differs in the essence of explaining the role of education, with regards to Schultz model (1963), indicating that increased education level narrows income distribution. The "wage effect" by Knight and Sabot (1983) is crucial to understand why education changes the spread of income.

3.2 Income distribution

Income distribution indicates the allocation of earnings, from investments, salaries, sales etc. The income distribution is often misunderstood since there are different perspectives regarding it. From a humanitarian point of view, an unequal distribution may be suppressive within societies, since it causes social clashes. From an economical perspective, income distribution could affect different factors of growth positively, such as human capital, savings, investments etc. Income inequality is acknowledged as a rewarding mechanism, where the best fitted are allocated the toppaid jobs and suitable roles within society. It adds a supplementary motivation for the lessfortuned to reach another "social class" (Ray 1998 p.169-170).

Figure 3.1 shows the difference in income distribution between the richest 20% and the poorest 20% in 2009 with focus on the European Union member states. From the figure 3.1, one can acknowledge the income gap between the rich and poor within the EU countries. The richest 20 % in Latvia are more than 7 times richer than the poorest 20 %. Romania's top class has 6.7 times more income than the bottom. The richest in Luxembourg, France, Germany, Cyprus have approximately 5 times more than the poor. The social-democratic regimes are more equal and enjoy around 3-4 times richer than the poorest 20 %. Sweden, Denmark and Finland may be more even due to free education system, free health care and other social benefits that increases the equality between the citizens, such as unemployment benefits for the lower average income quartile. Latvia, Romania and other with high inequality between the rich and poor can be explained by the lack of social benefits such as free education system at the higher levels, e.g. university level.

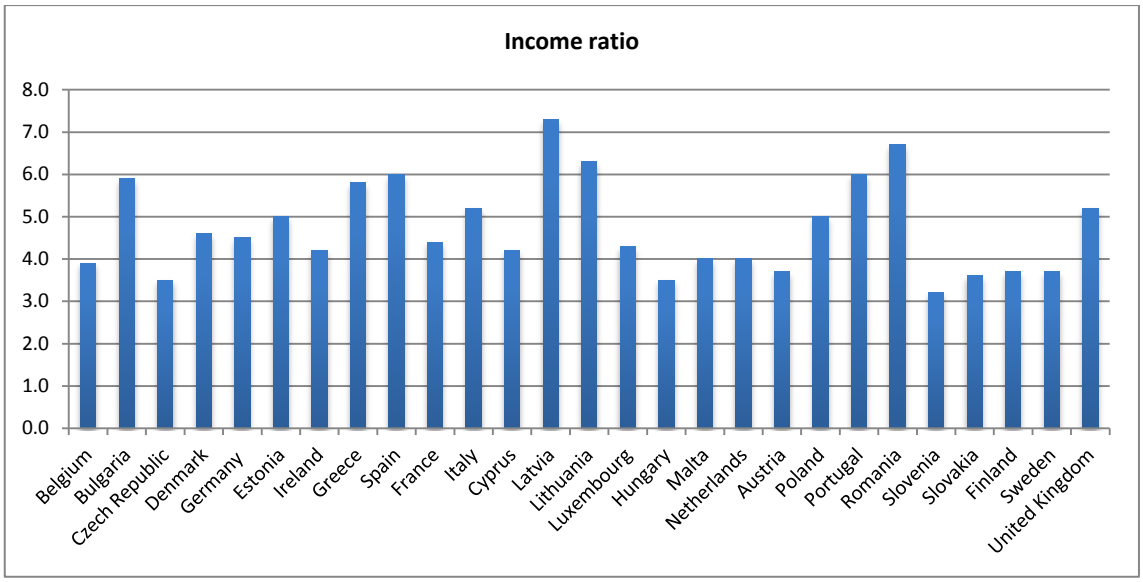

Figure 3.1 – Income Distribution across the EU in 2009 (Eurostat 2011)

The unequal income has a negative effect on the civil society (Krueger 2002). This is an important factor explaining the exclusion of some with regards to education. The countries with higher inequality have higher rates of homicides and other criminalities, along with lower life expectancy for the economic bottom. Countries with high GDP do not reflect the wellbeing of the mass, rather the high income received by the top shift. Portugal has the highest index of health and social problems, and also the highest stretch between the top 20% and the bottom 20% economically. UK has the second spot, followed by Greece, Italy, Ireland, France etc.

