

Ratio Working Paper No. 102

# ***Trust and Economic Growth: Conflicting Results between Cross-Sectional and Panel Analysis***

Felix Roth

# Trust and Economic Growth: Conflicting Results between Cross-Sectional and Panel Analysis<sup>1</sup>

27 June, 2007

Felix Roth<sup>2</sup>

Successful operation of an exchange economy depends on mutual trust and the use of norms – explicit and implicit. When these behavioural modes are plentiful, it is easy to overlook their role. But when they have to be cultivated, that lacuna can be a major barrier to economic success (Sen 1999: 263)

This paper examines the relationship between trust and economic growth. With the help of panel data I conclude that economic growth is negatively related to an increase in trust. My result is contrary to works taking a cross section design in which trust is positively related to growth. The relationship is tested in the context of EU countries, OECD countries, transition countries and developing countries. Interpersonal trust and systemic trust is differentiated.

In recent years it has become popular in economic science to discuss the relationship between social capital and economic growth. Social Capital is said to be “*the glue that holds societies together*” and it is emphasized that “*without it no economic growth or human well-being*” is possible (Serageldin 1999: iii). Although I agree that it is important to broaden the neo-classical growth model (Solow 1956) - which normally includes the factors of labour, physical capital and lately human capital (Barro 1991, Mankiw, Romer and Weil 1992, Barro and Sala-i-Martin 2004) - by the factor social capital (Dasgupta 1999, Serageldin 1999, Serageldin and Grootaert 1999, Whiteley 2000), the term social capital has to be discussed carefully in the first instance, as it has a considerable number of different definitions. In the following paper I firstly pay close attention to those definitions which are relevant for the relationship between social capital and economic growth, and focus on the

---

<sup>1</sup> I wish to thank Stefan Klasen, Fran Tonkiss, seminar participants of the research seminar for Ph.D. candidates at the chair of Stefan Klasen, the participants of the Summer School of the Postgraduate Programme *The future of the European Social Model* and the participants of the 2006 Ratio Colloquium for Young Social Scientists: Trust, Reciprocity and Social Capital for valuable comments and suggestions.

<sup>2</sup> University of Göttingen, Fellow of the Postgraduate Programme *The future of the European Social Model*, Humboldtalle 3, 37073 Göttingen, Germany; E-mail: [froth1@gwdg.de](mailto:froth1@gwdg.de)

dimension of trust within the paradigm of social capital. Recent empirical research shows that there is a positive relation between interpersonal trust and economic growth (Knack and Keefer 1997, La Porta et al. 1999, Whiteley 2000, Zak and Knack 2001, Beugelsdijk et al. 2004).

In contrast to existing works which examine the relationship between social capital and economic growth using a cross-section research design, I use a panel research design. This was first done in a paper by Roth and Schüler (2006)<sup>3</sup>. This paper differs from the earlier version in that it uses a newly constructed and expanded data set using more observations (countries and points in time) and in that it focuses on the main empirical results. I investigate whether there is a different pattern for OECD, EU15, transition and developing nations and argue that it is important to differentiate these kind of country samples. Furthermore I aim to differentiate between interpersonal and systemic trust.

## I. Theoretical links between Trust, Social Capital and Economic Growth

### *1. Social Capital and Trust*

Many economists focus on trust when talking about social capital (Knack and Keefer 1997, Solow 1999, Whiteley 2000). Tonkiss (2000: 78) comments that trust regularly features – together with norms and networks – within definitions of social capital. But how is trust related to social capital? Let us firstly look at the classic definitions of social capital by James Coleman and Robert Putnam.

Coleman (1988, 1990), similarly to Pierre Bourdieu (1983), defines social capital as those resources of social structure which are utilized by individual actors and facilitate certain actions of the actor. In contrast to other forms of capital, such as physical and human capital, social capital is embedded in the relationships between two or more actors. Although mentioning three forms of relationships which contain social capital<sup>4</sup> (1988:101 ff.), Coleman tends to identify the

---

<sup>3</sup> Roth and Schüler (2006) is available on request.

<sup>4</sup> These are the following three: i) Obligations, expectations and trustworthiness of structures, ii) information channels and iii) norms and sanction.

trustworthiness of the social environment as the most important form of social capital (Coleman 1990 in Whiteley 2000: 448).

Building upon Coleman's works, the American political scientist Robert Putnam, studying the regions of Italy, comes to the conclusion that: "(...) *norms and networks have fostered economic growth, not inhibited it*" (Putnam 1993: 176). He defines social capital as "*features of social organizations, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated action*" (167). Putnam stresses that the indicators "*networks*" and "*norms*" function as a prerequisite of trust (177), thus trust appears an outcome of norms and networks.

This definition mixes psychological (trust and norms) and behaviouristic (networks) indicators. Kenneth Newton doubts that it is wise to combine all three dimensions. He suggests that from an empirical point of view the concepts should be separated into their components and tested empirically (1997: 584). I agree with Newton that it is important to separate the dimensions of social capital into its components trust, norms and networks for two reasons. By hypothetically combining all three indicators into an index we face the problem of multicollinearity<sup>5</sup> and the weighting<sup>6</sup> of the different indicators becomes unclear.

In the following paper I therefore want to focus on the dimension of trust within the concept of social capital. I leave it open as to whether social capital can be reduced to trust only, or if other dimensions like social networks are essential for a satisfactory operationalisation of social capital. For further research in the field of social capital a strict division of the indicators of social capital is necessary to develop a closer look at the mechanisms of how each indicator works empirically. This research approach helps to minimize the danger of overstretching the paradigm of social capital.

---

<sup>5</sup> Multicollinearity is usually regarded as a problem because it means that the regression coefficients may be unstable. This implies that they are likely to be subject to considerable variability from sample to sample (Bryman and Cramer 2005: 302). When we add a new x variable that is strongly related to x variables in the model, symptoms of possible trouble include the following i) Substantially higher standard errors, with correspondingly lower t statistics, ii) Unexpected changes in coefficient magnitudes or signs, iii) nonsignificant coefficients despite a high R<sup>2</sup> (Hamilton 2003: 166).

<sup>6</sup> Usually one has to weigh the indicators forming an index due to theoretical reasons.

## 2. *Definitions of Trust*

Fukuyama defines trust as the “*expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms*” (Fukuyama 1995: 26 in Tonkiss 2000: 79). Luhmann defines trust as an elementary fact of social life (2000:1) and determines the problem of trust as a risky input (Luhmann 2000: 27). Dasgupta defines trust as “*the expectation of one person about the action of others that affect the person's choice, when an action of others are known*” (Dasgupta 1997:5 in Ostrom 1998: 12).

Although there is a variety of definitions of trust recent literature distinguishes between three forms of trust. Authors distinguish between interpersonal or generalized trust, thick trust, and systemic or institutional trust (Putnam 2000: 137, Newton 1997: 578 ff., Luhmann 2000). Newton (1997) and Williams (1988) classify trust which is generated by family networks as thick trust. Thick trust is mostly measured by asking whether the person trusts her own family members. This question is asked for example in the second wave of the World Value Survey (1990-1993). In contrast, generalized trust is defined as trust which is generated by looser, secondary relations in modern societies, based on everyday interaction between people who do not otherwise know each other. Generalized trust is measured by asking whether people in general can be trusted. Most scientists focus on interpersonal trust when examining the relationship between economic growth and trust, as it is supposed to facilitate cooperation and lower transaction costs in economic systems. Economic systems tend to be characterized by a substantial degree of differentiation, and exchange activity frequently depends upon trust in strangers. The common survey item seeking to measure interpersonal trust asks respondents whether “*people can be trusted in general* or whether *you can't be too careful when dealing with people*”. This item, which is used in several international surveys<sup>7</sup>, is used in this paper when I talk about trust. Like many other authors doing research on trust I therefore focus on interpersonal trust.

Thirdly, systemic or institutional trust refers to the confidence people have in certain institutions. In talking about systemic trust I focus on trust in the parliament, trust in the police, armed forces and big companies.

---

<sup>7</sup> For example the WVS, ESS, ISSP and Eurobarometer.

### 3. *Positive Relationship between Trust and Economic Growth*

Arrow argues that the presence of virtues such as trust plays a significant role in the operation of economic systems (1972: 345). He builds his assumption upon the paradigm of exchange and elaborates that the process of exchange requires or is greatly facilitated by virtues, as for instance trust (345). For Fukuyama trust is an essential factor in economic outcomes. A nation's well-being and its ability to compete depend upon the level of trust inherent in a society (1995:7). In line with the argument Sen argues that "*the development and use of trust in one another's words and promises can be a very important ingredient of market success*" (Sen 1999: 262) and that "*no society would be viable without some norms and rules of conduct*" (Sen 1977: 332).

All authors argue for a positive relationship between trust and economic benefit. But how is trust related to economic growth?

