Social Capital, Trust, and Economic Growth—

A Cross-Sectional and Panel Analysis

Dissertation

zur Erlangung des wirtschaftswissenschaftlichen Doktorgrades der

Wirtschaftswissenschaftlichen Fakultät der

Universität Göttingen

vorgelegt von

Felix Maria Roth

aus Singen a.H.

Göttingen, 2007

Erstgutachter: Prof. Stephan Klasen, Ph.D.

Zweitgutachterin: Dr. Fran Tonkiss

Tag der mündlichen Prüfung: 12. Oktober 2007

To my mother,

Dagmar

Acknowledgements

TABLE OF CONTENTS

PART II: EMPIRICS

TABLES

ACRONYMS

CME	Coordinated Market Economies
EU	European Union
GDP	Gross Domestic Product
ICPSR	Inter-University Consortium for Political and Social Research
LME	Liberal Market Economies
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
UN	United Nations
WVS	World Value Survey

PREFACE

The following thesis examines three topics: the relationship between social capital and economic growth, the relationship between human capital, social capital, and economic growth, and the relationship between the welfare state and social capital. In the first two topics, social capital is the independent variable. The third topic treats social capital as the dependent variable and deals with the determinants of social capital. The main question here is whether there is a crowding-out effect between welfare state effort and social capital.

The thesis is divided into two parts and six chapters. The first part, the theory, intertwines all three topics into one line of thought. It provides a short introduction to the relevant questions of research, gives definitions of *social capital* and *trust* and argues for the claim that the dimension of trust, in particular, must be considered within the paradigm of social capital. Economic growth models are introduced and how the social and human capital paradigm fits into the models is discussed. Theoretical arguments supporting a positive, as well as a negative, relationship between trust and economic growth are detailed. The concept that the importance of social capital is dependent upon the degree of economic development in a nation is likewise discussed.

In the second part, the empirical results of the research are presented. This section is organised along three topics of research: trust and economic growth (Chapter III), human capital, social capital, and economic growth (Chapter IV), and the welfare state and social capital (Chapter V). The topics are structured as follows: a presentation of discussions on operationalisation, the model specifications, and the measurement of the data and the case samples. Results from descriptive statistics will also be presented. Thereafter, econometric results will be presented. The following econometric methods will be used: i) cross-section analysis, ii) pooled panel analysis, and iii) panel analysis. A brief conclusion will be given after each section. The last chapter summarises the overall results of the research presented. A short outlook for further research is given.

Chapter I   Theoretical Links between Social Capital, Trust, and Economic Growth

> 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, p. 263)

1.   Introduction

Recent years have seen interest in the theoretical and empirical relationship between social capital and economic growth. Specifically, the World Bank[1] has put the concept of social capital on the agenda in their framework of the Social Capital Initiative (SCI). In the foreword of the working paper series of the SCI, Ismail Serageldin argues that the "traditional composition of natural capital, physical or produced capital, and human capital needs to be broadened to include social capital" and continues to say, "Social capital is the glue that holds societies together and without it there can be no economic growth or human well-being." (1999, p. iii). But not only the World Bank has emphasised the paradigm of social capital; the Organisation for Economic Co-operation and Development (OECD) has interlinked the paradigm of social capital with that of human capital and examines possible interactional effects between social capital, human capital, human well-being, and economic growth (OECD, 2001). In addition, the European Union, while not explicitly emphasising the paradigm of social capital, promotes the goal of social cohesion; in the Lisbon Strategy, the European Council stresses that, in addition to economic growth and better jobs, social cohesion must be strengthened by the year 2010.

Although the author agrees that it is important to broaden the neoclassical growth model (Solow, 1956)—which normally includes the factors of labour, physical capital, and of late, human capital (Barro, 1991; Mankiw, Romer, & Weil, 1992; Barro & Sala-i-Martin, 2004)—by the factor *social capital* (Dasgupta, 1999;

---

[1] At the programme's homepage—http://www1.worldbank.org/prem/poverty/scapital/home.htmt—the initiative claims that social cohesion, that is to say social capital, "is critical for poverty alleviation and sustainable human and economic development". In addition to various texts, the World Bank has published 24 papers on social capital in their social capital initiative working paper series.

Serageldin, 1999; Serageldin & 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 and different levels of analysis[2] and is applied in different research areas[3] within the social sciences. In the following chapter, close attention will be paid to those definitions relevant to the relationship between social capital and economic growth and focus on the paradigm of trust within that of social capital.

2. Social Capital and Trust

Many economists focus on the concept of trust when talking about social capital (Knack & Keefer, 1997; Solow, 1999; Whiteley, 2000; cf. Putnam & Heliwell, 1999). Tonkiss (2000) comments that "trust regularly features—together with norms and networks—within definitions of social capital" (p. 78). But how is trust related to social capital? Although there are various definitions of social capital (Fukuyama, 1996, p. 26; Temple, 2001 in OECD, 2001, p. 39; Ostrom, 1999, p. 176; Newton, 1997, p. 576) (For a wide range of definitions see Woolcock (1998, p. 189), here the

---

[2] Portes (2000) differentiates between two levels of analysis. On the one hand, the analysis can take place at the micro-level. In the centre of this research are the so—called "networks" of an actor. With the help of this research design, relationships between the income, the human capital, and the networks of a person can be analysed. Initiators of this type of research were Pierre Bourdieu (1983) and James Coleman (1988, 1990). Social capital at the individual level is a private good and can only be possessed by individuals. On the other hand, social capital can also be used as a concept at the meso and macro-level. This approach has been made especially popular by the works of Robert Putnam (1993). In this kind of relationship, social capital is seen as a stock, which is available for communities, regions, or nations. According to Portes (2000), "Coleman never openly challenged the new use of the term by Putnam." (p. 3). The analysis then does not focus on the individual actor but on the nation with its particular characteristics. These characteristics include aggregated entities. These consist of, for example, the yearly change of stock of the Gross Domestic Product, the stock of the labour force, or the stock of human capital. The stock of social capital is, as well, a characteristic of a nation. Social capital at the meso and macro-level is a collective good. It is not created through intentional individual efforts, but rather is created as a side effect of individual behaviour. As all actors profit from this kind of capital, even those who have not contributed and invested in it, there exists the danger of free-riding.

[3] Woolcock (1998) differentiates six areas of research: i) family and youth, ii) education, iii)community, iv) labour and organisation, v) democracy, and vi) general cases of collective action problems (p. 193, ff.). In addition, the research on growth and social capital should be added to Woolcock's classification. An analysis of the international social capital literature indicates (Winter, 2000, p. 17 in Putnam, 2001, p. 18) that before 1983, there were only 20 contributions to the the topic of social capital , while between 1991 and 1995 there were 109, and between 1996 and March 1999 there were 1,003. In the last decade, the literature on social capital has increased exponentially. Upon entering the term "social capital" in the international social science citation index in 2006, 1,429 results were retrieved. For a historical background of the term "social capital", see Putnam (2001).

"classical" definitions of James Coleman and Robert Putnam to clarify the relationship between social capital and trust will be used.

2.1   James Coleman

Coleman defines the paradigm of social capital in his treatises *Social capital in the Creation of Human Capital* (1988) and *Foundations of Social Theory* (1990). Social capital is intended to be a resource from the social structure of actors within society. This resource represents capital for the actor, his social capital. The term social capital represents the attempt to connect the macro-level, or the social structure, with the micro-level, at which social interaction takes place. Coleman hereby creates a synthesis between the Rationale Choice Theory and the assumption of socialisation theory (see Sen, 1977; Misztal, 1996, p. 65). The concept of social capital offers the possibility of embedding the extremely individualistic homo oeconomicus, who acts exclusively with the motive of maximizing his utility function in his environment, creating a relationship between the action of an actor and the action of his environment. Coleman regards the socialisation-paradigm as an essential explanation for actions, but he misses the importance of the actor's initiative. As this he understands the Rational-Choice paradigm of maximizing one's utility. He notes (1988):

> The use of the concept of social capital is part of a general theoretical strategy discussed in the paper: taking rational action as a starting point but rejecting the extreme individualistic premises that often accompany it. The conception of social capital as a resource for action is one way of introducing social structure into the rational choice paradigm. (p. 95)

Coleman intents to introduce a new form of capital, in addition to the existing forms of capital like physical and human capital, in the process of building scientific theories. Social capital is segregated from physical and human capital in the following manner:

> Just as physical capital is created by changes in materials to form tools that facilitate production, human capital is created by changes in persons that bring about skills and capabilities that make them able to act in a new way. (1988, p. 100)

Taking the definition of human capital as a starting point, Coleman derives his definition of social capital. Social capital hereby is crucial for building human capital. As with human capital, social capital should be understood to be an indicator of wealth. Not only "hard" indicators such as physical capital, but also "soft" indicators like education and social cohesion should be understood as constituting a society's wealth. The concept of social capital attempts to address that problem. Coleman remarks (1988):

> Social capital, however, comes about through changes in the relations among persons that facilitate action...Just as physical capital and human capital facilitate productive activity, social capital does as well. For example, a group within which there is extensive trustworthiness and extensive trust is able to accomplish much more than a comparable group without that trustworthiness and trust. (pp. 100, 101)

Human capital is a capital form which is embedded in individual actors, whereas social capital is a characteristic of the relations between them.

> If physical capital is wholly tangible, being embodied in observable material form, and human capital is less tangible, being embodied in the skills and knowledge acquired by an individual, social capital is less tangible yet, for it exists in the relations among persons. Just as physical and human capital facilitate productive activity, social capital does as well. (id., pp. 100, 101)

In contrast to other forms of capital, social capital seems to be embedded in the relationships between two or more persons. But what exactly determines relationships which create social capital? Coleman mentions three forms of relationships involving social capital: i) obligations, expectations, and trustworthiness of structures, ii) information channels, and iii) norms and sanction. Although mentioning three forms, Coleman tends to identify the trustworthiness of the social environment as the most important form of social capital (in Whiteley 2000, p. 448).

2.2. Robert Putnam

Putnam is one of the first authors to use the term social capital, which is used by Coleman at the micro and meso-level, as a concept for the macro-level. If Coleman (1990) still argues that

Whether social capital will come to be as useful a quantitative concept of social capital as are the concepts of financial capital, physical capital, and human capital remains to be seen; its current value lies primarily in its usefulness for qualitative analyses of social systems and for those quantitative analyses that employ qualitative indicators. (pp. 305, 306)

Putnam, on the other hand, uses the concept of social capital, taking Coleman's approach as a theoretical base, as a quantitative measure. In his book *Making Democracy Work* (1993), a comparison of the different Italian regions of Italy, Robert Putnam aggregates social capital at a regional level and discovers, that an index of civic involvement in the 1900's is strongly associated with the economic development of a region in the 1970's . He comes to the conclusion that high stocks of social capital in an economic region "bolster the performance of the polity and the economy, rather than the reverse" (p. 176).

But how does Putnam define *social capital*? In 1993 he defines it as "features of social organizations, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated action" (p. 167). He interlinks the term *social capital* automatically with the concept of civic engagement and the existence of a strong civil society(Putnam, 1993, 1995, 2000; Putnam & Heliwell, 1999). This is also emphasised in his definition in the year 2000 where he connects social capital with the concept of civic virtues (p. 19). However, Putnam (1993) stresses that the indicators *networks* and *norms* function as a prerequisite of trust (p. 177); trust thus appears to be an outcome of norms and networks.

The inclusion of psychological (trust and norms) and behavioristic (networks) dimensions into one definition has been criticised. Kenneth Newton doubts that it is wise to combine all three dimensions (1997). He suggests that from an empirical point of view, the concept of social capital should be separated into its components. Whether trust and civic engagement are associated must be tested empirically (pp. 583, 584). Newton's emphasis on the importance of separating the dimensions of social capital into its components, trust, norms and networks appears preferable for two reasons. First, by hypothetically combining all three indicators into an index, one

faces the problem of multicollinearity[4], and the weighting[5] of the different indicators becomes unclear. As trust seems to be the most important dimension of social capital (Coleman, 1990; Fukuyama, 1996; Newton, 1997, p. 576; Ostrom, 1998, Uslaner, 1999, p. 122; Tonkiss, 2000; Zak & Knack, 2001), this work focuses primarily on the dimension of trust within the concept of social capital in the following empirical application. The issue of whether or not social capital can be reduced to trust only, or if other dimensions like social networks are essential for a satisfactory operationalisation of social capital, is left open. (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 approach helps to reduce the danger of over stretching the paradigm of social capital. Nevertheless, if one wants to examine social capital as a multidimensional concept, it is necessary to construct a social capital index (Dasgupta & Serageldin, 1999; Paxton, 1999, 2002; Putnam, 2000; Putnam & Heliwell, 1999; Sabatini, 2007; van Oorschot & Arts, 2005). In Chapter IV, five dimensions of social capital are addressed.

3.   Definitions and Forms of Trust

Fukuyama (1996) defines *trust* as the "expectation that arises within a community of regular, honest, and cooperative behavior, based on commonly shared norms" (p. 26). Luhmann (2000) defines *trust* as an elementary fact of social life (p. 1) and determines that the problem of trust as a risky input (p. 27). The Oxford English Dictionary defines *trust* from an economic perspective as "the confidence in the ability and intention of a buyer to pay at a future time for goods supplied without present payment" (Misztal, 1996, p. 16). Delhey and Newton (2005) define trust as "the belief that others will not deliberately or knowingly do us harm if they can avoid

---

[4] 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 & Cramer, 2005, p. 302). When a new x variable is added that is strongly related to existing 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, and iii) nonsignificant coefficients despite a high R^2 (Hamilton, 2003, p. 166).
[5] Usually one has to weigh the indicators before creating an index due to theoretical reasons.

it, and will look after our interests, if this is possible" (p. 311). Dasgupta (1997) defines *trust* as "the expectation of one person about the action of others that affect the person's choice, when an action of others is known" (p. 5, in Ostrom, 1998, p. 12).

Although there is a variety of definitions of *trust*, recent literature distinguishes between three different forms. Authors note the distinctions between interpersonal or generalised trust, thick trust, and systemic or institutional trust (Putnam, 2000, p. 137; Newton, 1997, pp. 578, ff.; Luhmann, 2000). Newton (1997) and Williams (1988) classify trust which is generated by family networks as thick trust. Thick trust is usually 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)[6]. In contrast, generalised 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. Generalised 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 should facilitate cooperation and lower transaction costs in economic systems. Economic systems tend to be characterised by a substantial degree of differentiation, and exchange activity frequently depends upon trust in strangers. The interpersonal trust variable is constructed, as it is usually agreed upon by scholars from various disciplines (Inglehart, 1990, 1999; Knack & Keefer, 1997; Paxton 1999, 2002; Uslaner, 1999; Alesina & La Ferrara, 2000; Putnam, 2000; Whiteley, 2000; Zak & Knack, 2001; van Oorschot & Arts, 2005; Delhey & Newton, 2005), by aggregating the answer, "Most people can be trusted", to the survey item, "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" (WVS, 1999-2002). The item ranges theoretically from 0 to 100. Interpersonal trust can be regarded as a good indicator of the levels of solidarity in a society, as well as a good indicator of the overall level of social cohesion in society. This survey item, which is used in several international surveys[7],

---

[6]The question which is asked is the following: "How much do you trust various groups of people? a) family and b) your own nationals".

[7] These include, for example, the WVS, the European Social Survey (ESS), the International Social Survey Programme (ISSP), and the Eurobarometer.

is likewise used in this paper when discussing trust. Like many other authors researching the concept of trust, the author focuses specifically on interpersonal trust.

The third category of trust, systemic or institutional trust, refers to the confidence people have in certain institutions. (When discussing systemic trust here, the focus is on trust in the parliament, the police, the armed forces, and the big companies.) The common survey item is: "I am going to name a number of organisations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence, or no confidence at all?". The items are ordinal scaled and range from one to four where 1 symbolizes "A great deal" and 4 symbolizes "None at all". The items are inverted due to their inversed scales; therefore, 1 symbolizes "None at all" and 4 symbolizes "A great deal".

4.   Social Capital in Economic Growth Models

Neoclassical economic models are identified by the works of Solow (1956) and Swan (1956). By using a neoclassical production function, with diminishing returns for each input, and focusing on exogenous savings, population growth, and technological change, these models suggest convergence of per capita income.

According to Inglehart (1997), these models "have a logical weakness" in that they show "a paradoxical steady-state result", implying "an unchanging standard of living" (p. 228). Therefore, in the mid 80's, "as it became clear the standard neoclassical growth model was theoretically unsatisfactory as a tool to explore the determinants of long-run growth" (Barro & Sal-i-Martin, 2004, p. 61), economists started to construct endogenous growth models (Roemer, 1986, 1990; Lucas, 1988; Barro & Sala-i-Martin, 2004), stressing the possibility of endogenous economic growth. When working with a broader concept of capital, a concept that included human capital, it was assumed that diminishing returns did not apply. Accordingly, many empirical growth models have focused on human capital (Mankiw, Romer &

Weil, 1992; Barro, 1991; Barro & Sala-i-Martin, 2004)[8]. A seminal paper by Barro (1991) showed that the process of convergence can best be understood when including human capital. Furthermore, Barro identified a range of other variables as being important for long-term economic growth. This kind of methodology is called "Barro-type" regression[9]. Durlauf, Johnson, and Temple provide a generic representation of these regressions (2005):

$$\gamma_i = \beta \log y_{i,0} + \psi X_i + \pi Z_i + \varepsilon_i,$$

where γ_i is the growth rate in country i, $\log y_{i,0}$ and X_i stand for those growth determinants that are suggested by the Solow growth model, when in fact Z_i stands for those growth determinants that lie outside Solow's theoretical work. The inclusion of social capital and human capital can therefore best be understood as being an important Z_i variable, essential for explaining economic growth. Recently, authors began working with panel data when examining economic growth (Islam, 1995; Caselli et al, 1996; Forbes, 2000).

5.   Positive Relationship Between Social Capital, Trust, and Economic Growth

Arrow (1972) argues that the presence of virtues such as trust plays a significant role in the operation of economic systems (p. 345). He builds his assumption upon the paradigm of exchange and elaborates that the process of exchange requires or is greatly facilitated by virtues such as trust (p. 345). For Fukuyama (1996) 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 (p. 7). This argument is built upon his belief that economic activity itself is part of the social life and constitutes itself according to the norms, rules, and moral obligations of a society (p. 7). Robert Putnam (1993) comes to the conclusion that "norms and networks have

---

[8]Authors have not yet fully agreed on what to emphasis when considering human capital. Roemer (1990) puts emphasis on new technological innovation by increasing research and development spending. Lucas (1988) argues for the development of education.
[9]For the following argumentation, see also Morten (2006).

fostered economic growth, not inhibited it" (p. 176). In line with this argument, Sen (1999) argues that "The development and use of trust in one another's words and promises can be a very important ingredient of market success." (p. 262) and that "No society would be viable without some norms and rules of conduct" (Sen, 1977, p. 332).

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

According to Whiteley (2000), interpersonal trust has three direct and indirect channels through which it might stimulate economic growth (p. 451).

Firstly, trust has a direct effect on economic performance through reducing transaction costs. In his book *Institutions, Institutional Change and Economic Performance*, Douglass North (1990) constructs a theory of institutions which is very closely connected to a theory of transacting. Transaction costs theoretically evolve during the economic process of exchange and specialisation and are defined as costs associated with banking, insurance, finance, wholesale, and retail trade, or in terms of dealing with lawyers and accountants, etc. (p. 28). Wallis and North (1986, in North, 1990) researching on transaction costs in the US, demonstrated that transaction costs in the US have nearly doubled (from 25 to 45 percent) over the last century. They come to the conclusion that transaction costs are a part of the costs of production and restate the traditional production relationship by including transaction costs. North argues that:

> The total costs of production consist of the resource inputs of land, labour, and capital involved both in transforming the physical attributes of a good...and in transacting—defining, protecting, and enforcing the property rights to goods (the right to use, the right to derive income from the use, the right to exclude, and the right to exchange). (p. 28)

Taking this new production function into consideration, high-trust societies should produce a higher output than low-trust societies as the cost for transactions like monitoring, enforcing, and protecting contracts is smaller. People who trust each other do not spend as much time or money protecting their property rights. They might be able to solve their problems without lawyers or lawsuit.

Secondly, trust has a direct influence on growth because it enables actors to solve collective action problems (Whiteley, 2000, p. 451). This argument is similar to Putnam's (1995) analysis, 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, and iv) it reduces egoism (p. 76). 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 that evolve for example with smog problems, CO_2 emissions, and clean neighborhoods (Hardin, 1982, p. 9), as well as, for example, the problem of overfishing (Ostrom, 1990, p. 3). Generally, in high-trust societies, people will not so readily take advantage of the public infrastructure.

The third direct effect is that principal-agent problems might be much less significant in high-trust societies (North, 1990, pp. 32, 33). Principal-agent problems are a part of the transaction cost theory. 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.

Similar to the arguments of Knack and Keefer, Fukuyama (1996) argues that high-trust communities are not as dependent on extensive contracts and legal regulations (p. 26) and that cooperation in high trust-societies will not have be enforced by coercive means (p. 27). He concludes that "if people who have to work together in an enterprise trust one another,...doing business costs less" (p. 27).

Moreover, trust works indirectly via interactions with human capital, physical investment, and convergence, all of which are known to contribute to economic growth. It can be argued that i) in high-trust societies the returns on educational investments are higher, ii) high-trust societies are less risk-averse which creates greater incentives to invest in physical and human capital (Keynes, 2000, p. 125), and iii) the diffusion of innovation and new technologies will be faster in high-trust societies as they are "facilitated by cooperative and trusting behaviour" (Whiteley, 2000, p. 452).

While interpersonal trust is the trust we have in other people, institutional trust, on the other hand, is the trust we have in institutions (Luhmann, 2000;

11

Hellmann, 2004). Similar to interpersonal trust, institutional trust should positively affect economic outcomes.

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

6. Negative Relationship Between Social Capital, Trust, and Economic Growth

It has been argued thus far that trust, and therefore the facilitation of collective action, leads to economic development and growth. But is this necessarily or always the case? There exist five theoretical explanations why trust could lead to a decline in economic growth.

6.1 Mancur Olson

One starting-point for a negative relationship between trust and economic growth can be found in the literature on collective action by Mancur Olson (1982). This literature admittedly deals with the dimension of networks rather than the dimension of trust, but the discussion proves quite fruitful and for these purposes, appropriate. Olson analyses the relationship between collective action and economic performance 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 argues that stable societies are in danger of accumulating "collusions" and "organizations of collective action" over time (p. 41). If a society accumulates too many organisations that function as special interest groups, economic growth is harmed by reduced efficiency, by income being aggregated in the societies in which they operate, and by political life being made more divisive (p. 47). To give one example, if a state desires to implement labour market reform in which, for example, employee rights are reduced, a sector with cheap labour is implemented, working hours are extended, and social spending on unemployment benefits and support is decreased to reduce the costs of the labour factor, a highly trusting and solidaristic society would more likely oppose the state's efforts for reform and will, via the

mobilisation of collective action, stop the reform agenda, and therefore limit the potential of higher economic growth rates. This argument is built upon Putnam's 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 members of labour unions may be a critical factor for the existence of high levels of trust (Putnam, 1993, 1995, 2000). For Putnam himself civic associations and stocks of interpersonal trust are clearly interlinked. As such, the negative relationship between trust and economic growth could be driven by associational activity. Groups with strong bonding ties may produce, on an aggregated scale, a high interpersonal trust stock, while reducing economic outcomes, as described above. Although being aware of various negative outputs which can evolve from a strong civil society, Putnam never really clarified the extent to which civic engagement and high stocks of trust may hamper economic performance.

Although Olson's arguments are convincing, it seems somehow plausible that both set of arguments describe one part of the reality. But is there a possibility of combining both arguments into one theoretical construct?

The solution to the problem of combining both arguments should be the differentiation between countries with high and low levels of trust. Olson's argumentation appears crucial in relation to countries with high levels of trust, whereas the argument for a positive relationship between trust and growth seems to be relevant for countries with lower levels of trust. Thus the relationship between interpersonal trust and economic growth can be expected to be curvilinear (inverted U-shape). In low-trust societies an increase of trust should theoretically enhance economic performance, but once a threshold is reached, higher levels of trust will harm the economic performance. As there is a tendency for (highly) developed countries to exhibit high levels of interpersonal trust (as for instance, the Scandinavian states) and developing countries to exhibit low levels of interpersonal trust (Latin American countries, for example), highly developed countries should face a negative relationship between interpersonal trust and economic growth, in contrast to developing countries which should face a positive relationship.

Empirical evidence for this argument exists as seen from an examination of the relationship between democracy and economic growth[10]. Barro and Sala-i-Martin (2004) determine that the partial relationship between the growth rate of per capita GDP and the Freedom House indicator for democracy is curvilinear. Their estimates imply that democratisation appears to enhance growth for countries previously not very democratic but to retard growth for countries that have already achieved a substantial level of democracy (p. 529).

