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Can changes in social trust be explained by inequality?

A time series analysis of social trust over time and its association with changing inequality

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Abstract

This paper aims to investigate the development of social trust over time globally, as well as separately for continents and countries. This is done by using data from six different surveys and through an interpolation method making the survey measures comparable, resulting in a long and continuous data set. Consequently, with Gini measures from the new Standardized World Income Inequality Database, we investigate if changes in social trust is related to changes in income inequality. We conclude that social trust is varying in a large proportion of the countries studied, questioning earlier claims of social trust as a highly stable property over time. We find that social trust has been significantly increasing in Europe steadily since 2002. We also find that social trust in Latin America is fluctuating significantly, with a minimum around year 2003 and a maximum around year 2010. By regressing changes in trust on changes in income inequality, also including lagged effects and controlling for GDP/capita and degree of democracy, we do not find that the observed changes in social trust is related to changes in income inequality.

Keywords: social trust, inequality, time series

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1. Introduction

Would you say that people can be trusted in general? If you are from Sweden, like us, your answer is most likely "yes". That is good. It is not far out there to suggest that life is made simpler by being able to trust people around you, and for them to trust you. Trusting others is not only beneficial for you, but for society as a whole. But looking across nations, and even continents, this is not always the case. In many countries people would hesitate to trust the average citizen.

Trust is not something you decide from day to day. It is more likely either something taught at a very young age, or a result of things that has happened in your life. However, a question remains regarding whether or not it is something that changes over the course of your life, or maybe even over the course of generations.

The concept of social trust has become a popular term in economics recently, although having been around in other social sciences for some time, since it has shown to be a highly important cultural value explaining often desirable economic performances and outcomes. There is no universally used definition of trust, but the various definitions used across the trust literature together form a clear picture of what it is. Social trust can broadly be defined as the attitude that other people are trustworthy, upright and are expected to "do the right thing". Coleman (1990) defines the concept of trust by stating: "an individual trusts if he or she voluntary places resources at the disposal of another party without any legal commitment from the latter, but with the expectation that the act of trust will pay off". Pruitt and Kimmel (1977: 375) states that trust can simply be seen as "the expectation of cooperation". Newton (2007: 343-344) promotes a working definition of trust as "the belief that others will not deliberately or knowingly do us harm, if they can avoid it, and will look after our interests, if this is possible". The latter definition is consistent with both the common sense of what trust is and with the various definitions used across academia (Newton, 2007: 343-344). Based on this, social trust can be seen as a behavior encouraging mutually beneficial exchanges and agreements between citizens - a lubricant to economic exchange (Arrow, 1972).

There are mainly two types of trust which needs to be distinguished from each other, since they do not necessarily correlate; particularized trust - the one that exists amongst family members and close ones, and generalized trust - the one that exists amongst people in general, i.e the trust

one feels towards the average citizen. Banfield (1958) finds for instance when investigating a Southern Italian village that trust exists to a high degree within families but does not extend itself to other families. It is however generalized trust that has been the main focus of economic research aiming to study the general societal attitude of trusting others, its consequences and determinants. Various international surveys have been gathering data on generalized trust for at least 30 years by asking the question "Generally speaking, do you think that most people can be trusted, or can't you be too careful in dealing with people?". The measure of generalized trust in a population is the proportion answering that "most people can be trusted". Scandinavian countries continuously end up amongst the highest trusting countries and South American countries like Colombia, Brazil and Ecuador are amongst the ones with the lowest degree of generalized trust (see figure 1). Generalized trust can also be called social trust or interpersonal trust. All three are used across the trust literature. We will, however, from now on use the term "social trust".

Social trust has strong theoretical and empirical connections with income inequality. Countries with low levels of income inequality generally have higher levels of trust, depicted in figure 1.

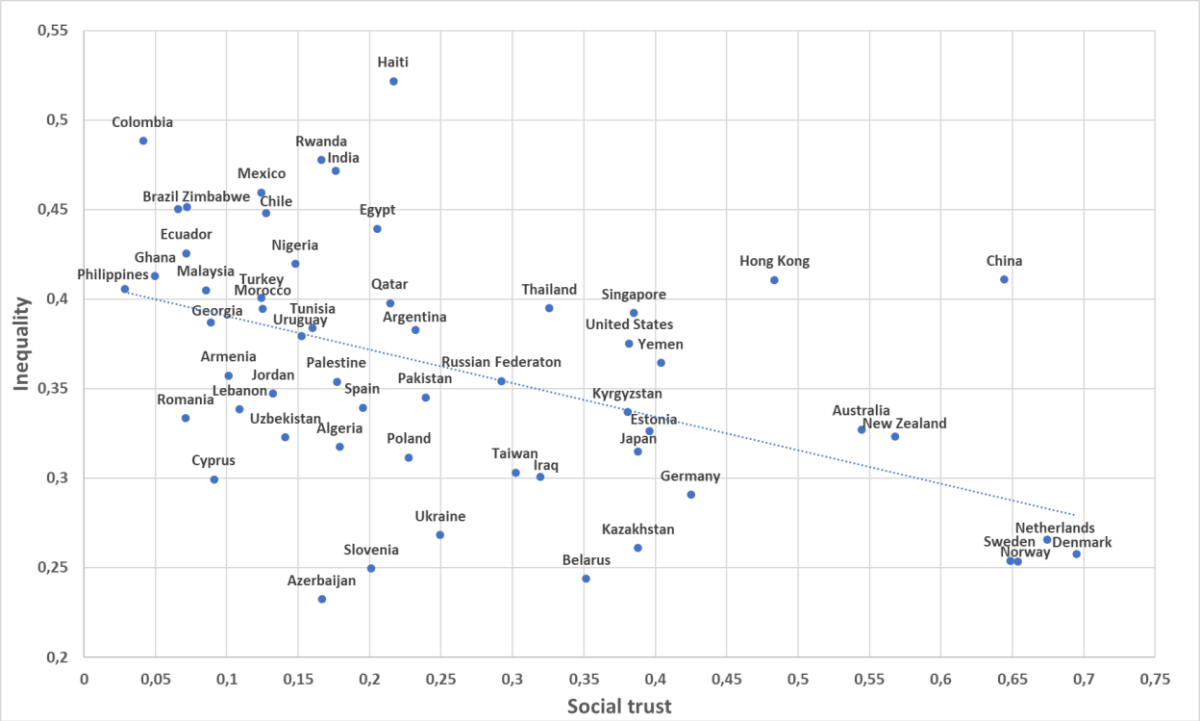


Figure 1: Inequality/trust scatter plot. *Sources: World Values Survey Wave 6 (social trust) & the Standardized World Income Inequality Database (Gini for disposable income) (Solt, 2016)*

Income inequality can be measured in a wide variety of ways, from using Gini coefficients to calculating how many percent of the total wealth in a population is owned by the richest 1, 5 or 10 percent. Whatever the measure, income inequality has been rising in many parts of the western world since the mid-80s, as illustrated in figure 2. The research on the causes of this rising inequality is multifaceted and provides various explanations. It is however not in the aim of this paper to go further into the reasons of this development, but to simply acknowledge this general trend and to question if this rise in inequality is related to falling social trust, since these two variables is found to be strongly associated with each other.

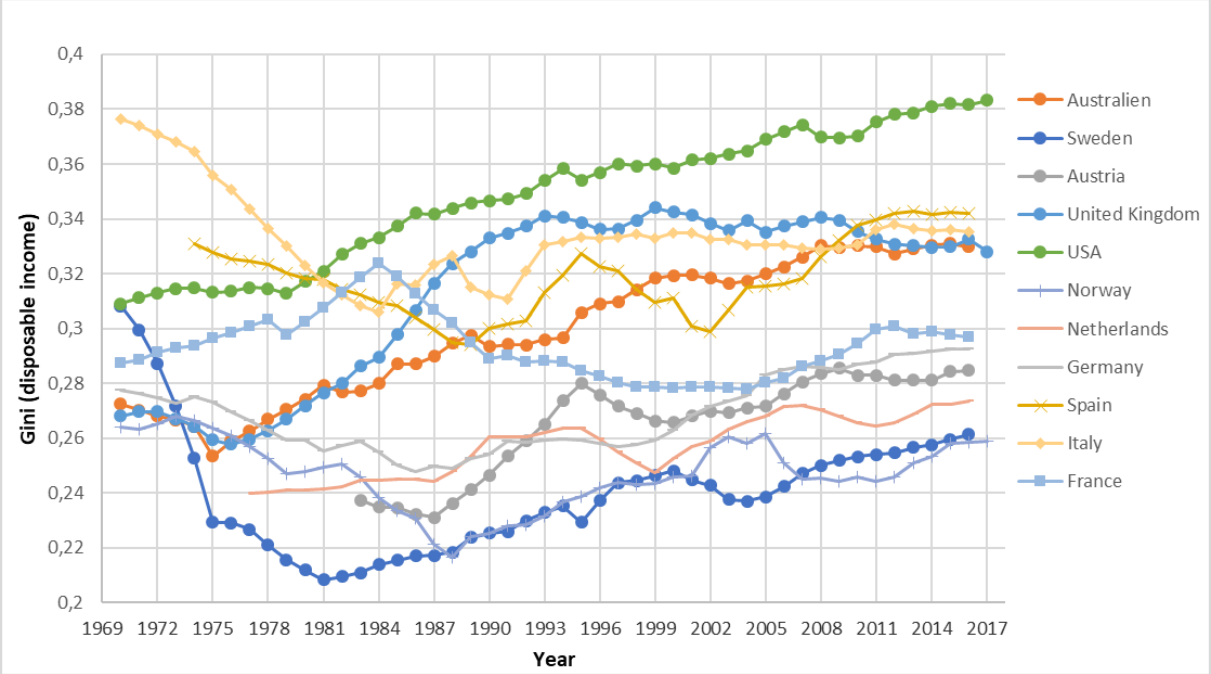


Figure 2: Development of Gini for disposable income 1970-2017. *Source: the Standardized World Income Inequality Database (Solt, 2016)*

2. Purpose and problem

Despite many cross-sectional studies on the consequences and causes of trust, there has been very few, if any, longitudinal studies on the development of social trust over time on a comprehensive world spanning scale. This is partly due to restriction in data. Today, with access to larger amounts of data than before and for an increasing number of countries we will through an interpolation method create comparable measures of trust over time from six different surveys. This will allow us to generate long and continuous time series of the development of social trust in the countries of the world, in the continents of the world and in the world as a whole. Within the already conducted trust studies, the general idea seems to be that social trust is stable over time. With our time series we will be able to empirically test this claim. Furthermore, with access to new substantial Gini data through the Standardized World Income Inequality Database (Solt, 2016), we will be able to test if income inequality, the most robust determinant of social trust according to earlier research, is associated with eventual changes in trust over time.

The problem statements of this paper formulated in questions are:

- How does social trust develop in the countries of the world, in the continents of the world and in the world as a whole?
- Are changes in social trust related to changes in income inequality?

3. Social trust

3.1 Theoretical concept of trust

There is no single well-established theory of social trust since it is used across many different disciplines. It is often seen as a key component of the more well-known and established concept social capital, popularized by Putnam (1993, 2000). Since they share the same property as efficiency-improving and cooperation-facilitating institutions they are sometimes used interchangeably. Social trust however is more often used as an indicator of social capital (Newton, 2001).

Theories of trust vary between treating trust as an individual personality feature, fundamentally learned either in early childhood or through later experience in life (Allport, 1961; Erikson, 1950; Cattell, 1965; Rosenberg, 1956), to treating it as a societal property measuring the aggregate trustworthiness of citizens (Putnam, 2000: 138; Newton, 2001: 203-4). The societal view of trust is a grateful point of departure for researchers aiming to discover the societal causes and consequences of having a trusting population. In a society, strongly dependent on cooperation and exchanges, trust is a fundamental condition for it to function. Economist Kenneth Arrow (1972: 357) has given attention to the importance of trust in economic exchange. He states that "[v]irtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence." Just as the blood transfusion system requires truthful donors and trusting recipients to work and allocate blood efficiently, the market economy requires truthfulness and trustworthiness to reduce transaction costs and facilitate, or even in the first place enable, Pareto-efficient exchanges. It is therefore reasonable to argue that a high degree of social trust improves efficiency in society by people relying on hand shakes instead of the necessity of contracts and lawyers, a willingness to pay tax since you trust your neighbor to do the same, a higher chance of getting hired based on merits and not because of relatedness, and so on.

The mutual benefit gained from trust is according to some theories precisely the necessary stimulus for trust itself. Coleman (1990: 99) states, in accordance with game theory, that the choice of placing trust in someone is determined by the attempt of maximizing one's own utility. Given rational actors, trust will therefore be placed where the expected gain of the outcome trumps the expected loss. The expected gains will be higher through cheating if the individuals

take a short-range perspective in the game, but higher through cooperating if the individuals take a long-range perspective (Pruitt and Kimmel, 1977: 375). The long-range/short-range perspectives can be translated into the degrees to which the individuals are likely to meet again. If the game is expected to be repeated many times to come, it would be beneficial for both individuals to cooperate. Cheating would perhaps result in higher gains for individual A today, but in the coming games individual B will most likely not trust A to cooperate, since he/she cheated last time.

B / A	**Cooperate**	**Cheat**
Cooperate	+10/+10	0/+15
Cheat	+15/0	+2/+2

Figure 3: A standard game theory set up

Therefore, it is reasonable that people with similar socioeconomic background are more likely to place trust in each other because of a higher expected gain, since the likelihood of meeting again is bigger. Coleman (1990) and Fukuyama (1995) suggest that individuals with closer social ties are more likely to put trust in each other, suggesting a positive relationship between homogeneity (ethnic, linguistic, religious, class etc.) and trust. Poor social ties caused by large class divisions and income differentials could therefore theoretically explain why income inequality seems to be so strongly connected to trust. This is in line with the immense literature on the negative association between trust and social exclusion or different kinds of societal divisions (Coffé and Geys, 2006; Knack & Keefer, 1997; Uslaner, 2000: 580; Alesina and La Ferrara, 2002; Paxton, 2002; Costa and Kahn, 2003; Hero, 2003).

3.2 Earlier research/empirics

Social trust correlates with income inequality (Bjørnskov, 2007, 2008; Delhey and Newton, 2005; Knack and Keefer, 1997; Nannestad, 2008; Uslaner, 2002), economic growth (Knack & Keefer, 1997; Whiteley, 2000; Zak & Knack, 2001; Beugelsdijk et al., 2004), quality of government (Helliwell & Putnam, 1995; la Porta et al., 1997; Rice & Sumberg, 1997; Knack, 2002; Nannicini et al., 2012), corruption (Uslaner, 2002) and welfare state size (Barr, 2004; Kumlin and Rothstein, 2005; Uslaner and Rothstein, 2005; Aghion et al., 2010) to name some of the more robust correlations. These findings are fairly non-disputed. The challenge of trust

research has lately been investigating the direction of causality, through both theoretical reasoning and empirical approaches. The research is ongoing and the conclusions are somewhat ambiguous. A wide range of cross-country studies points at economic growth (Knack & Keefer, 1997; Whiteley, 2000; Zak & Knack, 2001; Beugelsdijk et al., 2004), less corruption (Uslaner, 2002), better institutional and governmental quality (Helliwell & Putnam, 1995; la Porta et al., 1997; Rice & Sumberg, 1997; Knack, 2002; Nannicini et al., 2012) and higher life satisfaction (Uslaner, 2002; Bjørnskov, 2003; Algan and Cahuc, 2013; Helliwell and Wang, 2011) as consequences of a high degree of social trust.