Accordingly to Whiteley (2000: 451), interpersonal trust has three direct channels through which it might stimulate economic growth and three indirect channels. Trust has a direct effect on economic performance through reducing transaction costs. Transaction costs theoretically evolve during the economic process of exchange and specialization and are defined as costs associated with banking, insurance, finance, wholesale, and retail trade or in terms of dealing with lawyers and accountants etc. (North 1990: 28).

Secondly, trust has direct influence on growth because it enables actors to solve collective action problems (451). This argument is among others similar to Putnam's analysis (1995: 76), which puts forward four arguments why social capital, including interpersonal trust, has a positive effect on the economy: i) it facilitates coordination and cooperation for mutual benefit, ii) it solves dilemmas of collective action, iii) it reduces the incentives for opportunism, iv) it reduces egoism. These arguments are in line with Hardin (1982) and Ostrom (1990). In high trust societies it should theoretically be easier to cope with free rider problems (Whiteley 2000: 451, Hardin 1982: 9, Ostrom 1990: 3).

The third direct effect is that principal-agent problems might be much less significant in high trust societies (North 1990. 32-33). According to Knack and Keefer (1997) two arguments can be mentioned in this context: i) If entrepreneurs

devote more time to monitoring possible malfeasance by partners, employees and suppliers they will have less time to devote to innovation in new products or processes; ii) Employment contracts in which managers rely on employees to accomplish tasks can be difficult to monitor.

Moreover trust works indirectly via interactions with i) human capital, ii) physical investment and iii) convergence, all of which are known to make a contribution to economic growth. It can be argued that i) in high trust societies the returns to educational investments are higher, ii) high-trust societies are less risk-averse which creates greater incentives to invest in physical and human capital and iii) the diffusion of innovation and new technologies will be faster in high-trust societies.

Alongside interpersonal trust I might consider institutional trust, the trust we have in institutions (Luhmann 2000).

But must trust always be positively related to economic growth or are there theoretical arguments for a negative relationship between trust and economic growth? I now turn to theoretical arguments that imply a negative relationship between interpersonal trust and growth.

#### 4. *Negative Relationship between Trust and Economic Growth*

It has been argued up to now that trust and therefore the facilitation of collective action leads to economic development and growth. But is this necessarily or always the case?

One starting-point for a negative relationship between trust and economic growth is in the literature on collective action by Mancur Olson (1982). I have to acknowledge that this literature deals with the dimension of networks rather than the dimension of trust but I find the discussion quite fruitful and for my argumentation appropriate. Olson identifies the logic of collective action in quite a contrary way. Collective action can undermine the state's power to implement necessary reforms or agendas to maintain high economic growth rates (Olson 1982). To give one example, if a state wants to implement a labour market reform, in which for example employee rights are reduced, a sector with cheap labour is implemented, working

hours are extended, social spending on unemployment benefit and support is decreased to reduce the costs of the factor labour, a high trusting and solidaristic society may more easily oppose the state's efforts for reforms and will, via the mobilization of collective action, stop the reform agenda and therefore limit the potential of higher economic growth rates. This argument is build upon the empirical findings that a vibrant civil society is crucial for high levels of trust (Putnam 1993, 1995). In fact it could be actors within civil society, such as church groups, professional groups and Social Movements Organizations (SMOs) that oppose the state's will to implement reforms. Similarly the number of workers being member of labour unions may be a critical factor for the existence of high levels of trust (Putnam 1993, 1995, 2000).

The second explanation could be that, rather than trust, fear is a key explanatory variable for economic growth. A society with high levels of fear will not as easily oppose to processes of reformation of the economy. These processes of reformation on the other hand are crucial for economic prosperity, especially in the advanced economies of the OECD. The government will meet less opposition if the society is weak and governmental policies can be implemented faster and without opposition. Let us consider an example from organizational theory. It can be part of a company's strategy to create an atmosphere of fear between its employees. This non-solidaristic working atmosphere mobilizes the employees to monitor themselves, work harder and raise the overall productivity of the company. Another example for the positive relationship between fear and economic growth is the following. A high unemployment rate in a country is most often interlinked with the fear of loosing one's job. Employees who are afraid of loosing their job work harder, take less legal employment rights into consideration, are less sick, are overall less demanding. This fear also has implications for the action of trade unions. The employers association have more power to push trough wage reduction and the extension of the working hours if the trade unions give top priority to the preservation of jobs. The extension of working hours has a direct positive effect on economic growth.

Thirdly one could argue that it is the welfare state effort that is responsible for a negative relationship between interpersonal trust and economic growth. If the welfare state creates high levels of interpersonal trust and is negatively affecting economic growth (see Atkinson 1999 for a detailed discussion of the relationship



between the welfare state and economic growth) an increase of welfare state activity would go hand in hand with an increase of levels of interpersonal trust and a decrease of economic growth. For the author it seems absolutely necessary to further clarify the relationship between welfare state effort, interpersonal trust and economic growth (See Roth forthcoming).

Fourthly the degree of social inequality could affect the two paradigms interpersonal trust and economic growth. On the one hand, taking the empirical results from Forbes (2000) for granted, an increase of social inequality is related to an increase of economic growth. On the other hand an increase of social inequality seems to be strongly related to a decrease of interpersonal trust (see Knack and Keefer 1997, Zak and Knack 2001, Knack and Zak 2002 and Rothstein and Uslaner 2005)

##### 5. *Economic Development and Social Capital*

Analytically it is important to distinguish between developed and developing countries. This view on differentiating developed from developing countries can be traced back to the work of Arrow. For him “*It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence*” (Arrow 1972: 357 in Knack and Keefer 1997: 1252). Mutual confidence in this sense is interpreted as mutual confidence in strangers. In the line of the arguments Sen (1999: 264) stresses that trust is especially important in less-developed societies with fewer formal institutions. The formal institutions in developed countries mean interpersonal trust may not be as critical, as they guarantee the necessary cooperation without the necessity of interpersonal trust. Similarly Woolcock, in referring to the differences of developed and developing nations, posits interpersonal trust as a basic explanation for the economic differences (1998: 153). In accordance with the argument Durlauf and Fafchamps mention that interpersonal trust is especially important for developing countries “*where many transactions are small and buyers and sellers are too poor for court action to yield reparation*” (Durlauf and Fafchamps 2005: 1650).

## II. Findings on trust and economic growth

Using a cross-sectional OLS regression of 29 market economies, Knack and Keefer (1997) find that interpersonal trust has a positive influence on economic growth (1980-1992) and investment. They draw their data from the first and second wave of the world value survey 1981-84 and 1990-93, using an economic growth model which includes initial GDP, primary education, secondary education, the price level of investment and interpersonal trust.

Building on their work, Zak and Knack (2001), using an OLS regression on 41 market economies, find a positive coefficient of trust on economic growth. They replicate the growth model in the paper of Knack and Keefer. To enlarge their country sample they mix data from the three waves of the World Value Survey (1981-84, 1990-91 and 1995-97), the Eurobarometer and a government-sponsored survey for the case of New Zealand. Dependent variables are again investment as a percentage of GDP and annual growth of per capita income. This time they investigate the time period from 1970-92.

Beugelsdijk et al. (2004) analyze the robustness of the results of Knack and Keefer (1997) and Zak and Knack (2001) along four dimensions of robustness. They first concentrate on the statistical significance. Secondly they explore the influence of changing sets of conditioning variables on the estimated effect of trust. Thirdly they analyze the sensitivity of the results for using different proxies or specifications for basic variables like human capital. Finally they investigate the effects on the significance and effect size when the 29 country sample by Knack and Keefer is extended by 12 in the Zak and Knack Paper. The authors come to the conclusion, that “(...) *their extensive robustness analysis further adds to the empirical evidence that trust matters for explaining variation in economic performance*” (132).

Berggren, Elinder and Jordahl (2007) conduct an extensive robustness analysis of the relationship between trust and growth by investigating a latter time period and a bigger sample size. The authors work with 63 countries using data on trust from the fourth wave of the World Value Survey and from the Latinobarometro, as well as new data on growth to separate time and sample effects. They investigate whether previous results on the trust-growth relationship for the period 1970-1992, studied by Zak and Knack and Beugelsdijk et al., holds also for

the 1990s. They find out that when outliers are removed (here they mention especially China) the trust-growth relationship is only statistically significant (Significance at the 95 percent level) in ten percent of their 1.140 regressions, and is as half as large, compared to the results that have been reported before. The authors emphasize however that their results do *“not necessarily mean that trust is unimportant for growth, but its important seems to be limited and uncertain than previously claimed”* (1).

La Porta and others (1999) using an OLS regression on 39 countries and a cross-section design with a dependent variable Growth of GDP per capita from 1970-1993 find a positive relationship between trust and economic growth. They come to the conclusion that *“in sum trust enhances economic performances across countries”* (317) and that *“(…) theories of trust hold up remarkably well when tested on a cross-section of countries”* (320).