In addition, dividing his country sample into "relatively rich" and "relatively poor" countries, Inglehart (1997) finds a negative relationship between secondary associations and economic growth in developed countries but, in contrast, finds a positive relationship between group membership in voluntary associations and economic growth in developing countries (p. 227).

6.2   Fear and Economic Growth

The second explanation could be that fear, rather than trust, is a key explanatory variable for productivity (Marcuse, 1994). A society with high levels of fear will less easily oppose economic reformation processes. These processes of reformation 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 organisational theory. It can be part of a company's strategy to create an atmosphere of fear between its employees. This non-solidaristic working atmosphere mobilises the employees to monitor themselves, work harder and raise the overall productivity of the company[11]. Another example of the positive relationship between fear and productivity is the following argumentation, which can be traced back to Marx (1998). A high unemployment rate in a country is most often connected to the fear of losing one's job. Employees who are afraid of losing their jobs work harder, stress their legal employment rights less, take less sick leave, and are less demanding overall. This fear also has implications for the actions of trade

---

[10]However, one has to mention that this result is highly controversial.

[11]The New York Times from the 22nd of June 2004 reports, citing the results from a study of 173 randomly chosen employees, that "when bosses were abusive some employees did little or nothing extra while others did a lot, partly covering for less helpful peers" (Carey 2004).

unions. Employers associations have more power to push tough wage reductions and extend working hours if trade unions give top priority to the preservation of jobs. Extension of working hours has a direct positive effect on economic growth.

On the surface, fear appears to be directly opposed to trust, such that high levels of trust would imply low levels of fear and vice versa. However, mistrust and fear may not be identical. A person who is afraid of losing his job would not necessarily mistrust his environment or even his boss. Further research should shed light on this problem and examine the links between trust and fear.

6.3   The Welfare State and Social Capital

The third argument is 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 negatively affects economic growth (see Atkinson 1999 for a detailed discussion of the relationship between the welfare state and economic growth), an increase in welfare state activity would go hand in hand with an increase in levels of interpersonal trust and a decrease in economic growth. On the other hand, the relationship can be the exact opposite. The welfare state also undermines interpersonal trust and positively affects economic growth. This kind of argumentation, that welfare state mechanisms diminish trust, is often referred to as a relationship of crowding-out (van Oorschot & Arts, 2005). Crowding-out in our sense means that the state performs duties that otherwise would have been done by means of social capital produced by the civil society and the family. If the state over stretches its competence, the resources of civil society are torn down and crowded out by the state and a very complicated and cost-intensive process is required to reactivate a vibrant civil society (Etzioni, 1993). The crowding-out debate refers mainly to networks and associations. Functions that were managed voluntarily are now organised by state agents. Alongside this process, interpersonal trust and solidarity are crowded out.

6.3.1 Arguments for Crowding-Out

Several authors are in favour of the crowding-out hypothesis (Habermas, 1973; von Weizsäcker, 1999; Fukuyama, 2000; Putnam, 2000). Fukuyama (2000) points out that states can have a negative impact on social capital when they undertake activities that are better left to the private sector or to civil society (p. 11). Carl Friedrich von Weizsäcker (1999) goes further by arguing, taking the German case into consideration, that the welfare state slowly but consistently destroys social capital, so crucial to a society's prosperity (p. 84). For Beck (1983) the welfare state is responsible for a transition from the classic paradigm of class and social class to the paradigm of individualisation. Welfare state mechanisms support the individualisation process as they liberate through the individualistic right of welfare and through the fact that principles of insurance are individualised. Communitarians argue that this process of individualisation endangers the reproduction of the societal system. Michael Walzer (Walzer, 1993, in Nunner-Winkler, 1997, p. 360), for example, argues that "modern societies are lacking a sense of community" and are therefore not able to reproduce themselves[12]. And Habermas (1973) talks about a motivation crisis triggered by welfare state mechanisms and resulting in the erosion of dimensions of civil society. There are many other authors who have argued along these lines. Typically, the welfare state has been claimed "to undermine individual initiative, threaten economic prosperity, create dependency culture" (Kuhnle & Alestalo, 2000, p. 9).

In summary, most authors would argue that in the process of crowding-out resources of civil society, the welfare state undermines solidarity and interpersonal trust.

6.3.2 Arguments against Crowding-Out

On the other hand, it is argued that welfare state mechanisms build trust and solidarity between people or are at least a fundamental mechanism for doing so (Kuhnle & Alestalo, 2000). This argument is particularly popular with respect to the

---

[12] This view can be traced back to the classical dichotomy "society" and "community" by Toennies (1887) and "organic" and "inorganic" society by Durkheim (1996). Coleman (1993), who interlinks their work with the paradigm of social capital, states that the community was crucial for the production of social capital. The erosion of community has now to be replaced by cost-intensive modern institutions.

German case. German politicians often refer to "sozialer Kälte" when talking about cuts in social expenditure. They argue that the German welfare system is a prerequisite for social justice, enabling social stability and social cohesion. A proper health, social security, and pension system, based on a system of solidarity finance and risk sharing instead of an individualized system in which the pension is financed with private capital, are said to foster high levels of solidarity. The same argument is used on an European level. The debate about the future of the European Social Model exemplifies the argument that welfare state mechanisms are important for social cohesion. Giddens (2006a, 2006b) for example argues that without an extensive European Social Model, the European Union will fail to function and will not secure steady economic prosperity. He points out three main problems the social model has to tackle i) provide a culture of risk sharing, ii) intervene against poverty, and iii) intervene against unlimited inequality. He argues that those three tasks are preliminary for growth and social cohesion, both being two main goals of the Lisbon strategy. Giddens calls for positive welfare state intervention against negative welfare state practices. This is part of his argumentation taken from the "third way", in which he constructs the enabling welfare state that supports familial structures and resources of civil society instead of working against them. Alongside this argument, Atkinson (1999) argues that the welfare state programs "are intended...to provide a sense of security to all citizens" (p. 6).

6.4   Social Inequality and Trust

The fourth argument is that, 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[13], an increase in social inequality is related to an increase in economic growth. On the other hand, an increase in social inequality seems to be strongly related to a decrease in interpersonal trust. Knack and Keefer (1997), Zak and Knack (2001), Knack and Zak (2002), in particular, as well as Delhy and Newton (2005) and Rothstein and Uslaner (2005), have given first

---

[13]One must admit however that these results remain very controversial among economists.

empirical proof that trust is stronger in nations with more equal income among citizens.

6.5   Inglehart's Arguments

As a fifth and final argument, Inglehart's (1990) claim that postmaterialist societies have lower economic growth than materialist societies due to the weight of other preferences could explain a negative relationship between interpersonal trust and economic growth. It could be deduced that postmaterialist societies exhibit higher levels of interpersonal trust and show less interest in economic growth[14]. Inglehart (1997) showed, based on a growth model from 1960 to 1989, that postmaterialism has a negative effect on economic growth, while achievement motivation has a positive effect (p. 231).

7.   Economic Development and Social Capital

Analytically, it is important to distinguish between developed and developing countries[15]. This view on differentiating developed from developing countries can be traced back to the work of Arrow. Arrow claims that "it can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence" (in Knack & Keefer, 1997, p. 1252). Mutual confidence in this sense is interpreted to be mutual confidence in strangers. Trust is especially important in less-developed societies with fewer formal institutions. In his book *Development as Freedom*, Sen (1999) argues that:

> What may not cause wonder or surprise in Zurich or London or Paris may, however, be quite problematic in Cairo or Bombay or Lagos (or Moscow), in their challenging struggle to establish the norms and institutions of a functioning market economy. (p. 264)

---

[14]A χ^2 test for the two variables interpersonal trust and the postmaterialistic index for the WVS 1981 and 1990 (World Value Study Group, 1999) with N= 89908 is significant at the 99-percent level meaning that the independence assumption can be rejected. The category, "postmaterialistic attitude", and the category, "Most people can be trusted", are positively associated. Forty-seven percent of the people with a postmaterialistic attitude trust most people, in contrast to 30 percent with a materialistic attitude, and in contrast to 36 percent of the total population.

[15]The author does not want to elaborate the question whether it is still appropriate to talk about developing countries. The term "developing countries" refers to a certain case selection containing countries which do not belong to the OECD or EU-27. For further details, see Chapter III.

The existence of formal institutions in developed countries means that interpersonal trust may not be as critical, as it is in developing countries as these institutions, guarantee the necessary cooperation for trade without interpersonal trust. Similarly, Woolcock (1998), referring to the differences between developed and developing nations, posits interpersonal trust as an important explanation for the economic differences (p. 153). In accordance with this argument, Durlauf and Fafchamp (2005) note 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" (p. 1,650). Putnam (1993) concludes that his findings relating to the northern and southern regions of Italy mirror the broader debate about development in the third world (p. 159). For him the lack of social capital could be the reason why many (but not all) third world countries are inextricably and inexplicably mired in poverty (p. 159). He comes to the conclusion that in developing countries, "proposals for strengthening market economies and democratic institutions…center almost exclusively on deficiencies in financial and human capital", although "the deficiencies in social capital in these countries are at least as alarming", and asks, "Where are the efforts to encourage social capital formation?" (in Woolcock, 1998, p. 154).

Chapter II   Previous Findings

> I think that those who write and talk about social capital are trying to get at something difficult, complicated, and important: the way a society's institutions and shared attitudes interact with the way its economy works. It is a dirty job but someone has to do it…(Solow, 1999, p. 6)

1.   Trust and Economic Growth

In 1997 Knack and Keefer examined whether "social capital has a pay-off". In Fukuyama's and Putnam's books *Trust* (1996) and *Making Democracy Work* (1993), and Robert Solow's book review *But Verify?* (1995), the authors try to find empirical evidence for the relationship between social capital and economic growth. The authors operationalise social capital as trust, norms, and associations. Using 29 market economies as units of observations[16], they discover that trust, in particular, as well as norms, matter for economic growth but that associations do not. They believe that the variable proportion of investment is the key channel of why trust has a positive effect on economic growth. They therefore examine as dependent variables investment share of GDP and growth of GDP per capita from 1980 to 1992. Their social capital variable is measured taking 21 observations from the first wave of the WVS (1981-84) and eight observations from the second wave of the WVS (1990-93). Thus the authors utilise trust values from 1990 to 1993 to explain the economic growth rate from 1980 to 1992. The authors were aware of the endogeneity problem and argue that reverse causation is not problematic due to the fact that the correlation between countries from the first and second wave of the WVS is very high (0.91)[17]. The authors admit however that "cooperative equilibria" (p. 1,267) can unravel very quickly, referring to the case of Yugoslavia and to the case of the United States, where a steady decline in trust has been taking place. Using an economic growth model which includes the proportion of eligible students enrolled in secondary and

---

[16]They included the following countries in their study: Norway, Finland, Sweden, Denmark, Canada, Australia, the Netherlands, the US, the UK, Switzerland, Iceland, Japan, Ireland, South Korea, Spain, India, Austria, South Africa, Belgium, Germany, Argentina, Italy, France, Nigeria, Chile, Portugal, Mexico, Turkey, and Brazil. They therefore included 23 OECD countries and six non-OECD countries. They did not include however the five transition countries the Slovak Republic, Hungary, Poland, Romania, and China.

[17]Although the authors show a strong correlation between the data of the two waves, they do not show that trust behaves stably. In fact, the authors should have examined the variance of the data. As shown later, a variance analysis of the interpersonal trust value shows that interpersonal trust changes substantially over time.

primary schools in 1960[18], per capita income at the beginning of the period, the price level of investment goods related to the United States, and interpersonal trust, their 29-nation sample over this period behaved similarly to the larger sample and longer time periods used by Barro (1991). The authors derived a coefficient on their trust item of 0.082 and on their CIVIC item of 0.272, which the authors interpreted as a ten percent rise in trust as associated with an increase in growth of four-fifths of a percentage point. They further noted that "each four-point rise in the 50-point CIVIC scale...is associated with an increase in growth of more than one percentage point" (p. 1,260). As instrumental variables[19] for trust, the authors included i) the number of law students in 1963 as a percentage of all postsecondary students and ii) a homogeneity indicator. They discovered that when instrumenting for trust, the coefficient remained significant. Using an interaction term between GDP per capita and interpersonal trust the authors derived a negative result and a stronger coefficient for their interpersonal trust coefficient. They interpret their results as:

> The impact of trust should be higher in poorer countries, if trust is more essential where contracts are not are not reliably enforced by the legal system, and where access to formal sources of credits is more limited due to an underdeveloped financial sector. (p. 1,260)

The authors continue to conduct a robustness analysis. They first delete influential cases and second, include additional regressors which are normally used for growth regressions (labour force growth, an indicator for openness, M2/GDP, the black market premium, a property rights indicator, currency depreciation, institutional investor credit rating, and income inequality. Even after all these specification changes, their trust coefficient remains statistically significant.

In 2001 Zak and Knack re-investigated the empirical results from Knack and Keefer which were published in 1997. This time, however, the authors solely stressed the relationship between trust and economic growth. They used observations from 41 market economies. They used all three waves from the WVSs of 1981 to 1984, 1990 to 1993, and 1995 to 1997. Their values range from 5.5 percent for Peru to 61.2

---

[18] Why the authors use the data from 1960 to explain the economic growth rate from 1980-1992 is not clear. They cite the approach of Barro who uses the primary and secondary rates of enrollment, but one should mention that Barro attempted to explain the economic growth rate from 1960 to 1985.
[19] Both instrumental variables should be described as weak, as there is no real theoretical framework governing which instruments are appropriate for interpersonal trust (for the discussion, see also Durlauf & Fafchamps, 2005). A proper theoretical framework for instrumental variables still has to be developed.

percent for Norway. Because most of the countries were included in at least two surveys, they used the earliest observation where trust is an independent variable, and the latest

Table 2.1

Previous Empirical Results Between Trust and Economic Growth

Dependent Variable	Growth of GDP per Capita			
Equation	1	2	3	4
Article	Knack & Keefer 1997	Zack & knack 2001	Berggren, et al. 2007	Berggren, et al. 2007
Growth per Capita	80-92	70-92	70-92	90-00
Interpersonal Trust	0.082**	0.063**	0.064**	0.062**
Income	yes	yes	yes	yes
Primary Schooling	yes	no	no	no
Secondary Schooling	yes	no	no	no
Schooling	no	yes	yes	yes
PPP	yes	yes	yes	yes
N	29	41	39	63

yes = variable is included in the growth model; no = variable is not included in the growth model
* 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)

variable where trust is a dependent variable. The author's included nine developing countries taking observations from the third wave of the WVS (1995-97) and three OECD countries. The two OECD countries, Luxembourg and Greece, are taken from the Eurobarometer in the 1980's. The case for New Zealand is taken from a government-sponsored survey in New Zealand patterned after the WVS. The authors' objective was to obtain a representative country sample that was not as "OECD-heavy" (p. 306) as Knack and Keefer's sample. The authors used Barro-type cross-country investment and growth regressions. Their dependent variables was investment share as a percentage of GDP, averaged over the period from 1970 to

1992, and average annual growth in per capita income over the same period. Accordingly, they used data from the Penn World Tables, version 5.6. In addition to trust the authors included 1970 per-capita income, schooling attainment for 1970 from the Barro and Lee dataset (1993), and the price of investment goods for 1970. Depicting the relationship between trust and economic growth, the authors came to the conclusion that a positive relationship exists between trust and growth. They determined that growth rises by nearly one percentage point on average for each 15-percentage point increase in trust (p. 309). Although the authors are aware of the problem of reverse causation, they use trust variables from 1996 for the 1970 period. The authors used the same argument as Knack and Keefer (1997); they state that the extremely high (0.91) correlation between the first and the second wave of the WVS suggests that changes in trust over time are small relative to cross-country variations.

Beugelsdijk, Groot, and Schaik (2004) took a Levine and Renelt article (1992) as a starting point to reevaluate the results of the papers by Knack and Keefer and Zak and Knack. They analysed the statistical robustness of the results of Zak and Knack along four dimensions of robustness. They concentrated on the statistical significance and explored the influence of changing sets of conditioning variables on the estimated effect of trust. Moreover, they analysed the sensitivity of the results for using different proxies or specifications for basic variables like human capital. Finally, they investigated the effects on the significance and effect size when the 29-country sample by Knack and Keefer was extended by 12 in the Zak and Knack paper. Their conclusions reveal that the Zak and Knack results on trust in terms of statistical significance of the estimated coefficients are highly robust. These results are in sharp contrast to those of the Knack and Keefer paper, which are not very robust. They determined that the robustness results obtained in Zak and Knack are to a large extent driven by the inclusion of the two cases of Peru and the Philippines. They conclude that the empirical literature on trust and economic growth seems to be plagued more by data limitations than by econometric problems such as omitted variable biases. 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" (p. 132).

Berggren, Elinder, and Jordahl (2007) conducted an extensive robustness analysis of the relationship between trust and growth by investigating a latter time

period and a larger sample size. In addition to robustness tests that focus on model uncertainty, they systematised the investigation of outlier influence on the results by using the robust estimation technique, Least Trimmed Squares. Furthermore, they used extreme-bound analysis (EBA) to determine how the statistical significance and size distribution of the estimated coefficients of trust are affected by a systematic variation of the control variables. The authors worked with 63 countries using data on trust from the fourth version of the WVS and from the Latinobarometro, as well as new data on growth, to separate time and sample effects. They investigated whether previous results on the trust-growth relationship for the period of 1970 to 1992, studied by Zak and Knack and Beugelsdijk, et al.., also hold for the 1990's. They learned that when outliers are removed (here they mention China, specifically) the trust-growth relationship is only statistically significant (with significance at the 95-percent level) in ten percent of their 1,140 regressions and that it is half as large compared to the results that had been previously reported. The authors emphasise however that their results do "not necessarily mean that trust is unimportant for growth, but its importance seems to be more limited and uncertain than previously claimed" (p. 1).

La Porta and others (1999), using an OLS regression on 39 countries and a cross-section design with a dependent-variable, per-capita GDP growth rate from 1970 to 1993 found a significant positive relationship between trust and economic growth. They concluded that "in sum trust enhances economic performances across countries" (p. 317) and that "despite economist's scepticism...theories of trust hold up remarkably well when tested on a cross-section of countries" (p. 320).

Whiteley (2000) examined the relationship between trust and economic growth in the framework of a modified neoclassical model of economic growth. Using cross-section designs in a 34-country sample, and using the timeframe of 1970 to 1992, 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" (p. 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 to 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.

Working with a postmaterialistic index generated from the WVS, Inglehart showed that postmaterialistic societies have lower economic growth than materialist societies due to the weight of other preferences (1990). Taking GDP per-capita growth from 1960 to 1989 as a dependent variable, he demonstrated that post-materialistic attitudes have a negative effect on economic growth (1997, 231).

These empirical studies involve a critical and important step in focusing on the concept of trust when reflecting upon economic growth. Their cross-section design strongly supports the hypothesis that trust is relevant to economic growth. Nevertheless, they all 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. Furthermore, using a fixed-effects model provides two advantages. Firstly, unobserved heterogeneity can be controlled for. Secondly, the problem that the interpretation of the trust items differs across countries can be addressed.

2.   The Welfare State and Social Capital

Most research which has been done concerning the crowding-out hypothesis has dealt with cross-sectional evidence or longitudinal data for specific case studies.

In longitudinal studies, Putnam determined that social capital is declining in the US (1995, 2000). He mentions that interpersonal trust declined, voter-turnout decreased, classical associations lost members, union membership declined, parent-teacher associations (PTAs) suffered declining membership, and citizens were no longer as engaged in local political and communal activities as they once were. Likewise, fraternal organisation membership declined during the 1980's and 1990's. In 2000 Putnam demonstrated that social capital, constructed as an index consisting of 14 separate indicators (one being interpersonal trust), is declining in the US. He

used longitudinal data from a wide range of surveys and warned of an erosion of civicness and a decrease in the levels of social capital.

Pamela Paxton (1999) attempted to test Putnam's hypothesis. She created an social capital index consisiting of 14 items taking longitudinal data over a period of 20 years from the General Social Survey (GSS). To operationalise trust, she mixed indicators of interpersonal trust and systemic trust. For the operationalisation of associations, she mixed membership and informal socialising. She determined that while there was a decline in trust in individuals and the social capital index, no general decline in trust in institutions and no decline in associations could be observed.

Kumlin and Rothstein (2005) ascertained that welfare state institutions have the capacity to destroy and to create social capital. Their empirical analysis, based on Swedish survey data, suggested that the specific design of welfare-state policies influences the production of social capital. Furthermore, they learned that experience with universal institutions tends to build trust.

Doing a longitudinal study, using time-series data and pooled cross-sectional survey data in Sweden, Rothstein (2001) found out that social trust, political engagement, and the participation in voluntary organisations actually increased with the development of the welfare state. Hall (1999), taking the same data for Britain, found out that there has been no erosion of social participation in Britain, although he detected a decline in social trust. Taking the same variables as Rothstein and Hall, Freitag (2001) found no decline in social capital in Switzerland.

Scheepers, et al. (2003), used a cross-sectional design to study the crowding-out hypothesis. Their sample was drawn from the Eurobarometer. They concluded that people living in social democratic regimes tend to have the least amount of social contact, whereas people living in the Latin rim have the greatest degree of social contact.

Van Oorschot and Arts (2005) found only weak evidence in favour of the crowding-out hypothesis. They used an eight-scale measurement model of social capital in order to capture its three basic dimensions of networks, norms, and trust. They explored the relationship between welfare state mechanisms and social capital at both country and individual level. They controlled for confounding factors that may be related to social capital. At the aggregate level they found no evidence at all

in favour of the hypothesis, but rather determined "that there is a tendency for social capital levels to be somewhat higher in more developed welfare states, especially regarding trust and active participation" (p. 16). At the individual level, they find out that it is relevant to people's social capital in which type of welfare state they live and how comprehensive the welfare state programmes are.

Delhey and Newton (2005) employed UN data to examine cross-national patterns of social trust. Their research brings together a variety of economic and political factors with social and cultural factors, ethnic fractionalisation, and religion, (specifically, traditions of protestantism). They concluded that "high trust countries are characterised by ethnic homogeneity, Protestant religious traditions, good government, wealth (gross domestic product per capita), and income equality" (p. 311).

Knack and Keefer (1997) investigated the channels through which trust might affect economic outcomes. They noted that trust and civic norms are stronger in nations with higher and more equal incomes, with institutions that restrain predatory actions of chief executives, and with better-educated and ethically homogeneous populations. They found no effect between formal groups and interpersonal trust but did find however a positive effect between Olson groups and no effect between Putnam groups.

Cross-country studies, in particular, involve a critical and important step in focusing on the relationship between the welfare state and social capital. Their cross-section design supports the hypothesis that welfare-state mechanisms affect the creation of social capital, as well as the creation of interpersonal trust (see here especially van Oorschot & Arts, 2005). Van Oorschot and Arts (2005) argue that the strongest test for the crowding-out hypothesis would need time-series and panel data for a great number of welfare states. They continue to say that "such data is not available" (p. 7). However, the authors are just partly correct. On an aggregated level, using the nation as the observation unit, it is possible to use the different waves of the WVS and the Eurobarometer 25 to generate panel data for the social capital and interpersonal trust variables. For policy decision making, an analysis of the effect of changes in social expenditure on social capital and especially interpersonal trust is relevant.

3.   Human Capital, Social Capital, and Economic Growth

Although it is not generally accepted that human capital is the most important factor in explaining international variations in economic growth, empirical growth studies usually include the paradigm of human capital. The main theoretical reason for this is that the predicted rate of convergence in the classical Solow-Swan model is not in accordance with the empirical evidence. Working with a broad concept of capital that includes human capital (Barro & Sala-i-Martin, 2004, p. 60), the observed convergence can be explained. Mankiw, Romer, and Weil (1992) show that an augmented Solow growth model accounts for approximately eighty percent of the international variance in economic growth. Their result, that human capital is an important factor when accounting for growth rates of GDP per capita, has often been replicated, as well as questioned. Temple (2001) concludes that "the aggregate evidence on education and growth for large samples of countries continues to be clouded with uncertainty" (p. 916). Empirical evidence can be classified into three groups, results that find: i) a positive relationship (Barro, 1991; Barro & Sala-i-Marin, 2004; Krueger & Lindhal, 2001; Deutsche Bank, 2005), ii) no relationship at all[20] (Pritchett, 2001), and iii) even a reversed causality between human capital and economic growth (Vale, 2006). Most studies use a cross-section design. Some use a panel approach (Islam, 1995; Caselli et al., 1996; Barro & Lee, 1997). Only a few studies explicitly focus on the OECD[21].

Between human capital and social capital there is an important theoretical connection. In his seminal paper, Coleman (1988) argues that social capital is an important factor for explaining educational outcomes. He differentiates between two sources of social capital, the family and the community. The familial background consists of three factors: i) a financial transfer (income of the parents), ii) an

---

[20]Pritchett claims that although most African countries have done a rather good job of raising the overall level of education, no significant growth benefits were registered as a result. In a cross-national study, he shows that there is no association between increases in human capital attributable to the rising educational attainment of the labour force and the rate of growth of per-worker output. Pritchett offers three perspectives as to why this could be. First, the institutional government environment could have been sufficiently perverted that the educational capital lowered economic growth. Second, marginal returns to education could have fallen as the supply of educated labour expanded while demand remained stagnant. Third, educational quality could have been so low that years of schooling still created no human capital.