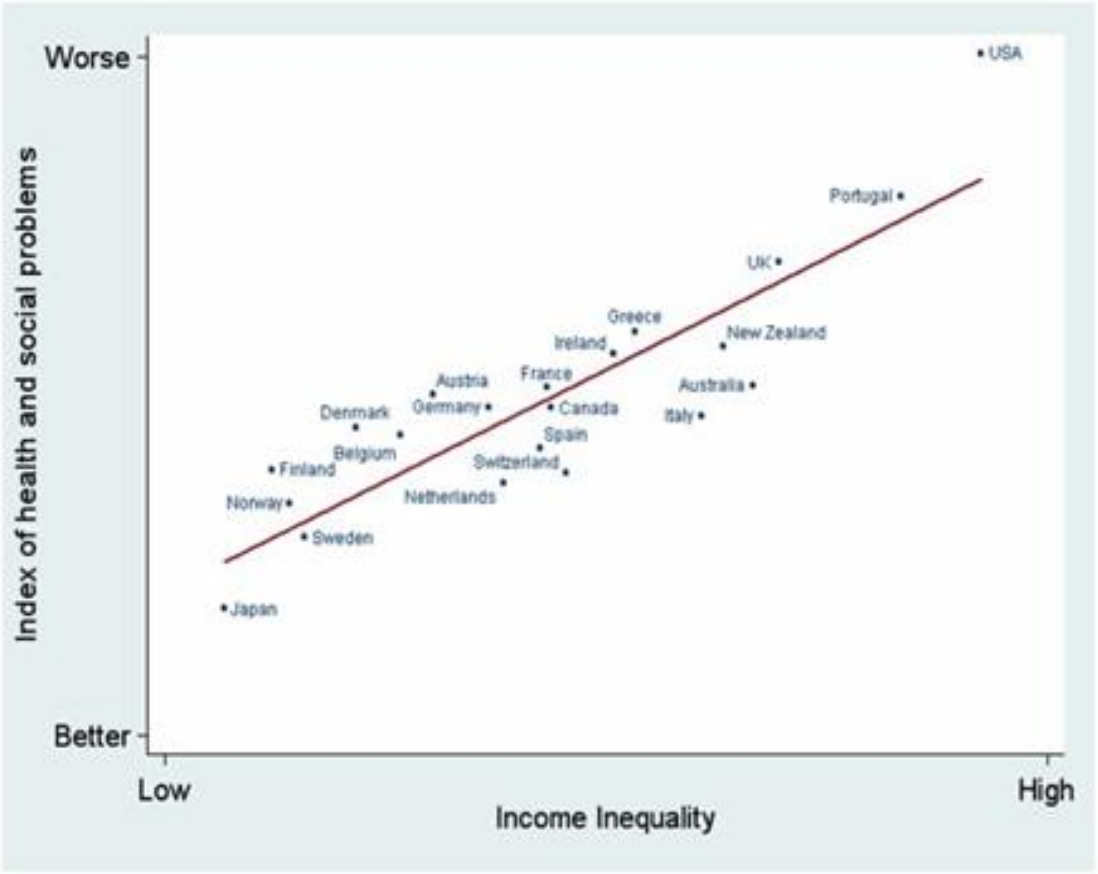

Figure 3.2 - Index of health and social factors relative to income inequality from The Spirit Level (Wilkinson 2009)

The health factor has an impact on income distribution as the healthier are more adequate for work (Wilkinson 2011). Also, the costs of medical care are also important to account for since high percentage of the income are flown into it. High income inequality usually tends to hold back growth in poorer countries or developing ones, while boosting growth in the developed economies. This is due to social cohesion in the less fortuned societies, where the poor citizens do not have the potential of climbing up the economic ladder due to suppression or imprisonment. Some are required to actively participate in crimes to support their families etc. Higher unemployment rate is also an intriguer of social injustice and increased inequality (Wilkinson 2009, Sen 1997). In developed economies, as social-democratic regimes as in Sweden, these factors are not necessary since social benefits are promised and education may be free. In other words, where opportunities arise for people to invest in themselves and in education to receive a better future, any individual will make the best of it. On the other hand, if the oppor-

tunity is lacking, the people will remain suppressed and other ways to survive will be prioritized and the risks would be taken (Schultz 1981, Barro 1999).

3.3 Education

Human capital has been distinguished recently from the factor of labor, since it indicates the knowledge possessed by the labor force. It is acknowledged as the level of attributes, knowledge and competence such as intelligence of the labor force to enhance economic values, by increasing the level of production. The knowledge is a direct effect of education or experience within the working field. In some member states within the EU, there exist a labor-surplus market. This indicates that the amount of available human capital exceeds the capital resources, referring to high unemployment level. Developing the educational and health sectors could exploit this, since they require more human capital than capital resources. Increased education improves the social structure, along with the level of knowledge within a population. It improves human development and the standards of production, by increasing the quality and quantity produced (Mahbub 1996).

Education is the key component of human capital and the main source of general human capital, opposing job-specific human capital that includes experience and other components. The basic findings in Schultz' work is that education investments lead to direct increase in human capital, hence an increase in productivity and economic growth. According to Schultz (1981), experience is left out due to its difficulty in estimating the right parameters and data. Education contributes to easier accessibility to information, improvements in sanitation and health, investments in future generations and increased equality. It reduces poverty since more education offers better jobs, without accounting for racial, gender or social discrimination. It also increases the social statue of individuals and their families. Sufficient level of education enhances entrepreneurial talent and specialization required in the field of labor. Yet be aware that education itself is not sufficient and the benefits of it do not appear immediately as self-motivation, experience, personality and other factors are taken into account. Often, changes are only seen in the generations to come, as more income is available for consumption and investments. The price effects of education play a major role in the distribution of education, as the lack of affordability is often the reason of being left out from the educational system (Schultz 1975).

Checchi (2000) explains education as the main source of upgrade within economical communities. By lowering tuition fees and offering financial benefits for students, the incentive to study increases, leading to lower income inequality. Quality of education is also an important factor for improved competitiveness. Education offers increased specialization, preferences and choices within the preferred workfield. The possibility to work within the field of interest enhances productivity (Heshmati 2004).