Whiteley (2000) examines the relationship between trust and economic growth in the framework of a modified neo-classical model of economic growth. Using a cross-section design in a 34 country sample, taking the growth rate of GDP per capita from 1970-1992 as the dependent variable, he comes to the conclusion that an index of three trust indicators from the World Value Survey 1990-93 has a positive effect on economic growth, with an impact as great as the variable human capital and conditional convergence. His findings support the idea that *“values play a key role in explaining cross-national variations in economic performance and that they cannot be ignored in any properly specified model of economic growth”* (460).

In contrast to these findings Heliwell (1996), taking an OECD country sample (17 OECD countries), found a negative relationship between trust and productivity growth from 1960-1992 (Associations and social capital, an equally weighted combination between trust and associations, are also negatively related to productivity growth). His results seem to be the only cross-country indication of a negative effect between trust and economic performance.

These empirical studies involve a critical and important step in focusing on the concept of trust when reflecting upon economic growth. Their cross-section designs support the hypothesis that trust matters for economic growth (cf. Heliwell 1996). They all nevertheless neglect to examine how changes in trust affect economic growth. For policy decision making, however, it might be more relevant to analyse

the effect of changes in trust on economic performance by using a fixed-effects model. Furthermore using a fixed-effects model does give me two advantages. Firstly I am able to control for unobserved heterogeneity. Secondly, I am able to tackle the problem that the interpretation of my trust items differ across countries.

### III. Data and Measurement

#### 1. Operationalization

The World Value Survey has only limited data on trust. The trust variable is constructed, as it is usually agreed upon by scholars from various disciplines (Inglehart 1990 and 1999, Knack and Keefer 1997, Paxton 1999 and 2002, Uslaner 1999, Alesina and La Ferrara 2000, Putnam 2000, Whiteley 2000, Zak and Knack 2001, van Oorschot and Arts 2005, Delhey and Newton 2005), by aggregating the answer *Most people can be trusted*<sup>8</sup> (after deleting the “*Don't know*” answers) to the item “*Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people*” (WVS1999-2002)<sup>9</sup>. I am thereby able to compare the stock of trust in different nations from developed, to non-developed, to transition states. The stock of trust varies from 2.6 percent in Brazil (26 out of 1000 respondents answered “*Most people can be trusted*” (WVS 1995-1997) to 66.5 percent (665 out of 1000 respondents answered “*Most people can be trusted*” in Denmark (WVS 1999-2002). There are various critiques of this operationalization<sup>10</sup>.

---

<sup>8</sup>In the Eurobarometer 25 the answer is “*Most people could be trusted*”.

<sup>9</sup>The ending of the question is slightly different in the first three waves of the WVS and the Eurobarometer 25: “*(...) cant be too careful in dealing with people*” (WVS 1981-84, WVS 1990-93, WVS 1995-97) and “*(...) could not be too careful in dealing with people*” (Eurobarometer 25).

<sup>10</sup>This approach is criticized by referring to the non-comparability of the different cultural backgrounds of the countries that participate in the World Value Survey. Researchers question whether data from China can be compared to data from Germany when the etymological meaning of the term trust differs in the languages. Although correct these criticism has to be neglected when comparing different cultures, in so far as intercultural comparison would be made impossible. I therefore have to be pragmatic in using the data which is available. Furthermore recent research provides evidence that individuals from the different countries did interpret the question from the WVS in similar ways (Paxton 2002: 261) and that the trust data is valid and of high quality as it correlates highly with a natural experiments done by the *readers digest* (Knack and Keefer 1997: 1257). Glaeser (2000) doubts that the item measures trusting behaviour, but the overall level of trustworthiness in a society. Jagodzinski and Manabe (2005) state that the item is not measuring trust

## 2. *Model Specification*

To be able to compare my results with previous empirical work conducted on the relationship between trust and economic growth I use a version of the economic growth model used by Knack and Keefer (1997), Zak and Knack (2001), Beugelsdijk et al. (2004) and Berggren et al. (2007). Furthermore a version of this kind of growth model was used by Forbes (2000) when analysing the relationship between inequality and economic growth in a panel setting from 1965-1995.

In my baseline model, economic growth is estimated as a function of the natural logarithm of income, the price level of investment<sup>11</sup>, human capital, interpersonal and systemic trust<sup>12</sup>. I estimate an unbalanced panel. The baseline growth model for my fixed-effects estimation is modelled as follows :

$$\begin{aligned} Growth_{i,t} = & \beta_1 Trust_{i,t-1} \\ & + \beta_2 Income_{i,t-1} \\ & + \beta_3 Human\ Capital_{i,t-1} \\ & + \beta_4 PPPI_{i,t-1} + \alpha_i \\ & + w_{i,t}, \end{aligned}$$

where  $i$  represents each country and  $t$  represents each time period (with  $t = 1-5$ );  $Growth_{it}$  is the average annual growth for country  $i$  at period  $t$ ;  $Trust_{i,t-1}$ ,  $Income_{i,t-1}$ ,  $Human\ Capital_{i,t-1}$ ,  $PPPI_{i,t-1}$ , and are respectively trust, income, human capital and

---

but misanthropy, and it was taken as an index of misanthropy by Rosenberg. Sobel, Portes and Durlauf and Fafchamps criticize the method of aggregation. For them social trust should better be measured on a micro- and meso-level (Sobel 2002: 151, Portes 2000: 4 ff., Durlauf and Fafchamps 2005). Furthermore Knowles (2005), argues that there are problems with the coverage and the sample representativeness of each nation (16). Inglehart (Coodbook in Inglehart 2000) points out that data in developing countries are not fully representative for the whole country. People living in cities and the better-educated are over-sampled. Even when adjusting the data through weighting these groups are still over-represented.

<sup>11</sup>This variable is frequently utilized in macroeconomic and international literature and measures how the cost of investment varies between each country and the United States. It is meant to capture market distortion that affect the cost of investment, such as tariffs, government regulations, corruption, and the cost of foreign exchange (Forbes 2000: 873). For further description see Barro (1991: 433).

<sup>12</sup> Factors other than social capital examined in this context include the rule of law, democracy, ethnic fractionalization, gender inequality, fertility rate, government consumption ratio, the terms of trade, inflation rate, indicators of political stability, etc. (Barro 1991, Klasen 2002, Barro and Sala-i-Martin 2004).

price level of investment for country  $i$  during period  $t-1$ ;  $\alpha_i$  represents a group specific constant term and  $w_{i,t}$  is the error term.

### 3. *Measurement of data*

Data on incomes and growth are based on per capita incomes between 1980 and 2004 adjusted for purchasing power parity (PPP, expressed in constant 2000 U.S. Dollars) drawn from the World Development Indicator Database 2006. Since yearly growth rates incorporate short-run disturbances, growth is averaged over five-year periods. My dependant variable is an average growth rate per capita for the periods 1980 - 1984, 1985 - 1989, 1990 - 1994, 1995 - 1999 and 2000 - 2004.

- The data on price level of investment, population growth as a proxy for the factor Labour, the investment share of GDP at constant prices and Openness at constant prices is drawn from the Penn World Tables 6.1 (Heston et al. 2002)<sup>13</sup>. The variables were constructed by using lagged variables (1979, 1984, 1989, 1994 and 1999) in order to control for the problem of endogeneity.
- The data on interpersonal trust and systemic trust is drawn from four waves of the World Value Survey (WVS)<sup>14</sup> 1981-1984<sup>15</sup>, 1990-1993<sup>16</sup>, 1995-1997<sup>17</sup>

---

<sup>13</sup> The Penn World Table provides key economic data for 168 countries for some or all of the years 1950-2000. It can be downloaded at <http://pwt.econ.upenn.edu>.

<sup>14</sup> The World Value Survey series is designed to enable a cross national comparison of values and norms on a variety of topics and to monitor changes in values and attitudes across the globe. A full description is given under <http://www.worldvaluessurvey.org/services/index.html>.

<sup>15</sup> The data for Argentina was taken from 1984. The data for the US, Sweden, South Korea, South Africa, Norway and Hungary were taken from 1982. The data can be ordered from the ICPSR (Inglehart 2000). The data was weighted by using original weight (v236). As no researcher, I am aware of, ever mentioned if taking weights I computed the values for the first wave of the WVS (1981-84) with and without weights. When taking no weights the USA would have an interpersonal trust value of 40.5 instead of 45,4 as reported in Knack and Keefer (1997: 1284). For a better comparison of my results I figured to take weights. Furthermore the codebook for the dataset mentions to use the weight variable as it corrects the sample to reflect national distributions of key variables (Codebook: 52 in Inglehart 2000). In contrast Delhey and Newton compute most of their interpersonal trust without taking weights (2005: 315)

<sup>16</sup> The data for Romania was taken from 1993. The data for Slovenia was taken from 1992. The data for Argentina and Brazil were taken from 1991. The trust data was weighted by using original weight (v236). The data can be ordered from the ICPSR (Inglehart 2000).