[21]For a broad discussion of empirical findings, see Vale (2006), Baici and Casalone (2006), and Djistera (2006).

educational transfer (human capital of the parents), and iii) the social capital within the relationship between the parents and the child. The final source, social capital within the relationship between the parents and the child, stands for the parents' physical presence, the hours spent with the child, and the attention the child gets from his parents. Social capital is crucial when explaining the high school drop-out rate. The drop-out rate increases with less parental physical presence (Coleman mentions for instance the single-parent family) and less attention. Teachman, et al., (1997) show that social capital is essential for educational outcomes. Hauser, et al., (2007) argue that stocks of social capital positively affect regional innovation processes and that the dimension of associational activity strongly influences patenting activity. According to Whiteley (2000), in a society in which trust is low, educational investment may not work effectively (p. 451). The OECD report, *The Well-Being of Nations—The Role of Human and Social Capital* (2001), stresses that both paradigms, human and social capital, have no direct effect on economic growth but might have some indirect effect on variables of technological change and investment[22]. Knack and Keefer (1997) come to the conclusion that trust is stronger in nations with better-educated populations (p. 1251). Knack and Zak (2002) argue that trust can be raised by increasing education. Social and human capital is analysed by Putnam on a macro-level. Examining the different US states, he shows in his book, *Bowling alone* (Putnam, 2000), that there is a high correlation between his social capital index and educational outcomes[23]. Putnam concludes that "the level of social trust in a state and the frequency with which people connected informally with one another are closely correlated to educational performance" (p. 300).

As analysed in section 2 in Chapter I, above, the most important theoretical and empirical dimension of social capital is interpersonal trust. Trust, one could say, is a critical and quite reliable factor to consider when trying to measure social capital. But there is of course more behind social capital than trust. It is a multidimensional

---

[22]For a theoretical discussion of the relationship between social capital, human capital, and growth, see Piazza-Georgi (2002).

[23] When talking about educational outcomes, Putnam mentions students' scores on standardised tests taken in elementary school, junior high school, and high school, as well as the school drop-out rate. He states that this relationship between social capital and educational outcome persists even after accounting for racial composition, affluence, economic inequality, adult educational levels, poverty rates, educational spending, teachers' salaries, class size, family structure, religious affiliation, and the size of the private-school sector (pp. 299, 300).

concept, which has at least three theoretical dimensions: interpersonal trust, norms of reciprocity, and civic associations. Some researchers therefore believe that social capital cannot be measured by a single indicator alone, but that social capital must be viewed as a multidimensional concept. Accordingly, Serageldin and Grootaert (1999) propose to create an index to measure social capital (p. 55). Pamela Paxton (1999, 2002) works with social capital indices to examine the relationship between social capital and democracy. Putnam (1993) shows that there is a positive relationship between stocks of different dimensions of social capital and the economic performance in Italy. Putnam and Heliwell (1999) show that a social capital index consisting of a "Civic Community" index, an "Institutional Performance" index, and a "Citizen Satisfaction" index is positively related to economic growth. The convergence in Italian regions is faster in those regions with more social capital.

Sabatini (2007) strengthens Putnam's analysis; he works with a multidimensional social capital index in the case of Italy and shows that there is a positive relationship between social capital and economic development. Knack and Keefer (1997) noted that an index of norms of reciprocity is positively related to economic growth. Putnam (2000) works with a social capital index that consists of five dimensions (measures of community organisational life, measures of engagement in public affairs, measures of community volunteerism, measures of informal sociability, and measures of social trust) with a total of 14 indicators (p. 291). His social capital index is highly correlated with educational outcome, health, happiness, and democracy.

Authors working with a social capital index work with cross-sectional data but not panel data. Working with panel data with the different dimensions of social capital provides the opportunity to analyse the effect of changes in social expenditure on economic growth.

Chapter III   Trust and Economic Growth

> That nonprofit motives have a role in the success of capitalism is not a new point, even though the wealth of historical evidence and conceptual arguments   in   that direction is often neglected in contemporary professional economics. (Sen, 1999, p. 264)

1.   Operationalisation, Model Specification, Data and Case Selection

1.1   Operationalisation

The World Value Survey presents only limited data on trust. The trust variable is constructed, as it is usually agreed upon by scholars from various disciplines (Inglehart, 1990,1999; Knack & Keefer, 1997; Paxton, 1999, 2002; Uslaner, 1999; Alesina & La Ferrara, 2000; Putnam, 2000; Whiteley, 2000; Zak & Knack, 2001; van Oorschot & Arts, 2005; Delhey & Newton, 2005), by aggregating the answer, "Most people can be trusted."[24] (after deleting the "Don't know." answers[25]) 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?" (WVS, 1999-2002)[26]. It is thereby possible to compare the stock of trust in different nations, from developed to developing, with transition states. The stock of trust varies from 2.6 percent in Brazil (26 out of 1,000 respondents answered, "Most people can be trusted." (WVS, 1995-1997) to 66.5 percent (665 out of 1,000 respondents answered "Most people can be trusted." in Denmark (WVS, 1999-2002). There are various critiques of this operationalisation[27].

---

[24]In the Eurobaromter 25, the answer is "Most people could be trusted".

[25]When aggregating the interpersonal trust item and taking the dataset with the ICSPR study number 2790 (Inglehart, 2000), the values for 1981 to 1984 and 1990 to 1993 are automatically computed without the "Don't know." answers. The 1995-1997 values however are computed without and with the "Don't know" answers. One therefore has to be very careful when generating the levels of interpersonal trust with the third wave of the WVS (1995-1997). Most of the cases must be newly computed. In Sweden for instance, 10 percent of the population answered with "Don't know".

[26]The ending of the question is slightly different in the first three waves of the WVS and the Eurobarometer 25: "[One] cant be too careful in dealing with people." (WVS, 1981-84; WVS, 1990-93; WVS, 1995-97) and "[One] could not be too careful in dealing with people." (Eurobarometer 25).

[27]This approach is criticised by referring to the non-comparability of the different cultural backgrounds of the countries that participate in the WVS. 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, this criticism must be disregarded when comparing different cultures, in so far as intercultural comparison would otherwise be made impossible. I therefore have to be pragmatic in using the data which is available. Furthermore recent research provides evidence that

1.2   Model Specification

To be able to compare these results with previous empirical work conducted on the relationship between trust and economic growth, 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) was used. Furthermore, a version of this type of growth model was used by Forbes (2000) when analysing the relationship between inequality and economic growth in a panel setting from 1965 to 1995.

In the baseline model, economic growth is estimated as a function of the natural logarithm of initial income, the price level of investment[28], human capital, and interpersonal and systemic trust[29]. An estimate of an unbalanced panel was made. The baseline growth model for the fixed-effects estimation is modelled as follows (see Greene, 2003, p. 285; Kohler & Kreuter, 2001, pp. 238, ff.):

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

individuals from the different countries did interpret the question from the WVS in similar ways (Paxton, 2002, p. 261) and that the trust data is valid and of high quality as it has a high correlates to a natural experiment done by the *Readers Digest* (Knack & Keefer, 1997, p. 1257). Glaeser (2000) doubts that the item measures trusting behaviour, and believes that it measures the overall level of trustworthiness in a society. Jagodzinski and Manabe (2005) state that the item does not measure trust but misanthropy, instead, and it was taken as an index of misanthropy by Rosenberg. Sobel (2002, p. 151), Portes (2000, pp. 4 ff.) and Durlauf and Fafchamps (2005) criticise the method of aggregation. For them social trust should more accurately measured on a micro- and meso-level. Furthermore, Knowles (2005), argues that there are problems with the coverage and the sample representativeness of each nation (p. 16). Inglehart (Coodbook in Inglehart 2000) points out that data in developing countries are not fully representative of 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.

[28]This variable is frequently utilised 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 affects the cost of investment, such as tariffs, government regulations, corruption, and the cost of foreign exchange (Forbes, 2000, p. 873). For further description, see Barro (1991, p. 433).

[29] Factors other than social capital examined in this context include the rule of law, democracy, ethnic fractionalisation, gender inequality, the fertility rate, the government consumption ratio, the terms of trade, the inflation rate, indicators of political stability, etc. (Barro, 1991; Klasen, 2002; Barro & Sala-i-Martin, 2004).

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

1.3   Data

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

- The data on the 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, are drawn from the Penn World Tables 6.1 (Heston, et al., 2002)[30]. The variables were constructed by using lagged variables (1979, 1984, 1989, 1994, and 1999) to reduce the problem of endogeneity.
- The data on interpersonal trust and systemic trust are drawn from four waves of the WVS[31] 1981-1984[32], 1990-1993[33], 1995-1997[34], and

[30] 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.

[31] The WVS 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.

[32] The data for Argentina were 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 were weighted using original weight (v236). As no known researcher has ever mentioned whether or not weights were taken, the values here have been computed for the first wave of the WVS (1981-84) with and without weighting. When taking no weights, the US would have an interpersonal trust value of 40.5 instead of 45.4 as reported in Knack and Keefer (1997, p. 1,284). For a better comparison of these results, weights were taken. 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, p. 52 in Inglehart, 2000). In contrast, Delhey and Newton (2005) compute most of their interpersonal trust without weighting the data (p. 315).

[33] The data for Romania were taken from 1993. The data for Slovenia were taken from 1992. The data for Argentina and Brazil were taken from 1991. The trust data were weighted by using original weight (v236). The data can be ordered from the ICPSR (Inglehart, 2000).

[34] The data for Britain were taken from 1998. The data for Brazil, Bulgaria, Poland and West Germany were taken from 1997. The data for Bangladesh, Chile, Finland, Norway, the Philippines, South

- 1999-2002[35] and the Eurobarometer 25[36], providing data for 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[37]. Data were taken for 1980, 1985, 1990, 1995, and 2000.

- Data on welfare efforts 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)[38].

- Data on income inequality are based on the UN-database, WIDER. Only data originally drawn from the Luxembourg Income Study (LIS) are taken.

- Data on membership in trade unions are derived from the International Labor Organisation and were sent to the author upon request.

1.4   Case Selection

Lijphart (1971, 1975) argues that a researcher should be interested in generating general claims with universalistic character. This approach can best be tackled by the statistical method. To be able to use the statistical method at the level of the nation (One Case—One Nation Approach) however, the researcher should try to extend the amount of cases as far as possible. In addition to the geographical extension, the researcher should include historical data to increase the amount of his cases. Due to the restriction in the interpersonal and systemic trust value for these purposes, the country sample in this section consists of 41 countries[39] (A list of all countries

Africa, South Korea, Sweden, Switzerland, Turkey, and Venezuela were taken from 1996. The data were 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 larger, and in South Africa, around nine times larger than the sample without applying weights. 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 18.2. However, as the sample sizes are proportional to each other, for better cross-country comparison, values which were weighted by v236 were used. Regardless, differences in the values do not influence econometric results. In most cases, the "Don't know." answers had to be deleted.

[35]The data for Bangladesh were taken from 2002. The data from study number 3975 can be ordered from the ICPSR (European Values Study Group and World Values Survey Association, 2004). The data were weighted by taking the variable s017.

[36]The trust data were weighted by using European Weights. The data can be ordered from the Zentralarchiv (ZA) in Cologne (Rabier, Riffault, & Inglehart, 1988).

[37]The data can be drawn from http://www.cid.harvard.edu.

[38]Those statistics are available over the internet from http:www.oecd.org/statistics. The social expenditure data are given for a range of 30 OECD countries.

[39] A list of included countries is given in Table 3.1. The following countries are excluded due to data restrictions regarding the human capital aspect, the following countries were excluded: Armenia,

included is given in Table 3.1). The observations were made over the time period from 1980 to 2004 providing five time periods with a total of 129 cases for the analysis. Figure A7 gives an overview of the country clusters and regime typologies used in the analysis.

The G7 countries are included in the sample. Twenty-seven out of 30 OECD countries[40] and 14 out of 15 EU-15 countries[41] are included. In addition to the 27 OECD countries, the three transitional and recent EU-27 member states, Bulgaria, Romania and Slovenia are also included here. Furthermore, the two emerging economies China and India, a five-country sample from Latin America including the countries Argentina, Brazil, Chile, Peru, and Venezuela[42], one African country (South Africa), and three countries from Asia (Bangladesh, Pakistan, and the Philippines) are included.

The following country clusters or regime typologies are used. Differentiation will be made between a sample consisting of transition countries, OECD, OECD-23, and EU-15 countries, developing countries, Latin American countries, Liberal Market Economies, and Scandinavian countries. Transition countries, particularly, 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, the Slovak Republic, and Slovenia, were characterised by a rapid decline in economic growth rates (growth rate from 1990-1994) and strong increase in economic growth rates starting from the mid 1990's (1995-1999). Hence the OECD-country sample, which includes the three transition countries Slovak Republic, Poland, and Hungary, as well as Iceland, must be differentiated from a sample of OECD-23 countries as the data for the three

Azerbaijan, Bosnia-Herzegovina, Belarus, Estonia, Georgia, Latvia, Lithuania, Macedonia, Moldavia, Montenegro, Nigeria, Puerto Rico, Russia, Serbia, Tambov, and the Ukraine. The countries Croatia and the Czech Republic were excluded due to data restrictions from the Penn World Tables 6.1.

[40] Twenty-seven out of 30 OECD countries have been included. They are Austria, Australia, Belgium, Canada, Denmark, France, Finland, Germany, Greece, Hungary, Italy, Ireland, Iceland, Japan, Mexico, the Netherlands, Norway, Portugal, Poland, the Slovak Republic, Spain, Sweden, South-Korea, Switzerland, Turkey, the United Kingdom, and the US. Luxembourg, the Czech Republic and New Zealand had to be excluded due to data restrictions.

[41] Fourteen out 15 EU-15 countries have been included. They are Austria, Belgium, Denmark, France, Finland, Germany, Greece, Italy, Ireland, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. Only Luxembourg had to be excluded.

[42] The relationship between trust and economic growth has to be evaluated very carefully in the case of Venezuela, as it is the fifth largest exporter of oil and its economy heavily depends on the world market price of oil, that is to say the growth of the GDP per capita is heavily dependent on the oil price. This is the reason why Mankiw, Romer, and Weil (1992) only include "Non-Oil" countries in their country sample.

transition countries are difficult to interpret. Iceland is a case which is most often excluded in cross-country investigations due to the size of its economy. In addition, EU-15 countries should be treated separately from OECD countries for several reasons. On the one hand, the EU-15 countries are characterised by integration into a single market allowing free trade and free movement of persons, services, and capital. On the other hand, the EU-15 countries are said to have a specific European social model (Giddens, 2006a, 2006b; Kaelble, 2004; Aust, et al., 2000) placing them in strong contrast to countries from the OECD.

As explained above, this section differentiates between developing and developed countries[43]. Developing countries include the following eleven countries: Argentina, Brazil, Chile, Peru, Venezuela, Bangladesh, the Philippines, Pakistan, India, China and South Africa. In addition, consideration is given here to regime typologies taken from Hall and Soskice's (2001) and Esping-Andersen's (1990) argumentation. In their book, *Varieties of Capitalism,* Hall and Soskice (2001) differentiate between three kinds of regime typologies: Liberal Market Economies (LMEs), Coordinated Market Economies (CMEs), and Mediterranean. Nations with liberal market economies tend to rely on markets to coordinate endeavors in both the financial and industrial-relation systems, while those with coordinated market economies tend to have institutions in both spheres that reflect higher levels of non-market coordination. The third type of capitalism is described as Mediterranean and is marked by a large agrarian sector and recent history of extensive state intervention that have left them with specific kinds of capacities from non-market coordination in the sphere of corporate finance but more liberal arrangements in the sphere of labor relations (pp. 20, 21). LMEs include the following five countries: the UK, the US, Canada, Australia, and Ireland. Esping-Andersen (1990) distinguishes in his book, *The Three Worlds of Welfare Capitalism,* three welfare models: conservative-corporatistic, liberal, and social-democratic. These models differ in the type of de-commodification and the manner in which social policies form social stratification, as well as in the relationship between state, markets, and family. According to this division, the conservative corporatistic model represents an example for the cases of Germany and France, the liberal model is representative of an example for the US, and the social-democratic model is representative for the Scandinavian states. When

---

[43]It can even be doubted if it is logically correct to include developed and developing countries into one country sample (OECD, 2001, p. 29).

36

discussing the Scandinavian countries, reference is made to the four countries Finland, Sweden, Norway, and Denmark.

2.   Descriptive Statistics

2.1   Interpersonal Trust

Table 3.1 lists all interpersonal trust values for the included country observations in the dataset. In the first period (WVS, 1980-1983), 22 observations are used. The mean value of trust is 39.9 percent with a standard deviation of 12. Mexico has the lowest trust value of 17.7 and Norway, the highest of 61.2. In the second period (1986), data from the Eurobarometer 25 are used. The Eurobarometer only has observations on 11 countries in the European Union. As only the importance of OECD and EU-15 countries is stressed here, the inclusion[44] of data on the eleven countries from 1986 was pragmatic. The mean value of trust is 38.6 percent with a standard deviation of 12.3. The lowest is 21.3 (France) and the highest is 63.5 (Denmark). In the third period (1990-1993), 32 observations are included. The mean value for trust is 37.4, with a standard deviation of 15.8. The values range from 6.7 (Brazil) to 66.1 (Sweden). In the fourth period (WVS, 1995-1997), the interpersonal trust data were drawn from 27 countries. The mean value is 28.9 percent with a standard deviation of 16.7. The lowest value is 2,.8 (Brazil), the highest is 65.3 (Norway). In the last period (WVS, 1999-2002), 37 countries of the 41-country sample are included. The mean value is 30.1 percent with a standard deviation of 15.7. Values range from 8.4 (the Philippines) to 66.5 (Denmark). From Table 3.3, which reports the final dataset with means, standard deviations, and ranges for each of the variables, it can inferred that levels of interpersonal trust

---

[44] This inclusion aided in the use of data from 1981 and therefore allowed the analysis of the relationship between trust and growth for a 25-year time period to be made.

Table 3.1

Levels of Interpersonal Trust

Country	Trust 81	Trust 86**	Trust 90	Trust 95	Trust 99
Argentina	27	-	23.3	17.5	15.4
Australia	47.8	-	-	39.9	-
*Austria**	-	-	31.8	-	33.9
Bangladesh	-	-	-	20.9	23.5
*Belgium**	30.2	29.5	33.2	-	30.7
Brazil	-	-	6.7	2.8	-
*Britain**	44.4	39.7	43.6	31	29.7
Bulgaria	-	-	-	28.6	26.9
Canada	49.6	-	52.4	-	38.8
Chile	-	-	22.7	21.9	22.8
China	-	-	60.1	52.3	54.5
*Denmark**	56	63.5	57.7	-	66.5
*Finland**	57.2	-	62.7	47.6	58
*France**	24.8	21.3	22.8	-	22.2
*Germany**	29.8	43.4	37.8	41.8	34.8***
*Greece**	-	50	-	-	23.7
Hungary	33.1	-	24.6	-	21.8
Iceland	41.6	-	43.6	-	41.1
India	-	-	34.3	37.9	41
*Ireland**	40.2	33.3	47.4	-	35.2
*Italy**	26.3	30.3	35.3	-	32.6
Japan	40.8	-	41.7	46	43.1
Mexico	17.7	-	33.5	28	21.3
*Netherlands**	46.2	50.2	55.8	-	59.8
Norway	61.2	-	65.1	65.3	-
Pakistan	-	-	-	20.6	30.8
Peru	-	-	-	5.0	10.7
Philippines	-	-	-	5.5	8.4
Poland	-	-	34.5	17.9	18.9
*Portugal**	-	28.4	21.4	-	10
Romania	-	-	16.1	-	10.1
Slovak Rep.	-	-	23	-	15.7
Slovenia	-	-	-	15.5	21.7
South Africa	29	-	28.3	18.2	11.8
South Korea	38	-	34.2	30.3	27.3
*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
United States	45.4	-	50	35.6	35.8
Venezuela	-	-	-	13.7	15.9
Observations	22	11	32	27	37
Average	39.9	38.6	37.4	28.9	30.1

Note: **The trust data from 1986 were taken from the Eurobarometer 25. ***Trust data for Germany were taken from West Germany in 1981, 1986, 1990, and 1995. The data from 1999 were taken from unified Germany. Countries in italics represent OECD Countries. Countries marked with an asterisk are from the EU-15.

range from 2.8 percent in Brazil[45] in Period 4 (1995-1997) to 66.5 percent in Denmark in Period 5 (1999-2002).

At first sight one can recognize that trust values in the liberal market economies, the US, the UK, Ireland, Australia, and Canada, have strongly decreased over time and stabilised themselves at substantially lower levels. Taking the values from 1981 to 1999, the US levels of trust declined from 45.4 to 35.8, the United Kingdom's from 44.4 to 29.7 percent, Ireland's from 40.2 to 35.2, Canada's from 49.6 to 38.8, and Australia's level of trust declined from 47.8 to 39.9 percentage points.

The opposite trend can inferred from the three post-fascist countries and current G7 members Germany, Japan, and Italy. Italy's level of trust increased from 26.3 percent in Period 1 (1981-1984) to 32.6 percent in Period 5 (1999-2002). Germany's level increased from 29.8 percent to 39.9 in 1995 and declined due to data for a reunified Germany to 34.8 percent. The actual increase for West Germany should therefore exceed 39.9 percent. Japan's level of trust increased slightly from 40.8 percent to 43.1 percent. Considering longitudinal data from within the German case presents an even clearer picture (Noelle, 2005). The Germans' level of interpersonal trust increased steadily from the beginning of Germany's democracy after World War II. The trust value increased from 13 percent in the 1950's to 45 percent in the year 2005.

A third trend can be observed in the four Scandinavian states. Although already being high-trust countries in the 1980's, the Scandinavian countries all increased their levels of trust from 1981 to 2002[46]. Denmark's level of trust increased by 10.5 percent, Sweden's by 9.2 percent, Norway's by 4.2, and Finland's by 0.8 percent.

The countries in Latin America behaved in a somewhat ambivalent fashion. On one hand, there are the two low-trust countries—Brazil and Peru—with three out of four values under ten percent. On the other hand, it can be determined that the

---

[45]This level of trust is amazingly low. On first impression, however, the Codebooks reveal that the data should be valid. The fieldwork was conducted by the Instituto Gallup de Opiniao in Fall 1997 with N = 1.149. That same institute already did the fieldwork in the 1990's. Theoretically, Brazil, being next to China and India, one of the big three emerging markets, should have a major problem attaining stable economic development if they cannot increase their level of interpersonal trust.

[46]The Scandinavian countries have to be characterised as high-trust countries. In 14 out of 15 observation more than half of the Scandinavian people claimed to trust other people. Eight out 15 times the value is over 60 percent. Only once did the trust value decline—to 47.6 percent in Finland in Period 4 (1995-97).

moderate-trust society of Chile has values all near 22[47]. Peru increases its level of trust from 5.0 to 10.7, whereas Argentina's level of trust declines from 23.3 to 15.4. The trend in transition countries can best be described as a process of decreasing levels of trust. Poland, Hungary, the Slovak Republic, Romania, and Bulgaria face decreased trust levels. Only Slovenia's trust level increased.

Portugal and Greece face substantial losses in the level of interpersonal trust. The Netherlands in contrast steadily increase their level of trust from 46.2 percent in Period 1 to 59.8 percent in Period 5. India also steadily increases its level of

Figure 3.1

Average Levels of Trust for Selected Countries and Regime Typologies
from 1981 to 2002
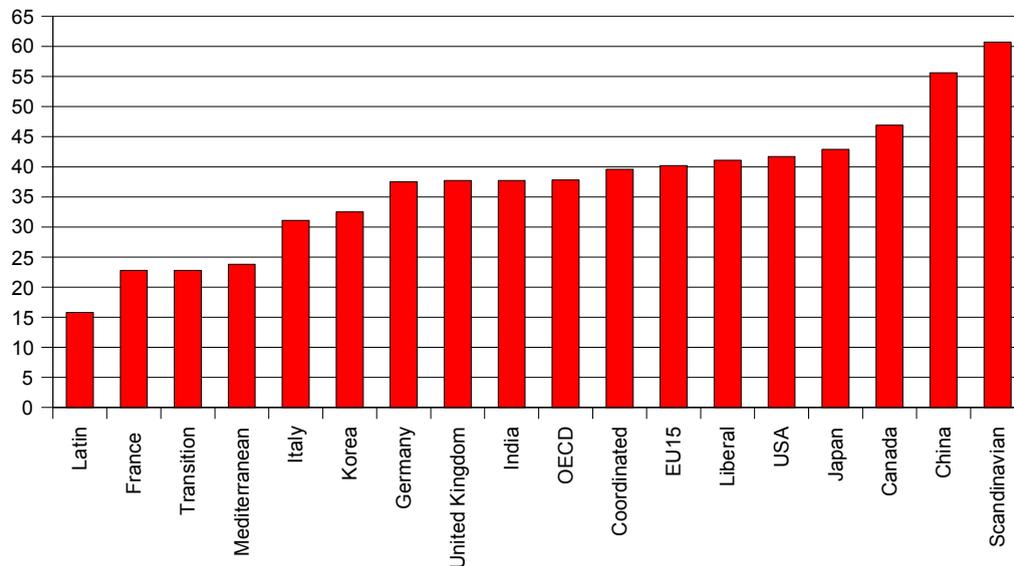
interpersonal trust, while South Africa loses around two-thirds of its former level of trust (from 28.3 to 11.8). Finally, mention must be made of the astonishingly high levels of trust in China. China has three exceptional values ranging from 52.3 percent in Period 4 (1995-1997) to 60.1 percent in period 3 (1990-1993)[48].