Factors affecting the level of education negatively include:

- Level of illiteracy due to work at early age or lack of affordability
- Unequal regional coverage, some regions are alienated due to high migration, high criminality or located in rural areas
- Low quality in the educational system
- Insufficient funding of educational institutions or other public institutions that offer economical help for the less fortuned
- Gender and racial inequalities

Arrow (1973) and Spence (1973) argue that the final degree received at university or upper secondary school matters more than the amount of years required for graduation. This is known as the sheepskin effect, higher income due to fulfilling your degree, and not for the time period. It remains unanswered whether time can justify the qualification of some, yet the efficient student may have an advantage over the less efficient in the labor market due to higher productivity in less time constraints (Weiss 1983). The assumption used in the model is that everyone with a degree is compatible for the same achievements, yet the ones who finished in shorter time are more skilled.

European standards on education, as the Bologna Process, compares the level of education applicable for different jobs. The agreement between the European states enhances the mobility of the labor force, competitiveness and appropriate matchmaking (Swedish Education ministry 2011). These comparisons do not properly take into account the quality of schooling or the type of education, rather the degree level on tertiary education and the title received within the field of interest. The degrees reflect the abilities, preferences and choices taken by the workers (Barro & Lee 2001).

Schultz defines education as a non-tradable life-long "stock" with no transportation costs. Education is costly and hence is acknowledged as an investment in you. This investment should occur at early age to benefit from it for a longer period (Schultz 1981).

Figure 3.3 shows the tertiary education attainment across the EU member states. The level of education is accounted in percentage, indicating the amount of the population with completed tertiary education. Rep. of Ireland has the highest education level with over 30 % followed by Finland, Luxembourg and U.K. Italy, Malta, Greece, Portugal are at the bottom. This could be due to the large share of the population leaving school at early age to work in the service sector, which does not require higher education level.

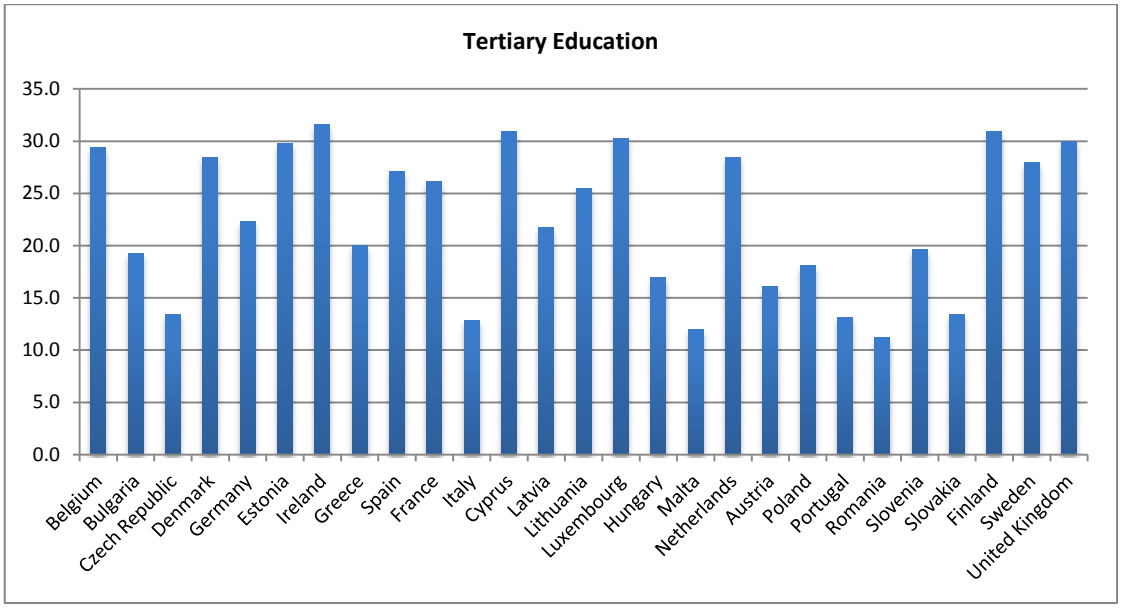

Figure 3.3 – Tertiary education across the EU in 2009 (Eurostat 2011)

The mobility of educated laborers, since the imposition of the European Union, has increased due to the possibility of receiving work permission easily between the member states. This has lead to an increase in the spread of income throughout the EU due to the willingness of educated citizens from the less developed countries to seek better futures for themselves and their families. The ability of education abroad, in a member state where the education level is higher and the fees are cheaper or for free along with a promising future, has the tendency to attract the less fortuned, yet willing student, to move to countries such as Sweden, Great Britain, and Germany etc.

3.4 The effect of education level on income distribution in EU

The spread of income distribution across the EU has increased the incitements to better education, as the main idea is that the better education you possess, the more likely you will receive better salary. The willingness to earn higher salaries and reach higher positions within the market drives an individual to endure with the level of education. This is known as the wage effect. With a high level of the educated within a population, "wage compression" may occur due to increased supply of educated workers, hence decreasing the salaries and benefits of high-educated workers (Knight & Sabot 1983). According to the human capital theory, which emphasizes the role of schooling, the higher the education and experience of workers (the two major components of human capital), the higher the income received due to the assumed increased productivity. In order to invest more years in a higher education, it is critical to receive, once the working life starts, a compensation for the lost income throughout the years as a student. The satisfaction of possessing more knowledge after university does not cover for the lost income, hence the importance of a higher salary than for the non-educated (Mincer 1974).