<sup>17</sup> The data for Britain was taken from 1998. The data for Brazil, Bulgaria, Poland and West-Germany were taken from 1997. The data for Bangladesh, Chile, Finland, Norway, Philippines, South Africa, South Korea, Sweden, Switzerland, Turkey and Venezuela were taken from 1996. The data was weighted by using original weight (v236). The data can be ordered from the ICPSR (Inglehart 2000). The sample for Japan, Finland and South Africa were, when taking the weight variable v236, changed significantly in proportion. In Japan the sample was 20 times smaller, in Finland 100 times bigger and in South Africa around 9 times bigger. The values for Japan without taking the weighting operation is 42.3 instead of 46, for Finland 48,8 instead of 47.6 and for South Africa 15,9 instead of

and 1999-2002<sup>18</sup> and the Eurobarometer 25<sup>19</sup> providing me with Data from the year 1986.

- The data on human capital are based on Barro and Lee (2000) and refer to the total years of schooling of the Total Population Aged 25 and Over<sup>20</sup>. Data was taken from 1980, 1985, 1990, 1995 and 2000
- Data on welfare effort are based on the size of spending of the welfare state, typically expressed as a proportion of gross domestic product as in the OECD statistics for social security transfers (OECD 2004)<sup>21</sup>.
- Data on income inequality are based on the UN-database WIDER. Only data from the Luxembourg Income Study (LIS) is taken.

---

18.2. However, as the sample size is proportional to each other, I took, for better cross-country comparison, values which were weighted by v236. Anyhow, differences in the values do not influence econometric results. In most cases the *Don't know* answers had to be deleted.

<sup>18</sup>The data for Bangladesh was taken from 2002. The data with the study number 3975 can be ordered from the ICPSR (European Values Study Group and World Values Survey Association 2004). The data was weighted by taking the variable s017.

<sup>19</sup>The trust data was weighted by using European Weights. The data can be ordered from the Zentralarchiv (ZA) in Cologne (Rabier, Jacques-Rene; Riffault, Helene and Ronald Inglehart 1988).

<sup>20</sup>The data can be drawn from <http://www.cid.harvard.edu>.

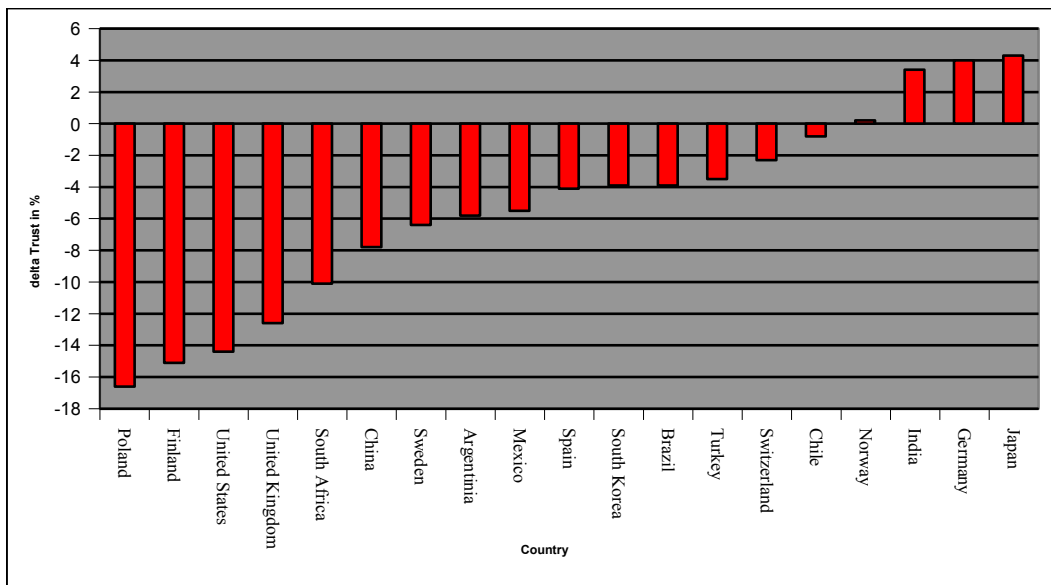
<sup>21</sup>Those statistics are available over the internet from <http://www.oecd.org/statistics>. The social expenditure data is given for a range of 30 OECD countries.

#### IV. Descriptive Statistics

My sample consists of 41 countries. 27 out of 30 OECD<sup>22</sup> countries and 14 out of 15 EU15<sup>23</sup> countries are included. Table 1 lists all interpersonal trust values for the included country observations in my dataset.

Figure 1 shows the changes of trust from 1990 to 1995 for the countries for which the data was available for both periods.

**Figure 1**  
Changes of Trust from 1990 - 1995



In contrast to the agreement that interpersonal trust is a constant variable, formed by the cultural background of a nation (Knack and Keefer 1997, Zak and Knack 2001, Knowles 2005, Delhey and Newton 2005: 314, c.f. Inglehart 1997: 224, Inglehart 1999: 95, Noelle 2005: 5), the Figure shows that there is a strong decline in trust

<sup>22</sup> I included 27 out of 30 OECD countries. The countries which are included are Austria, Australia, Belgium, Canada, Denmark, France, Finland, Germany, Greece, Hungary, Italy, Ireland, Iceland, Japan, Mexico, Netherlands, Norway, Portugal, Poland, Spain, Sweden, South-Korea, Switzerland, Slovak Republic, Turkey, United Kingdom, USA. Luxembourg, New Zealand and Czech Republic had to be excluded due to data restrictions.

<sup>23</sup> I included 14 out of 15 EU 15 countries. The countries which are included are Austria, Belgium, Denmark, France, Finland, Germany, Greece, Italy, Ireland, Netherlands, Portugal, Spain, Sweden, United Kingdom. Only Luxembourg had to be excluded.



**Table 1**

## Levels of Interpersonal Trust

Country	Trust 81	Trust 86*	Trust 90	Trust 95	Trust 99
USA	45,4	-	50	35,6	35,8
Japan	40,8	-	41,7	46	43,1
Germany	29,8	43,4	37,8	41,8	34,8**
France	24,8	21,3	22,8	-	22,2
Italy	26,3	30,3	35,3	-	32,6
Britain	44,4	39,7	43,6	31	29,7
Canada	49,6	-	52,4	-	38,8
Australia	47,8	-	-	39,9	-
Austria	-	-	31,8	-	33,9
Belgium	30,2	29,5	33,2	-	30,7
Denmark	56	63,5	57,7	-	66,5
Finland	57,2	-	62,7	47,6	58
Greece	-	50	-	-	23,7
Iceland	41,6	-	43,6	-	41,1
Ireland	40,2	33,3	47,4	-	35,2
South Korea	38	-	34,2	30,3	27,3
Mexico	17,7	-	33,5	28	21,3
Netherlands	46,2	50,2	55,8	-	59,8
Norway	61,2	-	65,1	65,3	-
Portugal	-	28,4	21,4	-	10
Spain	34,5	35,3	33,8	29,7	36,2
Sweden	57,1	-	66,1	59,7	66,3
Switzerland	-	-	43,2	40,9	-
Turkey	-	-	10	6,5	15,7
Slovak Rep.	-	-	23	-	15,7
Hungary	33,1	-	24,6	-	21,8
Poland	-	-	34,5	17,9	18,9
Slovenia	-	-	-	15,5	21,7
Bulgaria	-	-	-	28,6	26,9
Romania	-	-	16,1	-	10,1
China	-	-	60,1	52,3	54,5
India	-	-	34,3	37,9	41
Argentina	27	-	23,3	17,5	15,4
Brazil	-	-	6,7	2,8	-
Chile	-	-	22,7	21,9	22,8
Peru	-	-	-	5,0	10,7
Venezuela	-	-	-	13,7	15,9
S. Africa	29	-	28,3	18,2	11,8
Bangladesh	-	-	-	20,9	23,5
Pakistan	-	-	-	20,6	30,8
Philippines	-	-	-	5,5	8,4
Observations	22	11	32	27	37
Average	39,9	38,6	37,4	28,9	30,1

*Note:* \*The trust data from 1986 is taken from the Eurobarometer 25. \*\*Trust Data from Germany were taken from West-Germany in 1981, 1986, 1990 and 1995. The Data from 1999 was taken from unified Germany.

between the 1990 and 1995 time period<sup>24</sup>. Only Germany, Japan and India have increased their level of trust. On the other end of the scale the two liberal economies the United Kingdom and the United States face a severe decline. The United States loses 14,4 percent of interpersonal trust, the United Kingdom 12,2 percent. Poland and Finland face the severest losses. Poland loses 16,6 percent, Finland 15,1, South Africa loses 10,1, China loses 7,8 and Sweden loses 6,4 percent. Argentina and Mexico lose around 5 percent. Only Chile and Norway behave stably.