Regarding the determinants of social trust, it is shown that income inequality, the share of Catholics and Muslims (hierarchical religions) in the population, being a post-communist society (Bjørnskov, 2006) and corruption (Richey, 2010) negatively determines social trust while being a monarchy positively determines social trust (Bjørnskov, 2006). Some studies have stated that ethnic diversity has a negative effect on trust (Knack & Keefer, 1997), and that Protestantism (Uslaner, 2002) and economic growth (Knack & Keefer, 1997; Zak & Knack, 2001; Delhey & Newton, 2005) have positive effects on trust. However, Bjørnskov (2006) does not find support for these results after testing them for endogeneity issues.

Income inequality is the most recurring variable associated with trust in the literature. The main assumption here seems to be that income equality affects trust (Alesina and la Ferrara, 2002; Uslaner, 2002; Delhey and Newton, 2005; Bjørnskov, 2007, 2008). This is implicated both explicitly or implicitly and through different theoretical and empirical approaches. One of them is by studying the association between welfare state size and social trust. Many of these studies state that big welfare states cause social trust - implicating that they do so via inequality-reducing policy and therefore works as trust-improving machineries (Barr, 2004; Kumlin and Rothstein, 2005; Uslaner and Rothstein, 2005; Aghion et al., 2010). However, Bergh & Bjørnskov (2011) rather claim the reverse causal direction; already high-trusting people are more likely to develop big welfare states. Bergh & Bjørnskov (2014) consolidate this view further by theoretically and empirically concluding that the direction of causality is rather from trust to inequality than the reverse. This pinpoints a central dispute in the social capital literature - can trust be affected by public policy or is it a historically rooted, hardly variable, feature? Despite the claims that inequality affects trust, with the implication that trust could fluctuate when answering to inequality changes, there are plenty of evidence that trust is a highly stable property. In psychology there is, in general, a consensus that the propensity to trust is learnt in

early childhood (Bjørnskov, 2006: 3). Katz & Rotter (1969) finds that 75% of the variation in youths trust level is explained by the trust levels of their parents, which would support this claim. Uslaner (2004) finds that descendants to immigrants in the US have trust scores similar to the country from which their ancestors emigrated from. States with a large proportion of Swedish immigrants for example have higher social trust than other states. Bjørnskov (2006) assesses the stability of the trust score when regressing changes in trust between World Values Survey waves on initial trust, and also observes a strong regression-to-mean effect on the trust score, implying a trust score fluctuating around a stable equilibrium level.

With the theoretical concept and empirics of trust in mind, social trust is, to say the least, a highly interesting measure for both politicians and researcher interested in cultural values affecting important social and economic outcomes.

3.3 The standard method of measuring trust

The method of measuring trust by asking the question "Generally speaking, do you think most people can be trusted…" has been used ever since data started being collected on the subject. The question and the answers vary slightly in wording between surveys and waves but the differences are negligible. However, uncertainty about the validity of the measure could be shined a light upon. It is not certain whom the respondents think of when answering if most people can be trusted or in which situations. Some may have their own ethnic group in mind and others may think of people in their neighborhood when answering. If asked in an extraordinary context respondents answers may be affected by radical, life-changing experiences fresh in mind and therefore not mirror the if they think most people can be trusted *generally.*

However, several studies indicate that the method of measuring trust explained above actually is a good measure of the basic theoretical concept, i.e the aggregate degree to which people in a society generally trust others to be upright and "do the right thing". For example, Knack (2001) shows in an experiment that the trust score of a country correlates with how many wallets being returned when "accidentally" dropped. Lederman (2002) and Uslaner (2002) shows that trust determines other behavioral features of a society associated with honesty and uprightness such as less corruption and less violent crimes which, again, indicates that the measure captures the underlying concept of trust. Overall, research on social trust repeatedly shows that the trust

score correlates with societal behaviors and norms that we theoretically expect it to be associated with.

One can question if the trust question is perceived the same in all countries. Do for instance Swedish trust scores measure the underlying concept of trust to the same extent as Chilean scores? Carlin et al. (2017) compares World Value Survey trust scores (the survey measure) with behavioral scores derived from an experimental trust game (the experimental measure) of different countries and find that the survey measure and the experimental behavior through the trust game show a consistent and significant correlation at cross-country level, implying that the method used and the question asked in the surveys is perceived the same way and measures the same thing in different countries.

4. Creating comparable measures of trust

The basis of this paper is to investigate the development of social trust in the countries of the world, in the continents of the world and in the world as a whole. To achieve long and substantial time series we merge scores from multiple surveys together. For this, it is first necessary to make their scores comparable.

4.1 Data

To measure the degree of social trust over time in different parts of the world we have been using secondary data. Data on social trust was gathered from World Values Survey (WVS), European Social Survey (ESS), Latinobarometro, Afrobarometer, Asian Barometer and Arab Barometer using the answers from the standard question "Generally speaking, would you say that you can trust most people, or that you can never be too careful when dealing with others?". This is still the method used in virtually every social trust study (Bjørnskov, 2006: 2).

4.2 Differences in the standard question

Before processing the data collected data, we investigated if the question or answers were formulated differently in the surveys, to ensure reliability. We found that they differed somewhat. The most frequent phrasing of the question was "Generally speaking, would you say that you can trust most people, or that you can never be too careful when dealing with others?", and the most common answers were between a simple "yes", "no" or "don't know". However, for some years of the World Values Survey the question was rather phrased as "General

speaking, would you say that most people can be trusted or that you must be very careful in dealing with people?". We thought the phrasing "very careful" instead of "can never be too careful" could be perceived as slightly harsher and would therefore tilt respondents towards the more affirmative answer. However, the different wordings of the question and the answers were treated as one and the same in the WVS codebook for the longitudinal data file, meaning that both versions of the question was coded under the same variable. In addition, we considered the difference in the questions negligible. With this in consideration, we moved forward by treating the different wordings of the questions as the same.

4.3 Coding

The answers provided for respondents could differ between a yes/no, to a scale of 1 to 10, in addition with variations of "don't know" and "both". In the case of the answers being a scale of 1 to 10, we coded 1-6 as "no" and consequently 7-10 as "yes". The decision was based on observing that surveys using the 1 to 10 scale typically assign 1-3 as "low trust", 4-6 as "medium trust" and 7-10 as "high trust". We interpret the latter as a "yes" since it is shown to be an accurate estimation when comparing between studies with a 1 to 10 scale - and only yes/no - as possible answers. Furthermore, we decided to omit any answer but "yes" or "no" because, firstly; answers like "don't know", "both" or "no answer" didn't provide any further information to the question, and secondly; only a small minority of subject answered this way. In fact, we take the latter as a positive remark, since it indicates that the question is not misunderstood and consequently the measurement is fairly accurate.

4.4 Interpolation

We now had data on trust scores, i.e. the proportions of the country populations answering "yes" to the standard trust question, for 141 countries with the earliest data point from 1981 and the latest from 2016, organized in six columns for the six different surveys. By simply examining the data it became evident that the surveys complemented each other, in the way that where data was missing from one survey, data from another survey could fill that gap. This was a crucial condition for being able to incorporate the surveys into one unified dataset and this way be able to generate long and substantial social trust trends. However, we did not want to hastily merge the survey scores into the same column without carefully considering eventual differences between the surveys. Observing countries with overlapping data, i.e data for the same country and year from different surveys, we could at first glance tell that they seemed to

differ. This could perhaps be a consequence of differences in methodological approaches between the survey organizations, or something else. Therefore, we tested if there were systematic differences between the surveys' overlapping data, to determine which approach of interpolation to use.

The first step in the interpolation process was to identify all countries with overlapping data, i.e countries with two trust scores for the same year from different surveys. WVS was always one of the surveys involved in cases of overlapping data since it includes data from all around the world while the other surveys were restricted to specific continents. We therefore tested for differences between WVS and all of the other surveys individually. We decided to test this in two different ways; one was to calculate the difference of the survey scores of all overlapping data and then take the mean of these differences to assess whether it differed from 0, and the other was to test whether there was a linear correlation between the overlapping data by doing a simple linear regression with the WVS trust score as the dependent variable and the other survey as the independent variable.

Both methods showed similar results. Where there was a mean significantly different from zero, there was also a significant linear association, except for one case. The exception was WVS and ESS which showed a significant linear association but no mean significantly different from zero. The fact that there was one more significant linear correlation than mean difference was the first indication that using the regression equation was a better interpolation method. Moreover, it seemed reasonable to suggest the systematic difference to be proportional rather than constant, since a constant difference would relatively modify observations of lower trust much more, than the ones high in trust. With that in account, we decided to proceed with interpolation by using the equations from the regressions.

Regressions on the overlapping data points were made on WVS and the rest of the surveys respectively. The table below shows the returned equations from the regressions with significant results:

$$Trust_{WVS} = 1.425248 * Trust_{ESS} - 0.13914 \quad (1)$$

$$Trust_{WVS} = 0.495456 * Trust_{Latinobarometro} + 0.055076 \quad (2)$$

$$Trust_{WVS} = 0.795471 * Trust_{Afrobarometer} - 0.02045 \quad (3)$$

$$Trust_{WVS} = 0.587794 * Trust_{Arab\ Barometer} + 0.024226 \quad (4)$$

$$Trust_{ESS} = 0.5938040 * Trust_{WVS} + 0.130909 \quad (5)$$

$$Trust_{Latinobarometro} = 0.701453 * Trust_{WVS} + 0.09206 \quad (6)$$

The first four equations were used to interpolate values *to* WVS, from the other surveys, to conduct the global trends. The latter two were used to interpolate *from* WVS to ESS and Latinobarometro to conduct the continent trends.

On that note, an acknowledgement needs to be made regarding the expanded data sets in general. As previously mentioned, different methods of interpolation were approached, and careful reasoning was applied. However, since the data sets are not entirely from the same source, one extra glance of precaution is needed when analyzing the time series.

4.5 Population weighting

When generating trends for continents and for the world, population weighting needs to be applied. When calculating the degree of social trust in a continent or in the world from national data, the continent/world must be seen as the population from which a representative sample is drawn. This sample should be representative for the continent/world, meaning that trust scores for largely populated countries should weigh more than trust scores for smaller countries. The weights were calculated by simply dividing the population of each country, for each year, with the total population of the entire sample in the same year.

To obtain weighted trust scores, the weights is multiplied with the trust score for every country-year observation. The sum of the new weighted trust scores for all countries every specific year is now an estimated average value of the trust level of the continent/world that year, with which we can generate a time series.

4.6 Restrictions

At this point, a declaration of the restrictions in data is necessary, since they will dictate which countries and continents to include in the results. ESS and Latinobarometro provided far better data in general than any of the other surveys. Firstly, data was collected more continuously by these organizations. Latinobarometro provided data *annually* throughout almost the entire time period, resulting in time series with at least 17 observations for every country. ESS provided data every second year from 2002 to 2016 resulting in time series with at least 8 observations

for every country. The other surveys varied between having only one single observation to 3-4 observations for every country. Secondly, the ESS and Latinobarometro waves were isolated years, as opposed to the other surveys whose waves were conducted over intervals of several years, resulting in data inconsistency. Thirdly, the sample of countries included in every wave in ESS and Latinobarometro were fairly constant, while the other surveys were fairly inconsistent throughout the waves with which countries to include and which not. We therefore decided to use Latin American countries and European countries when generating country trends, and Latin America and Europe as continents when generating continent trends. However, when generating the world trend interpolated data from other surveys was included. Note that we used Latin America (South -, Central America and Mexico) as one continent, since all Latin American countries were conveniently included in the same survey (Latinobarometro).

5. Generating time series

5.1 Global

Early in the process of generating a global time series we encountered difficulties regarding finding a constant sample that had the optimal mix between the largest number of countries included in the sample and the longest possible time span. The surveys differed in years with available data and the frequency of data which meant fairly big restrictions, since only countries with data reoccuring for the same years could be used in a constant sample, which consequently led observations of certain years - and countries - to be excluded. To get around these difficulties we had four different approaches to generating a world trend, explained below. One of them was based on solely World Values Survey data, the second included ESS and Latinobarometro to get a larger sample. To avert said complications regarding the constructing of a constant sample, these three approaches involved having intervals as time periods to not lose countries due to missing years. The intervals were based off the waves of WVS, which were conducted over 4-5 year time spans. Nonetheless, this still meant a restriction in the case of fewer observations (in this case time periods), but at least this way allowed us to incorporate more countries without being deprived of the long time horizon. The third approach used individual years as time periods.

In our first approach we identified the countries with the earliest data points to use these as a constant sample with which we would generate the longest possible time series. These countries were Australia, Finland, Japan, Mexico, Sweden and USA, all of them from World Values Surveys first wave 1981. These countries were included in World Values Surveys wave 1

(1981-1984), wave 3 (1995-1998), wave 5 (2005-2009) and wave 6 (2010-2014) except for Finland which was not included in wave 6 and therefore had its trust score interpolated from European Social Survey. As mentioned, we chose to interpret the waves/intervals of the World Values Survey as time periods even if they spanned over multiple years. This world trend is however not a good estimate of the world's development of social trust, since the world is represented by six countries.

Finding a constant sample to generate trends was only possible using World Values Survey scores (except for Finland's last observation), due to consistency problems. Therefore, our next strategy was trying with a shorter time horizon allowing for a larger sample, as well as incorporating interpolated values from other surveys. We continued to use intervals as time periods and allowed the years of the interpolated values to vary within the intervals. This strategy allowed us to include any country from ESS, Latinobarometro, Afrobarometer and Arab barometer, with at least one observation within the WVS intervals. In the case of multiple observations within any interval, the mean of those trust scores were used as a single trust score. The optimal choice between having the largest sample possible and the longest time horizon possible was to have 4 time points; 1995-1998 (WVS's wave 3), 1999-2004 (WVS's wave 4), 2005-2009 (WVS's wave 5), 2010-2014 (WVS's wave 6). The sample of this world trend consisted of 40 countries[1]. This was a better trend than the previous one since it included a large proportion of the countries of the world and some of the most populated countries as well. However, due to too few time points, it is difficult to draw any certain conclusions based of this trend.

Since ESS and Latinobarometro had the most continuous data of the surveys, we figured we could generate a world trend with more data points than the previous two without having to use intervals as time points, however only with European and Latin American countries. This was our third approach. The time restriction in this world trend was mainly due to European Social Survey, since it had data from 2002 to 2016 while Latinobarometro had from 1996 to 2015. Other restrictions were due to European Social Survey having data only every second year whilst Latinobarometro had for every year except 2012 and 2014. With this in mind, the longest

[1] Argentina, Bolivia, Brazil, Chile, China, Colombia, Costa Rica, Czech Republic, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, Germany, Guatemala, Honduras, Hungary, India, Japan, South Korea, Mexico, Nicaragua, Nigeria, Norway, Panama, Paraguay, Peru, Poland, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, Great Britain, USA, Uruguay and Venezuela

and most continuous time series possible was one with five time periods, 2002, 2004, 2006, 2008 and 2010. This trend has specific years as time points and more observations, as opposed to the previous two world trends. However, it is not a representative trend of the world since it only consists of European and Latin American countries.