In the case where the level of salaries are similar between the educated and non-educated, or experienced and non-experienced, the incitements to invest more years into an education program decreases, since there exist no guarantees of compensation and hence the people would rather work immediately after high school. This shows that an unequal income distribution has a positive effect on human capital, and an equal income distribution may affect it negatively (Graham et al. 2002).

Is the gap of the income distribution healthy to enact human capital or does it affect it negatively? To offer an example suitable for human capital's effect on income distribution, it is not required to look further than the educational system in Sweden, where tutors earn low salaries in comparison with jobs with no educational requirements. Teachers usually study for at least four years to receive a degree which will offer them approximately 25 500 crowns per month (17 850 after taxes). Many may argue that this salary is high, which is the case in many countries, yet in Sweden, an average worker with no skills or education may receive approximately 24 000 crowns per month (16 800 after taxes)(Statistiska Centralbyrån 2010). With a four year education, indicating four years of debt and lost income, approximately 1 000 crowns extra disposable income per month as a compensation is not sufficient. This could increase the incitements

for students to leave their educations and instead invest, at early age, in the working field where they may earn money and experience, which is also considered a part of human capital. As a conclusion, the comparison of different incomes, for educated and non-educated, may be the difference between a positive or negative shift in human capital development. The assumption is that the increased level of education has direct effect on the income distribution, as more experienced and educated workers' productivity are enhanced, which is reflected in the wage differences.

Income distribution is affected by the transferals of technology and educated laborers from the less developed states towards the leading economies of the world, and in the topic's case, the European Union. The non-educated citizens are disfavored by the system in contrary to the highly educated (Tamura 1991). Education has two distinct effects on the economic performance on regional and national levels, the first is the productivity of each employee, due to the level of knowledge. The second is the ability to adjust to new technologies and fast-moving industries due to experience (Mincer 1958). Education is indispensible to modern labor markets due to the increased requirements at work. These requirements are direct effects of modernized technologies and specialization needs. Multiple studies conclude the fact that the higher educated are compensated more, shown in their wage level, their prominent social status and the level of employment of the educated (Cohn & Addison 1997). Higher educational attainment is reached by simplifying the access, through lowering tuition fees and public financing, also by raising the quality of tutors and books.

In the occurence of high human capital, which offers an incentive of increased unequal income distribution, part of the population may be excluded from the education system. This could be due to higher requirements to apply, or simply due to the lack of affordability. It also depends on the national system of each member states, as Sweden has less spread in the income distribution due to the free educational system and higher taxes for high earners, while Great Britain has a higher spread due to the high fees for universities and lower taxes for high earners. Education is important in order to reduce the spread of different income levels in an economy in addition to its direct impact on labor productivity (Schultz 1963, Becker 1964, Tilak 1989). Usually, the income distribution spread is higher in developing countries due to the large amount of poor citizens. Also, in developing countries' rural areas, where farms are still maintained by whole families, the

opportunity cost to send a child to earlier stages in school could be costly, even though the education at that level is usually free (Todaro & Smith 2009 p.394-396).

Some theorists argue that inequality is suitable for increasing incentives for citizens to innovate and invest. They mention the increase of income inequality as a direct effect of increased wage differentials based on jobs requiring education, and vice versa. The capitalistic influence by these authors is about rewarding the educated and influencing the less fortuned to invest in a stable education. The problem lays in the affordability, in which solutions are lacked (Goldin & Katz 2007). Public spending on education may offer access to everyone, yet the problem lays in affording materials and attending school. Also, the income gap may widen since raised taxes will be imposed to fund the public education. The necessity of affording education for low-income families is prioritized, as citizens should strive to invest in their own human capital. Public policies should emphasize this assumption, by promoting free educational system and design policies suitable for the poor as it is healthy for economic growth. Tax cuts and other benefits could raise the incentives of low-income takers in prioritizing such investments. Also, the banking system should be remodelled, as the less fortuned are neglected the possibility of receiving credits, leading to no education affordability (Sylwester 2000).

Highly developed countries as Sweden, UK and Germany necessitate a higher educational level for most of its citizens, since their economies prioritize technological manufactures and banking systems that need specialized laborers. Workers at corporations are usually highly educated in order to understand the underlying process required to improve the efficiency of production. On the other hand, education is less required in service concentrated sectors, such as touristic countries. In southern Europe, the level of education is low, shown in Greece, Spain, Portugal, Italy etc. due to the availability of jobs that does not prioritize education as in restaurants, hotels, bars and other touristic sectors. Yet the income distribution is more severe in these countries, since the educated gain much more than the non-educated. Take into account that the average income does not account for the gratuity tips offered at the service sector, hence the low income level shown (Mingat & Tan 1996).

Schultz (1981) implies that the level of education determines the income distribution across the country. The income distribution of societies with higher education level is

often less unequal to others, with emphasize on the word "often" and not always (Schultz 1981). According to Schultz, inequality in education widens the income distribution as the top earners enjoy bigger share of income and bottom earners will increase in proportion, yet their income share is smaller. On the other hand, increased level of education affects the two tails of the rich and poor, as the bottom earners will enjoy more disposable income, and the richer will have less due to decreased wage level as a direct cause of more competition (Schultz 1963).