**Figure 2**

Scatter Plot between  $\Delta$  Trust [1995-1990] and  $\Delta$  Growth [9599-9094]

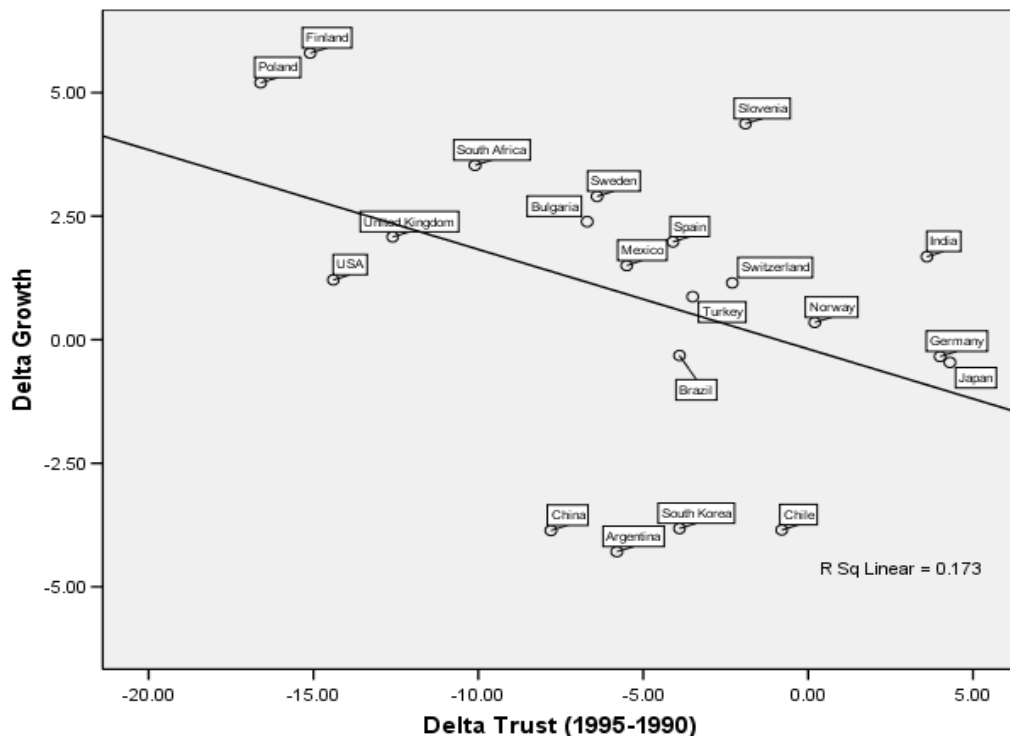


Figure 2 shows the relationship between the changes of trust in the period [1995-1990] and the changes of growth in the period [9599-9094] for all countries (“Before and After” Comparison). The change in the trust level of the USA of -14,4

<sup>24</sup>Although trust values intercorrelate strongly (comparing every combination of two waves I get values from 0.75 to 0.93) there are still very important changes over time. If the wealthiest nation of the world, the United States, and the United Kingdom lose nearly one third of their original trust level, trust cannot be treated as a constant variable. These changes of trust have to be highlighted and have to be examined. Taking the case of Germany for instance clarifies that over the timespan from 1950 to 2005 there is steady increase of the level of interpersonal trust in Germany (Noelle 2005). To stress on the US case once more: Inglehart and Uslaner show that there is a decline in interpersonal trust from 58 percent in 1960 to 36 percent in 1994 (Inglehart: 1999: 95, Uslaner 1999: 132).

percent is associated with a change in the annual growth for that period of 1,2 percent. In the USA a decline in trust went hand in hand with a rise in annual growth. In the United Kingdom we get the same picture. The change in the trust level of -12,2 percent is associated with a change in the annual growth rate of 2.08 percent. The Scandinavian countries Finland and Sweden support the findings on the USA and the United Kingdom. The decline in trust of -15,1 and -6,4 percentage points go hand in hand with an increase of the growth rate of 5.8 and 2.9 percentage points. The transition countries Poland and Bulgaria behave in the same manner. In Poland the decline in trust of 16,6 is related to increase of 5,2 percent of annual growth. This relationship changes when observing Argentina and India. In Argentina a decline in the level of trust of -5,8 goes hand in hand with a decline in the annual growth rate of -4,3 percent. In India an increase of the level of trust of 3,4 percent is followed by an increase of the annual growth rate of 1,7. In the cases of Argentina and India, there seems to be a positive relationship between trust and economic growth. Taking all countries into consideration I get a weak negative relationship between delta Trust and delta Growth with an R-Square value 0,173. Considering only OECD countries the R-Square rises to 0,461.

**Table 2**  
Summary Statistics

Variable	Year	Observations	Mean	Standard deviation	Minimum	Maximum
<i>Growth</i>	1980	22	1.6	1.6	-1.64	6.65
	1985	11	3.0	1.3	1.17	5.12
	1990	32	1.13	3.21	-5.07	11.38
	1995	27	2.15	2.1	-2.24	7.52
	2000	37	2.29	2.04	-0.58	8.37
<i>Interpersonal Trust</i>	1980	22	39.9	12	17.7	61.2
	1985	11	38.6	12.3	21.3	63.5
	1990	32	37.4	15.8	6.7	66.1
	1995	27	28.9	16.7	2.8	65.3
	2000	37	30.1	15.7	8.4	66.5
<i>Income</i>	1980	22	9.62	0.38	8.49	10.03
	1985	11	9.73	0.23	9.32	10.03
	1990	32	9.50	0.76	7.38	10.33
	1995	27	9.15	0.92	7.19	10.31
	2000	37	9.45	0.87	7.3	10.43
<i>Human Capital</i>	1980	22	7.80	1.85	4.49	11.91
	1985	11	7.28	1.76	3.57	9.42
	1990	32	7.94	2.20	3.68	12
	1995	27	7.76	2.74	2.32	12.18
	2000	37	8.14	2.27	2.45	12.25
<i>Price level of investment</i>	1980	22	101.4	24.6	58.6	143.2
	1985	11	62.6	8.13	47.5	73.9
	1990	32	82.5	24.7	39.8	128.5
	1995	27	75.6	31.3	29.6	154.5
	2000	37	75.3	27.0	31.97	126.8
<i>Openness</i>	1980	22	43.7	23.6	10.98	103.11
	1985	11	51.8	26.8	24.8	104.2
	1990	32	48.3	26.4	10.45	117.55
	1995	27	47.2	24.4	14.13	110.16
	2000	37	72.4	36.9	19.4	176.7
<i>Investment</i>	1980	22	23.63	4.56	13.82	34.16
	1985	11	20.31	2.19	15.86	23.18
	1990	32	22.1	6.13	9.24	36.5
	1995	27	19.4	6.95	7.64	40.71
	2000	37	21.0	5.80	7.03	30.04
<i>Systemic Trust - Parliament</i>	1980	22	2.51	0.31	2.09	3.45
	1985	-	-	-	-	-
	1990	31	2.38	0.33	1.8	3.18
	1995	24	2.05	0.32	1.4	2.68
	2000	37	2.3	0.35	1.7	3.34

## V. Econometric Analysis

First of all, using a cross-section design, I estimate an OLS-model with robust estimators of standard errors for my dataset<sup>25</sup>. For my dependent variable I use the growth rate of GDP per capita for the 15 year period from 1990–2004. My country sample consists of 32 countries due to data limitations from my interpersonal trust value in the 1990's. Regression 1 in Table 3 shows that all variables have the expected signs except the human capital variable. I get a negative significant coefficient for my income variable (conditional convergence), I get a negative significant coefficient for my variable price level of investment and I replicate the positive significant relationship between interpersonal trust and economic growth. This result is in accordance with most empirical findings using a cross-section design and taking interpersonal trust data from the 1990's (Knack and Keefer 1997, Zak and Knack 2001, La Porta et al. 1999).

Secondly, I estimate the model using a pooled panel analysis. A pooled panel analysis is similar to the method of a standard ordinary least square estimation, but in order to get more reliable estimates of the parameters, a pooled panel estimation widens the database by pooling the time series of the country sample. Hence my pooled panel consists of 129 observations with 41 individual cases. Using a pooled panel regression and examining all 129 observations Regression 2 in Table 3 replicates my result from the cross-section design and the results of most empirical research. I get a significant positive coefficient for my trust variable. However my proxy for human capital “average years of schooling” shows no significant relationship with economic growth. Furthermore conditional convergence shows no significant relationship with economic growth.