5.2 Continents

As mentioned before, Europe and Latin America were the only continents with fairly long and continuous data, which led to excluding the other continents for creating aggregating continent trends. The procedure here was more straightforward than for the global trend. Since data for European countries came from the same survey (ESS) almost all the countries had data for the same years. The same applied to Latin America through Latinobarometro. Thus, there were only a few countries that had to be excluded from the constant sample of both Europe and Latin America. The constant sample of Europe consisted of 15 countries[2], with data every second year from 2002 to 2016, and for Latin America it consisted of 17 countries[3], with data for every year from 1996 to 2015, except for 1999, 2012 and 2014.

5.3 Countries

In the case of country trends of social trust, data was used mainly from the continents respective survey (ESS for Europe and Latinobarometro for Latin America), with some interpolated values from WVS.

All time series mentioned above (global, continental and national) was first observed in scatter plots (graphs 1.1 to 2.31 in appendix 1 and 2). Simple linear regressions with social trust as the dependent variable were then made for every one of the time series. However, if a scatter plot showed non-linear tendencies, we proceeded with testing for second- and third-degree polynomial correlations as well.

[2] Belgium, Finland, France, Germany, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and Great Britain.

[3] Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

6. Testing the inequality/trust relationship

The next problem was to test whether there is a correlation between changes in social trust and changes in inequality, both without control variables and with controlling for GDP/capita and political state (degree of democracy). We began by finding measurements of inequality for the same years and countries that we had data on social trust. For the measurement of inequality, we used the Gini coefficient of disposable income, collected from the Standardized World Income Inequality Database (Solt, 2016) after examining Gustavsson & Jordahl's (2007) evidence that inequality of disposable income is more harmful to social trust than other inequalities. Data for GDP was collected from Penn World Tables 9-0 (Feenstra et. al, 2015) and data for political state is from Our World in Data (2019).

When the data was collected, we proceeded by calculating the difference of social trust and difference of Gini for every country between various time periods, and then testing the correlation between them. Since the data between the continents differed somewhat in years, we tried doing both a "global" linear regression of the changes in trust and Gini for the years in common, as well as dividing the continents and making separate regressions for the individual continents, to enable the inclusion of additional years.

6.1 Global

Similarly as for making the time series, the constant sample was once again restricted with data only for the time period 2002-2010, every second year. Nevertheless, we generated variables on the difference of social trust between years 2002-2006, 2006-2010 and 2002-2010. Consequently, the same was done for the change in Gini coefficient. These specific time periods were chosen simply to not only test the regression of the full time horizon, but to make it further robust by also splitting it in the middle for two separate regressions.

To fully confirm the question whether the change in social trust over time is affected by income inequality, we also wanted to test a lag, meaning that perhaps a change in income inequality would affect social trust in the future, and not right away. To do this we tried a similar approach as above, but now with the change of the Gini coefficient as a lagged variable. We generated further variables of differences between every second - and fourth - year. Then we tested simple linear regressions of change in social trust at time period t, with the change in the Gini coefficient at time t-1.

6.2 Continents

Regarding the individual regressions of the continents the method stayed the same, but with more variations of time periods due to broader data. First we made regression on the "longer" time horizons again.

For Latin America we initially tested specific time periods that looked intriguing by looking at the time series of social trust. The data for the aggregated time series reaches from 1996-2015, with some clear fluctuations around 2003 and 2010. Therefore we generated variables on changes in social trust and Gini for the time periods 1996-2003, 2003-2010 and 2010-2015, to test linear regressions. Onward, to make sure we do not only test periods where we detect variations, we continued also generating - testing the regression of - the time periods 1996-2005 and 2005-2015, just splitting the entire period in the middle.

Since the data for Latin America has a lot wider span of time periods, as well as more continuous data, it enabled a more substantial test with lags. Variables of the differences were generated between every second year, every third year as well as every forth. These were all tested separately, as in all the 2-year variables in one regression, all the 3-year variables in another, etc. As previously, the regressions were made of change in social trust at time period t, with the change in the Gini coefficient at time t-1.

As for Europe, the approach was identical, although the data set differed again. It mostly affected the regressions of the lagged variables since Europe only had observations in social trust every second year, so the lagged variables could only be done in even numbers, leading to generated 2-year variables and 4-year variables, not the 3-year ones. Except for that, the logic stayed the same; first a longer time horizon was tested without lags, and then all the lagged variables with the difference in Gini set to a lag of period t-1.

6.3 Correcting for GDP/capita and political state

Lastly, to firmly conclude the correlation between changes in trust as a function of changes in the Gini, we wanted to correct for two more variables; GDP/capita and democracy. As for GDP, we used the variable "rgdpna" (Real GDP at constant 2011 national prices USD), from the Penn World Table 9-0 (Feenstra et. al, 2015). Since the last year of data for our global constant sample was 2010, that was the year we chose. We converted the national real GDP to GDP/capita by dividing it on the population of the same year, which was also collected from

the same dataset (ibid). Onward, the variable was used both as a continuous independent variable as well as a dummy variable to separate developed from developing countries. The dummy was defined as 1 if the country had 12000 USD or above in GDP/capita, which roughly represents a developed country according to Our World in Data (2019).

To correct for the political state, i.e if a country can be considered democratic or not, we counted how many years the country has been democratic since 1950. The year 1950 was a point chosen by us, simply with the attempt of including as much historical data as possible but still avoid the geographical complications before and during World War 2 (the European map was quite different which could likely cause problems for the data).

The data was taken from Our World In Data (2019), which had annual scores between -20 until +10, which represented everything from colonies to full democracies. We counted how many years since 1950 the countries had a score between 6-10, which represented a democratic state. Everything below was defined as undemocratic. Further, this variable also used as both a continuous independent variable, as well as a dummy variable to separate historical democratic countries from ones with an undemocratic history. The dummy was defined as 1 if the country had 50 or more (out of 66 possible) years with a democratic political state.

7. Results

This section is divided in two parts. The first part shows the results for the generation of the time series of the world, of the world's continents and of world's countries. The second part will present the results for testing if income inequality is related to changes in social trust.

7.1 The time series

7.1.1 Global

Neither of the three world trends generated provided interesting results. The first two attempts had too few observations and uncertain time points. The third attempt did have specific years as time points, but only included European and Latin American countries. We therefore choose not to proceed with the world trend.

7.1.2 Continents

The development of social trust in Europe shows a strong significant increase from 2002 to 2016 with an annual increase of 0,34% (figure 4). The regression is presented in the table in appendix 4.

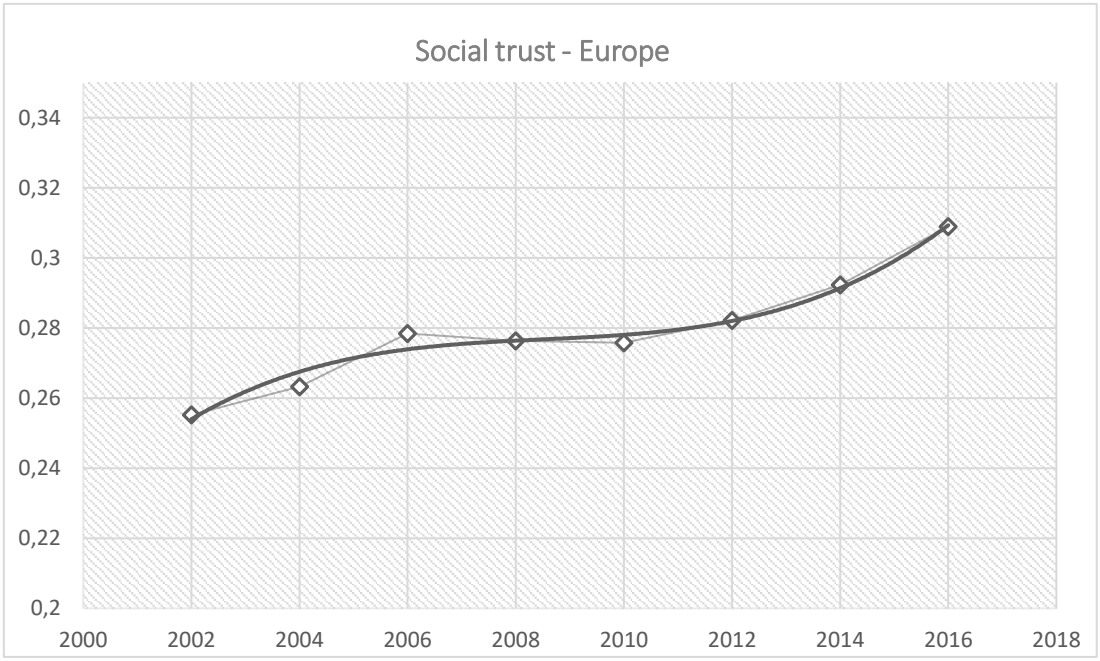


Figure 4: The development of social trust in Europe 2002-2016

The development of social trust in Latin America shows a third-degree polynomial trend with a minimum around year 2003 and a maximum around year 2010 (figure 5). The regression is presented in the table in appendix 3.

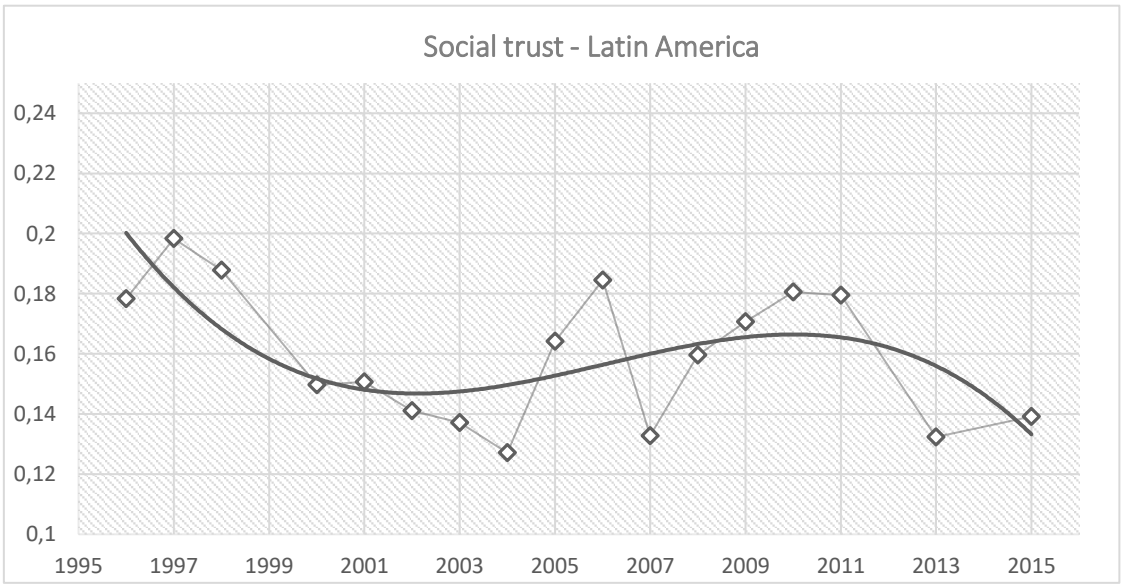


Figure 5: The development of social trust in Latin America 1996-2015

7.1.3 Countries

The country trends are presented graphically in appendix 1 and 2 (graphs 1.1 to 2.31) and with regression tables in appendix 3 and 4. The regression tables will include every regression made. Linear regressions were made for every country and continent. The decision to continue with making second and third-degree regressions was made if the graphs showed non-linear tendencies. Every country showing non-linearity in the graph were subject to suspicion and therefore tested for non-linear associations.

3 of the countries show a significant decrease in social trust in the period studied (Colombia, Uruguay and Bulgaria). 9 of the countries studied show a significant increase in social trust in the period studied (Estonia, Finland, Germany, Israel, Netherlands, Norway, Sweden, Switzerland and Great Britain). We can observe 5 countries with a U-shaped trend (Argentina, Brazil, Chile, Spain and Ukraine) and 1 country with an inverted U-shaped trend (Venezuela). 4 of the countries show a very similar third-degree polynomial trend (Dominican Republic, El Salvador, Honduras and Guatemala), all resembling a waveform with simultaneous falls and rises. These add up to 22 countries showing a non-stable trust trend. The countries with a stable trust trend (i.e, no linear or non-linear significant trend) add up to 26.

COUNTRIES	
Stable trust trend	26
Non-stable trust trend	22
Linearly increasing	9
Linearly decreasing	3
U-shaped	5
Inverted U-shaped	1
Third-degree wave	4

Table 1

7.2 How does changing social trust relate to changing inequality?

The second problem to assess was whether the change in social trust over time was associated with changes in income inequality. Here we included the Gini coefficient of disposable income as a measure for income inequality. We took the first difference between two different time periods, for social trust as well as the Gini coefficient, and tested simple linear regressions therebetween. In line with the rest of the paper, this was done on both a global level, as well as one continent at a time, and was done between various combinations of time periods. The trust variables were named "T"-followed by the difference taken. For example, T1006 would mean the change of trust from 2006 to 2010 (the trust score of year 2010 subtracted by the score year 2006). Exactly the same was done for the Gini variables but with a "G" instead of a "T".

Firstly we made a global regression on change in social trust and the change in inequality of the entire time period we had a constant sample for; 2002-2010, as well as dividing it in the middle, 2002-2006; 2006-2010. As we see in table 2 below, there was no significant correlation between the variables in either time period.

Table 2: **Global**

	Whole period	**First half**	**Second half**
	02-10	02-06	06-10
VARIABLES	T1002	T0602	T1006
G1002	0.040		
	(0.040)		
G0602		0.050	
		(0.046)	
G1006			0.029
			(0.040)
Constant	0.009	0.021*	-0.011
	(0.009)	(0.012)	(0.009)
Observations	36	34	40
R-squared	0.028	0.035	0.013

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The result for the entire period, 2002-2010, can also be illustrated in a scatter plot (figure 6). As confirmed above the trends are not significant, however, we can observe that the Latin

American countries seem to go towards a more equal income redistribution, while Europe has a pretty stable equality, or perhaps even lean towards becoming more unequal.