---

[47]The level of trust is thus as high as in France which indicates a stable trust level of around 22 to 24 percent. It is important to mention however that France has the lowest level of trust out of the G7 countries.

[48]For the 1990's it is argued that among users of the WVS, there is an oral tradition that the Chinese survey had some serious problems of reliability and validity (Whiteley, 2000, p. 464). One could also argue however that an authoritarian state like China that has managed to maintain power for decades has managed to evoke a forced solidarity between its people. China is the only country next to the four Scandinavian countries that has a value of over 60 percent. Thus one should speak about the authoritarian state of China as a high-trust society. This result is highly problematic given the

The bar chart in Figure 3.1 assists visualisation of the variance in the distribution of the interpersonal trust data when averaged over five time periods for the regime typologies Liberal, Coordinated, Transition, Scandinavian, Mediterranean, Latin American, OECD, and EU-15 countries. Once again the figure makes clear that the Scandinavian countries exhibit the highest amount of trust; countries from Latin America the lowest. Transition countries have the second lowest levels of trust, directly followed by the sample of Mediterranean countries. Citizens of Coordinated, Liberal, OECD, and EU-15 countries have about the equal levels of trust, around 40 percent.

2.2   Economic Growth

Table 3.2 lists all economic growth values for the included country observations in the dataset. The data ranges from -5.07 in the Slovak Republic from 1990 to 1994 (in the middle of the transformation process) to 11.38 percent in China. The mean value of the growth rate of GDP per capita in the first period (1980-1984) is 1.6 percent with a standard deviation of 1.6. The minimum growth is -1.64 in Argentina and the maximum growth is 6.65 percent in South Korea. The mean value for growth of GDP per capita in the second period (1985-1989) is 3.0 with a standard deviation of 1.3. The minimum value is 1.17 for Greece and the maximum value is 5.12 for Portugal. Spain and Ireland both have high growth rates with 4,38 and 4,36 percent. In the third period (1990-94) the mean value for growth is 1.13 with a standard deviation of 3.21. The minimum is -5.07 for Slovak Republic and the

---

relationship between democracy and trust (Paxton, 2002), as Paxton argues that high levels of trust and democracy go hand in hand. On the one hand, it could be argued that the data from China are not valid, although after investigating the codebooks there seem to be no irregularities which could explain the fact that China has a trust value of over 60 percent. The surveys in China have been investigated by different research institutions   In China the principal investigators for the 1990's were the China Statistical Information Center (Beijing). The overall population is N=1000. The principal investigators were Jiang Xinrong, Xiang Zongde, and Ronald Inglehart. In 1995 the overall population was N = 1500. The survey was conducted by Gallup China (Beijing). The principal investigators were Max Larsen and Michael Guo. In 1999 the survey was conducted by the Research Center for Contemporary China at the Peking University with N = 1000. Regardless, it appears that the results from China should be handled carefully, as they clearly go against common sense. An authoritarian regime should be characterised by low levels of interpersonal trust.

Table 3.2

Economic Growth Rates

Country	Growth 80-84	Growth 85-89	Growth 90-94	Growth 95-99	Growth 00-04
Argentina	-1.64	-	6.74	2.45	0.10
Australia	1.55	-	-	2.87	-
*Austria**	-	-	1.62	-	0.58
Bangladesh	-	-	-	1.88	3.83
*Belgium**	0.81	2.85	0.49	-	1.15
Brazil	-	-	1.02	0.70	-
*Britain**	1.26	3.59	0.73	2.81	1.84
Bulgaria	-	-	-	-2.24	5.56
Canada	1.13	-	0.28	-	1.30
Chile	-	-	6.06	2.21	2.33
China	-	-	11.38	7.52	8.37
*Denmark**	2.01	1.19	1.11	-	0.50
*Finland**	2.45	-	-2.03	3.77	1.88
*France**	1.29	2.35	0.54	-	1.18
*Germany**	1.00	2.48	2.00	1.66	0.52
*Greece**	-	1.17	-	-	4.08
Hungary	3.10	-	-3.32	-	3.97
Iceland	1.55	-	-0.77	-	0.88
India	-	-	2.65	4.33	4.55
*Ireland**	3.17	4.38	2.94	-	3.98
*Italy**	1.5	3.13	0.78	-	0.89
Japan	1.85	-	1.08	0.63	0.63
Mexico	0.15	-	1.63	3.13	-0.10
*Netherlands**	0.23	2.29	0.81	-	0.53
Norway	2.47	-	2.83	3.18	-
Pakistan	-	-	-	0.96	1.52
Peru	-	-	-	0.42	2.53
Philippines	-	-	-	0.69	1.30
Poland	-	-	-0.06	5.14	3.48
*Portugal**	-	5.12	0.72	-	-0.30
Romania	-	-	-3.62	-	7.25
Slovak Rep.	-	-	-5.07	-	4.42
Slovenia	-	-	-	4.62	3.34
South Africa	-0.62	-	-2.78	0.75	2.23
South Korea	6.65	-	6.55	2.73	3.89
*Spain**	0.77	4.36	1.25	3.23	1.41
*Sweden**	2.24	-	-0.43	2.47	1.19
Switzerland	-	-	-0.80	0.35	-
Turkey	-	-	0.44	1.31	2.28
United States	1.85	-	1.41	2.61	1.79
Venezuela	-	-	-	-2.22	-0.58
Observations	22	11	32	27	37
Average	1.6	3.0	1.13	2.15	2.29

Countries in italics represent OECD countries. Countries marked with an asterisk are from the EU-15.

maximum is 11.38 percent for China. As expected after the separation from the USSR the transition countries and EU-27 members Slovak Republic, Hungary, Poland, and Romania all face negative growth rates. Hungary's growth declined by 3.32 percent, Romania's growth declined by 3.62 percent, Poland's growth declined slightly by 0.06 percent, and Bulgaria's growth declined by 2.24 percent (in Period 4). This negative trend is followed by a rapid increase of growth rates from 1995-2004. Poland's economy grew by 5.14, the Slovak Republic's by 4.42 percent (Period 5), Hungary's by 3.97 percent (Period 5), and Slovenia's by 4.62. Astonishingly, Finland's growth decreased by 2.03 percent[49].

Figure 3.2

Economic Growth in Selected Countries from 1980 to 2004
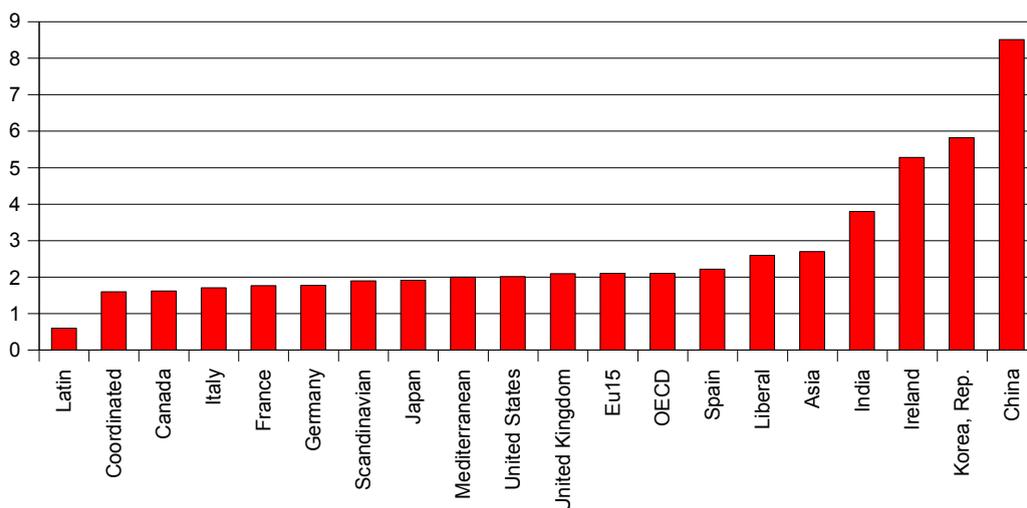
In the fourth period (1995-1999), the mean value for growth is 2.15 percent with a standard deviation of 2.1. The lowest value is -2.24 for Bulgaria and the highest value is 7.52 for China. Finland rapidly recovers by increasing its growth by 3.77 percent. India has the third highest growth rate after Poland and China with 4.33 percent.

In the fifth period (2000-2004), the mean value is 2.29 with a standard deviation of 2.04. The lowest value is -0.58 for Venezuela and the highest value is 8.37 for China. All transition countries grow very rapidly, especially Romania with 7.25 percent. India increased its growth even further to 4.55 percent. Greece has a

---

[49]Finland faced severe strikes in the lumber industry.

remarkable growth rate of 4.08 percent. One fact is obvious from an overview of the figures: China's growth has not been surpassed by any country for the last 15 years.

Figure 3.2 highlights the long-term growth rate between 1980 and 2004 of the G7 states and the four high-growth countries, India, Ireland, South Korea, and China. Several regime typologies are also introduced. Whereas none of the G7 countries were able to reach average growth rates of more than 2.2 percent (Spain has the highest growth rate in the G7 members at 2.2 percent), India has achieved an average growth rate of 3.8 percent, Korea, a growth rate of 5.82 percent, Ireland, a growth rate of 5.28 percent, and China's GDP per capita grew on average a staggering 8.51 percent per year.

2.3   Changes in Trust

Figure 3.3 shows the changes in trust from 1990 to 1995 for the countries for which the data were available for both periods. Figure 3.4 shows the variation coefficient for interpersonal trust for selected countries over all years and Figure A.1. shows the changes in trust for 20 selected OECD countries. In contrast to the consensus that interpersonal trust is a constant variable, formed by the cultural background of a nation (Knack & Keefer, 1997; Zak & Knack, 2001; Knowles, 2005; Delhey & Newton, 2005, p. 314; c.f. Inglehart, 1997, p. 224; Inglehart 1999, p. 95; Noelle 2005, p. 5), Figure 3.4 shows that a variance in trust exists, whereas Figure 3.3 shows that there is a strong decline in trust between years 1990 and 1995[50]. Only Germany[51], Japan, and India have increased their levels of trust. On the other end of

---

[50]Although trust values intercorrelate strongly (comparing every combination of two waves gives values from 0.75 to 0.93), there are still very important changes over time. If the wealthiest nation in 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 in trust must be highlighted and 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 (Noelle, 2005). To emphasis on the US case once more: Inglehart (1999, p. 95) and Uslaner (1999, p. 132) show that there is a decline in interpersonal trust from 58 percent in 1960 to 36 percent in 1994. Paldam (2007), who has worked independently on the analysis of the variance in interpersonal trust, discovers that there exists a great variance in the interpersonal trust data over time.

[51] When observing the German case, pragmatism was necessary. Trust values for 1981, 1986, 1990, and 1995 were taken from West Germany. The trust value for Germany in 1999 was taken for the whole of Germany including West and East Germany. The values for human capital for 1980 and 1985 were taken from West Germany and the values for 1990, 1995, and 2000 were taken from United Germany.

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 most severe losses; Poland loses 16.6 percent, Finland loses 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 3.3

Changes in Trust from 1990 to 1995
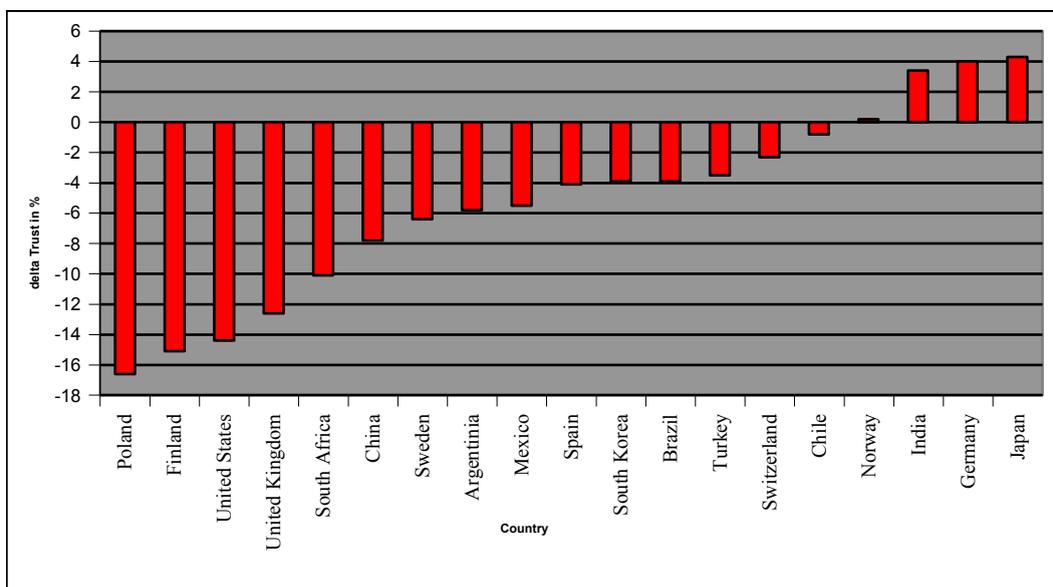
But is there an explanation for such a rapid decline in interpersonal trust? In the case of Poland, one could easily argue that the transformation from socialism to capitalism was accompanied by a severe decline in the overall level of trust. Finland faced a major economic crisis as the economy declined by 2.3 percentage points. The United States' and the United Kingdom's income inequality was growing from 37.2 to 39.1 percentage points in the case of the US and from 32.6 in 1985 to 36.3 in

45

Figure 3.4

Variation Coefficient for Trust for Selected Countries for All Years
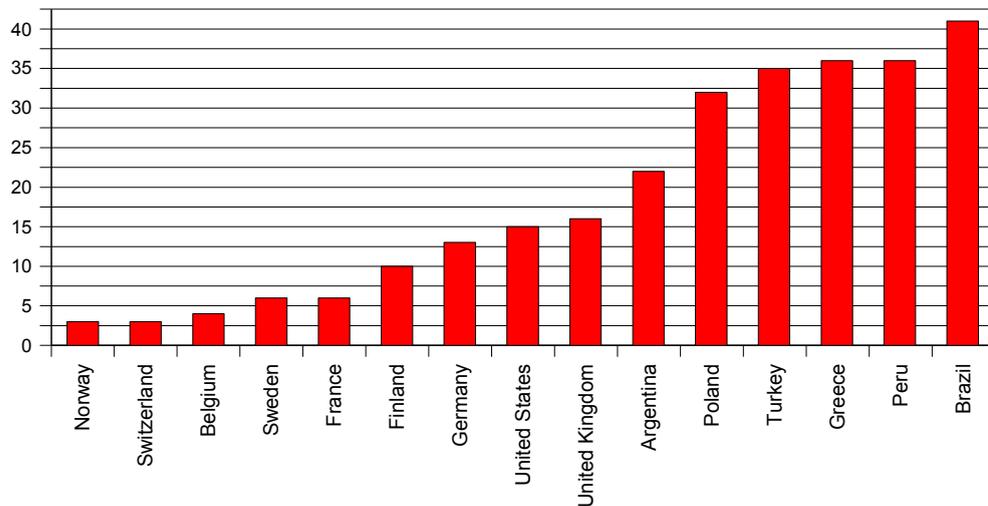
1995 in the case of the United Kingdom. Another ad hoc explanation could be the new political world environment during the 1990's; after the collapse of the USSR and the end of the Cold War the US, and closely following the US, the UK engaged in extended periods of warfare, starting with the first Gulf War. It is possible that a backlash from the war was created affecting the realm of civil society by increasing the overall level of fear and mistrust. Whereas the initiation of war should theoretically create at the outset of the conflict high levels of interpersonal trust as strong patriotism is evoked, the level of interpersonal trust should decline after several years of warfare. This is however merely an ad hoc explanation and empirical proof is required[52].

---

[52]The matter is not as simple as it appears. Common sense dictates that the terrorist act of 9/11 in the US should have had a direct negative effect on interpersonal trust. As was pointed out to the author however by Robert Putnam quite the opposite was found to be true. In the short run, "external attacks have the effect of increasing social solidarity".

2.4   Relationship Between Changes in Trust and Changes in Economic Growth

Figure 3.5 shows the relationship between the changes in trust for the period [1995-1990] and the changes in growth in the period [9599-9094] for all countries ("Before and After" Comparison). The change in the trust level in the US of -14.4 percent is associated with a change in the annual growth for that period of 1.2 percent. In the US, a decline in trust went hand in hand with a rise in annual growth (see also Figure A3). In the United Kingdom, the same picture is replicated. The change in the trust level of -12.2 percent is

Figure 3.5

Scatter Plot Between Δ Trust [1995-1990] and Δ Growth [9599-9094]
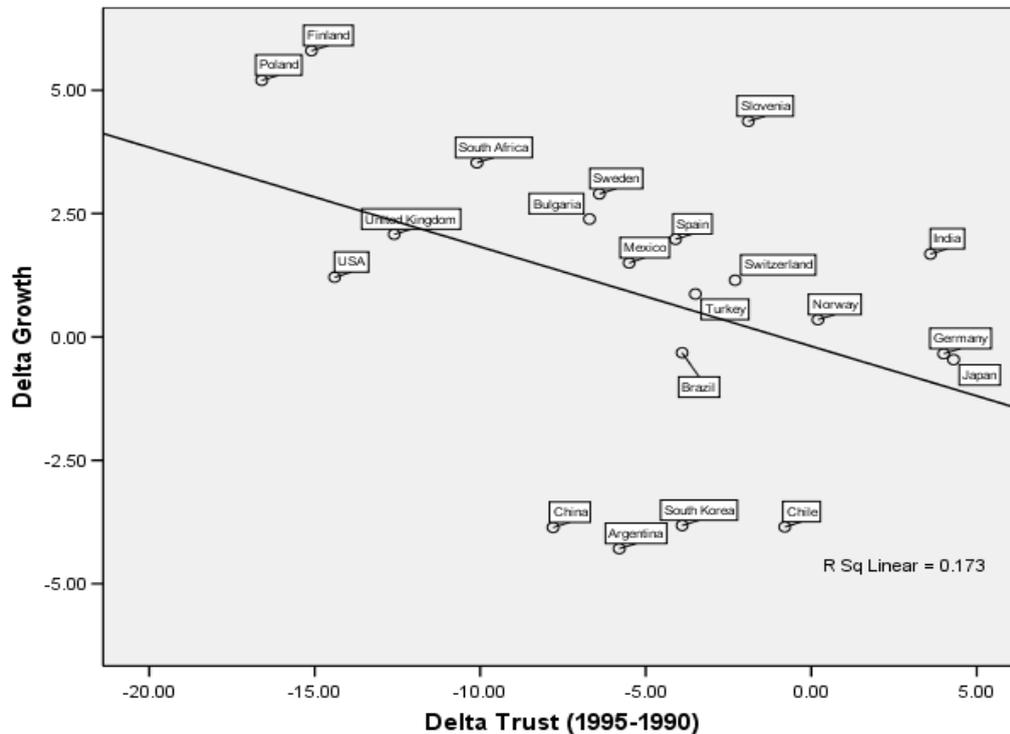
associated with a change in the annual growth rate of 2.08 percent. The Scandinavian countries Finland and Sweden support the findings on the US and the United Kingdom. The decline in trust of -15.1 and -6.4 percentage points corresponds to an increase in the growth rate of 5.8 and 2.9 percentage points. The transition countries Poland and Bulgaria behave in the same manner. In Poland the decline in the trust level of 16.6 is related to the increase of 5.2 percent in annual growth (see also Figure A4). This relationship changes when observing Argentina

47

Table 3. 3

Summary Statistics

Variable	Year	Observations	Mean	Standard Deviation	Minimum	Maximum
Growth	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
Interpersonal	1980	22	39.9	12	17.7	61.2
Trust	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
Income	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
Human Capital	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
Price Level of	1980	22	101.4	24.6	58.6	143.2
Investment	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
Openness	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
Investment	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
Systemic Trust -	1980	22	2.51	0.31	2.09	3.45
Parliament	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

and India. In Argentina, a decline in the level of trust of -5.8 percentage points corresponds to 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 in the annual growth rate of 1.7 (see also Figure A5). In the cases of Argentina and India, there seems to be a positive relationship between trust and economic growth. Taking all countries into consideration, a weak negative relationship exists between delta Trust and delta Growth with an R-Square value 0.173. Considering only OECD countries, the R-Square rises to 0.461.

3 Econometric Analysis

3.1 Cross-Sectional Analysis

Using a cross-section design, an OLS-model[53] is estimated with robust estimators of standard errors for the dataset[54]. For the dependent variable, the average growth rate of GDP per capita for the 15-year period from 1990 to 2004 is used. The country sample consists of 32 countries due to data limitations from the interpersonal trust value in the 1990's. As can be inferred from Table 3.1, 21 countries from the OECD-23 sample are included. There are no data for Australia and Greece. Twenty-five countries are included in the OECD country sample which itself includes the three transition and recent EU-27 members, the Slovak Republic, Hungary, Poland, and Iceland. Besides the 25 OECD observations, Romania, China, and India, as well as the three Latin American countries Argentina, Brazil, and Chile, and the African country, South Africa, are included.

In Regression 1 in Table 3.4, the natural logarithm of income in the year 1990, the average years of schooling as a proxy for the stock of human capital, the price level of investment, the interpersonal trust value are all indicated. The same model has been utilised by Knack and Keefer (1997) and most research which followed their approach (Zak & Knack, 2001). It is therefore possible to compare these results with theirs[55]. All variables used here are stock variables[56]. Interpersonal trust values are all taken from the the second wave of the WVS which was conducted from 1990 to 1993. The variable Human Capital, is applied for the 1990's and the

---

[53]The popularity of an OLS estimation derives in part of its theoretical advantages given ideal data. If errors are normally, independently, and identically distributed (normal i.i.d.), then OLS is more efficient than any other unbiased estimator (Hamilton, 2006, p. 239).

[54]Testing for heteroskedasticity which tests the assumption of constant error variance by examining whether squared standardised residuals are linearly related to ŷ (Hamilton, 2006, p. 199) yields a significant heteroskedasticity ($\chi^2 (1) = 4.18$). The results suggest that in this instance the null hypothesis of constant variance should be rejected. A Residual-Versus-Predicted graph shows that especially the two cases, China and Ireland, are responsible for the presence of heteroskedasticity. Therefore, an OLS regression with robust estimators is used. This option allows the author to calculate the standard errors in a way which does not imply homoskedasticity of the error term.

[55]Although they split the variable Human Capital into primary and secondary schooling because the primary schooling rate is the second strongest variable in a study introduced by Barro and Sala-i-Martin (2004) in where they analyse the growth of GDP per capita from 1960 to 1996 for 88 countries (p. 547).

[56]Stock variables, which are variables which are measured at the beginning of the period to tackle the problem of endogeneity, are used in the analysis. Different from stock variables are flow variables which measure the variables throughout the time.

price level of investment is taken from 1989. Regression 1 clarifies that all variables have the expected signs except the human capital variable. A negative significant coefficient for the income variable (conditional convergence) is produced; likewise, a negative significant coefficient for the price level of investment is produced and the positive significant relationship between interpersonal trust and economic growth is replicated. This result, the positive relationship between Interpersonal Trust and Economic Growth, is in accordance with most empirical findings using a cross-section design (see here particularly Knack & Keefer, 1997; Zak & Knack, 2001). Taking this model specification and this country sample, it is clear that human capital is not significantly related to economic growth[57]. Regression 4 therefore introduces a new model dropping the insignificant variable Human Capital and including the new variable Investment Share of GDP. All four variables are highly significant and have the expected signs. Conditional convergence, a negative coefficient for the price level of investments, a positive coefficient on interpersonal trust and a positive coefficient on the investment share of GDP all appear. This model explains 69 percent of the variance of the dependent variable Growth of GDP per capita, 6 percent more than equation 1. The Omitted Variable Test shows that there are no omitted variables[58]. Regressions 2 and 3 demonstrate that the theoretical argumentation that interpersonal trust affects economic growth (Knack & Keefer, 1997, c.f. Zak & Knack, 2001) via the channel, Proportion of Investment, is not supported by this analysis, although there does exist a slight impact from investment to interpersonal trust as the the relationship between trust and economic growth becomes weaker in Regression 3.

---

[57]As already mentioned, Knack and Keefer (1997) have split the variable Human Capital into primary and secondary school. Average years of schooling was used here. This could account for why Human Capital does not show significance. On the other hand, the more obvious explanation is that the specific country sample utilised is not appropriate for showing a significant relationship between Human Capital and Economic Growth.