In order to explore how changes of trust affect economic growth, I estimate the model using a panel analysis<sup>26</sup>. The standard methods of panel estimation are fixed

---

<sup>25</sup>Testing for heteroskedasticity which tests the assumption of constant error variance by examining whether squared standardized residuals are linearly related to  $\hat{y}$  (Hamilton 2006: 199) I get significant heteroskedasticity. My results suggest that in this instance I should reject the null hypothesis of constant variance. A residual-versus-predicted graph shows that especially the two cases China and Ireland are responsible for the presence of heteroskedasticity. I therefore use an OLS regression with robust estimators. This option allows me to calculate the standard errors in a way which does not imply homoskedasticity of the error term.

<sup>26</sup>For a detailed discussion of panel analysis see Frees 2004, Baltagi 2005, Greene: 283 ff., Stata Press 2005b.

effects or random effects. The fixed effects estimates are calculated from differences within each country; the random effects incorporate information across individual

**Table 3**

OLS, Pooled Panel, Fixed-Effects, Random Effects

Estimation method	OLS	Pooled Panel	Fixed effects	Random effects
Equation	(1)	(2)	(3)	(4)
<i>Interpersonal Trust</i>	0.069*** (3.75)	0.05*** (2.77)	-0.08** (-2.52)	0.04** (2.15)
<i>Income</i>	-1.21*** (-2.88)	-0.69 (-1.40)	-4.81*** (-3.67)	-0.81 (-1.38)
<i>Education</i>	0.50 (0.74)	0.15 (1.10)	0.87*** (3.49)	0.20 (1.19)
<i>PPP</i>	-0.03*** (-2.76)	-0.03*** (-3.30)	-0.04*** (-3.36)	-0.03*** (-3.00)
<i>Constant</i>	12.9** (3.75)	8.3** (2.25)	46.2*** (4.12)	9.1** (2.09)
<i>R-Squared</i>	0.63	0.22	0.28	0.32
<i>Countries</i>	32	41	41	41
<i>Observations</i>	32	129	129	129
<i>Period</i>	90-04	80-04	80-04	80-04

\* Significance at the 90 percent level (one-tailed test)

\*\* Significance at the 95 percent level (one-tailed test)

\*\*\* Significance at the 99 percent level (one-tailed test)

*Note* : Numbers in parentheses are heteroskedasticity-adjusted *t*-ratios. R-Squared is the within-R-squared for fixed effects and the between-R-Squared for random effects.

countries as well as across periods. The major drawback with random effects is that it is consistent only if the country-specific effects are not correlated with the other explanatory variables. A Hausmann specification test can evaluate whether this independence assumption is satisfied (Hausman 1978, Forbes 2000: 874, Stata Press

2005a: 441-448). My Hausmann test indicates that I should take a fixed-effects model<sup>27</sup>.

Regressions 3 and 4 in Table 3 considers the case of linear regression with panel data. As there has been no research conducted on panel data I am aware of I found it most appropriate to start estimating my panel data with the method of linear regression. As there is the possibility of cross-sectional heteroskedasticity I am using a robust estimation technique. The coefficient are the same with and without the robust estimation technique, however the robust estimator produces larger standard errors. My fixed-effects estimations use 41 cross-section observations with 129 observations. Regression 3 in Table 3 contradicts the results of all previous empirical works (Kack and Keefer 1997, Zak and Knack 2001, La Porta and others 1997, Beugelsdijk et al. 2004, cf. Heliwell 1996), as well as my own results from my cross-section design and my pooled panel analysis as I get a negative (-0.08) and significant (-2.52) coefficient for my interpersonal trust variable, which means that changes in trust and changes in economic growth are negatively related to each other. All other variables in my model have the expected signs. I find significant conditional convergence, a positive relationship between human Capital and economic growth and a significant negative coefficient for the variable price level of investment. 28 percent of the within-variance can be explained. Regression 4 presents the random-effects model. As expected when taking a random-effects model I replicate my positive results from the cross-section and the pooled panel analysis. I get a positive (0.04) and significant result (Significant at the 90 percent level).

### *Sensitivity Analysis*

Since the negative relationship between interpersonal trust and economic growth in Regression 3 in Table 3 challenges econometric work using a cross-section design the robustness of the results has to be tested. To test the sensitivity of my results Table 4 shows several specification tests including the exclusion of influential observations, the alteration of case specifications, the inclusion of additional regressors, the restructuring of the data and resampling techniques. The first row of

---

<sup>27</sup>The test statistic is  $\chi^2(4) = 213.42$ . This rejects the null hypothesis at any standard of significance.

Table 4 (labelled none) reports the results, standard errors and regression coefficient, taken from Regression 3 from Table 3. Succeeding rows report the effects of interpersonal trust on economic growth when the indicated change is made. The second row of Table 4 reports the results after dropping the case of Poland from my country sample. As can be inferred from Figure 2 in Poland a decrease of interpersonal trust of 16,6 is associated with an increase of economic growth of 5.2 percent. As suspected the case of Poland plays an important part in explaining the relationship between trust and economic growth. Although the relationship between trust and economic growth stays significant (significance at the 90 percent level) the coefficient decreases from -0.08 to -0.06. In the third row I drop the case of Greece. As can be inferred from Table 1 Greece level of trust decreases by 26,7 percent. This decrease is associated with an increase of economic growth by 2,91 percent. After deleting Greece from my country sample the relationship between changes in trust and changes in economic growth loses statistical significance. Row 4-13 examine the different country samples. When excluding the six transition countries<sup>28</sup> from my country sample I detect a curvilinear relationship. When examining an OECD country sample the relationship is negatively related to economic growth (which is strongly due to the case of Poland). In my OECD23 country sample the relationship can either be linear modulated or curvilinear. In the linear modulation I get a significant negative result, however the curvilinear relationship explains 16 percent more of the variance in international growth rates. Similarly to my OECD23 country sample my EU15 country sample<sup>29</sup> can be modulated in both relationships either linear or curvilinear. In the linear modulation I get a significant negative coefficient (Which is strongly due to Finland and the United Kingdom), however the curvilinear model is able to explain 52 percent of the within variation (18 percent more than the linear model). Apart from Poland and

---

<sup>28</sup> Especially transition countries should follow a different path when considering economic growth rates over the time period studied. In 1989 the economy of the six transition countries that are included in the analysis Bulgaria, Hungary, Poland, Romania, Slovak Republic and Slovenia were characterized by a rapid decline in economic growth rates and vital increase in economic growth rates during the 1990's.

<sup>29</sup>EU15 countries should be treated separately from OECD countries for several reasons. On the one hand the EU-15 countries are characterized by an integration in one single market allowing free trade, free movement of persons, service and capital. On the other hand the EU-15 countries are said to have a specific European social model (Giddens 2006a and 2006b, Kaelble 2004, Aust et al. 2000) contrasting them strongly to countries from the OECD.



**Table 4**  
Sensitivity Analysis- Fixed Effects Estimation

Specification Change	Coefficient on Trust	Standard error	Countries	Observations	R-Square Within
<i>Influential Cases</i>					
None	-0.08**	(-2.52)	41	129	0.28
1 (Poland)	-0.06*	(-2.06)	40	126	0.27
2 (Poland+ Greece)	-0.05	(-1.60)	39	124	0.27
<i>Country Samples</i>					
without transition	0.18** / -0.003***	(2.35 / -3.03)	35	115	0.45
OECD	-0.08**	(-2.45)	27	94	0.21
OECD23	-0.05*	(-1.68)	23	83	0.32
OECD23	0.26*** / -0.004***	(3.05 / -3.76)	23	83	0.48
EU15	-0.08*	(-1.91)	14	54	0.34
EU15	0.28*** / -0.004***	(2.31 / -3.13)	14	54	0.52
Liberal	-0.09***	(-3.58)	5	18	0.60
Scandinavian	-0.21*	(-2.17)	5	15	0.74
Developing	0.13*	(1.99)	11	29	0.71
Latin America	0.27**	(3.50)	5	13	0.96
<i>Specifications</i>					
Open	-0.05*	(-1.68)	41	129	0.46
KI	-0.08**	(-2.59)	41	129	0.29
PopGro	-0.07**	(-2.48)	41	129	0.29
strust parliament	-0.1***	(-2.64)	41	114	0.26
strust forces	-0.1***	(-2.95)	41	114	0.26
strust police	-0.11***	(-3.01)	41	114	0.27
strust company	-0.04	(-1.35)	41	102	0.46
Social					
Expenditure	-0.065**	(-2.14)	27	84	0.32
Inequality	-0.09**	(-2.27)	20	62	0.42
<i>Restructuring of data</i>					
3 Waves (unbalanced)	-0.11**	(-2.21)	41	96	0.28
3 Waves (balanced)	-0.09*	(-1.81)	15	45	0.60
5 Waves (balanced)	-0.08	(-1.30)	3	15	0.50
<i>Methods</i>					
Clustering for human capital	-0.08***	(-2.62)	41	129	0.28
boot	-0.08*	(-1.91)	41	129	0.28
jack	-0.08*	(-1.86)	41	129	0.28

\* Significance at the 90 percent level (one-tailed test)

\*\* Significance at the 95 percent level (one-tailed test)

\*\*\* Significance at the 99 percent level (one-tailed test)

Note : Numbers in parentheses are heteroskedasticity-adjusted *t*-ratios.