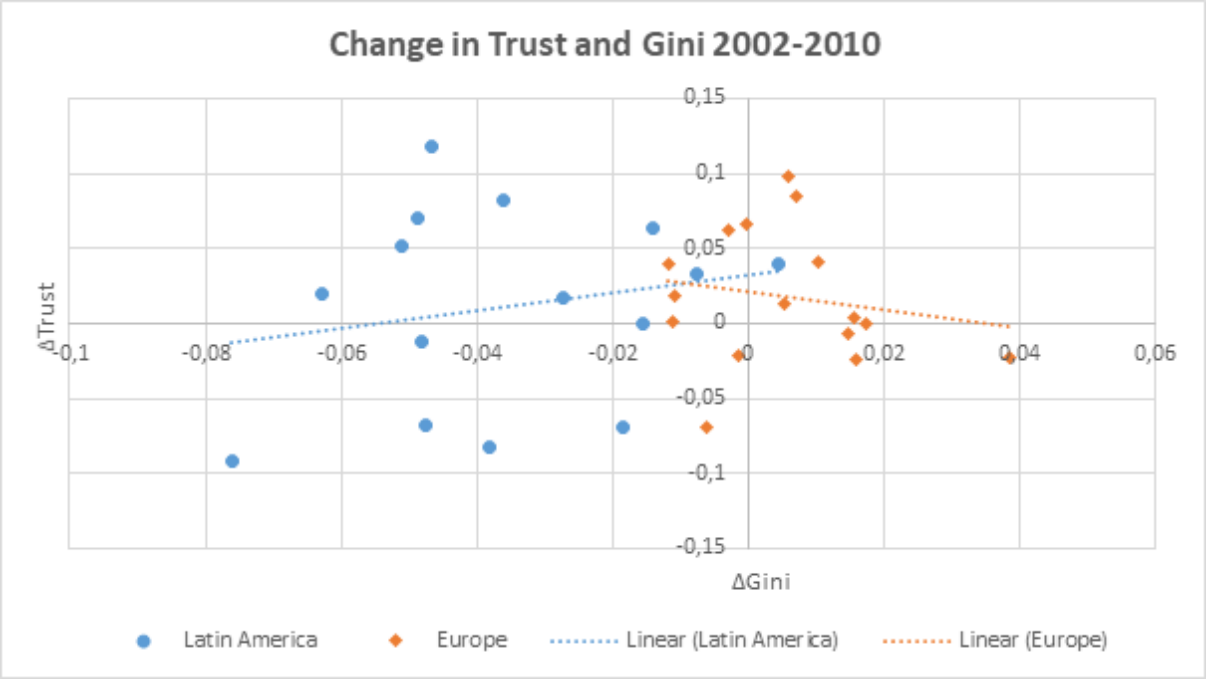


Figure 6: Scatter plot with change in trust on the Y-axis and change in Gini (disp) on the X-axis

Regressions were also made on longer time horizons we found interesting by simply looking at the aggregated time series. For Latin America this was between the three different time periods, 1996-2003, 2003-2010 and 2010-2015, since we recognized some fluctuations of social trust at those time periods earlier. Further we added the neutral time horizon of simply dividing the time series on the middle. However, as shown in table 3 below, there was no significant correlation within any of the time periods.

Table 3: **Latin America**

	First tri-period	**Second tri-period**	**Third tri-period**	**First half**	**Second half**
	96-03	03-10	10-15	96-05	05-15
VARIABLES	T0396	T1003	T1510	T0596	T1505
G0396	1.227				
	(0.742)				
G1003		0.516			
		(0.751)			
G1510			0.177		
			(1.872)		
G0596				1.022	

				(0.806)	
G1505					0.176
					(0.783)
Constant	-0.039***	0.048	-0.034	-0.008	-0.019
	(0.013)	(0.028)	(0.037)	(0.018)	(0.038)
Observations	17	17	16	17	16
R-squared	0.154	0.030	0.001	0.097	0.004

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Similarly as for Latin America, we first tested regressions on longer time horizons for Europe. Since the data differed, with the total time horizon being shorter for Europe, and the aggregated time series didn't show any particularly interesting fluctuation, we only divided it on the middle. Table 4 shows the correlation between the changes in inequality and social trust on the time periods 2002-2010 and 2010-2016. Just as the previous table, it shows no significant correlation.

Table 4: **Europe**

	First half	**Second half**
	02-10	10-16
VARIABLES	T1002	T1610
G1002	0.015	
	(0.052)	
G1610		0.042
		(0.054)
Constant	0.016	0.036***
	(0.010)	(0.009)
Observations	19	18
R-squared	0.005	0.036

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

To further confirm the question whether the change in social trust over time is explained by changes in income inequality, we tried a similar approach as above, but now with the change of the Gini coefficient as a lagged variable. Since there is no rule of thumb, nor theoretical basis, on how lagged the effect hypothetically would be, we proceeded by generating differences of both variables in various variations, testing for two year - three year (only for Latin America) - and four year lags. We then tested simple linear regressions between the correlation of change in social trust at time period t, with the change in the Gini coefficient at time t-1. Table 5 and 6

below shows no significant correlation in any of the attempted lag-variation for the global constant sample.

Table 5: **Global (two-year lag)**

VARIABLES	**Trust06 – Gini04** T0604	**Trust08 – Gini06** T0806	**Trust10 – Gini08** T1008
G0402	-1.990		
	(1.207)		
G0604		-0.310	
		(1.174)	
G0806			1.195
			(0.835)
Constant	0.033***	-0.007	0.003
	(0.011)	(0.010)	(0.008)
Observations	34	37	40
R-squared	0.078	0.002	0.051

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: **Global (four-year lag)**

VARIABLES	**Trust10 – Gini06** T1006
G0602	0.279
	(0.637)
Constant	-0.013
	(0.010)
Observations	33
R-squared	0.006

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For Latin America we had continuous data enough to try for a three year lag as well, however, the results below (table 7, 8 and 9) still do not show any significant correlation between the change in social trust with earlier changes in the Gini coefficient.

Table 7: **Latin America (two-year lag)**

VARIABLES	**Trust00 – Gini98** T0098	**Trust02 – Gini00** T0200	**Trust04 – Gini02** T0402	**Trust06 – Gini04** T0604	**Trust08 – Gini06** T0806	**Trust10 – Gini08** T1008
G9896	-5.376					
	(3.108)					
G0098		3.970				
		(2.480)				
G0200			-0.028			
			(1.941)			
G0402				-1.335		
				(2.288)		
G0604					-0.836	
					(3.127)	
G0806						2.079
						(1.641)
Constant	-0.039**	0.030	-0.028*	0.049*	-0.011	0.009
	(0.017)	(0.017)	(0.013)	(0.025)	(0.030)	(0.022)
Observations	17	17	17	17	18	18
R-squared	0.166	0.146	0.000	0.022	0.004	0.091

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: **Latin America (three-year lag)**

VARIABLES	**Trust03 – Gini00** T0300	**Trust06 – Gini03** T0603	**Trust09 – Gini06** T0906
G0097	1.506		
	(2.033)		
G0300		-0.470	
		(1.690)	
G0603			-1.186
			(1.615)
Constant	0.010	0.048**	-0.021
	(0.018)	(0.018)	(0.025)
Observations	17	17	17
R-squared	0.035	0.005	0.035

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: **Latin America (four-year lag)**

VARIABLES	**Trust04 – Gini00** T0400	**Trust08 – Gini04** T0804
G0096	0.274	
	(1.566)	
G0400		-1.447
		(1.240)
Constant	0.003	0.038*
	(0.017)	(0.020)
Observations	17	17
R-squared	0.002	0.083

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The same as for the global sample was done for Europe, which was merely because of the dataset only having observations every second year. Yet again, the tables below show no new findings of a correlation. The changes in social trust does not seem to be explained by lagged effects of changes in inequality either.

Table 10: **Europe (two-year lag)**

VARIABLES	**Trust06 – Gini04** T0604	**Trust08 – Gini06** T0806	**Trust10 – Gini08** T1008	**Trust12 – Gini10** T1210	**Trust14 – Gini12** T1412	**Trust16 – Gini14** T1614
G0402	0.538					
	(1.852)					
G0604		0.034				
		(0.873)				
G0806			-1.257			
			(1.010)			
G1008				1.820		
				(1.379)		
G1210					-2.191	
					(2.168)	
G1412						-0.169
						(2.209)
Constant	0.015	-0.007	0.003	0.004	-0.005	0.037***
	(0.011)	(0.006)	(0.006)	(0.008)	(0.009)	(0.007)
Observations	17	19	22	23	20	19
R-squared	0.006	0.000	0.072	0.077	0.054	0.000

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: **Europe (four-year lag)**

	Trust10 – Gini06	**Trust14 – Gini10**
VARIABLES	T1006	T1410
G0602	0.932	
	(0.926)	
G1410		-0.666
		(1.466)
Constant	-0.014	0.002
	(0.009)	(0.008)
Observations	16	20
R-squared	0.067	0.011

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Lastly, to fully confirm these results, we did a last step with **all** the same regression, lagged and non-lagged, but correcting for every countries BNP/capita and political state (which are both divided by 1000 in the dataset). The results stayed the same, there was no significant correlation found between the variables. Some of them are presented below (table 12, 13 and 14) (for simplicity reasons only the neutral time horizons).

Table 12: **Global (correcting for GDP/capita and political state)**

	Whole period	**First half**	**Second half**
	02-10	02-06	06-10
VARIABLES	T1002	T0602	T1006
G1002	0.10630		
	(0.07438)		
GDPcapita	0.00101	0.00077	0.00098
	(0.00098)	(0.00124)	(0.00092)
Democratic	-0.00638	-0.39700	0.05279
	(0.70337)	(0.91237)	(0.61346)
G0602		0.07850	
		(0.09111)	
G1006			0.09612
			(0.06834)
Constant	-0.02241	0.01593	-0.04194
	(0.03872)	(0.05005)	(0.02998)
Observations	36	34	40
R-squared	0.06344	0.04848	0.05285

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: **Latin America (correcting for GDP/capita and political state)**

	Whole period	**First half**	**Second half**
	96-15	96-05	05-15
VARIABLES	T1596	T0596	T1505
G1596	-0.52616		
	(0.51574)		
GDPcapita	0.00110	0.00600*	-0.00415
	(0.00287)	(0.00329)	(0.00380)
Democratic	0.13093	1.26051	-2.59109*
	(1.23484)	(1.46168)	(1.40666)
G0596		0.45265	
		(0.85029)	
G1505			0.87573
			(0.77195)
Constant	-0.07003	-0.12465*	0.15449*
	(0.06904)	(0.05869)	(0.08424)
Observations	15	17	16
R-squared	0.11093	0.37065	0.30538

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14: **Europe (correcting for GDP/capita and political state)**

	Whole period	**First half**	**Second half**
	02-16	02-10	10-16
VARIABLES	T1602	T1002	T1610
G1602	-0.37565		
	(0.61726)		
GDPcapita	-0.00012	-0.00053	0.00044
	(0.00081)	(0.00111)	(0.00102)
Democratic	-0.11444	-0.62303	0.59189
	(0.62468)	(0.83866)	(0.68509)
G1002		-0.04944	
		(0.08013)	
G1610			0.10015
			(0.07213)
Constant	0.06217**	0.06629	-0.00645
	(0.02885)	(0.04658)	(0.03245)
Observations	18	19	18
R-squared	0.03774	0.08107	0.15335

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

8. Analysis

Our results show that 22 of the 48 countries studied show non-stable trust trends, either with linear increases/decreases or polynomial trends (table 1). The aggregate development of social trust of the European countries shows a strong increase in social trust from 2002 to 2016 with an average annual increase of 0,32% (figure 4). The Latin American aggregate development 1996-2015 show a third-degree polynomial trend with a minimum around year 2003 and a maximum around year 2010 (figure 5). We do not draw any conclusions from the attempts of a world trend due to inconsistency problems in data and few observations.

These are highly interesting results. Firstly, it shows that trust is not systematically stable throughout the countries studied, which questions the claim of social trust being generally stable over time. Secondly, since income inequality is rising in many parts of the western world, or in best case kept stable (see figure 6), one would assume that social trust would be decreasing, given the strong association between income inequality and social trust (Bjørnskov, 2006). However, we clearly see that it is rather the opposite - social trust is rising in Europe.

8.1 The variability of the trust measure

How is the variability of the trust score to be interpreted, as both theory and earlier studies claim that it is generally stable over time? One possible answer is that there have been few time series studies on the development of social trust on a world spanning scale. The approach taken in earlier studies has either been measuring changes in trust from one WVS wave to another, as in Bjørnskov (2006), or through various creative attempts to explain why it is stable, for instance by studying immigrants in the US (Uslaner, 2002) or parents influence on children's trust (Katz & Rotter, 1969). However, these are merely implicating that social trust is stable, lacking a quantitative time series analysis backing up these claims. The few quantitative studies that in fact have been conducted on trust over time have had a substantial time restriction in data. This study can show that when expanding the time horizon, social trust can change significantly over time. By simply observing the graphs it is clear that a country can have stable trust scores for 10-year periods but show a fluctuating trend when the time span is extended. If we for instance study the graph of Venezuela (graph 1.18 in appendix 1) we see that it shows a fairly stable development of social trust 1996-2004, as well as 2005-2010, but a significantly fluctuating trend when expanded to 1996-2015.

We found many interesting developments when observing both the country trends and the continent trends. Looking for example at Latin American countries, it is noticeable that many of the countries seem to have similar fluctuations. Brazil, the Dominican Republic, El Salvador, Guatemala, Honduras and Venezuela all have a similar pattern; a wave-formed trend with a minimum around year 2003 and a maximum around year 2010 (see figure 7). Another interesting detail regarding these trends is that there is a big variation of both initial social trust, as well as the level of social trust. For example Brazil starts with a value around 0.14 and is always within the range of 0.14-0.04 while Guatemala has an initial observation around 0.3 and ranges between 0.35-0.11. This strengthens that the trends are not behaving alike simply due to accidentally having similar initial levels of trust, nor that it could be a purely numerical coincidence regarding a certain range of trust. Additionally, the countries in question are fairly spread out geographically between South- and Central America, which excludes the chance of the fluctuations being a geographical coincidence in the dataset. In Europe, multiple countries show a significantly increasing social trust which together, in the aggregate European trend, results in a significantly increasing social trust. This all indicates that there is something affecting these fluctuations. This led us to test if the suggestively most robust determinant of social trust, inequality, was related to the changes in social trust.