[58]The Omitted Variable Test essentially regresses y on their x variables, as well as the second, third, and fourth powers of predicted y. It then performs an F test of the null hypothesis that all three coefficients on those powers of ŷ equal zero. If the null hypothesis is rejected, further polynomial terms would improve the model (Hamilton, 2006, p. 199). The null hypothesis must be rejected as there exists an F value of 1.51 and a probability of 0.23.

Table 3.4

Interpersonal Trust and Economic Growth—A Cross-Sectional Analysis for 32 Countries

Dependent Variable	Growth of GDP per Capita 1990-2004			
Estimation Method	OLS-robust	OLS-robust	OLS-robust	OLS-robust
Equation	1	2	3	4
Interpersonal Trust	0.072*** (3.81)	0.055*** (3.17)	0.047*** (2.88)	0.067*** (4.32)
Income	-1.13** (-2.68)	-1.67*** (-3.72)	-2.05*** (-4.76)	-1.33*** (-3.23)
Education	0.03 (0.33)			
PPP	-0.03*** (-2.88)			-0.04*** (-3.18)
Investment			0.076* (1.72)	0.10*** (3.21)
Constant	12.8*** (3.76)	16.0*** (4.05)	18.28** (5.08)	13.4*** (4.23)
R Squared	0.63	0.49	0.59	0.69
Omitted Variable Test	Not Done	Not Done	Not Done	Passed
N	32	32	32	32

* 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.

Sensitivity Analysis

To test the sensitivity of these results, Table 3.5 shows several specification tests including the exclusion of influential observations, the inclusion of additional regressors, the alteration of case specifications, the application of robustness tests, and the testing of the relationship by taking interpersonal trust values from the third wave of the World Value Survey (1995-1997) as independent variables and growth of GDP per capita values for the period 1996 to 2004 as the dependent variable.

Figure 3.6 shows an added-variable plot or partial-regression leverage plot (Hamilton, 2006, p. 201)[59]. Added-variable plots aid in uncovering observations exerting a disproportionate influence on the regression model. As can be seen from Figure 3.6, the most influential case in the 32-country sample is Ireland. The first row of Table 3.5 (labelled "None") reports the results, standard errors, and regression coefficient, taken from Regression 4 in Table 3.4. Successive rows reflect the effects of Interpersonal Trust on Economic Growth when the indicated change is made. The second row of Table 3.5 reports the results after dropping the case of Ireland from the country sample. The relationship between the variables Trust and Economic Growth remains significant (significance at the 99-percent level) and the coefficient decreases from 0.067 to 0.057. In the third row, the case of China is omitted. After deleting China, the relationship stays significant (significance at the 99-percent level) and decreases to 0.035. After taking out a third case, that of Brazil, the relationship again remains significant (significance at the 99-percent level) and decreases to a coefficient of 0.032.

Row 4 in Table 3.5 now includes additional regressors. The inclusion of the variable Population Growth as a proxy for Labour[60] and the variable Openness does not alter the result. The inclusion of the variable Social Expenditure per GDP however does alter the results, which could be due to the country sample with N=20 or the fact that trust and social expenditure are strongly related (see point 3, below—The Welfare State and Social Capital). When including the interaction term Trust*GDP, the trust

---

[59]In simple regression with one x variable, ordinary scatter plots suffice for this purpose.
[60]According to the classical production function Y(t)=F[K(t), L(t), T(t)] (where K(t) represents capital, L(t) represents Labour, and T(t) the technology), Labour represents the inputs associated with the human body. The inputs include the number of workers and the amount of time they work, as well as their physical strength, skills, and health (Barro & Sala-i-Martin, 2004, p. 24)

Figure 3.6

Partial Regression Plot—Trust and Economic Growth (1990-2004)
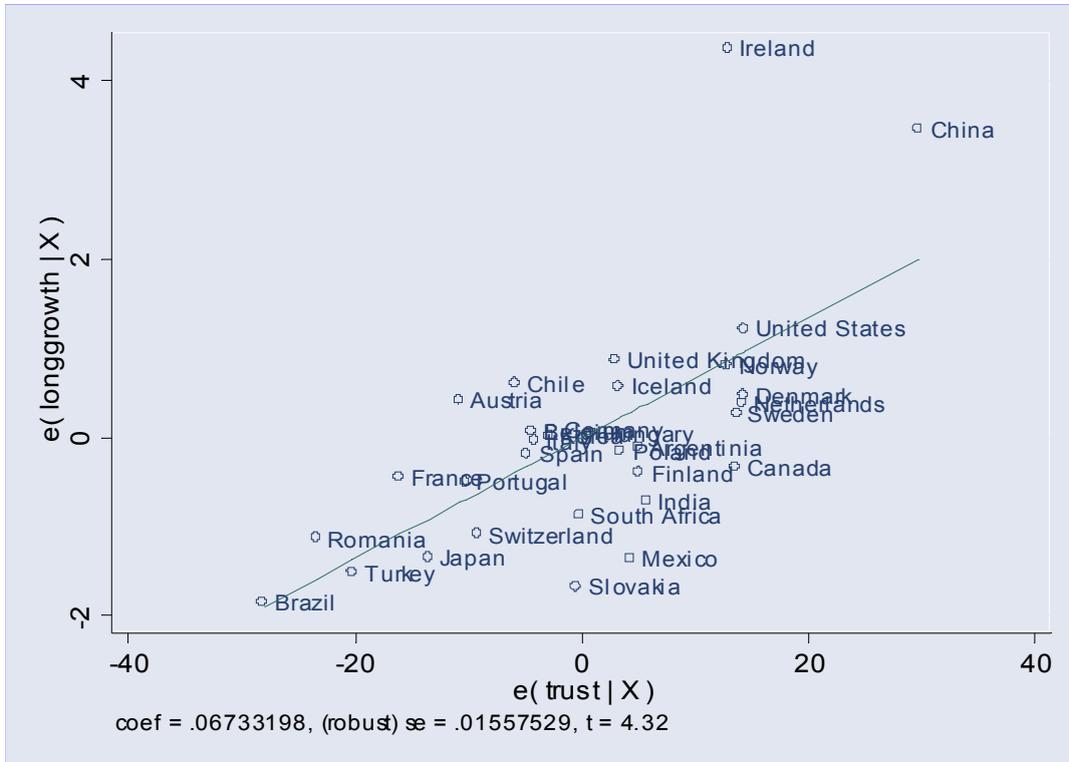
coefficient is highly significant and much stronger than before. This result replicates the one found by Knack and Keefer in 1997. The result can be interpreted to mean that the impact of trust on economic growth is stronger in poorer countries than in richer countries. Row 10 and 11 test for an alteration in the country sample. The relationship remains significant when taking either a sample of OECD or OECD-23 countries. As with the method of dropping influential observations, it is possible to check for outliers by using robust regressions[61] and quantile regressions. When using robust regressions and quantile regressions, the positive coefficient remains statistically significant. The last row shows the results when taking the ten-year growth period, 1995-2004, as a dependent variable. Using a 27-country sample the coefficient of trust is highly significant but less strong (0.04).

---

[61] Robust regression and quantile regression resist the pull of outliers, giving them better-than-OLS efficiency in the face of non-normal, heavy-tailed error distributions.

Table 3.5

Sensitivity Analysis—Cross-Sectional Analysis

Dependent Variable	Growth of GDP per Capita 1990-2004				
Specification change	Coefficient on Trust	Standard Error	Observations	R-Square	Estimation Technique
None (Equation 4 in Table 3.4)	0.067***	(4.32)	32	0.69	OLS, robust
Influential obs. Dropped	0.057***	(4.29)	31	0.80	OLS, robust
2 Influential obs. Dropped	0.035***	(4.54)	30	0.65	OLS, robust
3 Influential obs. Dropped	0.032***	(3.70)	29	0.65	OLS, robust
Population Growth	0.068***	(5.08)	32	0.75	OLS, robust
Open	0.061***	(4.52)	32	0.75	OLS, robust
Expenditure	0.045	(1.47)	20	0.34	OLS, robust
Trade Unions	0.069***	(4.20)	15	0.91	OLS, robust
Trust*GDP	0.40***	(4.36)	32	0.74	OLS, robust
OECD	0.051**	(2.17)	25	0.37	OLS, robust
OECD-23	0.055*	(2.08)	21	0.45	OLS, robust
Robust Regression	0.037***	(3.92)	32	-	Robust Regression
Quantile Regression	0.05***	(4.09)	32	-	Quantile Regression
DV: Growth of GDP per Capita 1995-2004	0.04***	(2.93)	28	0.58	OLS, robust

* 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 (not in the case of robust and quantile regression).

3.2   Pooled Panel Analysis

Secondly, an estimate for the model using a pooled panel analysis is made (Greene, 2003, p. 285; Baltagi, 2005, pp. 53, ff.). A pooled panel analysis is similar to the method of a standard ordinary least-square estimation, but in order to obtain more reliable estimates of the parameters, a pooled panel estimation widens the database by pooling the time series of the country sample. Hence the pooled panel consists of 129 observations with 41 individual cases[62]. Using a pooled panel regression and examining all 129 observations, Regression 1 in Table 3.6 replicates the result from the cross-section design and the results of most empirical research. A significant positive coefficient for the trust variable is obtained. However, the proxy the for human capital variable "average years of schooling", shows no significant relationship to economic growth. Furthermore, conditional convergence shows no significant relationship to economic growth. Overall the model does a poor job of describing the variance in the short-term growth rates utilised. Only 22 percent of the variance of economic growth can be explained by the model. As already shown in the descriptive statistics, transition countries follow an economic growth pattern which is quite different from the rest of the countries in the sample. Regression 2 therefore uses a country sample excluding the six transition countries. This country sample still has 115 observations. All variables have the expected signs and are significant. This yields conditional convergence, a positive relationship between human capital and economic growth, a positive relationship between interpersonal trust and economic growth, and a negative coefficient for price levels of investment. Thirty-five percent of the variance in international growth can be explained. As theoretically elaborated in Chapter I under Point 5.1, the relationship between trust and economic growth

---

[62] To be able to use OLS estimation, the cases have to be independent. A serious problem arising when pooling the data is that of auto correlation. As the same cases are included in the estimation several times, the residuals could be correlated to one another. This problem can be detected using the Durbin-Watson Test statistics (Kohler & Kreuter, 2001, p. 219; Hamilton, 2006, p. 350) and the Breusch-Godfrey test (Stata Press, 2005b, p. 99, ff.). In Equation 1 in Table 3.9, the Durban-Watson d statistic of $d = 0.89$ is too far from the centre of its distribution ($d = 2.0$). The Breusch-Godfrey test is significant (99-percent level of significance). Autocorrelation therefore exists. Using the Prais-Winston regression technique, however, which corrects for first-order autoregressive errors, yields the same results as when estimating the result with OLS. The Durbon-Watson statistic is now $d = 1.63$ which implies that there is autocorrelation remaining. The existent autocorrelation does not influence the interpretation of the results.

Table 3.6

Interpersonal Trust and Economic Growth—A Pooled Panel Analysis

Dependent Variable	Growth of GDP per Capita 1980-2004				
Estimation Method	OLS, robust	OLS, robust	OLS, robust	OLS, robust	OLS, robust
Country Sample	All	All without transition	All without transition	All without transition	OECD-23
Equation	1	2	3	4	5
Interpersonal Trust	0.05*** (2.77)	0.05*** (3.07)	0.16*** (4.42)	0.16*** (3.42)	0.17*** (3.47)
Interpersonal Trust.-Squared			-0.0015*** (-3.24)	-0.0013*** (-2.74)	-0.002*** (-3.47)
Income	-0.69 (-1.40)	-0.9** (-2.12)	-1.19*** (-2.73)	-2.26*** (-4.33)	-1.58*** (-2.74)
Education	0.15 (1.10)	0.26** (2.36)	0.31*** (2.86)	0.39*** (3.93)	0.23* (1.93)
PPP	-0.03*** (-3.30)	-0.04*** (-4.27)	-0.03*** (-4.18)	-0.03*** (-3.98)	-0.02*** (-3.18)
Population Growth	-			-1.09*** (-3.60)	
Investment	-			0.066* (1.92)	
Constant	8.3** (2.25)	10.0*** (3.00)	10.3*** (3.09)	20.2*** (4.56)	14.11*** (2.85)
R Squared	0.22	0.35	0.39	0.50	0.34
Countries	41	35	35	35	23
Observations	129	115	115	115	83
Period	80-04	80-04	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.

should not be linear but curvilinear (inverted U-shaped). Regression 3, taking a country sample without transition countries, modulates trust as a curvilinear relationship to economic growth by including the squared term of interpersonal trust into the regression. Astonishingly, the curvilinear relationship is highly significant[63].

[63]When modelling Regression 1 by including Proportion of Investment (ki) and leaving aside Price Level of Investment, a significant U-shaped relationship between interpersonal trust and economic growth for all 129 observations appears. When modelling Regression 1 and 2 with an augmented Solow model including Share of Investment (ki), Population Growth, Income; and Human Capital,

All variables in the regression have the expected signs and are highly significant (99-percent level of significance). The linear and squared term of interpersonal trust are each statistically significant: 0.16 (4.42) and -0.0015 (-3.24). These estimates imply that starting from a low-trust country (where the interpersonal trust value is for instance 2.8, as in Brazil), increases in interpersonal trust tend to stimulate economic growth. However, the positive influence attenuates as the level of trust rises and reaches zero when the indicator takes on a midrange of 53.3. Therefore, an increase in the level of trust appears to enhance economic growth in countries that have initial low levels of trust but to retard economic growth for countries that have already achieved a substantial level of trust. The model is able to explain 39 percent of variance in international growth rates (4 percent more than the linear modulation).

Regression 4 includes the two Solow variables Investment as a Proportion of GDP and Population Growth as a proxy for the factor Labour. Both variables have the expected signs. The model now explains 50 percent of the variance in international growth rates.

Regression 5 examines the OECD-23 Countries sample. A significant curvilinear relationship exists between trust and economic growth. All other variables have the expected signs and behave significantly. Conditional convergence, a positive relationship between human capital and growth and a negative relationship between price level of investments and economic growth; exists. Figure 3.7 shows the partial regression plot between trust and economic growth for the OECD-23 sample. It shows a curvilinear relationship between trust and economic growth.

To test the sensitivity of the results, Table 3.7 shows several specification tests including the exclusion of influential observations and the alteration of case specifications. The first row of Table 3.7 reports the results, standard errors, and regression coefficient taken from Regression 1 in Table 3.6. The second row excludes the most influential case, the case of China. The trust coefficient loses significance. This result is in accordance with Berggren, et al., (2007) who determined that when

Interpersonal Trust loses significance. In Regression 3, however, the inclusion of the Solow Variables and the exclusion of Price Level of Investment do not alter the results.

Figure 3.7

Partial Regression Plot for 23 OECD Countries—Trust and Economic Growth
(1980-2004)
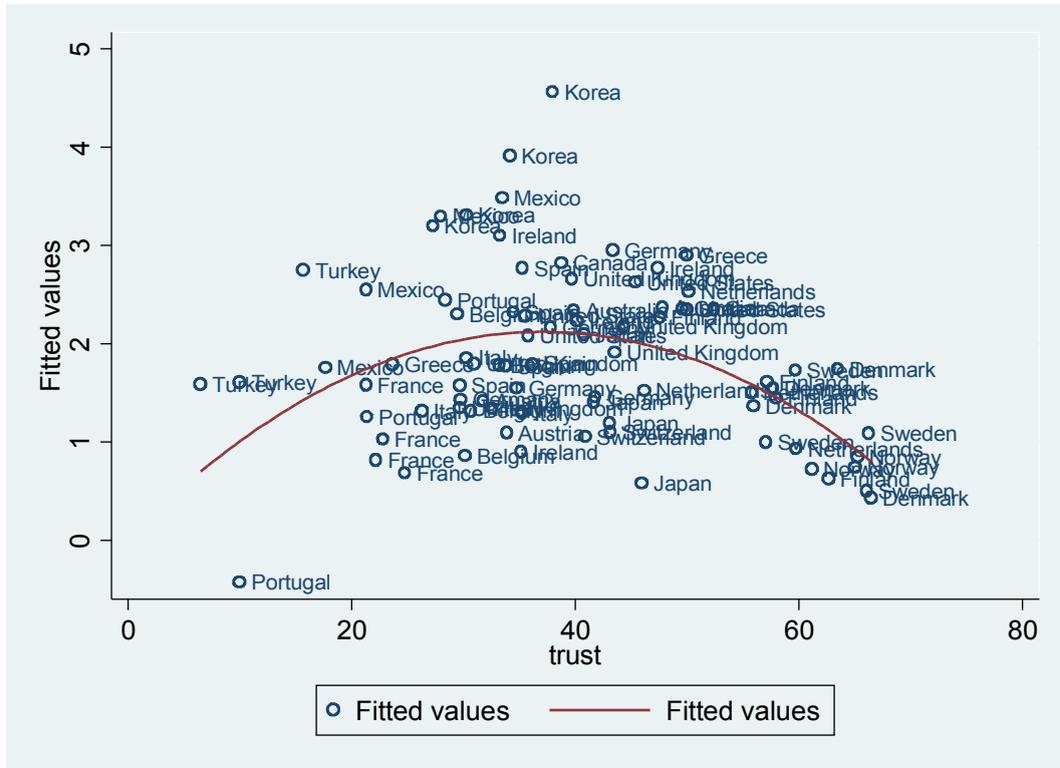
China is removed from the sample, "the trust growth relationship is no longer robust" (p. 1).

Row 3 reports the result from Regression 3, the curvilinear modulation between trust and economic growth for the country sample when excluding the six transition countries. After excluding China from the sample (Row 4), the curvilinear relationship remains highly significant. Row 5 reports the results for a linear modulation for the sample of OECD-23 countries. Trust is not significantly related to economic growth. Row 6 replicates the results from Regression 5 in Table 3.6. Taking a curvilinear model, 34 percent of the variance can be explained (10 percent more than in the linear modulation). Rows 7 and 8 show the results for the EU-15 Countries sample. Interestingly, in that sample, trust is negatively related to economic growth; both modulations, however, the linear, as well as the curvilinear modulation, are possible. In addition, the curvilinear relationship is able to explain six percent more variance than the linear modulation (R-Square = 0.43 instead of

59

0.37). Rows 9 and 10 report results for the two regime typologies, LMEs and Scandinavian countries. Both country-data clusters are strongly negative in their relationship to trust and economic growth.

Table 3.7

Sensitivity Analysis—A Pooled Panel Analysis

Dependent Variable	Growth of GDP per Capita 1980-2004				
Specification change	Coefficient on Trust	Standard error	Countries	Observations	R-Square
All countries					
None (Equation 1 in Table 3.6)	0.050***	(2.77)	41	129	0.22
Influential obs. Dropped	0.021	(1.55)	40	126	0.1
All countries without transition					
None (Equation 3 in Table 3.6)	0.16*** / -0.0015***	(4.42 / -3.24)	35	115	0.39
Influential obs. Dropped	0.14*** -0.0016***	(4.30 / -3.77)	35	112	0.29
Country Samples					
OECD-23	0.005	(0.35)	23	83	0.24
OECD-23	0.17*** / -0.002***	(3.47 / -3.47)	23	83	0.34
EU-15	-0.03*	(-2.10)	14	54	0.37
EU-15	0.12*** / -0.002***	(1.96 / -2.48)	14	54	0.43
Liberal	-0.10***	(-3.21)	5	18	0.51
Scandinavian	-0.14***	(-3.50)	4	15	0.35
Developing	0.12***	3.96	11	29	0.67

* 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.

Figure 3.8 illustrates the negative relationship in LMEs. Row 11 reports the results for the developing countries sample. As suspected, the trust coefficient is positive and highly significant (although, as already elaborated in Row 2, when excluding China from the developing countries sample, the trust coefficient is rendered insignificant).

Figure 3.8

Partial Regression Plot for Liberal Market Economies—Trust and Economic
Growth (1980-2004)

coef = -.10593078, (robust) se = .03301205, t = -3.21
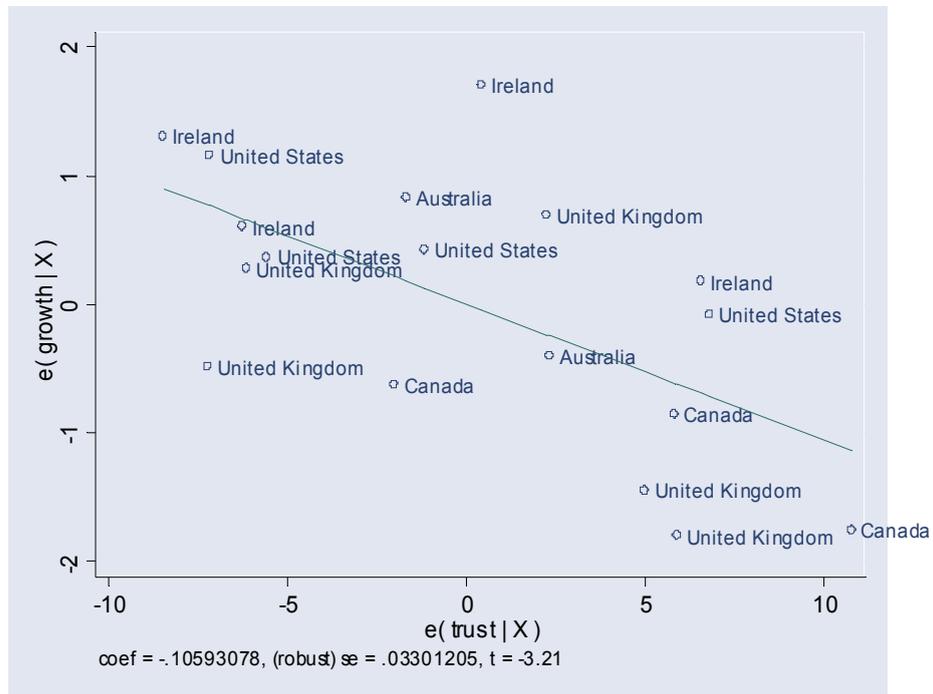
3.3   Panel Analysis

In order to explore how changes in trust levels affect economic growth, the model is estimated using a panel analysis[64]. The standard methods of panel estimation are fixed effects or random effects[65]. The fixed-effects estimates are calculated from differences within each country; the random-effects estimation, in contrast, incorporates information across individual countries as well as across periods. The major drawback with the random-effects analysis 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, p. 874; Stata Press, 2005a, pp. 441-448). The Hausmann test applied here indicates that the fixed-effects model should be used[66].

Regressions 1 through 5 in Table 3.8 consider the case of linear regression with panel data. As there has been no research conducted on panel data of which the author is aware, it seems most appropriate to begin the estimation of the panel data using the linear regression method[67]. As there is the possibility of cross-sectional heteroskedasticity, a robust-estimation technique is used. The coefficients are the same with and without the robust-estimation technique, however the robust estimator produces larger standard errors. The fixed-effects estimations use 41 countries with a total of 129 observations. It is an unbalanced panel[68]. Regression 1 in Table 3.8 contradicts the results of all previous empirical works (Knack & Keefer, 1997; La Porta, et al., 1999; Whiteley, 2000; Zak & Knack, 2001, Beugelsdijk, et. al., 2004; cf.

---

[64]For a detailed discussion of panel analysis, see Frees (2004), Baltagi (2005), Greene (2003, p. 283, ff.) and Stata Press (2005c).

[65]Results from the random-effects estimation are similar to the results of the pooled panel analysis. Results can be requested from the author.

[66]The test statistic is $\chi^2 (4) = 1129.17$. This rejects the null hypothesis at any standard of significance.

[67]The commands for this procedure with the software Stata (Stata Corporation, 2005) are usually referred to as "xtreg" commands. For a short introduction see Kohler and Kreuter (2001, pp. 238-246) and Hamilton (2006, pp. 191-195). For a detailed discussion, see Stata (2005c). In contrast to the method of linear regression Forbes (2000) uses the generalised method of moments (GMM). This estimator first differences each variable so as to eliminate the country-specific effect and then uses all possible lagged values of each of the variables as instruments. Forbes argues that the estimation by fixed or random effects is inconsistent due to the presence of the lagged income term (p. 876) and instead uses a method proposed by Arellano and Bond.

[68]According to Stata Press, xt commands are robust to the problem of missing observations (Stata Press, 2005c, p. 6)

Table 3.8

Trust and Economic Growth—Fixed and Random-Effects Estimation

Estimation Method	Fixed Effects Robust Estimation	Random Effects Robust Estimation	Fixed Effects Robust Estimation	Random Effects Robust Estimation	Fixed Effects Robust Estimation
Country Sample	All	All	All without Transition	All without Transition	All without Transition
Equation	1	2	3	4	5
Interpersonal Trust	-0.08** (-2.52)	0.04** (2.15)	0.18** (2.35)	0.17*** (3.88)	0.16** (2.25)
Interpersonal Trust, Squared			-0.003*** (-3.03)	-0.002**** (-3.26)	-0.003*** (-3.14)
Income	-4.81*** (-3.67)	-0.81 (-1.38)	-4.78*** (-3.73)	-1.81*** (-3.05)	-5.70*** (-4.53)
Education	0.87*** (3.49)	0.20 (1.19)	1.0*** (4.05)	0.50*** (3.14)	0.67** (2.36)
PPP	-0.04*** (-3.36)	-0.03*** (-3.00)	-0.03*** (-3.03)	-0.03*** (-3.19)	-0.02** (-2.54)
Open					0.04** (2.14)
Investment					-0.12* (-1.98)
Constant	46.2*** (4.12)	9.1** (2.09)	39.9*** (3.58)	14.2*** (3.09)	51.6 (5.15)
R-Squared	0.28	0.32	0.45	0.38	0.52
Countries	41	41	35	35	35
N	129	129	115	115	115
Period	80-04	80-04	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.