Greece the negative relationship between trust and economic growth seems to be driven by the highly developed countries from the liberal country sample<sup>30</sup> (Significance at the 99 percent level) and the Scandinavian<sup>31</sup> country sample. As already seen in Figure 3.5 in the United Kingdom and the United States a strong decrease in trust, is associated with an increase of economic growth. Row 11 examines the developing country sample<sup>32</sup>. An increase of interpersonal trust is associated with an increase in economic growth. Countries from Latin America<sup>33</sup> (Row13) face a positive relationship between changes of trust and changes of economic growth. The theoretical claim that, considering developing countries, trust changes should have a positive effect on changes of economic growth is hereby verified. Row 14 includes the variable Openness. The trust coefficient stays statistical significant. The model is now able to explain 46 percent of the within variation of economic growth (18 percent more than the original result from Regression 1 in Table 3.8). Openness seems to very important variable when trying to explain the within-variation of economic growth. Row 15 and 16 include the two Solow parameters investment share of GDP and Population Growth. The trust coefficient remains statistical significant. Row 17-20 includes four indicators of systemic i) confidence in the parliament, ii) confidence in the forces, iii) confidence in the police, iv) confidence in big companies. All four systemic trust variables are not statistically significant related to economic growth. However trust company is related to interpersonal trust as interpersonal trust loses statistical significance when trust company is included into the Regression. Furthermore when examining an OECD or EU15 country sample trust parliament and trust company are both negatively related to economic growth. Especially in Liberal market economies a decline in trust parliament is associated with an increase of economic growth (Significance at the 99 percent level). Row 21 includes social expenditure into the regression. The trust coefficient is not altered by the inclusion of social expenditure. The hypothesis which was elaborated in I (4) that social expenditure could explain the negative relationship between trust and economic growth has to be rejected

---

<sup>30</sup>The liberal country sample includes the US, the UK, Ireland, Canada and Australia (for details see Hall and Soskice 2001).

<sup>31</sup>The Scandinavian country sample includes Norway, Sweden, Denmark and Finland.

<sup>32</sup> I included the following countries: China, India, Argentina, Brazil, Chile, Peru, Venezuela, South Africa, Bangladesh, Pakistan and the Philippines.

<sup>33</sup>I included Argentina, Brazil, Chile, Peru and Venezuela.

(However the hypothesis was, due to data restrictions, only tested in 27 OECD countries with a total of 84 countries). Row 22 includes the Gini-Coefficient. The trust coefficient is not altered. The hypothesis which was elaborated in I (4) that social inequality could explain the negative relationship between trust and economic growth has to be rejected (However the hypothesis was, due to data restrictions, only tested in 20 OECD countries with a total of 62 observations). Row 23 examines an unbalanced panel for the time period 1990-2004. This procedure allows to exclude the data taken from the Eurobarometer 25. After excluding the first two periods (1980-1989) trust is still negatively and significantly related to economic growth. Row 24 considers a balanced panel with 15 countries and 45 country observations examining economic growth from 1990-2004 using data from the second, third and fourth wave of the WVS. Trust is negatively related to economic growth. When using a balanced panel from 1980-2004 (Row 25) taking 5 countries with 15 observations into consideration trust loses statistical significance (which is mainly due to the small number of observations). Row 26 shows the result when clustering for my human capital variable (Clustering for the other variables does not change my results). This procedure is introduced by Stata (Stata Press 2005b) and produces an estimator *that is robust to cross-sectional heteroskedasticity and within-panel serial correlation which is asymptotically equivalent to that proposed by Arellano (1987) (293)*. Row 27 and 28 introduce resampling techniques. Either when using bootstrap estimation or jackknife estimation the coefficient remains statistically significant (However only at the 90 percent level).

## VI. Conclusion

This paper has examined the relationship between trust and economic growth. Several findings are especially important.

Firstly, taking panel data and using a fixed-effects estimation, in a 41 country sample over the time period from 1980-2004 with a total of 129 observations, the paper points out that economic growth is negatively related to an increase of trust. This negative finding is in contrast to most empirical findings using a cross-section

design. The negative relationship seems to be mainly driven by developed countries from the OECD, the EU15 and very strongly by Liberal Market Economies and Scandinavian countries. From an economic growth perspective, one could therefore argue that developed countries inherent too much trust. The Olson thesis seems to be correct that too much cooperation strangles economic growth. However, when considering a country sample, which excludes the six transition countries I detect a curvilinear (inverted U-shaped) relationship. In countries with low levels of trust an increase of trust leads to an increase in economic growth (Developing country sample + Latin America country sample). In countries with high levels of trust an increase of interpersonal trust leads to a decrease of economic growth (especially Liberal Market Economies + Scandinavian country sample).

Secondly, the differentiation between systemic trust and interpersonal trust, reveals that not only interpersonal trust is significantly negatively related to economic growth but also my variables, `strust_parliament` and `strust_company`. Taking an OECD country sample an increase of both variables is negatively related to economic growth.

Thirdly, interpersonal trust behaves robust towards the inclusion of social expenditure per GDP and income inequality in an fixed-effects estimations as well as in a pooled panel design (However the relationship is only tested in an OECD23 country sample). Differently to my theoretical elaboration social expenditure and income inequality seem not be responsible for the negative relationship between trust and economic growth.

Although these results appear to be robust and in line with theoretical assumptions it is possible that the findings are partly due to omission of some variable not considered, that measurement error affect the results, or that the model is misspecified in other ways. Further investigations are necessary to corroborate the findings to be able to answer policy relevant questions.

## References:

- Alan Heston, Robert Summers and Bettina Aten (2002): *Penn World Table Version 6.1*, Center for International Comparisons at the University of Pennsylvania (CICUP).
- Alesina, Alberto and Eliana La Ferrara (2000): The Determinants of Trust, *NBER Working Paper 7621*.
- Arrow, Kenneth (1972): Gifts and Exchanges, *Philosophy and Public Affairs* 1, 343-362.
- Atkinson, A.B. (1999): *The economic consequences of Rolling back the Welfare State*, MIT.
- Aust, Andreas, Sigrid Leitner und Stephan Lessenich (ed.) (2000): *Sozialmodell Europa – Konturen eines Phänomens*, Opladen.
- Baltagi, Badi H. (2005): *Econometric Analysis of Panel Data*, West Sussex.
- Barro, Robert (1991): Economic Growth in a Cross-Section of Countries, *Quarterly Journal of Economics*, 407-443.
- Barro, Robert and Xavier Sala-i-Martin (2004): *Economic Growth*, Massachusetts.
- Barro, Robert J. and Jong-Wha Lee (2000): International Data on Educational Attainment: Updates and Implications, (*CID Working Paper* No. 42, April 2000) - HUMAN CAPITAL UPDATED FILES.
- Berggren, Niclas; Elinder, Mikael and Henrik Jordahl (2007): Trust and Growth: A shaky relationship, *Empirical Economics*, forthcoming.
- Beugelsdijk, Sjoerd, Henri L.F. de Groot and Anton B.T.M. van Schaik (2004): Trust and economic growth: a robustness analysis, *Oxford Economic Papers* 56, 118-134.
- Bourdieu, Pierre (1983): Ökonomisches, kulturelles und soziales Kapital. In: Kreckel, Reinhard (Hrsg.): *Soziale Ungleichheiten (Soziale Welt: Sonderband 2)*, 183–198.
- Bryman, Alan and Duncan Cramer (2005): *Quantitative Data Analysis with SPSS 12 and 13*, New York.
- Coleman, James (1988): Social Capital in the Creation of Human Capital, *American Journal of Sociology* 94, 95-120.
- Coleman, James (1990): *Foundations of Social Theory*, Cambridge.