The balance between "wage compression" and "wage composition" may explain the impact of education on income receival. "The composition effect" indicates that an increase in education level leads to higher income gap within the population due to improved productivity, hence the higher wage for the more effective employees. Yet with high education, "wage compression" may occur due to increased supply of educated workers, the premium of higher skills is less valued, hence decreasing the salaries and benefits of schooling. It also raises the salaries of the low-educated, which in turn narrows the income distribution. In other words, wage effect is determined by the supply and demand of laborers, hence the fluctuation of income distribution (Knight & Sabot 1983).

As a conclusion, income distribution is explained by the level of disposable income for the population of a state. Due to difficulties in measuring the whole population, the average income of quintiles are taken into account and compared. Also, human capital's main component is education since it develops and specializes laborers within their field of work. Schultz (1981) argues that the gap of income is narrowed by an increasing level of education, since the poorer receive higher wages and the rich are victims of the "wage compression". This assumption will be tested further in the empirical analysis section, with regards to the European Union.

4 Method & Data

This section investigates the theories presented in section two and three and their application in regression analysis. This offers the results necessary to understand the effect of the fluctuations of education on income distribution, with regards to the findings of Schultz. The model indicates that income distribution is narrowed down by increased education level. The paper will test the hypothesis by measuring the level of education and the average disposable income and its distribution. Cross-country data for the member countries of the EU are utilized in order to continue with further research between the period of 2005-2009. The dependent variable is stated as the income distribution, the main explanatory variable is the level of education of each country. The residual term will take into account all other components that affect the income level.
Income is denoted as the sum earned from wages, profit from private firms, social benefits and other income sources. Income distribution is explained by the gap between the richest and poorest, with regards to the different average income quintiles.

All member states are included within the years 2005-2009, regardless of their official entrance into the European Union. The paper provides the national differences of the member states with regards to the education level and income distribution. Bulgarian and Romanian average income in 2005 is lacking, also 2006 for the latter, hence the exclusion of Theil Index calculation for the mentioned countries that year. The combination of cross-country data with time-series offers range of data suitable for explaining the hypothesis to be tested (Gujarati 2003). Due to data shortage of the richest income quintile, its average is calculated by substracting the average income multiplied by five, due to five income quintiles, with the summation of the four lowest quintiles.

Welfare regime reflects the amount of welfare offered to the public in order to enhance consumption and ease the costs of education. The multiple welfare regimes available within the EU are social-democracies (Sweden, Denmark etc.), liberal (UK, Ireland), conservatists (Belgium, France, Germany etc.), East-European (Post-communist) states (Slovenia, Slovakia, Poland etc.) and others belonging to the Mediterranean (Spain, Greece, Italy and Portugal). The countries around the Mediterranean are considered a residual since no ideology is prevailing, instead different methods are used in the effort of promoting welfare. The assumption is that social-democratic welfare regimes are ex-

pected to include narrower income spread than other regimes since they offer benefits for the ones in need. These benefits differs from financial to educational benefits, such as unemployment monthly payments or free education. Also, conservative regimes have a tendency to offer benefits to its citizens (Esping-Andersen 1990).

The results of Schultz (1981) indicating that increased education level narrows the income distribution gap is empirically tested with a panel data regression analysis with least squares regression on all the member states of the EU between the years of 2005 and 2009. Eurostat provides us the data required for the empirical analysis section, as it is the official site of the European Union statistical base.

The utilized data of interest shows the percentage of the population enrolled in tertiary education (including university and non- university studies) in the education system in each country. This provides an indication of the number of persons expected to complete their studies, contribution to the increase of the education level. In the age of mid-20s, it is expected that most students have fulfilled at least a bachelor degree. This assumption is due to the willingness of students to make transitions between full time and part time studies and jobs before completing their education, at approximately age of 25. The reason of taking into account the tertiary education is due to the ability to specialize within a field of interest. Nowadays, the tertiary education is needed in order to stand out in the competitive labor market.

The definition of income in this paper regards the disposable income, indicating the income available for consumers after taxes. The level of taxes may differ across the European countries, as Sweden has a higher tax rate (30 % in average and maximum of 56.6 %) while other countries, such as Czech Republic, has an average income tax level of 15 %. Other taxes are induced as VAT, but this will not be taken into account since disposable income is the main focus. The level of taxes may also be deceiving since Swedish citizens enjoy more benefits from the welfare system than others, as the average Swede receives free health care, free education, social benefits for housing, unemployment benefits etc, while other countries receive barely any benefits from taxation except of the infrastructure improvements etc (Eurostat 2011).

4.1 Theil Index

The usual measure for income distribution across regions is the Gini coefficient, which is estimated from the Lorenz Curve. Due to major criticism of the coefficient, since it often offers the same coefficient for two regions with different income distribution, an entropy measure is needed, in this case the Theil Index. Theil Index is a form of generalized entropy index that measures the spread of data, in this case, the income distribution. The suitability of an entropy measure is due to its ability to decompose large quantities of data. Theil Index takes into account information theory and endures interpretations of the income distribution; it measures the divergence from perfect income equality within and across states (Theil 1967).

Since income distribution is difficult to perfectly measure it between the whole population, the statistics is limited instead calculated with the income quintiles, allowing the measure of the ratio between these extreme points. The measure of the skewness between quintiles and two extreme points, the rich and poor, is the basic assignment of an entropy measure. This is why the Theil Index is preferred rather than the Gini coefficient (Nelson 1984). The advantages of Theil Index is its ability to compare two different population sizes, since it only takes into account the proportion of rich and poor, the percentage size and not the actual amount. Also, the income distribution average of two countries may be compared, due to the importance of the total income within the country, and not the individual income. The Theil Index ranks the income from rich to poor, rather than taking into account the earnings of each citizen, regardless of what citizens A or B earn (Theil 1967 p.91-134).