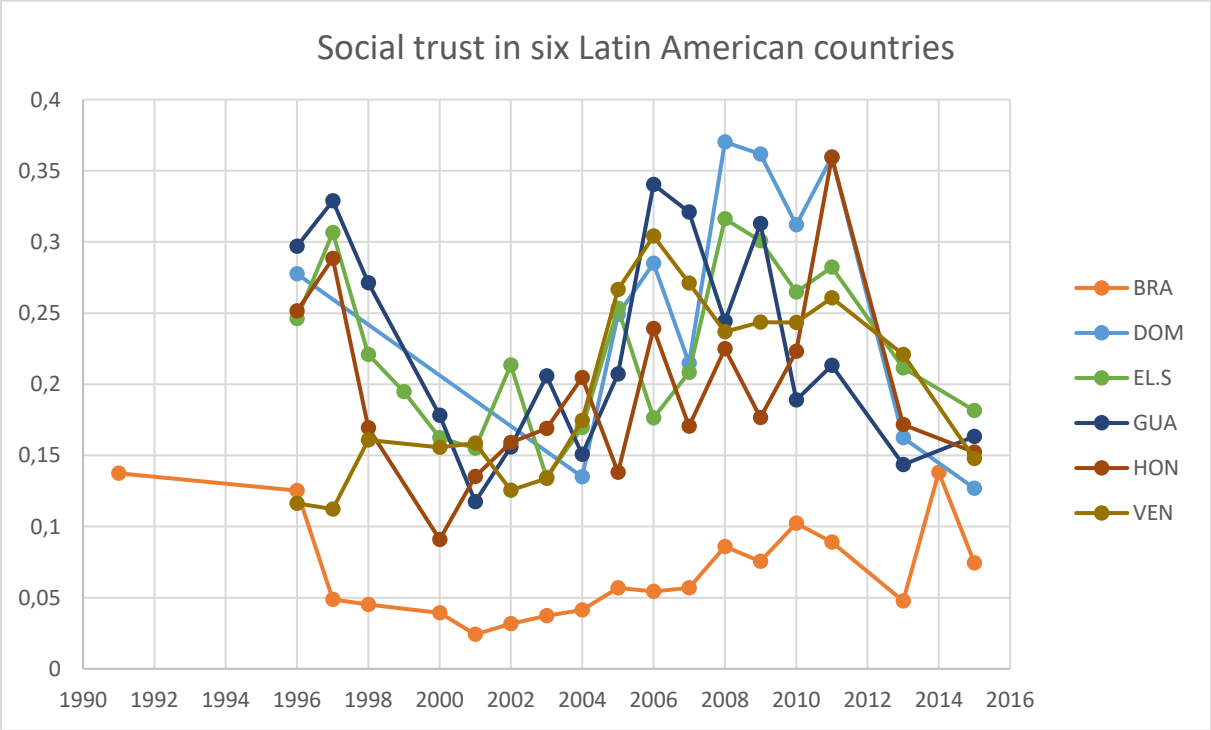


Figure 7: Development of social trust in Brazil, Dominican Republic, El Salvador, Guatemala, Honduras and Venezuela

8.2 The inequality/trust relation

To our surprise, the observed changes in social trust could not be explained by changes in income inequality. This is a fairly robust conclusion since the regressions on changes in trust and Gini were done in many variations. They were done both with the entire time period for which we had data on and the period simply split in the middle, as well as with relevant time periods where fluctuations were observed. The regressions did not show any correlation even when lagging Gini and correcting for BNP/capita and political state. In Europe, the same was done, with the exception of specific time periods showing fluctuations, since the aggregate did not show any.

Now, what could be the reasons behind not being able to explain changes in trust with changes in inequality? One possible reason is that there exists a more robust determinant of trust than inequality, perhaps a variable that could be a proxy for inequality. That would give one possible explanation for why the correlation between the level of trust and inequality has been confirmed in cross-sectional studies before, but maybe now with longitudinal data the hypothetical variable is more a direct determinant of trust than a proxy for inequality. As in, a high level of this hypothetical variable resembles a high level of Gini and consequently a low level of trust, but a change in said variable might not be translated to a proportional change in Gini, but does correlate more proportionally with changes of trust.

Another reason behind this could be that the general level of inequality of a country is a result of political history, deeply rooted informal institutions, historic traditions and culture, amongst other things. A country like Sweden, with this in mind, does not have a high trust level because of the low inequality *per se*, but because of all the deeper reasons behind the low inequality, like for example the historical absence of corruption, early universal suffrage and a long democratic legacy. This argument supports the conclusion of Bergh & Björnskov (2011) and Bergh & Björnskov (2014); equality is a result of a high trusting population, and not the reverse. A slightly different take on this could be that equality and trust both have the same historical determinants, and are therefore functioning as each other's proxies, as depicted in figure 8. Put differently, the causality of the correlation could be from some unknown omitted variables to both trust *and* equality. This could further strengthen the conclusion regarding countries with low inequality having high trust while changes in inequality do not relate to changes in trust. Either way, this viewpoint positions itself in the social capital dispute amongst those claiming

that trust is hardly affected by public policy, especially policy aiming to reduce income inequality.

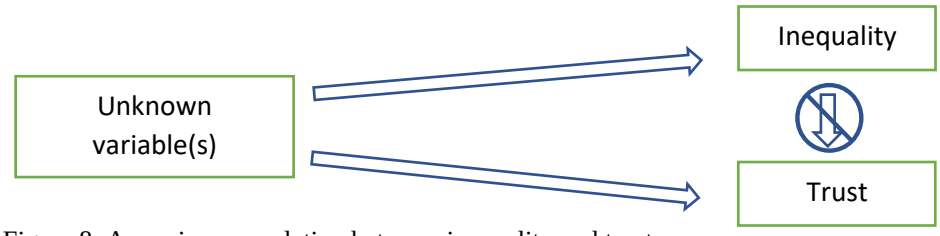


Figure 8: A spurious correlation between inequality and trust

The contradiction of a generally decreasing equality with a simultaneous increase of trust in Europe leads us to another possible explanation to why changes in inequality does not affect trust. It is reasonable to argue that the effect of inequality on trust depends on the underlying *causes* of the inequality itself. It is theoretically reasonable to think that inequality caused by non-legitimate ways to seek wealth, like tax evasion or corruption, will cause skepticism and distrust against the winners, while inequality caused by socially accepted and morally justifiable reasons, for example competitive market outcomes, will not affect trust as much. Put differently; inequality sprung from a playing field of equal opportunities will not cause distrust, since the players have closer social ties through their equal opportunities. In the case of Europe, this could be translated into that inequality has been rising as a result of reasons people find legitimate. It could also be the case that Europeans have become less averse to income inequality, which according to Gustavsson & Jordahl (2008) would dampen its effect on trust. Or it could be both, and that the former causes the latter, i.e that Europeans witnessing an increasing inequality by legitimate reasons may have developed a less averse attitude against income differentials. Lastly, Coleman's (1990) game theoretical approach stating that trust is based on expected utility, i.e. expected gain versus expected loss, translates directly to why highly developed countries would inherently have higher trust, since their relative loss of putting trust in someone on average is lower than for people in developing countries.

In summary, our results show that *changes* in social trust are not affected by *changes* in inequality. Nevertheless, the fact still remains that social trust is changing, and there are clear patterns depicted in many of the countries studied, implicating that there is indeed something having an effect on trust. Although we cannot enounce precisely what is affecting these changes, we can conclude that it is not solely an issue of inequality.

9. Conclusion and discussion

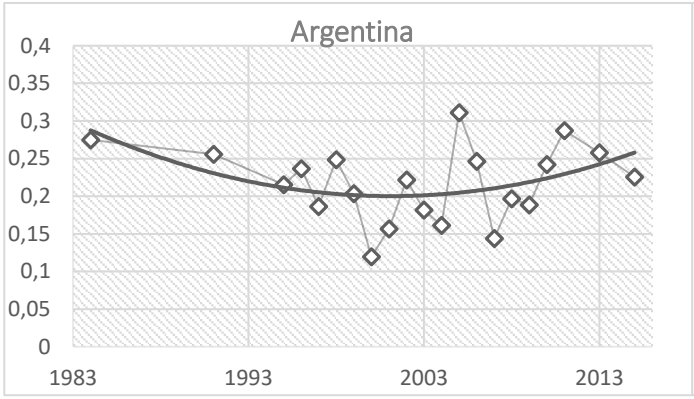
We have in this paper generated time series of the development of social trust in 48 European and Latin American countries, of the developments of the aggregate social trust in Europe and Latin America individually, as well as in the world as a whole. These trends have been generated from a large and substantial data set obtained by merging various survey scores together, i.e making their trust scores comparable, through interpolation. We conclude that the development of social trust is showing a non-stable behavior over time in a large proportion of the countries studied, questioning earlier theoretical and empirical claims of it being generally stable. Due to data inconsistency we do not draw any conclusions from the world trends generated. However, we find that social trust has been significantly increasing in Europe since 2002. This surprised us, since income inequality, the most well-documented (negative) determinant of social trust, is generally rising in many European countries. We also find a wave-formed trust trend in Latin America with a minimum around year 2003 and a maximum around year 2010. We can, however, not find that any of these changes are associated with income inequality.

Our findings raise many new questions to the discussion regarding social trust, by more or less rebutting two consensual ideas; the notion of stable social trust over time, as well as the idea that changes in trust is related to changes in inequality. We do not have any intention of undermining previous results, rather we provide multiple potential reasons of why the cross-sectional results might have occurred as they did. Nevertheless, we do see our conclusion as an important remark to this field of research. The *lack of correlation* between the changes in trust and changes in inequality, together with the *presence of fluctuations* in the trends of trust, gives reason to entertain the thought of a missing determinant. Something is clearly affecting the development of social trust, and it is doing so even across countries, as seen in the aggregate of both Europe and Latin America. As mentioned before, perhaps this hypothetical missing determinant is hidden away in the umbrella term that is inequality. It also raises the question of whether quantitative research really is enough for this line of research. For example, in the aggregated trend of Latin America's trust it is reasonable to suggest a need for qualitative analysis. Countries are showing significant fluctuations, too similar and simultaneous to be coincidental, and are located in a fairly politically eventful region. The wave-like trend of trust might be better explained through qualitative research, aiming to understanding cultural attributes or recent history, rather than solely focus on empirical solutions presented to work in

the western world. After all, why would there be a solution applicable across a culturally heterogeneous world?

To end on a slightly more optimistic note, the new substantial data on income inequality, as well as the increasingly larger time spans of trust data, has enabled for a lot more future research to be conducted within the field of social trust. Perhaps our results can encourage towards finding alternative solutions of increasing trust, not only putting all focus on hard-achieved redistributive amendments. After all, our results, together with other studies presented in this paper, points at the difficulty of affecting trust through inequality-reducing policy. Maybe by finding other ways to increase trust, said hard-achieved redistributive amendments would become easier to establish as a result, and equality also could increase as a product of it.

Appendix 1: Country trends – Latin America



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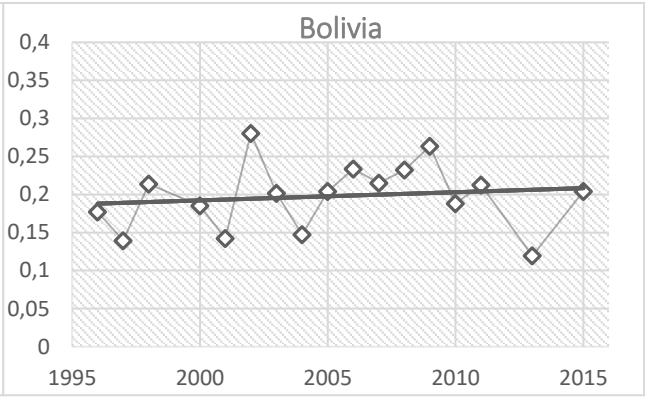

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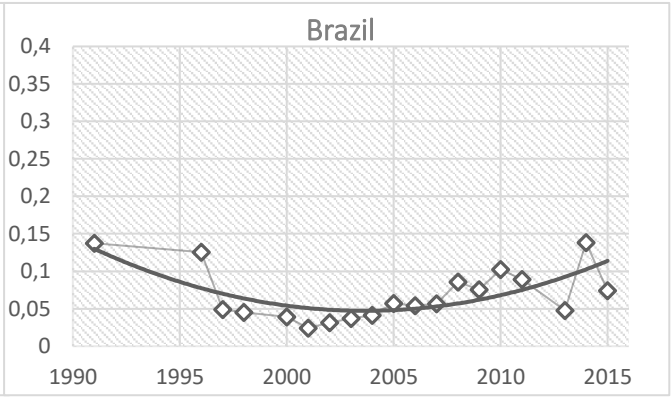

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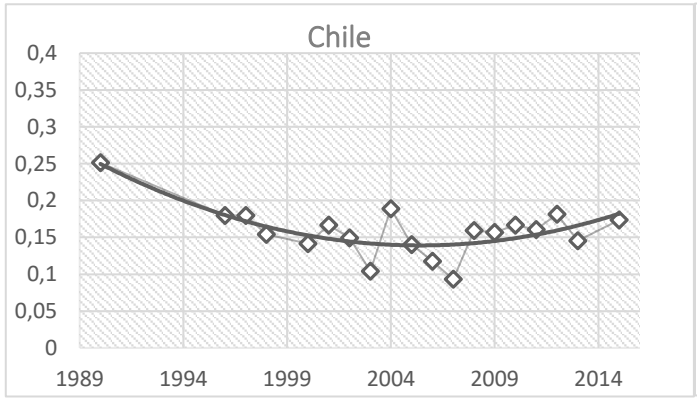

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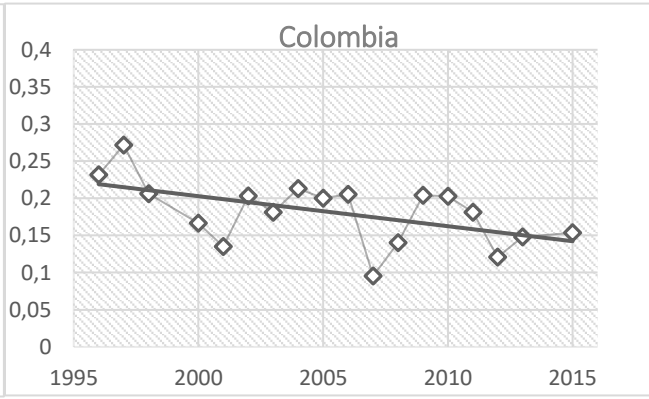

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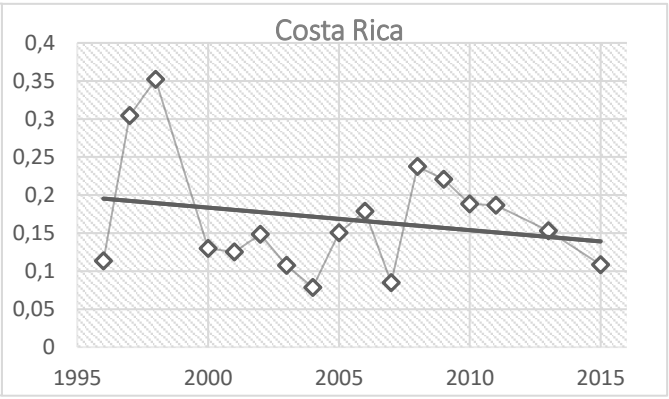

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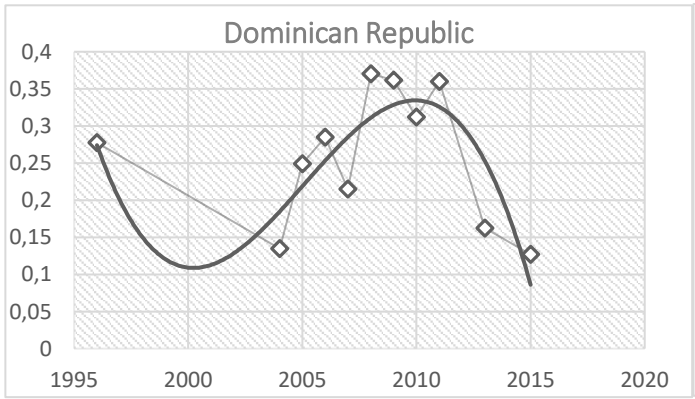

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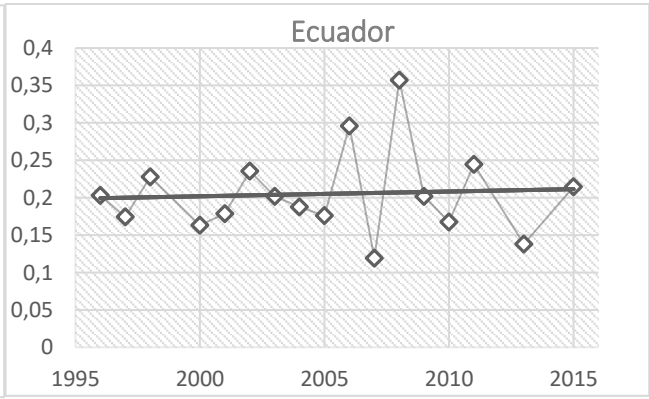