- Dasgupta Partha (1999): Economic Progress and the Idea of Social Capital. In: Dasgupta, Partha and Ismail Serageldin: *Social Capital – A Multifaceted Perspective*, Washington, 325-424.
- Delhey, Jan and Kenneth Newton (2005): Predicting cross-national levels of social trust: global pattern or Nordic exceptionalism? *European Sociological Review* 21, 311-327.
- Durlauf, Steven N. and Marcel Fafchamps (2005): Social Capital. In: Aghion, Philippe and Steven Durlauf (ed.): *Handbook of Economic Growth*, 1639-1699.
- European Values Study Group and World Values Survey Association (2004): EUROPEAN AND WORLD VALUES SURVEYS INTEGRATED DATA FILE, 1999-2002, RELEASE I [Computer File]. 2<sup>nd</sup> ICPSR version. ICPSR Study Number 3975. Cologne, Germany: Zentralarchiv für Empirische Sozialforschung (ZA)/Tilburg, Netherlands: Tilburg University/Amsterdam, Netherlands: Netherlands Institute for Scientific Information Services (NIWI)/Madrid, Spain: Analisis Sociologicos Economicos y Politicos (ASEP) and JD Systems (JDS)/Ann Arbor, MI: Inter-university Consortium for Political and Social Research [producers], 2004. Cologne, Germany: Zenralarchiv für Empirische Sozialforschung (ZA)/Madrid, Spain Analisis Sociologicos Economicos y Politicos (ASEP) and (JDS)/Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributors].
- Forbes, Kristin J. (2000): A Reassessment of the Relationship Between Inequality and Growth, *American Economic Review* 87, 869-887.
- Frees Edward W. (2004): *Longitudinal and Panel Data – Analysis and Application in the Social Sciences*, Cambridge.
- Fukuyama, Francis (1995): *Trust*, New York.
- Glaeser, Edward, David I. Laibson, Jose A. Scheinkman and Christine L. Soutter (2000): Measuring Trust, *The Quarterly Journal of Economics* CXV, 811-846.
- Giddens, Anthony (2006a): Debating the Social Model: Thoughts and Suggestions. In: The Hampton Court Agenda: A Social Model for Europe, *Policy Network*, 95-150.
- Giddens, Anthony (2006b): *Towards a new European Social Model*, Department of Sociology Research.
- Greene, William H. (2003): *Econometric Analysis*, New Jersey.
- Hall, Peter and David Soskice (2001): *Varieties of capitalism*, New York.
- Hamilton, Lawrence C. (2003): *Statistics with Stata Version 7*, Belmont.
- Hamilton, Lawrence C. (2006): *Statistics with Stata – Version 9*, Belmont.

- Hardin, Russel (1982): *Collective Action*, Maryland.
- Hausman, J. (1978): Specification tests in econometrics, *Econometrics* 46, 1251-1271.
- Heliwell, John (1996): Economic Growth and Social Capital in Asia, *NBER Working Paper* 5470.
- Inglehart, Ronald (1990) : *Culture Shift*, Princeton.
- Inglehart, Ronald (1997): *Modernization and Postmodernization – Cultural, Economic and Political Change in 43 Societies*, Princeton.
- Inglehart, Ronald (1999): Trust, Well-Being and Democracy. In: Warren, Mark E. (ed.) *Democracy and trust*, Cambridge, 88 -120.
- Inglehart, Ronald et al. (2000): WORLD VALUES SURVEYS AND EUROPEAN VALUES SURVEYS, 1981-1984, 1990-1993, and 1995-1997 [Computer file]. ICPSR version. ICPSR Study Number 2790. Ann Arbor, MI: Institute for Social Research [producer], 2000. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor].
- Jagodzinski, Wolfgang and Kazufumi Manabe (2005): How to Measure Interpersonal Trust? A Comparison of two different Measures, *ZA-Information* 55, PP. 85-96.
- Kaelble, Hartmut et al. (2004): *Das europäische Sozialmodell auf dem Weg transnationalen Staat*, Berlin.
- Klasen, Stephan (2002): Low Schooling for Girls, Slower Growth for all? Cross-Country Evidence on the Effect of Gender Inequality in Education on Economic Development, *The World Banc Economic Review* 16, 345-373.
- Knack, Stephen and Philip Keefer (1997): Does Social Capital have a Payoff? A Cross-Country Investigation, *Quarterly Journal of Economics* 112, 1251-1288.
- Knack and Zak (2002): Building Trust, Public Policy, interpersonal trust and Economic Development. *Supreme court Economic Review* 10, 91-107.
- Knowles, Stephen (2005): *The future of Social Capital in Development Economic Research* 2005, <http://www.wider.unu.edu/conference/conference-2005-3/conference-2005-3-papers/Knowles.pdf>.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer and Robert W. Vishny (1999): Trust in Large Organizations. In: Dasgupta, Partha and Ismail Seregaldin (ed.), *Social Capital – A Multifaceted Perspective*, Washington, 310-324.
- Luhmann, Niklas (2000), *Vertrauen*, Stuttgart.

- Mankiw, N. Gregory, David Romer and David N. Weil (1992): A Contribution to the Empirics of Economic Growth, *The Quarterly Journal of Economics* 107, 407-437.
- Newton, Kenneth (1997): Social Capital and Democracy, *American Behavioral Scientist* 40, 575-586.
- Noelle, Elisabeth (2005): Vertrauen ist besser, *Frankfurter Allgemeine Zeitung* 166, 5.
- North, Douglass C. (1990): *Institutions, Institutional Change and Economic Performance*, Cambridge.
- OECD (2004): *Social Expenditure Database (SOCX)*, [www.oecd.org/els/social/expenditure](http://www.oecd.org/els/social/expenditure).
- Olson, Mancur (1982): *The Rise and Decline of Nations: Economic Growth, Stagflation and Social Rigidities*, New Haven.
- Ostrom, Elinor (1990): *Governing the Commons*, Cambridge.
- Ostrom, Elinor (1998): A Behavioral Approach to the Rational Choice Theory of Collective Action: Presidential address, American Political Science Association, 1997, *The American Political Science Review* 92, 1-22.
- Paxton, Pamela (1999): Is Social Capital Declining in the United States – A Multiple Indicator Assessment?, *American Journal of Sociology*, 88-127.
- Paxton, Pamela (2002): Social Capital and Democracy: An Interdependent Relationship, *American Sociological Review* 67, 254–277.
- Portes, Alejandro (2000): The two Meanings of Social Capital, *Sociological Forum* 15, 1-11.
- Putnam, Robert D. (1993): *Making Democracy Work: Civic Traditions in Modern Italy*, Princeton.
- Putnam, Robert D. (1995): Bowling alone: America's Declining Social Capital, *Journal of Democracy* 6, 65-78.
- Putnam, Robert D. (2000): *Bowling alone: The Collapse and Revival of American Community*, New York.
- Rabier, Jacques-Rene; Riffault, Helene and Ronald Inglehart (1988): *Eurobarometer 25*, Holiday Travel and Environmental Problems, April 1986 [Computer File], ICPSR Study Number 8616.



- Roth and Schüler (2006): *Trust and Economic Growth – A Panel Analysis*, Manuscript Draft: University of Göttingen.
- Rothstein, Bo and Eric M. Uslaner (2005): All for all: Equality and Social Trust, *LSE Health and Social Care Discussion Paper Number 15*, London School of Economics and Political Science.
- Sen, Amartya Kumar (1977): Rational Fools: A Critique of the Behavioural of Economic Theory, *Philosophy and Public Affairs* 6, 317-344.
- Sen, Amartya Kumar (1999): *Development as Freedom*, Oxford.
- Serageldin, Ismail (1999): Foreword. In: Knack, Stephen: Social Capital, Growth and Poverty: A Survey of Cross-Country Evidence, *Social Capital Initiative Working Paper 7*, iii.
- Serageldin, Ismail and Christiaan Grootaert (1999): Defining Social Capital: An Integrating View. In: Dasgupta, Partha and Ismail Serageldin (ed.) *Social Capital – A multifaceted Perspective*, Washington 1999, 40-58.
- Sobel, Joel (2002): Can we trust social capital?, *Journal of Economic Literature* Vol. XL, 139-154.
- Solow, Robert (1956): A Contribution to the theory of Economic Growth, *The Quarterly Journal of Economics* 70, 65-94.
- Solow, Robert (1999): Notes on Social Capital and Economic Performance. In: Dasgupta, Partha and Ismail Serageldin: *Social Capital – A Multifaceted Perspective*, Washington, 6-10.
- Stata Press (2005): *Stata Reference Manual Release 9 – Reference A-J*, Texas.
- Stata Press (2005b): *Stata Longitudinal/Panel Data Reference Manual Release 9*, Texas.
- Tonkiss, Fran (2000): Trust, Social Capital and Economy. In: Tonkiss, Fran and Andrew Passey: *Trust and Civil Society*, London 2000, 72-89.
- Uslaner, Eric M. (1999): Democracy and social capital. In: Warren, Mark E. (ed.) *Democracy and trust*, Cambridge.
- Van Oorschot, Wim and Wil Arts (2005): The social capital of European welfare states: the crowding out hypothesis revisited, *Journal of European Social Policy* 15, 5-26.
- Williams, B. (1988): Formal Structures and Social Reality. In: D. Gambetta (ed.), *Trust: Making and Breaking Cooperative Relations*, Oxford 1988.

Whiteley, Paul F. (2000): Economic Growth and Social Capital, *Political Studies* 48, 443-466.

Woolcock, Michael (1998): Social Capital and Economic Development: Toward a theoretical Synthesis and policy framework, *Theory and Society* 27, 151-208.

Zak, Paul J. and Stephen Knack (2001): Trust and Growth, *The Economic Journal* 111, 295-321.