The formula used for competing the basic Theil Index is:

$$T_T = \frac{1}{N} \sum_{n=5}^{N} \left(\frac{x_i}{\overline{X}} * \ln \frac{x_i}{\overline{X}}\right) \quad (1)$$

where x_i is the income average of each quantile, $\overline{X}$ is the average income of the whole population, N is the number of observations (Ullah 1998). The previous formula has a higher responsiveness for changes in the upper quantiles, yet it is required to take into account the lower quantiles changes, hence the second formula:

$$T_L = \frac{1}{N} \sum_{n=5}^{N} \left(\ln \frac{\overline{X}}{x_i}\right) \quad (2)$$

The average of T_T and T_L are used to account for equal changes in all quintiles hence:

$$T_S = (T_T + T_L)/2 \quad (3)$$

The Theil Index has the range between 0 and 1, with the former indicating perfect distribution and 1 expressing perfect inequality. In other words, if individual *i* earns all income, then we reach complete inequality, and if all individuals have similar income, perfect equality is established. If all individuals enjoy the same share of income, then everyone should share the same average, indicating 0 value for the distribution. If the income differs, then the bigger the deviation is from the average, the more will the distribution fluctuate (Ullah 1998).

4.2 Measuring the hypothesis

This section presents the regression model, a description of how the cross- national data was collected and computed to measure the impact of the average disposable income. This paper takes into account different data measures, yet they all reach to the same results, the effect of education on income distribution. Partial correlation is suitable for measuring the association between the dependent and independent variables. The benefits of partial correlation are its straightforwardness in calculating and explaining the results from comparing data. Income distribution is used as the dependent variable and the main explanatory is education level. Education as the only explanatory variable is not sufficient, hence the inclusion of other factors that affects income level such as bad health status of the population, the unemployment rate and dummy variables consisting of different welfare-regimes. The following equation is for measuring income distribution:

$$Y = \alpha + \gamma Edu + \beta Z + \mu \quad (4)$$

Y is the income distribution with regards to the Theil Index, Edu is the education level with the total amount of educated citizens on an itinerary level divided by the total population, Z is the vector of the explanatory variables affecting income distribution as unemployment rate, population share not able to work due to very bad health status and dummy variables such as the welfare-regimes, and μ is the error term indicating the unmeasured variables affecting income distribution.

In order to achieve the robustness of the outcomes, the paper uses different empirical specifications. The determinants of the income inequality are not sensitive to the model specification. The methodology includes variability both across nation and over time. Panel data are used in order to minimize problems of omitted variables and to reduce measurement error. The combination of cross-country data with time-series offers range of data suitable for explaining the hypothesis to be tested (Gujarati, 2003). We use the static model with random effects (REs) for our analysis. Running The Hausman´s (1978) chi- square test, we conclude that the REs model is more appropriate than the fixed effects (FEs) model due to its consistency. Further, the REs is more suitable because there is no within- group in the dummy variables and they are omitted in the FEs model. We include a test (control) variable. Although it is possible to use several control variables we limit ourselves to use only one at the time. Cross-country data is used for 27 member countries between the time periods of 2005-2009. Some data is absent since new member states lack the statistics due to different factors; no organization for statistical measures, late EU membership, state of war etc. Bulgaria 2005 and Romania 2005-2006 lack data for its average income, hence the exclusion of their Theil Index measure in that period. The cross-country data is organized in categories depending on each states welfare regime, as the assumption is that welfare benefits ease the costs of education and narrows income distribution. The unemployed still enjoys an income, and the rich may pay more taxes, depending on the taxing system in each state. Each country belongs to only one regime, some countries are influenced by others, as the case in Sweden among others, where its essence is social-democratic, yet is subjected to liberal components (Esping-Andersen 1990).

4.3 Concluding the section

Table 4.1 - Descriptive Statistics

Variables	Expected Sign	Description	Data Source
TS: Theil Index		Income inequality within a country, computed with Equation 3	Author's calculation based from Statistics of Eurostat database
Education	**(-)** Schultz 1963, Mincer 1975, Knight & Sabot 1983, Tilak 1989, Gregorio & Lee	Share of the total population with tertiary education attainment	Eurostat Database
Unemployment rate	**(+)** Sen 1997	Share of the total population unemployed	Eurostat Database
Bad Health Status	**(+)** Wilkinson 2009	Share of the total population unabled to work due to bad health status	Eurostat Database
Social- D	**(-)** Esping- Anderson 1990	Socio- democratic welfare regime, qualitative variable	Esping-Anderson 1990
Liberal	**(-)** Esping- Anderson 1990	Liberal welfare regime, qualitative variable	Esping-Anderson 1990
Conservative	**(-)** Esping- Anderson 1990	Liberal welfare regime, qualitative variable	Esping-Anderson 1990
East- European	**(-)** Esping- Anderson 1990	East-European welfare regime, qualitative variable	Esping-Anderson 1990

How to measure the dependent variable: the dependent variable in this paper is the income distribution. The Theil Index measures it, by using the average income level of earnings of the quintiles. Also, the average income of the total population is taken into account along with the number of observations.