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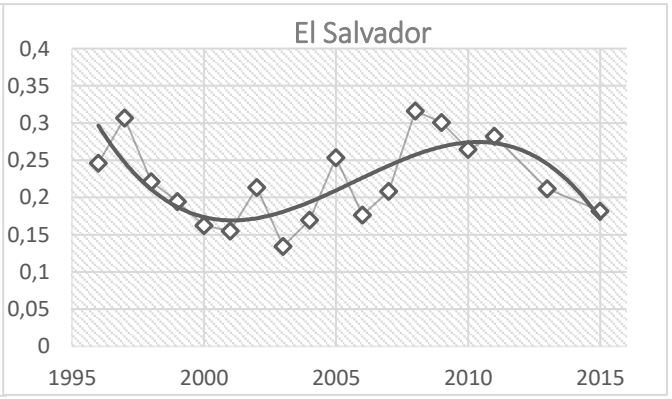

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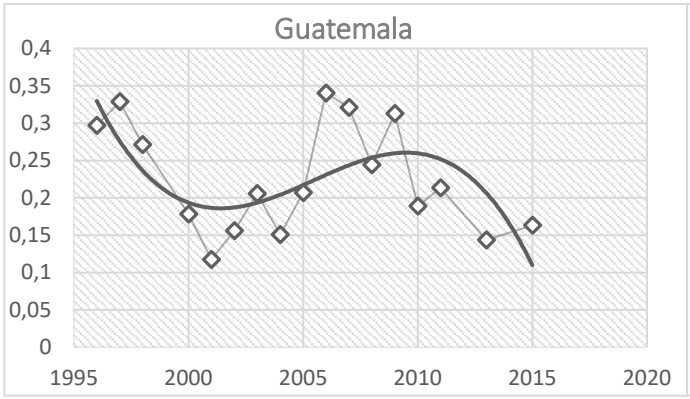

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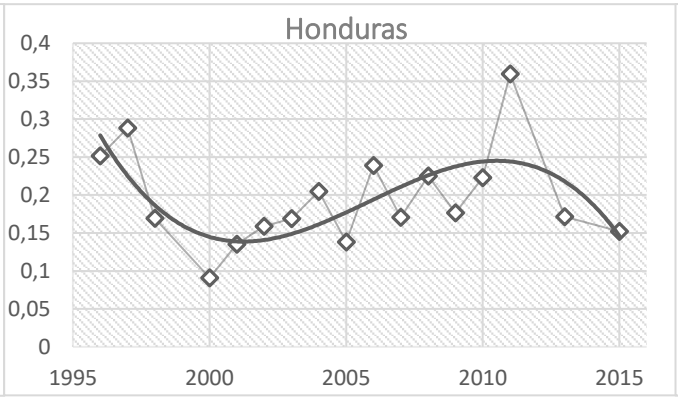

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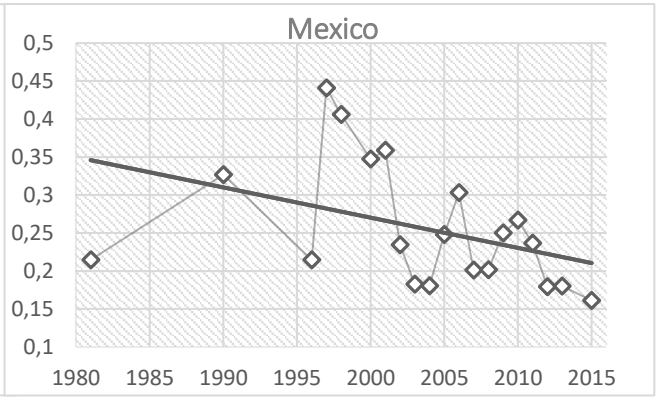

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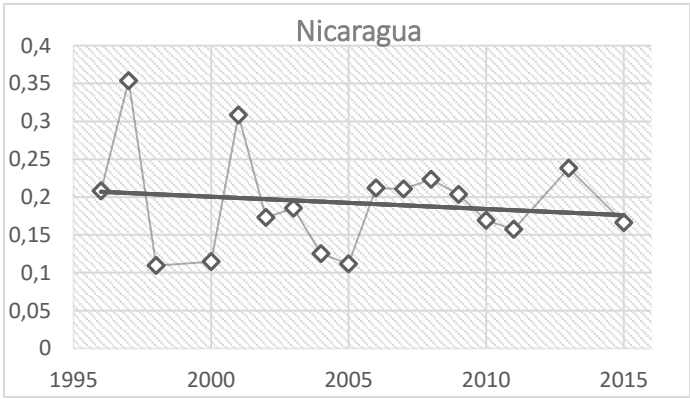

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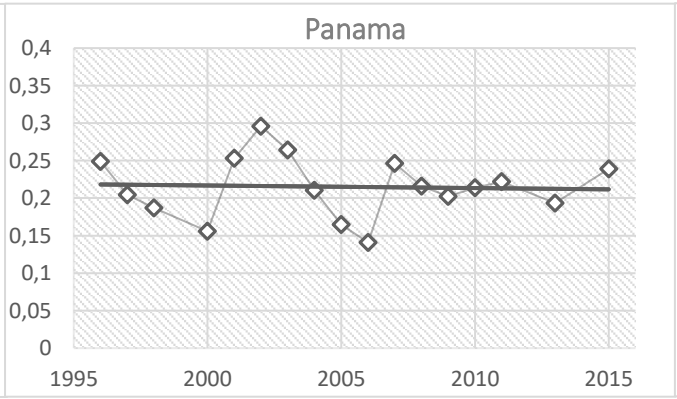

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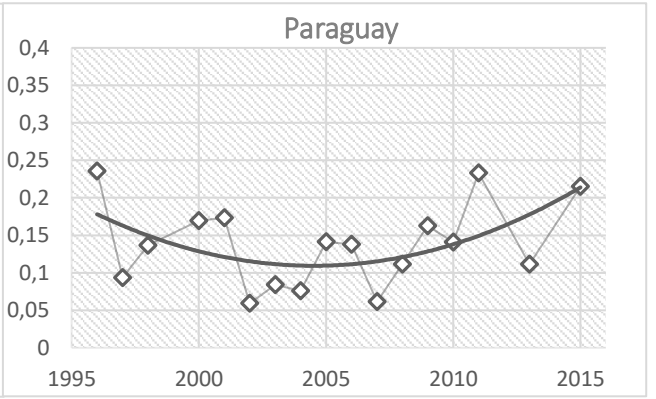

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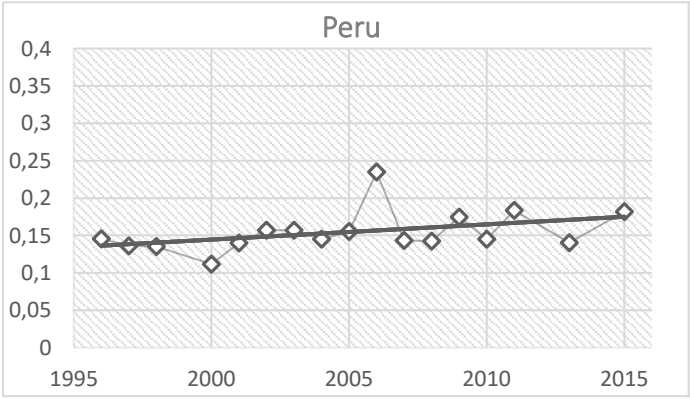

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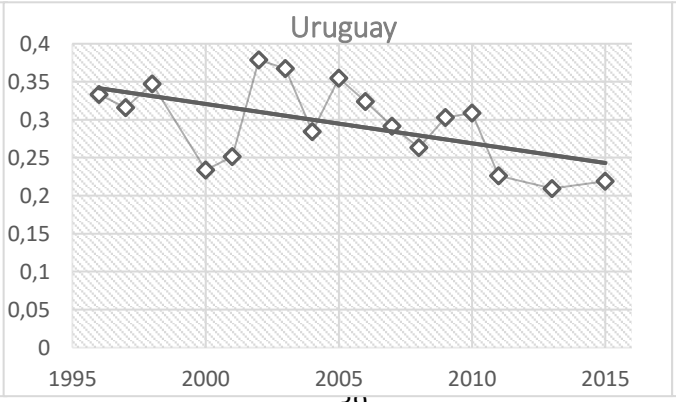

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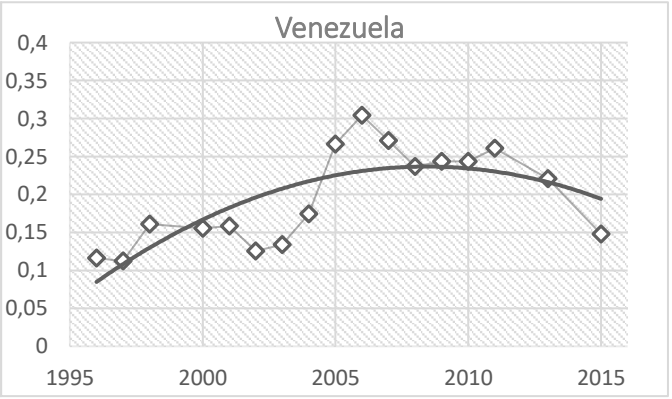

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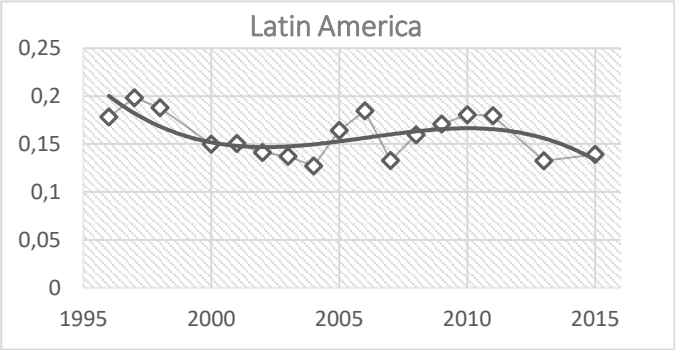
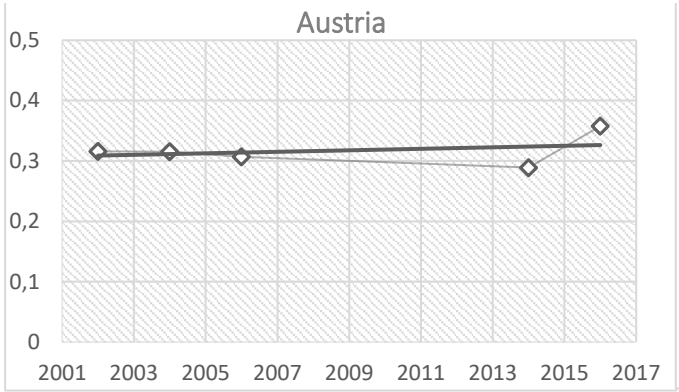


Graph 1.19

Appendix 2: Country trends – Europe



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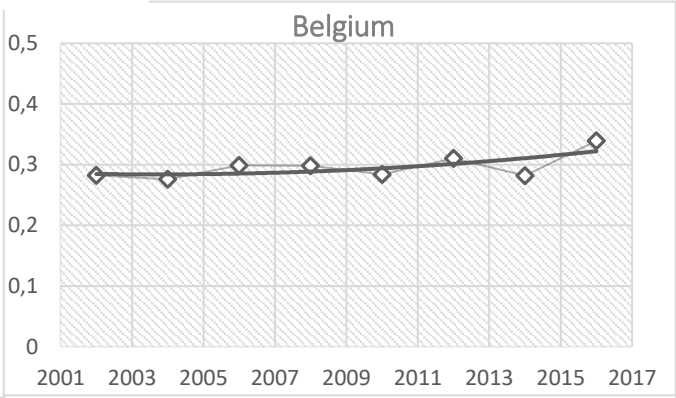

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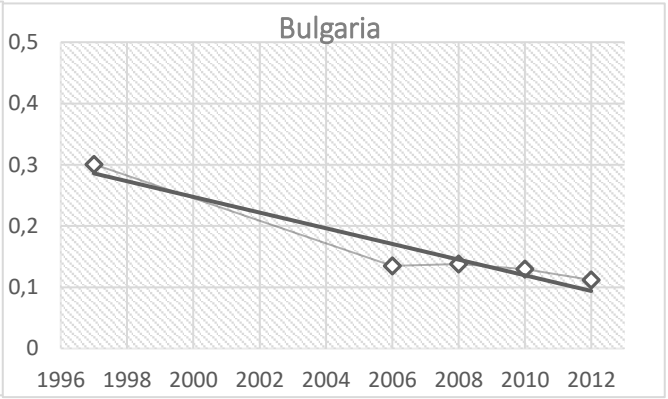

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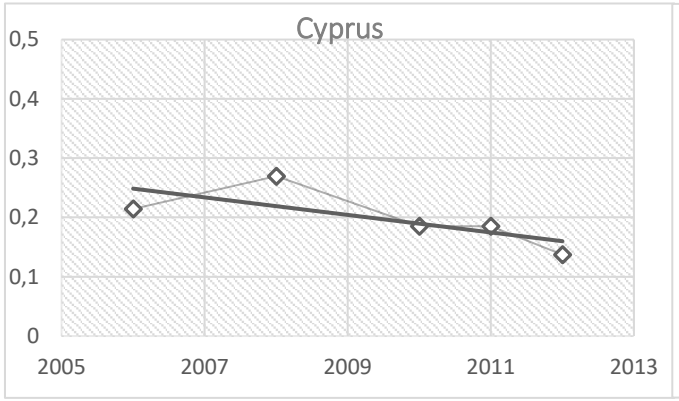

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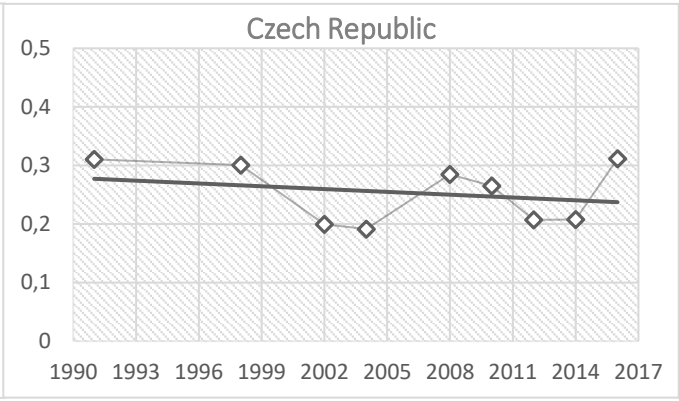