Heliwell, 1996), as well as these results from the cross-section design and the pooled panel analysis, a negative (-0.08) and significant (-2.52) coefficient for the interpersonal trust variable is obtained, indicating that changes in trust and economic growth are negatively related to each other. All other variables in the model have the expected signs. Significant conditional convergence, a positive relationship between human capital and economic growth, and a significant negative coefficient for the

variable price level of investment all appear. Twenty-eight percent of the within-variance can be explained. Regression 2 presents the random-effects model. As expected when employing a random-effects model, the positive result from the cross-sectional and the pooled panel analysis is replicated. It indicates a positive (0.04) and significant result (significance at the 90-percent level). Regression 3 shows the results for the growth model when the six transition countries are omitted from the country sample. Interestingly, the relationship between interpersonal trust and economic growth can also be modeled curvilinearly in the 115-country sample when trying to explain the within-variation with a fixed-effects model. In country observations with lower levels of trust, an increase in trust seems to have a positive effect on economic growth, whereas in country observations with high levels of trust, a decrease in trust seems to have a positive effect on economic growth. Regression 4 estimates the 115-country sample with a random-effects model. The results from Regression 3 in Table 3.6 are replicated. Regression 5 presents the results of the fixed-effect estimation when excluding transition countries and including the two variables, Openness and Population growth. The model is now able to explain 52 percent of the within-variation.

Sensitivity Analysis

Since the negative relationship between interpersonal trust and economic growth in Regression 1 in Table 3.8 challenges econometric work using a cross-sectional design, the robustness of the results must be tested[69]. To test the sensitivity of the results, Table 3.9 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, resampling techniques and clustering for human capital. The first row of Table 3.9 (labelled "None") reports the results,

---

[69]See Levine and Renelt (1992) for the importance of a sensitivity analysis.

Table 3.9

Sensitivity Analysis—Fixed Effects Estimation

Specification Change	Coefficient on Trust	Standard Error	Countries	Observations	R Square
Influential Cases					
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
Country Samples					
OECD	-0.08**	(-2.45)	27	94	0.21
OECD-23	-0.05*	(-1.68)	23	83	0.32
OECD-23	0.26*** / -0.004***	(3.05 / -3.76)	23	83	0.48
EU-15	-0.08*	(-1.91)	14	54	0.34
EU-15	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
Specifications					
Open	-0.05*	(-1.68)	41	129	0.46
KI	-0.08**	(-2.59)	41	129	0.29
Population Growth	-0.07**	(-2.48)	41	129	0.29
Confidence parliament	-0.1***	(-2.64)	41	114	0.26
Confidence forces	-0.1***	(-2.95)	41	114	0.26
Confidence police	-0.11***	(-3.01)	41	114	0.27
Confidence 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
Restructuring of data					
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
Methods					
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. R-Squared is the within-R-squared.

standard errors and regression coefficient, taken from Regression 1 in Table 3.8. Successive rows reflect the effects of interpersonal trust on economic growth when the indicated change is made.

The second row of Table 3.8 reports the results after omitting the case of Poland from the country sample. As can be inferred from Figure 3.5 and Figure A4, the case of Poland exhibits the strongest negative relationship between changes in trust and changes in economic growth (specifically, a decrease in interpersonal trust of 16.6 percent is associated with an increase in economic growth of 5.2 percent). As suspected, Poland plays an important part in explaining the relationship between trust and economic growth. Although the relationship between trust and economic growth remains significant (significance at the 90-percent level) the coefficient decreases from -0.08 to -0.06.

In the third row, the case of Greece is omitted. As can be inferred from Table 3.1, Greece's level of trust decreases by 26.7 percent, whereas its economic growth rate increases by 2.91 percent. After deleting Greece from the country sample, the relationship between changes in trust and changes in economic growth loses statistical significance.

Rows 4 through 12 examine the different country samples. When exaluating an OECD country sample, the relationship is negatively related to economic growth (which is strongly influenced by the data on Poland). In the OECD-23 country sample, the relationship can be either linearly modulated or curvilinear. In the linear modulation a significant negative result appears; however, the curvilinear relationship explains 16 percent more of the variance in international growth rates. As with the sample of the OECD-23 countries, the EU-15 Countries sample can be modulated in both relationships, either linear or curvilinear-wise. In the linear modulation, a significant negative coefficient (strongly influenced by the data on Finland and the United Kingdom) appears; the curvilinear model, however, is able to explain 52 percent of the within-variation (18 percent more than the linear model). Apart from Poland and Greece, the negative relationship between trust and economic growth seems to be driven by the highly-developed countries from the sample of liberal countries (significance at the 99-percent level) and the Scandinavian countries 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 in economic growth (see also

Figure A6). Row 11 examines the sample of developing countries sample. An increase in interpersonal trust is associated with an increase in economic growth (As the author is currently investigating the changes within particular cases, it is not problematic at this time to include China in the sample. After excluding the case of China, the relationship is still significantly (90- percent level) and positive (0.16)). Countries from Latin America (Row 12) face a positive relationship between changes in trust and economic growth. The theoretical claim that, considering developing countries, trust level changes should have a positive effect on economic growth is hereby verified.

Figure 3.9

Predicted Relationship Between Trust and Economic Growth—Fixed-Effects Estimation for Country Sample Excluding Transition Countries
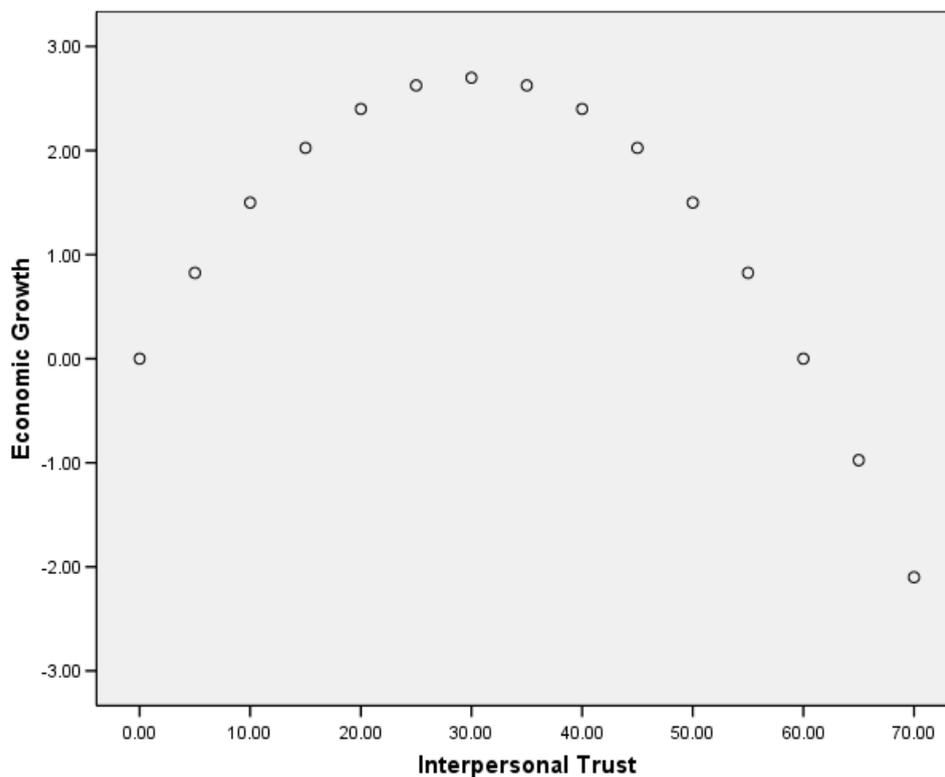
Figure 3.9 illustrates the findings between trust and economic growth from Regression 3 in Table 3.8. In a country with a low level of trust, an increase in trust is associated with an increase in economic growth if the increase in trust takes place

on the left side of the distribution (The maximum value of the graph is 30). Once a threshold of 30 percent of trust is exceeded, the increase in trust will hamper economic growth.

Row 13 includes the variable, Openness. The trust coefficient stays statistically significant. The model now explains 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 be a very important variable when trying to explain the within-variation of economic growth. Rows 14 and 15 include the two Solow parameters, Investment Share of GDP and Population Growth. The trust coefficient remains statistically significant.

Rows 16 through 19 include four indicators of systemic trust variables: i) confidence in the parliament, ii) confidence in the forces, iii) confidence in the police, and iv) confidence in major companies. None of the four systemic trust variables is statistically significant related to economic growth. However, confidence in companies is related to interpersonal trust as this variable loses statistical significance when the item is included in the Regression. Furthermore, when examining an OECD or EU-15-country sample, the variables Confidence in the Parliament and Confidence in major Companies are both negatively related to economic growth. Particularly in the LMEs, a decline in confidence in the parliament is associated with an increase in economic growth (significance at the 99-percent level).

Row 20 includes social expenditure in the regression. The trust coefficient is not altered by the inclusion of social expenditure. The hypothesis which was elaborated in point 5.4 in Chapter I, that social expenditure could explain the negative relationship between trust and economic growth, must be rejected (However, due to data restrictions, the hypothesis was only tested in 27 OECD countries with a total of 84 observations).

Row 21 includes the Gini-Coefficient. The trust coefficient is again not altered. The hypothesis elaborated in point 5.5 in Chapter I, that social inequality could explain the negative relationship between trust and economic growth, has to be rejected. (Here, also due to data restrictions, the hypothesis was only tested in 20 OECD countries with a total of 62 observations.)

Row 22 examines an unbalanced panel for the time period, 1990-2004. This procedure allows the exclusion of data derived from the Eurobarometer 25. After excluding the first two periods (1980-1989), trust is still negatively and significantly related to economic growth. Row 23 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 waves of the WVS. Trust is negatively related to economic growth. When using a balanced panel from 1980-2004 (Row 24) taking five countries with 15 observations into consideration, trust loses statistical significance (primarily due to the small number of observations).

Row 25 shows the result when clustering for the Human Capital variable. (Clustering for the other variables does not change the results.) This procedure was introduced by Stata (Stata Press, 2005c) and produces an estimator "that is robust to cross-sectional hereroskedasticity and within-panel serial correlation which is asymptotically equivalent to that proposed by Arellano (1987)" (p. 293).

Rows 26 and 27 introduce resampling techniques. Either when using Bootstrap Estimation or Jackknife Estimation, the coefficient remains statistically significant (however only at the 90-percent level).

4. Conclusion

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

First, taking panel data and using a fixed-effects estimation for a 41-country sample over the time period from 1980 to 2004 and with a total of 129 observations, the section points out that economic growth is negatively related to an increase in trust. This negative finding is in contrast to most empirical findings using a cross-sectional design. The negative relationship seems to be mainly driven by developed countries from the OECD (here specifically Poland, Greece, and the United States), and the EU-15 (here particularly the United Kingdom and Finland), and very strongly by LMEs and Scandinavian countries. From an economic growth perspective, one could therefore argue that developed countries exhibit too much trust. The Olson thesis, that too much cooperation strangles economic growth,

appears to be correct. However, when considering a country sample which excludes the six transition countries, a curvilinear relationship appears. In countries with low initial levels of trust, an increase in trust leads to an increase in economic growth (samples for developing countries and Latin America countries). In countries with high initial levels of trust, an increase in interpersonal trust leads to a decrease in economic growth (especially in the samples of LMEs and Scandinavian countries)[70]. The curvilinear relationship can be replicated in an sample of OECD-23 countries, as well as in an EU-15-country sample, meaning that in those countries in the OECD and EU-15 which have low initial stocks of trust, as for instance Portugal, an increase in trust is associated with an increase in economic growth.

Second, when analysing the relationship between interpersonal trust and economic growth in a cross-section of countries using either a cross-section, pooled panel, or random-effects design, the positive results from previous empirical research were replicated. However, when examining a country sample which excluded the six transition countries, a curvilinear relationship between interpersonal trust and economic growth was detected. In countries with low initial levels of trust, an increase in trust is associated with an increase in economic growth. But once a threshold of trust is surpassed, an increase in trust harms economic growth.

Third, the distinction between systemic trust and interpersonal trust reveals that not only interpersonal trust is significantly and negatively related to economic growth, but also the variables, Confidence in the Parliament and Confidence in Major Companies. Taking an OECD-country sample, an increase in both variables is negatively related to economic growth.

---

[70]One might intervene and ask whether it is certain that the causality runs from trust to economic growth and not vice versa. Firstly, trust is constructed as a lagged variable, implying causality from the research design. Secondly, "causal inference is theoretically driven" (Frees, 2004, p. 205), as "causal processes cannot be demonstrated directly from the data; the data can only present relevant empirical evidence serving as a link in a chain of reasoning about causal mechanisms" (Id. at, p. 205). Although one must admit that researchers are beginning to promote as valid theory the causal relationship from growth to trust via an interaction effect among growth, social capital, and the expansion of market activities (Bonatti & Bartolini, 2007), the theoretical arguments are not yet convincing, especially given that a curvilinear relationship between trust and economic growth exists. However, as Inglehart points out, the best interpretation of the relationship between cultural and economic processes is to assume that they are strongly "intertwined" and "mutually supportive" of each other (Inglehart, 1990, 1997, p. 225), the author does not want to reject the possibility that causality is intertwined and could therefore also run from economic growth to trust. However, as empirical causality tests (for instance the Granger causality test) are hard to conduct with regard to the small number of observations available, one should stick to theoretical arguments and, from the author's point of view, it is more convincing to discuss the relationship from trust to growth than vice versa.

Fourth, Interpersonal Trust behaves robustly towards the inclusion of Social Expenditure per GDP and Income Inequality in a fixed-effects estimation, as well as in a pooled panel design (However, the relationship is only tested in an OECD-23 countries sample). In contrast to the theoretical elaboration in point 5.3 and point 5.4 in Chapter I, social expenditure and income inequality seem to not be responsible for the negative relationship between trust and economic growth.

Taking these results into consideration, theoretical implications and empirical findings between trust and economic growth must be reevaluated. More theoretical and empirical research is necessary to clarify the relationship. From a policy point of view, it is important to differentiate between countries with high and low initial levels of trust. An increase in trust is crucial for countries with low levels of trust, but can likely be neglected by countries with sufficient levels of trust and may even hamper economic performance in countries with high levels of trust. The common knowledge which has governed the nature of discussions in social science and economics for the last ten years, that trust is positively related to economic performance, must be seriously questioned. The relationship depends on the level of trust already existing in a country, thus determining whether it is important to invest in trust-building policies or not.

Chapter IV **Human Capital, Social Capital, and Economic Growth—A Comparison of 24 OECD Countries**

> What could be more natural than to latch on to the outstanding intellectual success of the human-capital notion by adding a plausible third leg to the stool? (Solow, 2000, p. 7)

1. Operationalisation, Model Specification, Data, and Case Selection

1.1 Operationalisation

Dimensions of Social Capital

Firstly, the following dimensions of social capital are included in this empirical investigation. The dimension of norms of reciprocity is the first to address. This has already been done by Knack and Keefer (1997) and van Oorschot and Arts (2005). In contrast to their approach, only three items of the "norms item battery" from the WVS[71] are included here. The items "Claiming government benefits which you are not entitled to", "Cheating on tax", and "Someone accepting a bribe in the course of their duties" to the question "Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between" are addressed in this analysis. The answer is a Likert scale ranging from 1 to 10 with 1 representing "Never justified" and 10 representing "Always justified". The items are aggregated by their mean value and recoded. The sum of the items is divided by three which leaves a norms index ranging from 1 to10[72].

Secondly, dimensions of informal sociability are included (See here for instance Putnam, 2000, p. 291.) As comparison of the three consecutive waves of the WVS from 1990 to 2002 was desired, inclusion of items on "Time spent with parents and relatives" or "Time spent with friends" was not possible; rather the three

---

[71]This was done due to theoretical reasons as those three items could possibly be related to economic growth. Whether the three items "avoiding a fare on public transport", "keeping money that you have found", and "failing to report damage you have done accidentally to a parked vehicle", which are additionally taken into account by Knack and Keefer (1997), are theoretically related to economic performance is a separate question to be examined.

[72]A principal component analysis of the second and third wave of the WVS (1990-93 and 1995-97) for the three items with N=43184 confirms the construction of an index. It produces the following results: the eigenvalue is 2.0; the variance accounted for by the first factor is 67 per cent of the total variance; all three items load on one factor with values from 0.787 to 0.841. The constructed scale is reliable as the Cronbach's alpha value is 0.75. A principal component analysis of the fourth wave of the WVS (1999-2002) for the three items with N=31,325 confirms the construction of an index. It produces the following results: the eigenvalue is 1.75; the variance accounted for by the first factor is 58 per cent of the total variance; all three items load on one factor with values from 0.745 to 0.787. The constructed scale is reliable as the Cronbach's alpha value is 0.63.

items "Importance of Family", "Importance of Friends", and "Importance of Politics", to the question "Please say, for each of the following, how important it is in your life", were included. The answer is Likert-scaled ranging from 1 to 4 with 1 representing "Very important" and 4 representing "Not at all important". An Importance index[73] consisting of all three items was created. As this index is not reliable the three items were examined separately and the analysis ended up focusing on the "Family" item. This item is aggregated by taking its mean value and recoded. "One" then represents "Not very important" and 4 represents "Very important".

The systemic trust index consists of four systemic trust variables[74]. The four items "Confidence in the Parliament", " Confidence in the Armed forces", "Confidence in the Police", and "Confidence in major companies", to the question, "Please...tell me, for each item listed, how much confidence you have in them, is it a great deal, quite a lot, not very much or none at all?". The answers are Likert scaled ranging from 1 to 4 with 1 representing "A great deal of confidence" and 4 representing "No confidence at all". The items are aggregated by their mean value and recoded. The sum of the items is divided by four which leaves an index ranging from 1 to 4 with 1 representing "No confidence at all" and 4 representing "A great deal of confidence". The construction of the variable associational activity is explained in Chapter V.

---

[73]A principal component analysis of the second and third wave of the WVS (1990-93 and 1995-97) for the three items with N=46,849 produces the following results: the eigenvalue is 1.30; the variance accounted for by the first factor is 43 per cent of the total variance; all three items load on one factor with values from 0.61 to 0.74. As the constructed scale is not reliable since the Cronbach's alpha value is 0.31, the construction of an index is rejected. A principal component analysis of the fourth wave of the WVS (1999-2002) for the three items with N=31,325 produces the following results: the eigenvalue is 1.24; the variance accounted for by the first factor is 41 percent of the total variance; all three items load on one factor with values from 0.586 to 0.724. As the constructed scale is not reliable given that the Cronbach's alpha value is 0.25, the construction of an index is rejected.

[74]A principal component analysis of the second and third wave of the WVS (1990-93 and 1995-97) for the four items with N=43,008 confirms the construction of an index. It produces the following results: the eigenvalue is 1.88; the variance accounted for by the first factor is 47 per cent of the total variance; all four items load on one factor with values from 0.625 to 0.731. The constructed scale is reliable as the Cronbach's alpha value is 0.62. A principal component analysis of the fourth wave of the WVS (1999-2002) for the four items with N=26,766 confirms the construction of an index. It produces the following results: the eigenvalue is 1.94; the variance accounted for by the first factor is 49 percent of the total variance; all four items load on one factor with values from 0.654 to 0.769. The constructed scale is reliable as the Cronbach's alpha value is 0.64.

The social capital index[75] consists of the interpersonal trust item, the systemic trust index, and the norms index. As there exists only data on associational activity for the first and third wave of the World Value Survey, it is appropriate to not include the item on associational density in the social capital index, but rather to test associational activity separately. The social capital index was constructed by standardising each factor by subtracting its mean and dividing the result by the standard deviation. The average was then taken producing values ranging from -3 to +3 with -3 representing low stocks of social capital and +3 representing high stocks of social capital. The index construction is driven by the theoretical claim that "trust", "norms", and "networks" are all dimensions of social capital and should therefore all contribute to economic outcomes. As shown in the factor analysis and Figures B1-B5, the index construction is clearly not empirically driven.

1.2   Model Specification

In the baseline model, economic growth is estimated as a function of the natural logarithm of income, the investment share of GDP, population growth, human capital, and social capital. From the baseline growth model, the following equations are estimated:

---

[75]A principal component analysis of the second and third wave of the WVS (1990-93 and 1995-97) for the eight items (three norms items, four systemic trust items, and the interpersonal trust item) with N=37,172, shows that the three norms items measure one factor, the four systemic trust items measure another factor, and the interpersonal trust item should be regarded as a separate factor, as the item only loads 0.17 on the systemic trust scale. Furthermore, the Cronbach's alpha is reduced by five percent from 62 percent to 57 percent when including interpersonal trust. Thus interpersonal trust should be treated as a separate factor. More important however is the result that interpersonal trust and norms of reciprocity do not measure the same construct and must be treated as separate factors. This result is replicated on an aggregated level as a scatter plot (see Figure B5) between interpersonal trust and the norms index demonstrates. The norms index shows complete independence. This result is contrary to Knack and Keefer's (1997) claim that interpersonal trust and norms of reciprocity are positive correlated (p. 1,258). Although the author does not work with exactly the same five items of the "norms item battery" the conflicting findings are quite astonishing. Similar results have already been elaborated upon by Whiteley (2000). He showed that interpersonal trust loads poorly (0.22) on a trust scale of "trust in fellow nationals" and "trust in the family". Instead of treating interpersonal trust separately, he nevertheless included the item in his trust index (Id., pp. 454, 455).
A principal component analysis of the fourth wave of the WVS with N= 21,116 extracts three factors with eigenvalues of 2.14, 1.62, and 1.001, with one factor corresponding with the systemic trust index, one factor corresponding with the norms index, and the last factor corresponding with the interpersonal trust item.

$$Growth_{i,t} = \alpha_i + \beta_1 \, Social \, Capital_{i,t\text{-}1}$$

$$+ \, \beta_2 \, Human \, Capital_{i,t\text{-}1}$$

$$+ \, \beta_3 \, Income_{i,t\text{-}1}$$

$$+ \, \beta_4 \, Investment_{i,t\text{-}1}$$

$$+ \, \beta_5 \, Population \, Growth_{i,t\text{-}1}$$

$$+ \, w_{i,t},$$

where i represents each country and t represents each time period (with t = 1-3); *Growth*$_{it}$ is the average annual growth for country i at period t; *Income*$_{i,t\text{-}1}$, *Investment*$_{i,t\text{-}1}$, *Population Growth*$_{i,t\text{-}1}$, and *Human Capital*$_{i,t\text{-}1}$ are respectively income, investment, population growth, and human capital for country i during period *t-1*; α_i represents a group-specific, constant term and w$_{i,t}$ is the error term.

1.3   Data

Data on income and growth are based on per capita incomes between 1990 and 2004 adjusted for purchasing power parity (PPP, expressed in constant 2000 US dollars) drawn from the national accounts of the OECD (OECD, 2006). For the cross-section analysis, the annual growth rate for the fifteen-year time period from 1990 to 2004 is calculated; for the panel analysis, the annual growth rate for three five-year[76] time periods from 1990 to 1994, from 1995 to 1999, and from 2000 to 2004, is calculated.

- For the variable, Human Capital, data from the Barro and Lee dataset (2000) are used. The data are based on the variable average years of schooling of the total population aged over 25[77].

---

[76] Since yearly growth rates incorporate short-run disturbances, growth is averaged over five-year periods.
[77] The analysis included four different dimensions of human capital. The author first analysed what percentage of the population completed secondary education, and added to that value the total percentage of people attaining post-secondary education. This approach seems especially important for OECD countries in so far as in developed countries, it is the highest level of education that is most important for economic performance. Second, the classical measure of human capital, average years of schooling in a country, was analysed. Data for educational attainment of the total population aged 25 years and over was used. Both variables were divided in categories of male and female. Correlating the four measures yielded R-Squared results of 0.9 and higher. The author therefore adhered to the classical variable, Average Years of Schooling of the total population aged over 25.

- For the variable, Investment, the variable Investment Share of GDP (Ki)[78], from the Penn World Tables 6.1 (Heston, 2002) are used. The variable is lagged for the panel design (1989, 1994, 1999) in order to reduce the problem of endogeneity.

- To measure the labour force, data on population growth from the Penn World Tables 6.1 (Heston 2002) are used. The variable is lagged in the cross-section design taking a five-year average from 1985 to 1989, and in the panel analysis using the time intervals of 1985-1989, 1990-1994, and 1995-1999 in order to reduce the problem of endogeneity.