How to measure the explanatory variable: the main independent variable is the level of education within a country. The data includes all citizens who completed education on

university level, and divided with the total amount of the population to receive a percentage form. Other variables are included in the explanatory variable with regards to its effect on income distribution, as unemployment rate and bad health level. Dummy variables include the welfare-regimes.

The hypothesis to be tested is in accordance with Schultz model (1963), indicating that the income distribution gap is oftenly narrowed down by an increased education level.

The data analyzed:

- Compare the level of education across the member states
- Compare the level of average income of the member states, and calculate the income distribution with regards to the average income of the quintiles in each country by utilizing the Theil Index.
- Compare all data and results with the hypothesis in order to find a string running through. Take into account political regimes such as social-democratic states (Sweden, Denmark, Finland), liberals (UK, Ireland), conservatives (France, Germany etc.), Meditteranean states (Portugal, Spain, Italy etc.), East-European (Post-Communist) states (Slovenia, Czech Republic etc.)

6 Results & Discussion

This section includes analysis of the paper, with emphasis on the hypothesis regarding the correlation between income distribution and the education level: does higher education level narrow down income distribution?

By observing the countries with the lowest average income in graph 2.1, one can state that Romania, with an income mean above 2000 euro also has the lowest education level with 11%. However, Lithuania has one of the lowest disposable income means in the EU (4800 euro), while the education attainment lies in the middle of the scale with 25%. One can acknowledge that the spread of income distribution is higher in less developed countries, such as Romania, Latvia and Lithuania.

By analyzing the graphs and appendix, there exists a relationship between the education level and the average income of the member states. The states enjoying higher education levels are obviously in the top of the average income scale. Italy, Portugal and Malta have the lowest education levels, while their respective average income levels lies around the average EU income.

Our empirical analysis exploits the panel data set for the 27 EU countries included over the period 2005-2009, using the REs estimation. The data set with mean, standard deviation and maximum and minimum value variables are shown in the table below for 2005 and 2009. It depicts that the income inequality for the whole population has decreased slightly between the years.

Tables 4.2.1 Descriptive statistics for for year 2005

		Theil Index TT	Education	Unemployment	Bad Health Status
N	Valid	**25**	**27**	**27**	**25**
	Missing	**4**	**2**	**2**	**4**
Mean		**.052**	**.198**	**.082**	**.025**
Median		**.046**	**.206**	**.079**	**.025**
Std. Deviation		**.021**	**.066**	**.032**	**.015**
Variance		**.000**	**.004**	**.001**	**.000**
Minimum		**.024**	**.091**	**.044**	**.006**
Maximum		**.098**	**.286**	**.178**	**.058**

Table 4.2.2 Descriptive statistics for for year 2009

		TS	Education	Unemployment	Bad Health Status
N	Valid	**27**	**27**	**27**	**27**
	Missing	**0**	**0**	**0**	**0**
Mean		**.051**	**.224**	**.088**	**.022**
Median		**.0495**	**.223**	**.079**	**.021**
Std. Deviation		**.018**	**.070**	**.036**	**.011**
Variance		**.000**	**.005**	**.001**	**.000**
Minimum		**.024**	**.112**	**.037**	**.004**
Maximum		**.093**	**.316**	**.180**	**.052**

The REs model is robust as appeared by the same signs and significance when the model is computed with the Gini coefficient (Appendix). The control variable of education level is included to strengthen the trust effect of the independent variables. It is kept constant and strongly influences the other values. It is constant in order to test the relative impact of the independent variable, which makes the findings more powerful and accurate. We use it in order to include the diminishing returns of education. The table 4-3 presents the REs regression results, The Hausman´s test and the REs regression with the Gini coefficient as the dependent variable are presented in the Appendix.

Table 4.3: REs: Dependent variable is income inequality TS (Theil)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Education	(-0.323) (0.013)***	(-0.317) (0.014)**	(-0.264) (0.058)*	(-3.610) (0.012)**	(-0.176) (0.202)	(-0.287) (0.038)**	(-0.287) (0.072)*	(-0.259) (0.068)*	(0.240) (0.091)*	(-3.436) (0.018)**
Unempl. Rate		(0.033) (0.454)	(0.029) (0.523)	(0.055) (0.224)	(-0.029) (0.508)	(-0.028) (-0.586)	(-0.031) (0.491)	(-0.029) (0.505)	(0.030) (0.504)	(-0.056) (0.221)
Bad Health			(0.061) (0.262)	(0.093) (0.091)*	(0.069) (0.195)	(0.075) (0.168)	(0.055) (0.313)	(0.056) (0.306)	(0.064) (0.236)	(0.109) (0.043)**
EDU_2				(0.575) (0.020)**						(0.563) (0.023)
Social-D					(-0.486) (0.025)**					(0.622) (0.012)**
Liberal						(0.454) (0.098)*				(0.204) (0.476)
Conservative							(-0.185) (0.301)			(-0.275) (0.170)
East- European								(0.056) (0.726)		(-0.110) (-0.452)
Residual									(0.204) (0.248)	Omitted
R-Squared	0.228	0.37	0.377	0.384	0.339	0.358	0.378	0.385	0.324	0.3755
N	132	132	131	131	131	131	131	131	131	131