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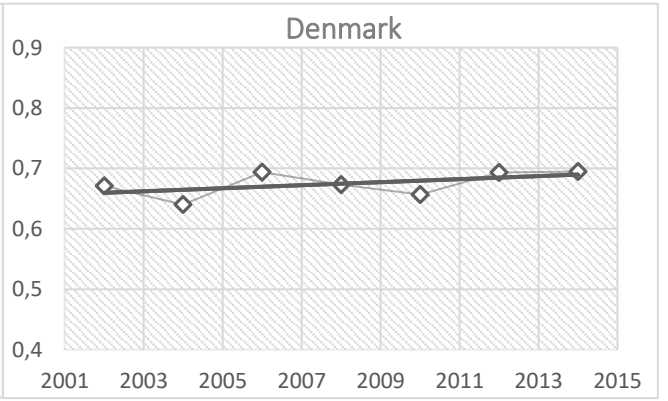

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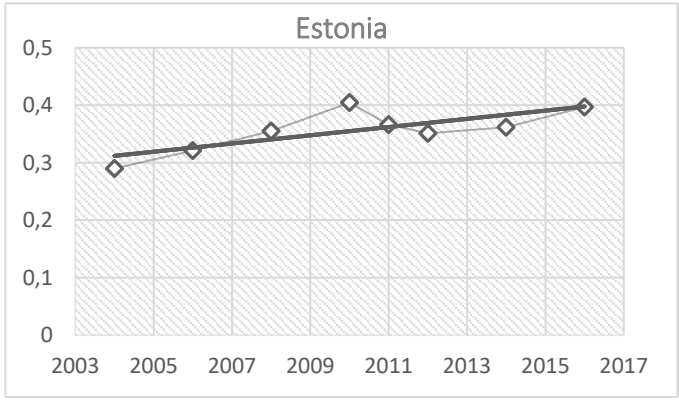

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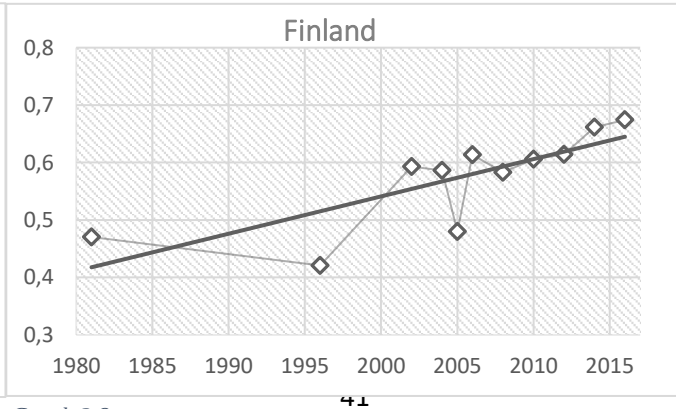

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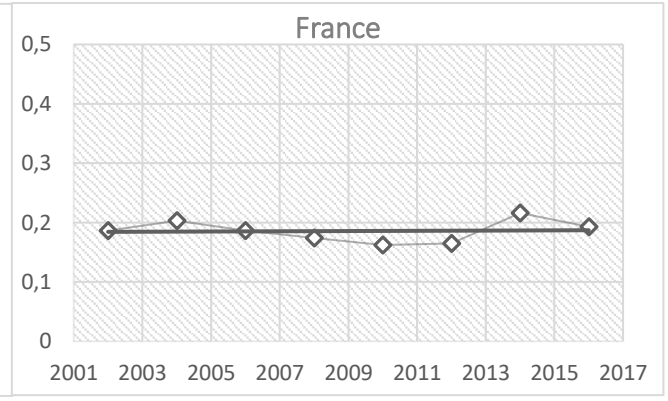

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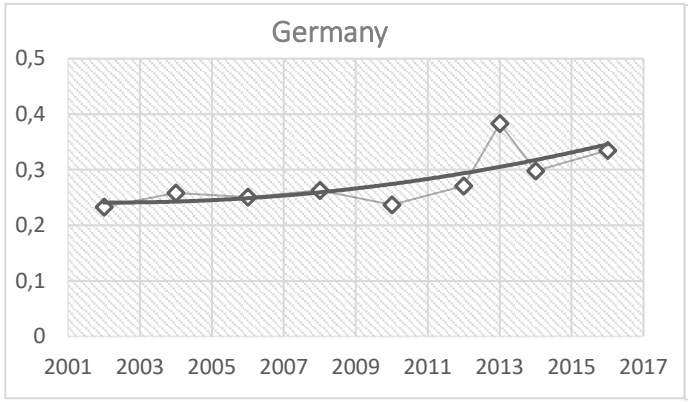

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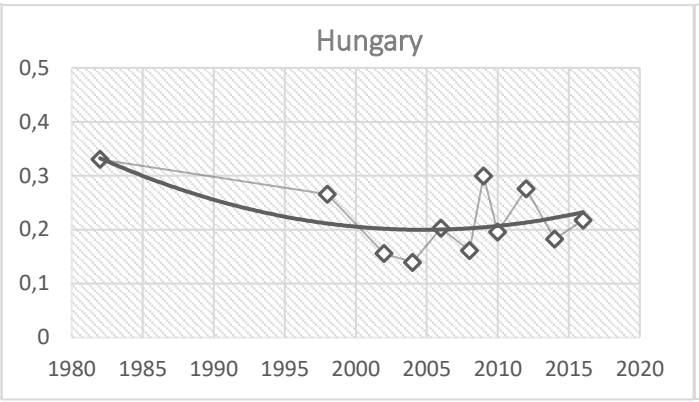

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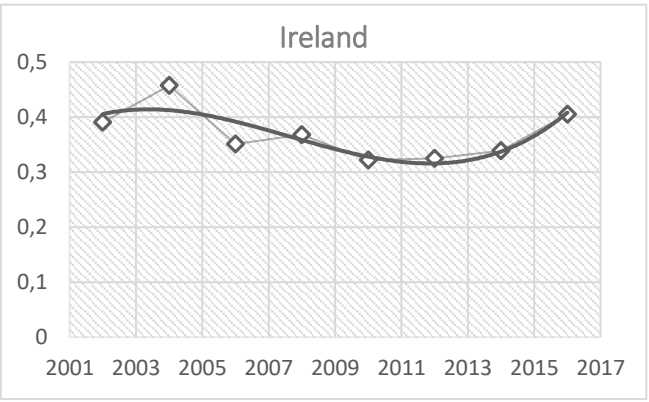

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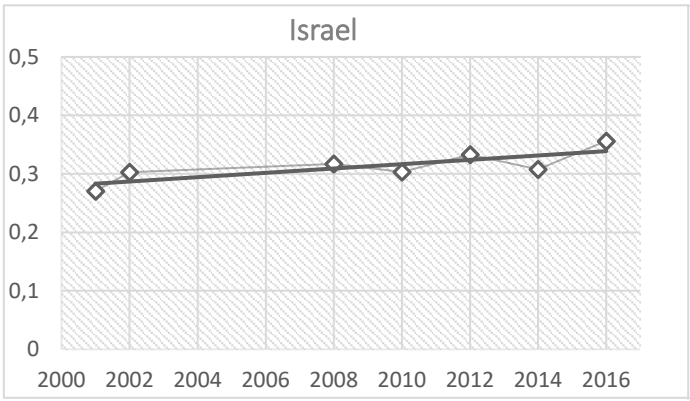

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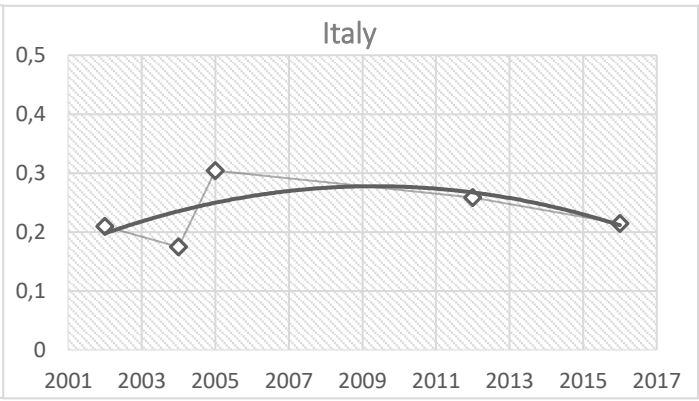

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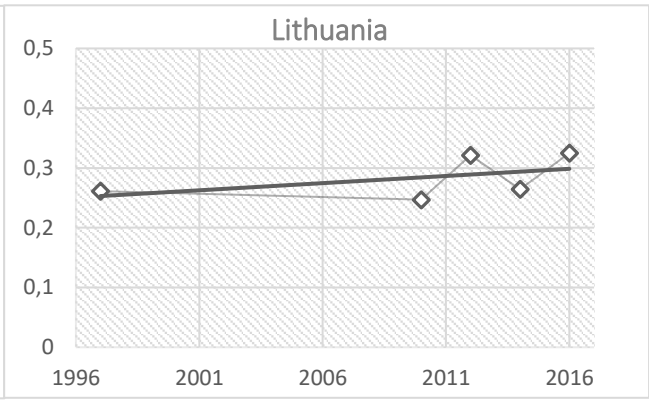

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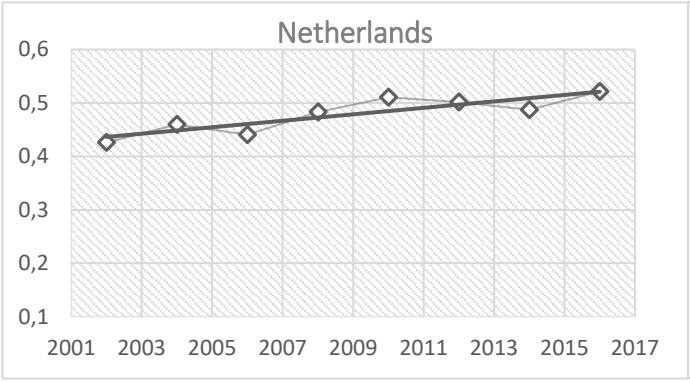

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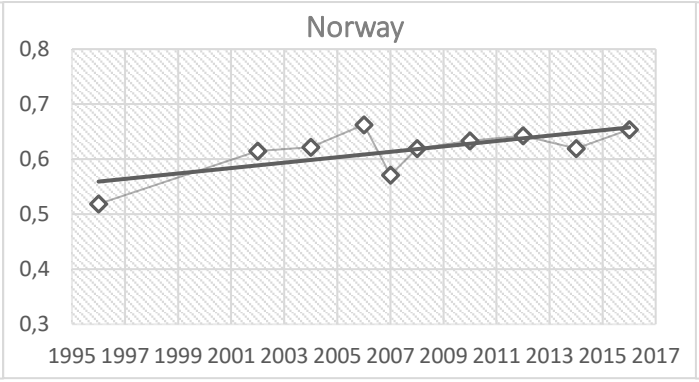

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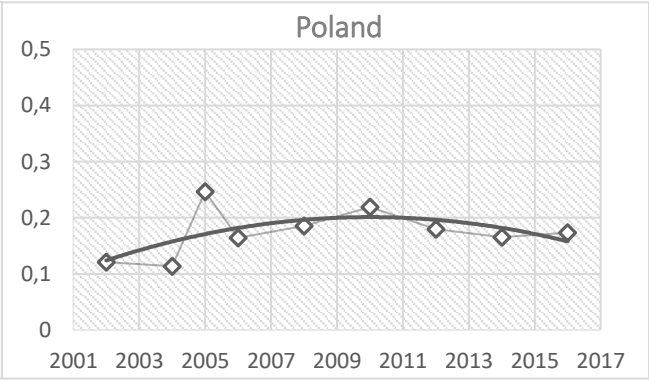

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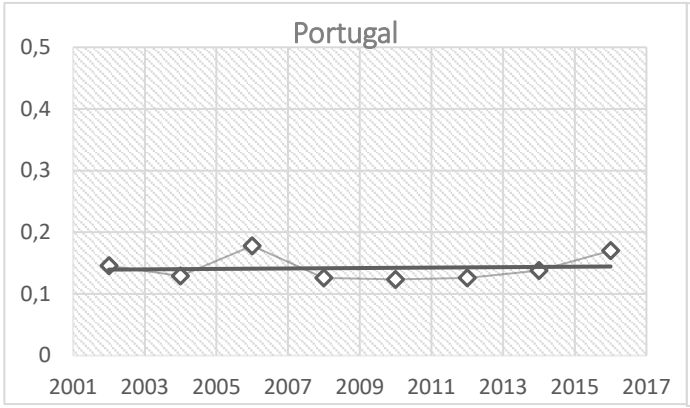

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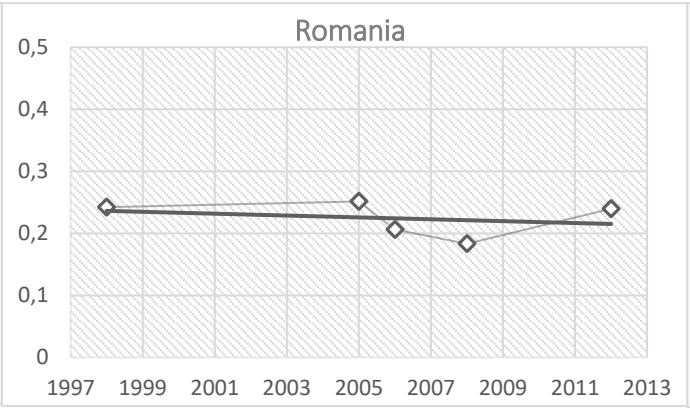

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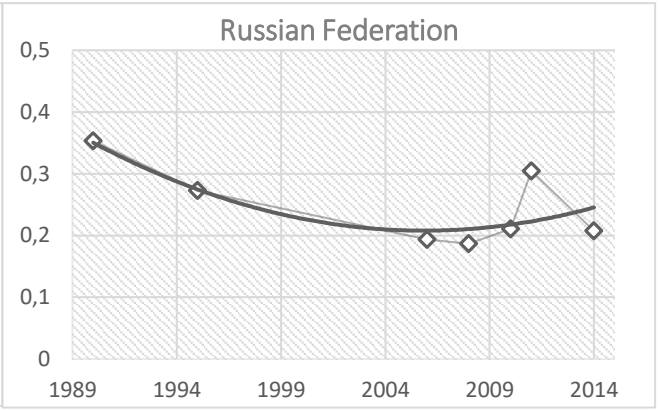

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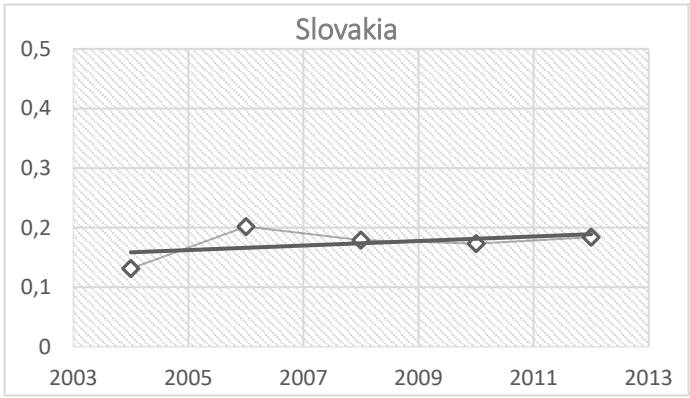