- For the variable social capital, data from the WVS[79] are used. The social capital variable is an index that consists of the item to measure interpersonal trust, a systemic trust index, and a norms of reciprocity index.

- For the variable, Social Expenditure per GDP, data from the OECD (2004) are used. The variable is lagged in the cross-sectional design using a five-year average from 1985 to 1989 and in the panel analysis, using time intervals of 1985-1989, 1990-1994, and 1995-1999 in order to reduce the problem of endogeneity.

- For the variable Gini-Coefficient, data from the OECD[80] (Förster et d'Ercole 2005) are used.

1.4   Case Selection

An OECD-country sample consisting of 24 countries[81] is used, but excluding six countries. Luxembourg is excluded due to data restrictions for the variable, Human Capital. Furthermore, Luxembourg should also be excluded due to the small size of its population (around 400,000). Iceland is likewise excluded due to its small population[82]. Poland, the Czech Republic, Hungary, and the Slovak Republic are excluded due to data restrictions for several variables and also due to the fact that

---

[78] There are two kinds of investment shares available from the Penn World Table 6.1: Ki and Ci. Ki measures the proportion of investment at constant prices; Ci measures the proportion of investment at *current* prices. Both shares are highly correlated to one another. All regressions were run when taking Ci and lagging it for 1984-1989, 1990-1994, and 1995-1999. The results were not significantly influenced.

[79] Data on the two first waves of the German case were taken from West Germany. Data on the third wave (1999-2002) were taken from unified Germany.

[80] The data were not fully complete. Therefore, data were taken from Forbes (2000) for the countries Spain, Belgium, and Korea for 1990 and from the Human Development Report(2005) for the countries Belgium and Korea for 1999.

[81] The following countries are included in the country sample: the United States, Japan, Germany, France, Italy, the United Kingdom, Canada, Australia, Austria, Belgium, Denmark, Finland, Greece, Ireland, Korea, Mexico, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and Turkey.

including transition countries makes it more difficult to interpret the results. Fourteen out of 15 EU-15 countries are included in the sample[83].

2.   Descriptive Statistics

Table 4.1 shows the descriptives for total growth in percentage points from 1990 to 2004 in comparison to the variable, Human Capital. Taking GDP per capita into consideration, most countries range from 1.0 to 2.4 percentage points of annual growth. The G7 countries range from 1.0 and 1.2 percent (Italy and Japan) to 1.8 and 2.1 percent (the United Kingdom and the US). Germany and France have had an average growth rate of 1.4 and 1.5 percent, respectively. There are two outliers in this trend for OECD countries, Ireland, with an average growth rate of 5.5 percent, and South Korea, with an average growth rate of 4.8 percent. Switzerland could be considered a third outlier with an average growth rate of 0.3 percent. Taking regime typologies into consideration, the two countries from Asia, South Korea and Japan, have the highest growth, due particularly to that of South Korea. They are followed by the liberal market economies[84]. One should note the large gap between the average growth rate of the liberal market regimes of 2.55 and that of the coordinated market regimes with an average growth rate of 1.36 percent. Mediterranean countries grew equally as fast as the Scandinavian states with high growth rates for Greece and Spain (2.2 and 2.4 percent, respectively) but a low growth rate for Italy with only 1.2 percent. Taking into consideration the human capital dimension, it is rather interesting that the US has

---

[82] This procedure is in accordance with Mankiw, Romer, and Weil (1992) who excluded countries having a population size of less than one million.
[83] The only country excluded is Luxembourg.

Table 4.1

Economic Growth from 1990 to 2004 and Average Years of School

	GDP per Capita Growth	Average Years of School
Ireland	5.5	8.77
South Korea	4.8	9.93
Greece	2.4	8.07
Australia	2.3	10.33
Norway	2.2	11.51
Spain	2.2	6.65
United Kingdom	2.1	9.04
New Zealand	1.9	11.34
United States	1.8	12.14
Turkey	1.8	4.44
Austria	1.8	8.49
Denmark	1.8	10.03
Canada	1.7	11.04
Netherlands	1.7	8.94
Portugal	1.7	4.59
Sweden	1.6	10.72
Belgium	1.6	8.57
Finland	1.6	9.81
France	1.5	7.96
Germany	1.4	9.60
Italy	1.2	6.59
Mexico	1.1	6.32
Japan	1.0	9.46
Switzerland	0.3	10.16
Asian	2.9	9.7
Liberal Market Economies	2.55	10.4
Mediterranean	1.8	6.4
Scandinavian[85]	1.8	10.51
Coordinated Market Economies[86]	1.36	9.2
OECD	2.0	8.93
EU	2.0	8.4

---

[85] The Scandinavian sample includes Sweden, Denmark, Norway, and Finland.
[86] The CMEs sample includes Austria, Belgium, Germany, the Netherlands, and Switzerland.

the largest number of average years of schooling in its population[87]. This trend is followed by liberal market economies and Scandinavian states, as well as the two countries from Asia, Japan and South Korea. Countries from coordinated market economies and Mediterranean countries follow. Overall the Scandinavian states have on average the highest stock of human capital with a value of 10.51. The Mediterranean countries rank last with a stock of 5.6. One should note the case of Italy; although one of the G7 countries in the sample, Italy has the surprisingly low value of 6.59.

Table 4.2 gives a summary of all variables used. From 1990 to 1994, the annual growth rate of GDP per capita was 1.07 percent. From 1995 to 1999, the annual growth rate increased to 2.79 percent but fell again to 1.44 percent from 1999 to 2004. The global economy therefore seemed to boom during the period 1995-1999. Stocks of human capital grew steadily from 8.57 to 8.97 and in 2000, to 9.26. Stocks of interpersonal trust steadily decreased from 41.88 to 36.7 percent. Systemic trust values range from 2.07 in Greece (WVS, 1999-2002) to 2.9 in Turkey (WVS 1995-97). The mean values are grouped around 2.5 with a standard deviation ranging from 0.16 to 0.18. The norms index ranges from 7.17 for Mexico (WVS, 1990-93) to 9.82 for Turkey (WVS, 1999-2002). The "Importance of Family" item ranges from 3.61 for Portugal (WVS, 1990-93) to 3.97 for Turkey (WVS, 1999-2002). The social capital index ranges from -1.82 for Mexico (WVS, 1990-93) to 1.45 for Denmark (WVS, 1999-2002).

---

[87] Even more interestingly the US has the highest percent of people who completed a post-secondary education and who started a post-secondary education. There are four other countries that have a high amount of post-secondary degrees. Australia, New Zealand, Canada, and South Korea. Interestingly, no European county is in the top six countries in this regard. The four LMEs, the US, Canada, New Zealand, and Australia, as well as the two economies from Asia, South Korea and Japan lead the ranking. The poorest achievers are the countries from the Mediterranean, particularly Turkey and Portugal.

Table 4.2

Summary Statistics

Variable	Year	Observation	Mean	Standard Deviation	Minimum	Maximum
Growth	1990	24	1.07	1.62	-2.45	6.39
	1995	24	2.79	1.51	0.76	8.67
	2000	24	1.44	1.22	-0.24	4.1
Human Capital	1990	24	8.57	2.06	3.95	12
	1995	24	8.97	2.08	4.54	12.18
	2000	24	9.26	2	4.8	12.25
Income	1990	24	9.83	0.40	8.6	10.27
	1995	24	9.89	0.39	8.72	10.35
	2000	24	10.04	0.39	8.82	10.49
Investment	1990	24	24.54	4.89	15.99	36.49
	1995	24	22.49	5.06	16.32	40.71
	2000	24	24.15	2.89	19.43	30.04
Population Growth	1990	24	0.57	0.62	-0.12	2.26
	1995	24	0.76	0.56	-0.08	2.16
	2000	24	0.59	0.47	0.16	1.74
Interpersonal Trust	1990	21	41.88	14.91	10	66.1
	1995	13[88]	38.64	14.9	6.5	65.3
	2000	21	36.7	15.7	10	66.5
Systemic Trust	1990	20	2.5	0.16	2.22	2.76
	1995	12	2.6	0.18	2.36	2.9
	2000	21	2.51	0.18	2.16	2.76
Norms	1990	21	8.79	0.60	7.17	9.68
	1995	11	9.02	0.38	8.16	9.46
	2000	21	8.95	0.45	7.96	9.82
Family	1990	21	3.82	0.08	3.61	3.92
	1995	12	3.84	0.09	3.69	3.96
	2000	21	3.87	0.07	3.7	3.97
Associations	1990	20	8.9	4.1	2.6	17.1
	1995	-	-	-	-	-
	2000	20	9.9	7.12	0.94	24.99
Social Capital[89]	1990	20	-0.01	0.76	-1.82	1.05
	1995	11	0.20	0.62	-1.02	1.23
	2000	21	-0.05	0.77	-1.68	1.45

---

[88] The third wave of the WVS, 1995-1997, was primarily conducted to analyse developing countries. Only 13 observations were available for the OECD sample. The sample included the US, Japan, the UK, Germany, Australia, Finland, South Korea, Mexico, Norway, Spain, Sweden, Switzerland, and Turkey.

[89] As there were no data for any of the three dimensions: interpersonal trust, systemic trust, and norms, three observations, those for—Switzerland (1989), Turkey (1996-7), and the United Kingdom (1998), — had to be excluded.

Figure 4.1 shows a scatter plot for data on social capital in relation to stocks of human capital for 20 countries in the 1990's[90]. The R-Squared value of 0.339 indicates that there is a significant positive relationship between these variables. There are interesting patterns to observe. Firstly, three out of four Nordic states—Denmark, Norway, and Sweden—range in the upper-right corner of the scatter plot. The liberal economies of the United States, Canada, the United Kingdom, and Ireland can also be positioned in the upper-right corner. Those countries all score relatively high on social capital measurements, as well as on human capital measurements. In the middle of the sample are the three CMEs Germany, the Netherlands, and Austria; Finland and Japan are positioned similarly. Portugal, as a typical representative for the Mediterranean-country sample, and Mexico are located in the lower left corner. Turkey functions as

Figure 4.1

Scatter Plot Between Social Capital and Human Capital in the 1990's
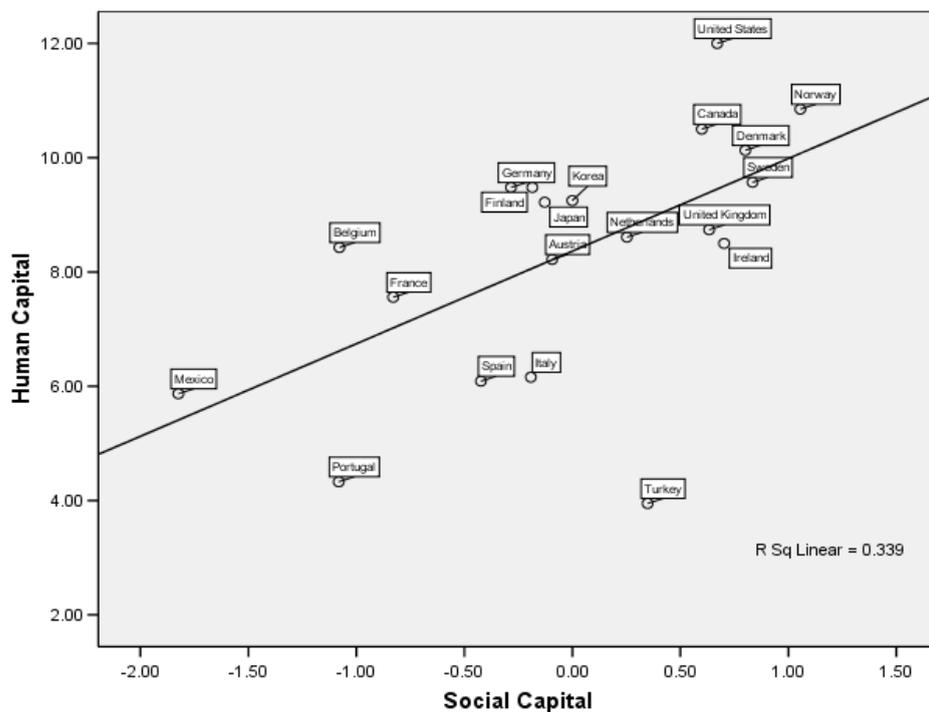
a clear outlier having a relatively high stock of social capital and the lowest stock of human capital (When Turkey is excluded from the sample the, R-Squared value increases to 0.539).

But why does Turkey perform so well, when considering its stock of social capital, as already depicted in Table 3.1 and Figure 3.7 and again highlighted in Figure B3, it has the lowest stocks of interpersonal trust in the OECD? This puzzle can be solved by examining the systemic trust index stocks and the norms index stocks. Figure B1 and Figure B2 demonstrate that Turkey has the highest stock of systemic trust (the mean score for the item "Confidence in the armed forces" is 3.48 in the 1990's, the highest value in the OECD) and the highest value in the norms index. This finding is quite astonishing as it strongly contrasts the findings relating to interpersonal trust. Scandinavian countries are not clustered at the far right side of the distribution (as for instance when observing interpersonal trust) but are clustered in the middle of the distribution with Finland having the second lowest value of the norms index in the 1990's. This is empirically due to the fact that many Finns stated that "claim[ing] government benefits you are not entitled to" is justifiable (mean score of 6.26, compared to 8.7 in the 1999's and 9.02 in the 1995's). In countries such as Finland with high levels of interpersonal trust and a strong civil society, measured as the density of associations (see Figure B6), people tend to be less authoritarian towards the state. In contrast countries with low levels of interpersonal trust and a weak civil society (see Figure 5.4), Turkey for instance, people tend to be *more* authoritarian towards the state. Thus the question whether it is justifiable to "claim governments benefits" or "cheat on tax" must be regarded as independent or even opposed to interpersonal trust[91].

Figures B4 and B5 exemplify these theoretical arguments. As already demonstrated in the factor analysis, the two scatter plots underscore the point that interpersonal trust is only very weakly associated with the systemic trust index[92] (R-square value of 0.072) and reacts completely independently of the norms index (R-

---

[91] The item on "cheat on tax" or "claim government benefits you are not entitled to" does not have to reflect the objective situation in the countries. Of course this point could be made with every survey item. However, the author assumes that the "norms item battery", in particular, is not very valid.

[92] If there is an association between systemic trust and interpersonal trust it is an association between the systemic trust item, "confidence in the parliament" and interpersonal trust as shown in the factor analysis of the fourth wave of the WVS.

Squared value of 0.008). When considering pooled data, the R-Squared values do not change significantly.

3.   Econometric Analysis

3.1   Cross-Sectional Analysis

Using a cross-section design, an OLS-model is estimated with robust standard errors for the dataset. Following a stepwise procedure, Regression 1 in Table 4.3 shows the results for the inclusion of the variable, Income. A significant result for the phenomena of absolute convergence is not obtained[93]. Regression 2 includes the two *Solow*-parameters, Investment and Population Growth. Both variables behave without significance but convergence then becomes significant; this means that conditional convergence is taking place. Regression 3 includes measurement for human capital. It shows that when including human capital data, the process of convergence becomes stronger and more significant, implying that poorer nations with high stocks of human capital are catching up faster. In this regard, the case of South Korea should be considered; South Korea is one of the poorer countries in the OECD and has a high stock of human capital.

Regressions 4 to 9 control for the social capital variables. Regression 4 includes the level of interpersonal trust inherent in a nation. Although interpersonal trust behaves without significance, all other variables have a stronger impact on growth. Sixty-seven percent of the total variance can be explained. However when including the systemic trust variable in Regression 6, a positive (2.23) and significant (2.42) coefficient[94] is obtained. The coefficient for education gets stronger (from 0.40 to 0.44). Sixty-nine percent of the variance can be explained. Regression 5 includes the item, "Importance of Family". This yields a positive (6.04) and significant (3.61) coefficient. The coefficient of human capital becomes somewhat stronger (from 0.40 to 0.42). Neither variable is case sensitive and each stays statistically significant after the exclusion of the most influential case.

---

[93] Barro and Sala-i-Martin (2004) showed, taking an 18-country OECD sample and a forty-year period from 1960 to 2000, that absolute convergence does apply significantly (p. 46).
[94] When included into Regression 4 in Table 3.4 instead of interpersonal trust and using a 31-country sample the systemic trust variable behaves positively (3.49**) and significant (2.39).

Table 4.3

Human Capital, Social Capital, and Economic Growth—A Cross-Sectional Analysis for 24 OECD Countries

Dependent Variable	Growth GDP per Capita 1990-2004								
Estimation Method	OLS Robust	OLS Robust	OLS Robust	OLS Robust	OLS Robust	OLS Robust	OLS Robust	OLS Robust	OLS Robust
Equation	1	2	3	4	5	6	7	8	9
Income	-0.82	-1.63*	-3.32**	-4.59***	-4.21***	-4.02***	-4.54***	-4.59***	-4.19***
	(-1.14)	(-1.85)	(-2.94)	(-4.01)	(-5.05)	(-4.19)	(-4.03)	(-3.98)	(-3.83)
Investment		0.05	0.03	0.004	0.007	0.03	-0.001	0.001	0.01
		(0.85)	(0.68)	(0.01)	(0.25)	(0.87)	(-0.03)	(-0.02)	(0.40)
Population Growth		-0.68	-1.13*	-1.78**	-1.97***	-1.63***	-1.76***	-1.78**	-1.63**
		(-1.16)	(-1.86)	(-2.84)	(-3.83)	(-3.07)	(-2.89)	(-2.56)	(-2.80)
Human Capital			0.40**	0.58***	0.42***	0.44***	0.55***	0.57**	0.44**
			(2.36)	(3.17)	(3.69)	(3.02)	(3.30)	(2.44)	(2.88)
Interpersonal Trust				-0.001					
				(-0.08)					
Family					6.04***				
					(3.61)				
Systemic Trust						2.23**			
						(2.42)			
Norms							0.26		
							(1.43)		
Associations								0.02	
								(0.03)	
Social Capital									0.41*
									(1.93)
Constant	10.0	17.1*	31.2***	43.2***	17.6**	32.4***	40.6***	43.2***	40.0***
	(1.40)	(1.96)	(2.89)	(3.89)	(2.48)	(3.69)	(3.81)	(3.88)	(3.75)
R-Squared	0.09	0.24	0.48	0.67	0.78	0.74	0.69	0.67	0.71
F-Test	1.31	1.18	4.30**	11.69***	20.40***	8.18***	12.68***	11.69***	7.95***
N	24	24	24	21	21	20	21	20	20

* 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.

When including the norms index and the variable for associational activity in Regressions 7 and 8, significant results are not obtained. However, when taking a 32-country sample as in Table 3.4, the positive result betweennorms and economic

growth[95] can be replicated, which was previously found by Knack and Keefer in 1997 (for more details see Chapter II).

Regression 9 examines the social capital index. It is significantly (significance at the 90-percent level) and positively related to economic growth. As the systemic trust index is positively related to economic growth in an OECD country sample (Regression 6 in Table 4.3), and the interpersonal trust item and the norms index are positively related to economic growth in a larger country sample (Regression 4 in Table 3.4), the result is as expected. However, when excluding the most influential case (Ireland), the relationship loses significance. Thus the relationship is strongly case sensitive. If the variable, Associational Activity, is included in the social capital index[96], a significant (significance at the 90-percent level) and positive coefficient for the social capital index (N=19) results. However, when excluding the most influential case (Germany) the relationship loses significance.

The results clarify that when trying to explain long-term economic growth, in this case, the 15-year growth period from 1990 to 2004, some dimensions of social capital can rather effectively explain differences in economic growth rates. The social capital index consisting of three dimensions (when associational activity is included, then four dimensions) is able to explain 23 percent of variance in international growth rates and is slightly positively affecting the impact of human capital (from 0.40 to 0.44) on economic growth. However, an interaction between human capital and any dimension of social capital is not detectable. This positive relationship between the dimensions of social capital and economic growth and the positive effect on human capital is in accordance with previous research focusing on the relationship between social capital and economic growth (Knack & Keefer, 1997; Putnam & Heliwell, 1999; Inglehart, 1997; Sabatini, 2007).

---

[95]When the norms index is included in Regression 4 in Table 3.4, instead of interpersonal trust, a positive (0.59) and significant (significance at the 99-percent level) coefficient is obtained. Further results can be obtained from the author upon request.
[96]Results can be obtained from the author upon request.

3.2   Pooled Panel Analysis

A pooled time series obtains observations about 24 countries over three time periods. Use of a pooled panel regression (Table 4.4) and using a stepwise procedure replicates the results from the OLS estimation for the relationship between human capital and

Table 4.4

Human Capital, Social Capital, and Economic Growth—A Pooled-Panel Analysis for 24 OECD Countries

Dependent Variable	Growth GDP per Capita 1990-2004								
Method	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel
Equation	1	2	3	4	5	6	7	8	9
Income	-0.52	-0.34	-2.23*	-3.57***	-3.43***	-3.26***	-3.51***	-3.60***	-3.30***
	(-1.08)	(-0.50)	(-1.86)	(-3.20)	(-2.89)	(-2.82)	(-2.97)	(-2.43)	(-2.86)
Investment		-0.05	-0.07	-0.05	-0.04	-0.03	-0.05	-0.02	-0.03
		(-0.62)	(-1.11)	(-1.23)	(-0.79)	(-0.60)	(-0.98)	(-0.18)	(-0.70)
Population Growth		0.09	-0.6	-1.22**	-0.94*	-0.87*	-0.95*	-1.0	-0.86
		(0.26)	(-1.14)	(-2.50)	(-1.85)	(-1.71)	(-1.77)	(-1.55)	(-1.66)
Human Capital			0.41**	0.83***	0.63***	0.62***	0.60***	0.65***	0.62***
			(2.48)	(4.97)	(3.93)	(3.98)	(3.71)	(4.32)	(3.72)
Interpersonal Trust				-0.04**					
				(-2.21)					
Family					0.15				
					(0.09)				
Systemic Trust						-0.14			
						(-0.13)			
Norms							0.49		
							(1.03)		
Associations								-0.04	
								(-0.92)	
Social Capital									-0.04
									(-0.16)
Constant	6.96	6.23	22.3**	33.2***	30.9**	30.1***	28.4**	32.7**	30.3***
	(1.43)	(1.00)	(2.10)	(3.40)	(2.29)	(2.76)	(2.48)	(2.60)	(3.00)
R-Squared	0.02	0.03	0.13	0.36	0.28	0.28	0.31	0.30	0.28
F-Test	1.17	0.69	2.71**	6.43***	5.64***	5.41***	6.00***	4.48***	5.40***
N	72	72	72	55	54	53	53	40	52

* 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.

economic growth. Convergence takes place this time however only after including human capital. The result confirms that poorer nations in the OECD sample grow faster when possessing high stocks of human capital; this conclusion is in accordance with the theory mentioned above. However, the model in Regression 3 inadequately accounts for the variance in international growth differences in OECD countries as it is only able to explain 13 percent of its variance. Regression 4 therefore includes the first dimension of social capital—interpersonal trust—in the model. Contrary to most cross-country estimations (Knack & Keefer, 1997; Whiteley, 2000; Zak & Knack 2001; c.f. Heliwell, 1996), a significant negative result for the interpersonal trust variable is derived, which implies that countries with high levels of trust grow more slowly than countries with low levels of trust. Moreover, the model is now able to explain 34 percent of the variance. (This could be due however to the new case selection of 55 cases.) This result was not supported by the OLS estimation, although one should consider that 21 observations might not be enough to produce statistically-significant results.

With respect to growth rates, the Scandinavian states, with inherent high levels of trust, show an average growth rate of 1.8 percentage points. This is less than the Mediterranean sample, the LMEs, or the Asian sample, all of which score lower on trust. When examining the regression for possible interaction effects, a significant relationship between interpersonal trust and human capital does not appear. However, the negative relationship between interpersonal trust and economic growth is primarily driven by the cases of Finland and Sweden. After the exclusion of these two cases, the relationship loses significance[97]. When including the other dimensions of social capital in Regressions 5 to 9, no significant relationship is detected.

When examining an EU-15 country sample in Table B1, on the other hand, a significant negative relationship between associations and economic growth[98] (Regression 3), as well as a significant negative relationship between interpersonal trust and economic growth (Regression 2), is apparent. An index between these two variables (Regression 4) is also significantly and negatively related to economic

---

[97]When excluding the variables *ki* and Population Growth, and including Price Level of Investment, it is again possible to model the relationship curvilinearly. When dropping the variable, Price Level of Investment, the relationship loses significance and is again statistically significant only when controlling for initial income.

[98]After the exclusion of the most influential case, the Netherlands, the relationship loses statistical significance.

growth (see Figure B6 for the close relationship between density of associations and interpersonal trust). But as the sample size is only 27 (as it is an unbalanced panel), the inclusion of certain cases might strongly influence the result. An interaction effect with human capital was not found. Furthermore, in Regression 5, a negative and significant relationship between the social capital index and economic growth is obtained; this is perhaps due to the influence of interpersonal trust and the strong negative relationship between interpersonal trust and economic growth or due to the specific sample size of N=31. After the exclusion of the most influential case (Greece) however the relationship loses significance.