The welfare regimes are used as the qualitative explanatory variables, the hypothesis states that income inequality is effected by a country´s welfare policy. The paper uses five categories of welfare state: liberal, social- democratic, east- European/ Post communist, Conservative and residual. This classification assumes that a country belongs to one single welfare regime. This is not the case in reality, where for instance countries such as Sweden, Denmark and Finland are dominantly social democratic, however this does not imply that they are free from liberal elements. In regression 10, the omitted variable is the residual (meditteranean) welfare regime. The regressions in table 4-3 show that the social- democratic welfare regime is an important determinant of the income inequality. As expected, it shows that in social- democratic countries, income inequality is lower, such as the Scandinavian countries e.g Finland and Denmark. The results of the regressions show that the liberal regime is only significant at 10% level of significance and it is positively correlated with income inequality. Education is appeared insignificant when taken into account social-democratic regimes, which can be explained by the benefits received for the uneducated, who are often employed by the manufacturing service or unemployed and received unemployment benefits. These factors increase the average level of the lower income quartile, hence decreasing income inequality. The qualitative variables of conservatives and eastern- Europe postcommunism show the expected signs, yet, they are insignificant in our estimation.

The main explanatory variable is the education level. Regression 1 shows that the relationship between the education level and the income inequality is negative and it is statistically significant. The higher the education level, the lower the income inequality within a country. This behavior accepts the the earlier works of Knight and Sabot (1983) stating the balance between wage "compression" and the composition effect. The estimate of the education level indicates that a 1% increase in this variable leads to 0.30% decrease in the income inequality. The earlier results of the main theorists included in the paper are accepted (Schultz 1963, Mincer 1964, Tilak 1989) stating that eduction promotes higher equality of income. The findings also indicate that the effect of education level is robust as it is not sensitive to the model specification. Regressions 4 and 10 include the diminishing return of the education level, with significance level at 5 %. This indicates that age and number of years within education matters. It is critical to understand that a certain level of education or age may hinder further increase in income as other factors play a role in appointing the income

level; as in experience, connection etc. These factors cannot be justified by the years at school, hence the importance of proceeding with the working life as soon as possible.

Other explanatory variables in the estimation are the unemployment rate and the bad health status. The short run impact of the unemployment rate on income inequality does not show the expected positive sign (in regressions 5-10) and it is not statistically significant in any of the regressions (3-10). This could be due to the short time period and the small amount of observations. The empirical results show that a highly bad health status of the individuals is associated with higher income inequality. The estimation has the expected positive sign and it is statistically significant indicating that if health status in a country worsens, the income inequality will increase. This can be explained due to less availability of laborers and no benefits offered for the ones in need. The results received from regression 10 indicate the significance of the education level, bad health status and the social- democratic welfare re-gime.

7 Conclusion

As a conclusion of our paper, which analyses the correlation between education level and income distribution, mainly by understanding the pattern of income distribution by increasing the educational level, we can confirm that higher level of the latter narrows down the former. Income distribution is affected by multiple levels, and it is required thousands and billions of variables in order to clearly answer our proposed answer. Factors such as religions, cultures, individual ambitions and needs, social and gender equality etc. are all variables that affect the income level. Yet our determination to understand the effect of education is due to our ambitions in life and to appreciate the education offered for us, which we do after understanding that education will increase our wage level and offer us more opportunities within the working field. Welfare regimes play a role in the skewness of income distribution, it may help to narrow it or expand it, depending on the fiscal policies. Bad health affects inequality negatively, since the sick are not able to work, hence income is lacking, also welfare regimes' policies may affect this.

How can we solve the injustices in this world and especially in Europe? This question cannot be solved in a matter of days, yet some suggestions will be offered. A higher sense of moral standards of the rich and the imposition of international laws by the right leaders to narrow the income distribution gap are required. Yet as long as sufficient resources are lacking, within the field of capital, especially human capital, we will not reach an equal society. Earth is abundant with resources and it is up to human beings to learn how to embrace it, hence the importance of developing the education level. With the money flouding into wars and other human evils and unnecessary consumption, we can afford the best equipments and schools to educate the citizens for whatever their ambitions might be, from the day of birth until death do us all apart!

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Appendix

Hausman Test

	——— Coefficients ———			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
logedu	-3.998231	-3.605091	-.3931397	.4299205
logunemp	-.0666966	-.0549849	-.0117117	.0097199
logbad	.0665567	.0934736	-.026917	.0242447
edu2	.6210467	.5740315	.0470152	.0691043

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 3.39
Prob>chi2 = 0.4943

GLS Random Effects

Dependent variable: Gini Coefficient

logts	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
logedu	-3.435616	1.448211	-2.37	0.018	-6.274058	-.5971737
logunemp	-.055719	.0455417	-1.22	0.221	-.1449792	.0335412
logbad	.1085202	.0560244	1.94	0.053	-.0012856	.218326
edu2	.5630752	.2484578	2.27	0.023	.0761069	1.050044
socialdemo~y	-.6218582	.2486286	-2.50	0.012	-1.109161	-.1345551
conservati~s	-.274455	.2002385	-1.37	0.170	-.6669152	.1180052
liberals	.2039712	.2862039	0.71	0.476	-.3569781	.7649204
easteurope~t	-.1069462	.1759668	-0.61	0.543	-.4518349	.2379424
residual	(omitted)					
_cons	11.55979	2.108807	5.48	0.000	7.426599	15.69297
sigma_u	.33111482					
sigma_e	.10584215					
rho	.90729395	(fraction of variance due to u_i)				

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