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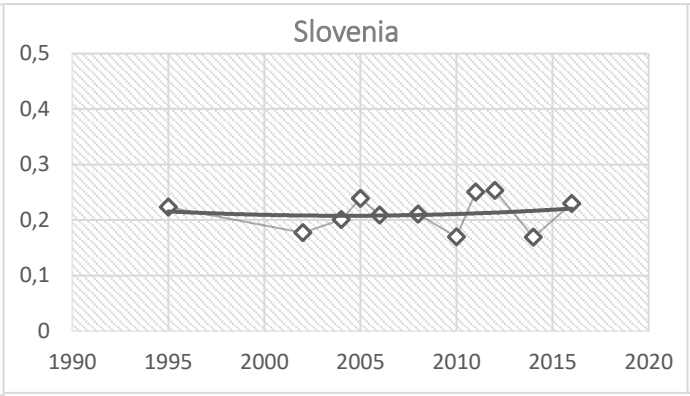

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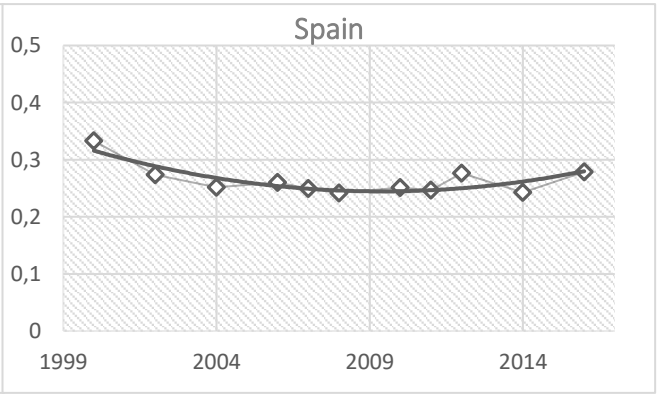

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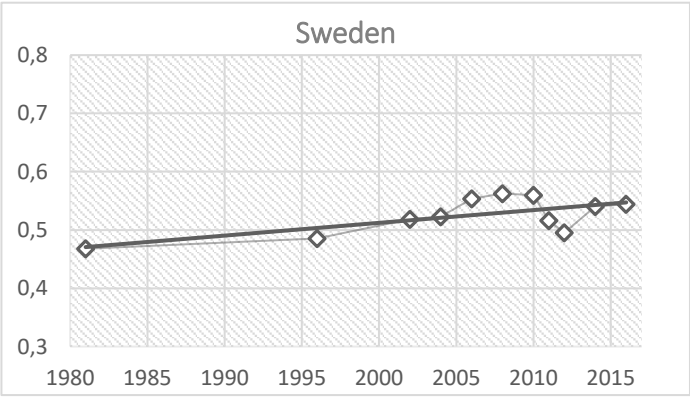

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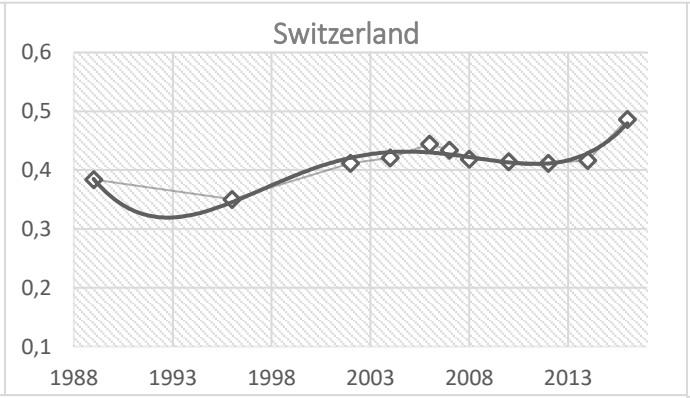

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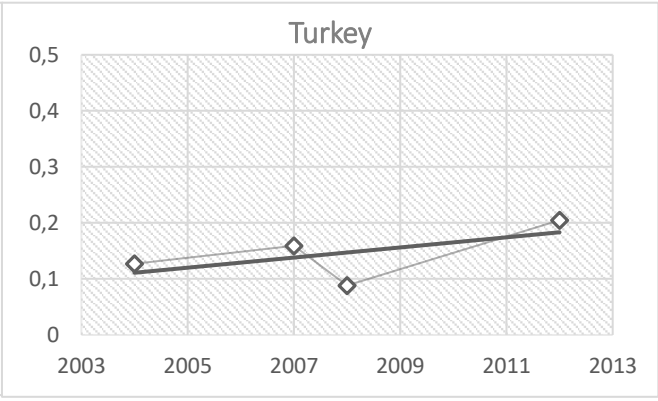

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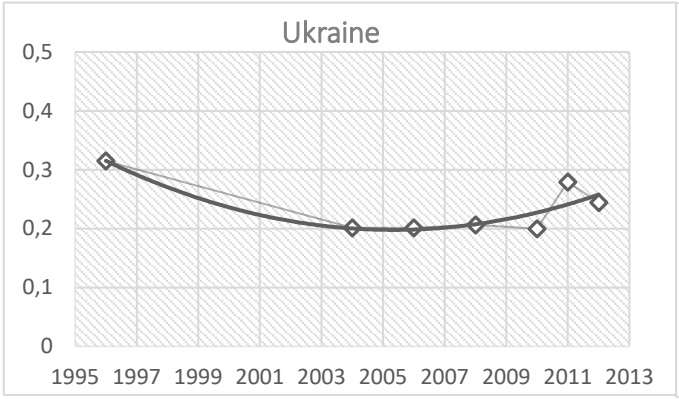

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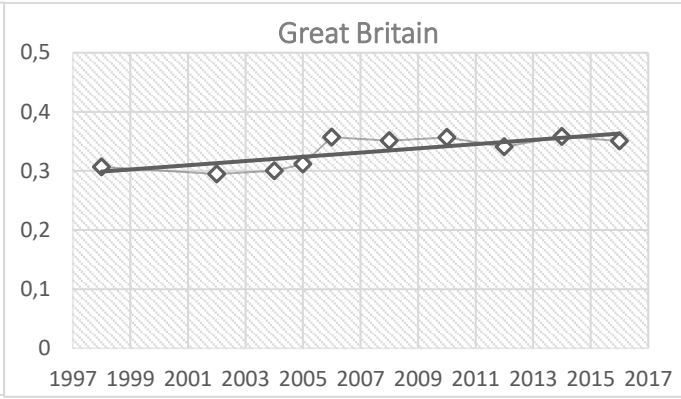

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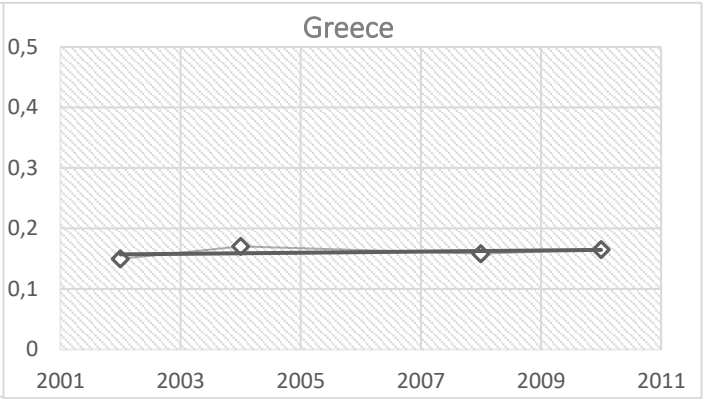

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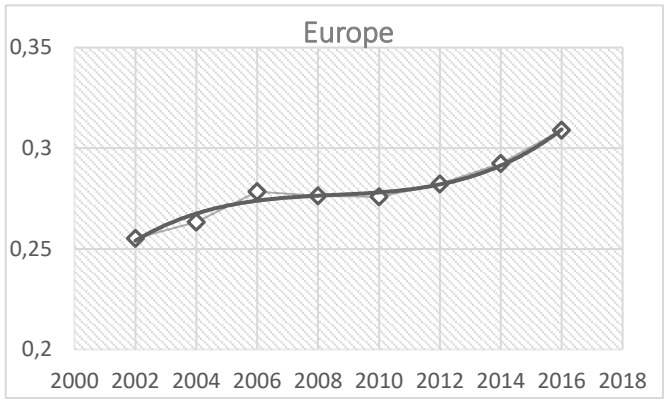

Graph 2.31

Appendix 3: Regression table – Latin America

Variable	*Argentina*	*Argentina*	*Bolivia*	*Bolivia*	*Brazil*	*Brazil*	*Chile*	*Chile*	*Colombia*	*Colombia*
t	-0,00085	-0,01022*	0,00107	0,01039	0,00029	-0,01309**	-0,00191	-0,01437***	-0,00404*	-0,00846
t^2		0,00030*		-0,00051		0,00052**		0,00047***		0,00024
t^3										
_cons	0,72929	0,28757	-1,94976	0,160541	-0,51191	0,12999***	3,99258	0,24971***	8,28723*	0,23220***
Observations	20	20	17	17	19	19	19	19	18	18
Adjusted R^2	-0,051	0,117	-0,046	0,029	0,056	0,410	0,083	0,525	0,240	0,221

Variable	*Costa Rica*	*Costa Rica*	*Dom. Rep*	*Dom. Rep*	*Dom. Rep*	*Ecuador*	*Ecuador*	*El Salvador*	*El Salvador*	*El Salvador*
t	-0,00296	-0,01082	-0,00230	0,01347	-0,08717*	0,00064	0,00555	0,00132	-0,00291	-0,05695**
t^2		0,00043		-0,00082	0,01344*		-0,00027		0,00023	0,00760***
t^3					-0,00049**					-0,00026***
_cons	6,10825	0,21848***	4,87270	0,23283*	0,27431**	-1,06909	0,18482***	-2,41820	0,22297***	0,29653
Observations	17	17	11	11	11	17	17	18	18	18
Adjusted R^2	-0,014	-0,051	-0,092	-0,103	0,553	-0,063	-0,114	-0,0436	-0,0951	0,478

*p < .05. **p < .01. ***p < .001

Variable	*Guatemala*	*Guatemala*	*Honduras*	*Honduras*	*Mexico*	*Mexico*	*Nicaragua*	*Nicaragua*	*Panama*	*Paraguay*
t	-0,00322	-0,06145*	0,00071	-0,06079**	-0,00398	0,01132	-0,00163	-0,00923	-0,00034	0,001201
t^2		0,00797*		0,00790**		-0,00040*		0,00042		
t^3		-0,00028*		-0,00027**						
_cons	6,67908	0,32977***	-1,23271	0,27865***	8,23571	0,23749**	3,45059	0,22933***	0,90456	-2,27081
Observations	17	17	17	17	20	20	17	17	17	17
Adjusted R^2	-0,00141	0,303	-0,063	0,344	0,119	0,318	-0,047	-0,078	-0,064	-0,051

Variable	*Paraguay*	*Peru*	*Uruguay*	*Uruguay*	*Venezuela*	*Venezuela*[2]	***Latin America***[1]	***Latin America***[1]
t	-0,01617	0,00204	-0,00518*	0,00515	0,00646*	0,02444**	-0,00127	-0,02045**
t^2	0,00095*			-0,00056		-0,00098*		0,00240*
t^3								-7,95291E-05*
_cons	0,17815***	-3,92607	10,67768*	0,31096***	-12,76147*	0,08480**	2,7042	0,20023***
Observations	17	17	17	17	17	17	17	17
Adjusted R^2	0,194	0,119	0,24586	0,314	0,292	0,514	0,039	0,329

*$p < .05$. **$p < .01$. ***p < .001

[1]Sample: *Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela.*

Appendix 4: Regression table – Europe

Variable	*Austria*	*Belgium*	*Belgium²*	*Bulgaria*	*Cyprus*	*Cyprus²*	*Czech Rep.*	*Czech Rep.²*	*Denmark*	*Estonia*
t	0,00124	0,00267	-0,00086	-0,01279**	-0,01478	0,02402	-0,00160	-0,01258	0,00252	0,00716*
t^2			0,00025			-0,00654		0,00043		
t^3										
_cons	-2,17905	-5,07307	0,28474***	25,833	29,890	0,22262*	3,4558	0,32092***	-4,3785	-14,027*
Observations	5	8	8	5	5	5	9	9	7	8
Adjusted R^2	-0,207	0,299	0,238	0,891	0,384	0,663	-0,069	0,103	0,120	0,523

Variable	*Finland*	*France*	*Germany*	*Hungary*	*Hungary²*	*Ireland*	*Ireland²*	*Israel*	*Italy*	*Italy²*
t	0,00649**	0,00019	0,00743*	-0,00288	-0,01167	-0,00366	-0,02223	0,00371*	0,00083	0,02184
t^2					0,00026		0,00133			-0,00149
t^3										
_cons	-12,447**	-0,20259	-14,650*	5,9951	0,33253***	7,7190	0,43255***	-7,1399	-1,4379	0,19758
Observations	11	8	9	11	11	8	7	7	5	5
Adjusted R^2	0,571	-0,164	0,439	0,093	0,211	0,00807	0,25100	0,55409	-0,320	-0,370

*p < .05. **p < .01. ***p < .001

Variable	*Lithuania*	*Lithuania²*	*Netherlands*	*Norway*	*Poland*	*Poland²*	*Portugal*	*Portugal²*	*Portugal³*	*Romania*
t	0,00240	0,02184	0,00605**	0,00492*	0,00231	0,01929	0,00036	-0,00626	0,01112	-0,00151
t^2		-0,00149				-0,00120		0,00047	-0,00284	
t^3									0,00016	
_cons	-4,5386	0,19758	-11,673**	-9,2551*	-4,4630	0,12391**	-0,57837	0,15269***	0,13942**	3,2441
Observations	5	5	8	10	9	9	8	8	8	5
Adjusted R^2	-0,012	-0,370	0,724	0,412	-0,064	0,130	-0,159	-0,124	0,122	-0,23767

Variable	*Russia*	*Russia²*	*Slovakia*	*Slovenia*	*Spain*	*Spain²*	*Sweden*	*Switzerland*	*Switzerland⁴*	*Ukraine*
t	-0,00478	-0,01797	0,00380	0,00031	-0,00231	-0,01517**	0,00219*	0,00303*	-0,04019**	-0,00360
t^2		0,00057				0,00081**			0,00753***	
t^3									-0,00042***	
t^4									7,57736E-06***	
_cons	9,8400	0,35032**	-7,4642	-0,42039	4,8932	0,31575***	-3,8650*	-5,6654*	0,38488***	7,4602
Observations	7	7	5	11	11	11	11	11	11	7
Adjusted R^2	0,331		-0,048	-0,107	0,099	0,652	0,420	0,452	0,902	0,022

*p < .05. **p < .01. ***p < .001

Variable	*Ukraine*[2]	*Great Britain*	*Great Britain*[3]	*Greece*	*Turkey*	***Europe***[1]	***Europe***[1]
t	-0,02515*	0,00357*	-0,00500	0,00092	0,00903	0,00317***	0,00904*
t^2	0,00135*		0,00151				-0,00128*
t^3			-6,1012E-05				6,51641E-05*
t^4							
_cons	0,31521***	-6,8378*	0,30266***	-1,6917	-17,980	-6,0882***	0,25401***
Observations	7	10	10	4	4	8	8
Adjusted R^2	0,721	0,533	0,586	-0,284	0,048	0,860	0,958

*p < .05. **p < .01. ***p < .001

[1]Sample: *Belgium, Finland, France, Germany, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, Great Britain.*

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