Thus contrary to the findings from the cross-section design, when analysing an EU-15-country sample, the relationship between the social capital index and short term economic growth is negative.

Sensitivity Analysis

To test the sensitivity of the results, Table 4.5 shows several specification tests including the exclusion of influential observations, the inclusion of additional regressors, and the alteration of case specifications.

The first row of Table 4.5 reports the results, standard errors, and regression coefficient, taken from Regression 3 from Table 4.4. The second row excludes the most influential case, that of Korea. After excluding Korea, the relationship between human capital and economic growth is rendered insignificant. In the cross-section design, the relationship behaves more stably. Thus the relationship between human capital and economic growth in a pooled analysis is very case sensitive and strongly driven by the high-growth countries within the OECD.

When controlling for the variables of Social Expenditure per GDP and Income Inequality, the significance of the human capital variable is not altered. Furthermore, when only examining a country sample of CMEs, the relationship between human capital and economic growth is significant and negative. For the liberal, Mediterranean, and EU-15-country samples, the relationship is not significant; for the Scandinavian country sample the relationship is positive and significant (significance at the 90-percent level).

Table 4.5

Sensitivity Analysis—A Pooled Panel Analysis

Dependent Variable	Growth of GDP per Capita 1990-2004				
Specification Change	Coefficient on Human Capital	Standard Error	Countries	Obs.	R-Square
Influential Cases					
None	0.38**	(2.41)	24	72	0.10
Influential obs. Dropped (Korea)	0.12	(0.86)	23	69	0.23
Specifications					
Inequality	0.44**	(2.30)	24	65	0.13
Expenditure	0.29*	(1.96)	24	71	0.16
Country Samples					
EU-15	0.06	(0.31)	14	42	0.24
Liberal	-0.56	(-1.65)	6	18	0.23
Coordinated	-0.41*	(-2.03)	6	18	0.61
Mediterranean	0.42	(0.90)	6	18	0.79
Scandinavian	1.69*	(1.99)	4	12	0.29

* 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.

3.3   Panel Analysis

Using a panel analysis, the Hausmann test indicates that a fixed-effects model should be used. As there is the possibility of cross-sectional heteroskedasticity, a robust estimation technique will be employed. Again using a stepwise procedure, Table 4.6 shows the basic results for the fixed-effect estimation in the OECD-country sample. As with the pooled-panel results, Regression 3 in Table 4.4 shows that the inclusion of human capital interacts with convergence. Interestingly, a positive coefficient for population growth results, which could be interpreted to mean that countries with high migration rates (the US, for example) are growing faster. An increase in

Table 4.6

Human Capital, Social Capital, and Economic Growth—Fixed-Effects Estimation for 24 OECD Countries

Estimation Method	Fixed-effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed-effects	Fixed effects	Fixed effects
Equation	1	2	3	4	5	6	7	8	9
Income	-2.21	-2.03	-6.57***	-6.11**	-5.78**	-5.79**	-6.36**	-6.82*	-5.80**
	(-1.18)	(-1.08)	(-2.47)	(-2.74)	(-2.33)	(-2.49)	(-2.88)	(-1.82)	(-2.61)
Investment		-0.31***	-0.24***	-0.2**	-0.19	-0.2*	-0.20**	-0.17	-0.2**
		(-3.67)	(-2.79)	(-2.15)	(-1.78)	(-1.75)	(-2.43)	(-1.29)	(-2.34)
Population Growth		1.19*	1.54**	1.73*	2.0*	2.10*	2.12**	3.47*	2.16*
		(1.69)	(2.22)	(1.89)	(2.03)	(1.92)	(2.38)	(1.93)	(1.94)
Human Capital			1.88***	1.30**	1.61***	1.55**	1.44***	1.76*	1.50***
			(2.72)	(2.40)	(2.96)	(2.64)	(3.28)	(2.03)	(3.16)
Interpersonal Trust				-0.08**					
				(-2.12)					
Family					-1.31				
					(-0.34)				
Systemic Trust						0.49			
						(0.23)			
Norms							1.43**		
							(2.32)		
Associations								0.07	
								(0.88)	
Social Capital									0.94
									(1.16)
Constant	23.7	28.6	54.8**	57.0***	52.8***	47.5**	42.1**	55.5*	49.3***
	(1.27)	(1.56)	(2.51)	(4.01)	(2.84)	(2.59)	(2.23)	(1.92)	(2.54)
R-Squared	0.03	0.36	0.46	0.61	0.54	0.52	0.62	0.48	0.56
Countries	24	24	24	24	24	24	24	24	24
Observations	72	72	72	55	54	53	53	40	52
Period	90-04	90-04	90-04	90-04	90-04	90-04	90-04	90-04	90-04

* 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.

population growth and human capital goes hand in hand with an increase in economic growth. Including human capital explains 46 percent of the within-variation in a country.

Including interpersonal trust in Regression 4 raises the value to 61 percent. As already shown from the pooled panel analysis, an increase in interpersonal trust

corresponds to a decrease in economic growth. Nonetheless, when including the norms index in regression 7, a significant (significance at the 95-percent level) and positive (1.43) relationship between the norms index and economic growth is elucidated. Sixty-two percent of the within-variation can be explained. The relationship between human capital and economic growth however weakens, however (as happens when including interpersonal trust); an interaction effect is not found. Thus an increase in the norms index is associated with an increase in economic growth. This result is apparently in contrast to the negative result for the Interpersonal Trust variable and supports previous positive findings in cross-section analyses (Knack & Keefer, 1997). This finding however again underlines the point that the norms index and interpersonal trust item must be evaluated separately. Regressions 5, 6, 8, and 9 include other dimensions of social capital in addition to interpersonal trust and the norms index. None shows significance.

Focusing on the EU-15 country sample[99] shows again that human capital is strongly connected to the process of convergence. An increase in human capital goes hand in hand with an increase in economic growth. When including interpersonal trust into the model, the within-variation rises increases to 74 percent of explainance, but the human capital variable loses significance. The norms index is positively (2.42) and significantly (significance at the 95-percent level) related to economic growth. All other social capital dimensions, including the social capital index, behave insignificantly. When the control variables, Social Expenditure per GDP and Income Inequality, are included, the significance of human capital is not altered (It should nonetheless be noted that when robust standard errors are not considered, social expenditure is significant at the 90-percent level).

Sensitivity Analysis

To test the sensitivity of the results, Table 4.7 shows several specification tests including the exclusion of influential observations, the alteration of case specifications, and the inclusion of additional regressors. The first row of Table 4.7 (labelled "None") reports the results, standard errors, and regression coefficient, taken from Regression 3 in Table 4.6. Successive rows report the effects of human capital on economic growth when the indicated change is made.

_____

[99]Results can be obtained from the author upon request.

The second row of Table 4.7 reports the results after dropping the case of Korea from the country sample. The relationship between human capital and economic growth remains significant (significance at the 95-percent level) the coefficient decreases from 1.88 to 1.69.

Rows 3 and 4 control for the inclusion of two additional regressors—Social Expenditure per GDP and Income Inequality. The coefficients for human capital stay robust.

Rows 5 through 9 reflect different case specifications. In Coordinated, Mediterranean, and the Scandinavian regimes typology, an increase of human capital is significantly and positively related to economic growth. In LMEs however the relationship is insignificant (which may be due to the fact that both the United Kingdom and the United States show a slight increase in human capital from 1995 to 2000 which is associated with a decrease in economic growth).

Table 4.7

Sensitivity Analysis—Fixed-Effects Estimation

Dependent Variable	Growth of GDP per Capita 1990 - 2004				
Specification change	Coefficient on Human Capital	Standard Error	Countries	Obs.	R-Square
Influential Cases					
None	1.88***	(2.72)	24	72	0.46
Influential obs. Dropped (Korea)	1.69**	(2.28)	23	69	0.49
Specifications					
Inequality	1.66**	(2.20)	24	65	0.43
Expenditure	1.26**	(2.26)	24	71	0.51
Country Samples					
Liberal	5.15	(1.74)	6	18	0.35
Coordinated	4.22**	(2.51)	6	18	0.77
Mediterranean	5.31*	(2.19)	6	18	0.42
Scandinavian	1.48*	(2.31)	4	12	0.72

* 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.

4.   Conclusion

Firstly, taking an OECD-country sample consisting of 24 out of 30 OECD countries with the dependent variable being Economic Growth of GDP per Capita from 1990 to 2004, and using an cross-section analysis, the conclusion can be made that human capital measured as the average years of schooling plays an important role in explaining international variances in the growth rate of GDP per capita. This result is replicated when using a pooled panel estimation. However, in the pooled panel design, the relationship is case sensitive and strongly driven by the case of Korea. Interestingly, using a fixed-effects panel estimation, an increase in human capital goes hand in hand with an increase in economic growth.

Secondly, when considering the relationship between dimensions of social capital and long-term economic growth (1990-2004) in an OECD-country sample, social capital is an important factor in explaining the variance in international growth rates. The systemic trust index, the "Importance of Family" item, and the social capital index provide a reasonably good explanation for this variance in growth rates.

Thirdly, when considering the relationship between short-term economic growth and dimensions of social capital, interpersonal trust alone provides an important explanation for economic growth. When trying to explain the changes in economic growth over time, both interpersonal trust and the norms index seem to play an important role. While an increase in interpersonal trust is negatively associated with economic growth, an increase in the norms index is positively associated.

Fourthly, the factor analysis and scatter plots show on the aggregated level that the systemic trust index, norms index, and interpersonal trust measure distinct facets of social capital and are not correlated. This finding is in contrast to Knack and Keefer's (1997). Certainly the variables of interpersonal trust and norms of reciprocity at least should behave much more homogeneously. As this not the case, the items from the "Norms Item Battery" of the WVS seem to be invalid for measuring the theoretical concept of norms of reciprocity.

Chapter V   The Welfare State and Social Capital

> States can have a negative impact on social capital when they start to
> undertake activities that are better left to the private sector or to civil
> society. The ability to cooperate is based on habit and practice; if the state
> gets into business of organizing everything, people will become dependent
> on it and lose their spontaneous ability to work with one another.
> (Fukuyama, 2000, p. 11)

1.   Operationalisation, Model Specification, Data, and Case Selection

1.1   Operationalisation

Welfare Effort

To measure the welfare effort of a country, the size of the welfare state's spending, typically expressed as a proportion of gross domestic product (GDP) (as in the OECD statistics for social security transfers (OECD, 2004)) is evaluated. This is a common procedure in empirical studies and has been applied by many researchers (e.g., Atkinson, 1998; van Oorschot & Arts, 2005). Social expenditure, as measured under OECD definitions, is an aggregated variable consisting of nine components. Roth and Tonkiss (2007) give a detailed overview of the nine components. They state that the components consist of:

> i) old-age provision (pensions, aged care, residential care, etc.); ii) survivor benefits (widows and veterans pensions, etc.); iii) health spending (in- and out-patient care, primary care); iv) family expenditure (maternity and paternity benefit; child allowances and benefits; lone parent benefit, etc.); v) incapacity benefits and services (disability benefits, sickness benefits, social care, etc.); vi) active labour market policies (employment and training services, employment subsidies); vii) unemployment benefits and support; viii) housing (housing benefits and subsidies); and ix) other social policy spending (for example, benefits or allowances to low-income households, and other social services). (p.12)

Furthermore, they find out that "across the sample, old age and health expenditure account for up to two-thirds of total social expenditure" (Id. p. 12).

Dimensions of Social Capital

To operationalise and measure social capital, researchers agreed on three dimensions of social capital. Those dimensions include trust, norms of reciprocity, and networks (Putnam, 1993, 1995, 2000; Knack & Keefer, 1997, Gabriel, et al., 2002; Offe, 2001). As this thesis primarily focuses on the concept of interpersonal trust, norms of reciprocity will not be further discussed. The concept of networks is still in discussion. It is not yet clear whether to adhere to the sociological dimension of networks or to include the political science argument taking actors of civil society into the equation. The dimension would then be more in relation to civics than networks. In the following argumentation, Robert Putnam's definition as depicted in his works will be used. For Putnam the indicator networks mostly includes dimensions from the sphere of civil society, especially those dimensions involved with group membership in voluntary associations (Putnam, 1993, 1995, 2000, 2001). In addition to associational activity, aspects related to Social Movement Organisations (SMOs) will be included in the measurement of networks. SMOs are a part of civil society and still have to be differentiated from classical forms of civil society. This distinction is made by Minkoff (1997). She doubts that Putnam's (1995) conclusion to disregard SMOs as an factor in building social capital is correct. Several researchers agreed on a methodology to measure networks (Inglehart 1997; Knack & Keefer, 1997; Paxton 2002; van Oorschot & Arts, 2005). The dimensions of networks are measured by the following item of the WVS: "Please look carefully at the following list of voluntary organizations and activities and say a) which if any do you belong to?". These items are nominal scaled where 1 stands for "Belong to" and 2 for "Not mentioned". The answer, "Belong to", is aggregated and ranges theoretically from 0 to 1. To construct a group index, all aggregated results are added together and then multiplied by ten. As ten items are included, the group index ranges from 0 to 100 with low values representing weak associational density and high values representing high associational density. The ten group items in the analysis are: i) groups for social welfare services for elderly, handicapped, or deprived people, ii) religious or church organisations, iii) education, arts, music, or cultural activity groups, iv) labour unions, v) political parties or groups, vi) local community action groups on issues like poverty, employment, housing, or racial

equality, vii) third-world development or human rights advocacy groups, viii) environmental groups, ix) professional associations, and x) youth work groups.

1.2 Model Specification

To estimate the determinants of social capital, the following model specifications are used in the model: social expenditure per GDP data, the natural logarithm of Income, and the Gini-Coefficient. The fixed-effects model can be described as follows:

$$
\begin{aligned}
Social\ Capital_{it} = \alpha_i + \ \ & \beta_1\ Social\ Expenditure_{\ i,t\text{-}1} \\
& + \beta_2\ Income_{\ i,t\text{-}1} \\
& + \beta_3\ Gini\text{-}Coefficient_{i,t\text{-}1} \\
& + w_{\ i,t,}
\end{aligned}
$$

where i represents each country and t represents each time period; *Social Capital $_{it}$* is the value for social capital for country i at period t; *Social Expenditure $_{i,t\text{-}1}$*, *Income $_{i,t\text{-}1}$* and *Gini-Coefficient $_{i,t\text{-}1}$* are respectively, social expenditure, income, and Gini-Coefficient for country i during period *t-1*; α_i represents a group-specific constant term and $w_{\ i,t}$ is the error term.

1.3 Data

Data on social expenditure is taken from the OECD (2004)[100]. As data for the time span from 1980 to 2001 are available, five time intervals are constructed. For Time Period 1, data from 1980 is incorporated. For Time Periods 2 through 5, four four-year intervals (1982-1985, 1986-1989, 1991-1994, and 1995-1998) are constructed. The idea behind this procedure is to use a lagged independent variable.

- Data on income is taken from the World Development Indicators for 2006. The variable is adjusted for purchasing power parity (PPP, expressed in constant 2000 US dollars). The variable is transformed by using the natural

---

[100] Those statistics are available over the internet from http:www.oecd.org/statistics. The social expenditure data are given for a range of 30 OECD countries.

logarithm to address any possible outliers when considering GDP per Capita values. The variable is constructed as described above.

- Data on income inequality is taken from the UN database, WIDER. For a valid cross-country comparison, data from the Luxembourg Income Study (LIS)[101]is used working with the income definition of "Monetary Income Disposable".

- Data on the density of associations is drawn from three waves of the WVS: 1981-1984, 1990-1993, and 1999-2002[102].

- Data on human capital are taken from Barro and Lee (2000).

- Data on trade unions are drawn form the International Labour Organisation (ILO).

- The data on interpersonal trust and systemic trust are drawn from four waves of the WVS 1981-1984, 1990-1993,1995-1997, and 1999-2002, and the Eurobarometer 25, providing data for the year 1986.

1.4   Case Selection

Due to data restrictions in the Social Expenditure and Interpersonal Trust variables, the country sample consists of 23 OECD[103] countries. The observations were made from 1980 to 2004, providing 79 cases for the analysis. The four transition countries the Slovak Republic, Hungary, the Czech Republic, and Poland were excluded due to the theoretical reasons mentioned above, as well due to massive data restrictions for the variable, Social Expenditure. Also excluded were the two smallest nations, Iceland and Luxembourg, due to data restrictions and due to their small size. New

---

[101]Fifty-one observations are taken from the Luxembourg Income Study (monetary income disposable); seven observations are taken from other sources. Three observations (1989, 1992, and 1998) for Japan are taken from Shirahase (2001) (income disposable). The data for Portugal and Greece in 1998 are taken from the European Commission (income disposable) (2005). The data for Finland in 1981 is taken from Jänti (2005) (income). The data for Australia is taken from the Australian Bureau of Statistics (2003) in 1995 (monetary income disposable). Working with 51 observations did not alter these results in comparison to the 58 observations sample.

[102]To be able to construct the variable, Associations, the merged dataset from the WVS (Inglehart, 2000) (which contains all three waves of the WVS) could not be used because the wording and items on "group membership" and "doing unpaid work" were not comparable to the WVS, 1999. This necessitated ordering another dataset which contained only data from 1981 to 1984 and 1990 to 1993 (World Value Study Group, 1999). The item on group membership and volunteer membership is in accordance with item of the WVS, 1999-2002. It is therefore possible to compare group membership over three time periods: 1981-84, 1990-93, and 1999-2002.

[103] The following countries were included: the US, Japan, Germany, France, Italy, the United Kingdom, Canada, Spain, Belgium, the Netherlands, Portugal, South Korea, Mexico, Australia, Greece, Denmark, Finland, Norway, Sweden Switzerland, and Turkey.

Zealand was likewise excluded due to data restrictions in the Interpersonal Trust variable.

All G7 countries are included in the sample, as well as 14 out of 15 EU-15 countries[104]. Differentiation is made between and amongst OECD-23, EU-15, Mediterranean, and Scandinavian countries and LMEs, and CMEs (Hall & Soskice, 2001; Esping-Andersen, 1990). As mentioned above (1.1.4), EU-15 countries should be analysed separately from OECD countries. The following country clusters and regime typologies are addressed: CMEs include Austria, Belgium, the Netherlands, Switzerland, and Germany. For Mediterranean, the following six countries are included: France, Italy, Greece, Portugal, Spain, and Turkey. For LMEs the following five countries are included: the US, the United Kingdom, Canada, Ireland, and Australia. The Scandinavian countries include Sweden, Denmark, Norway, and Finland.

2. Descriptive Statistics

Table 5.1 lists all Social Expenditure values for the included country observations in the dataset. The data range from a minimum of 2.1 percent for Mexico in Period 3 (1986-1989) to 35 percent for Sweden in Period 4 (1991-1994). Overall there exists the trend that social expenditure increases over time. The Netherlands is the only exception to this trend as their expenditures decline from 26.9 percent in Period 1 to 24.2 percent in Period 5.

Table 5.2 reports the final dataset, with means, standard deviations, and ranges for each of the variables. In Period 1 (1980), 15 out of the 23 countries are analysed. The mean value for social expenditure is 19.32 with a standard deviation of 6.05. Japan has the lowest value with 10.2 percentage points, followed by Australia with 11.2 percentage points and the US with 13.3 percent. The maximum value for social expenditure is Denmark's with 29.1 percent. In the second period (1982-85), the mean expenditure rate is 21.65. Portugal has the lowest value of 11.1 and the Netherlands, a value of 28.8 percent. The third period (1986-89) includes Mexico

---

[104] Fourteen out of 15 EU-15 countries were included. They are Austria, Belgium, Denmark, France, Finland, Germany, Greece, Italy, Ireland, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. Only Luxembourg had to be excluded.

Table 5.1

Social Expenditure Costs per GDP

Country	80	82-85	86-89	91-94	95-98
United States	13.3	-	13.1	15.1	15
Japan	10.2	-	11.2	12.2	13.9
Germany	23	23.5	23.6	26.3	27.6
France	21.1	24	26	-	29.2
Italy	18.4	21	21.6	-	23.6
United King.	17.9	20.8	19.9	22.8	22.3
Canada	14.3	-	17.1	-	18.8
Australia	11.3	-	-	16.1	-
Austria	-	-	24.1	-	26.2
Belgium	24.1	26.5	26.1	-	27.9
Denmark	29.1	29	28.4	-	31.2
Finland	18.5	-	23.5	32.7	29.3
Greece	-	17.1	-	-	22.1
Ireland	17	18.7	20.5	-	17.5
South Korea	-	-	-	3.2	4.4
Mexico	-	-	2.1	4.8	8.4
Netherlands	26.9	28.8	26.7	-	24.2
Norway	-	-	24.6	26.4	-
Portugal	-	11.1	12.1	-	18.8
Spain	15.9	17.7	18.1	21.6	21
Sweden	28.8	-	30.2	35	31.7
Switzerland	-	-	15.4	21.7	-
Turkey	-	-	5.2	8.2	9.8

with an expenditure value of 2.1 percent. Sweden increased its expenditure rate to 30.2 percent. In 1995 Sweden has further increased its expenditure rate to 35 percent. In the fifth period, it decreased to 31.7 percent. A detailed overview of the change in the social expenditure costs over time for selected OECD countries is given in Figure C1.

Taking income inequality into consideration, the picture is somehow similar. In the 1980's the lowest value belonged to Sweden with 20.7 percent and the highest

value to Spain and the US with 34.4 percent each. Including Mexico into the sample from the 1990's causes the Gini-Coefficient to rise to 52.4, 55.1, and 54.4 percent, respectively. Finland's income inequality is the lowest in the sample three consecutive times (22.4, 23.5, and 26.8 percent). A general pattern that the Gini-Coefficient increases over time can be observed. In the US the Gini-Coefficient increases from 34.4 percent in the 1980's to 40.8 percent in the 1999's. In Italy it increases by 4.4 percent, in the UK, by 8.1 percent, in Belgium, by 7.5 percent, in Norway, by 5.6 percent, in Sweden, by 6.5 percent. Associations range between 0.94 for Turkey in the fifth period (WVS, 1999-2002) to 25 for Sweden in the fifth period (WVS, 1999-2002). Overall associations have very high values for the four Scandinavian countries, the Netherlands, and the two liberal countries, the US and Canada. Associations are low in the Mediterranean countries Turkey, France, Portugal, and Spain. A big increase in associations has taken place in the US and Sweden from 1990 to 1999 according to the data of the WVS. The level of US associations increased from 15 to 23. Sweden's increased from 14.3 to 25 (the highest of the sample in 1999). The Netherlands' associational level increased from 11.1 to 17.1 (highest value in 1990) to 23 in 1999. In Germany, on the other hand, a different trend is observable. Associations decrease from 7.9 to 4.55. In the UK a similar picture is observable; associations decreased from 9.2 (1980) to 7.9 (1990) to 4.74 (1999).

Figure 5.1

Social Expenditure per GDP (1995-1998)—A Cross Section of Countries
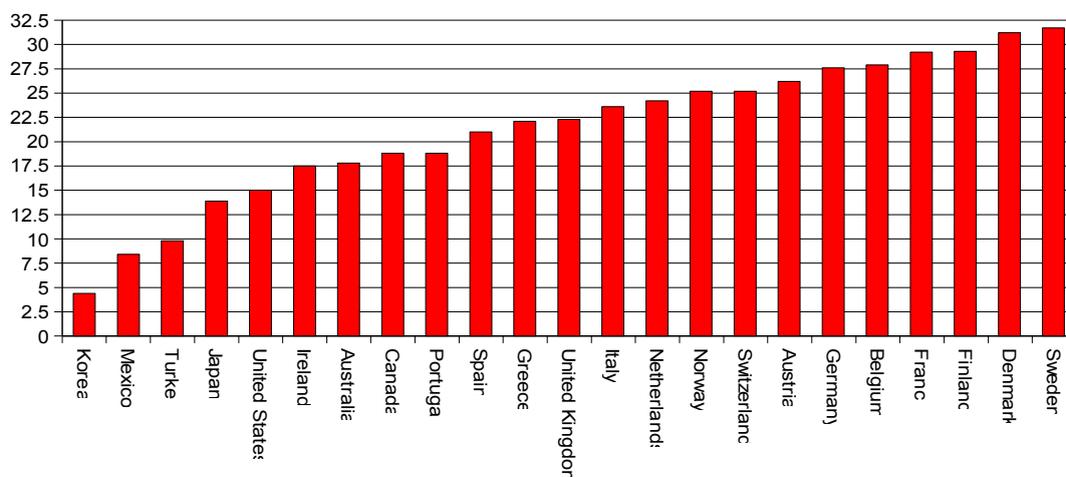
Figure 5.1 visualises levels of social expenditure across the selected OECD countries. The most interesting pattern to observe is the discrepancy between the four largest economies in the world. Whereas the US and Japan are located at the very left side of the distribution with low social expenditure values of 13.9 and 15 percent, respectively, Germany and especially France are located at the very right side of the distribution with high social expenditure levels of 29.2 and 27.6 percent, respectively. France's social expenditure level also matches the average sum of that for the three small Scandinavian economies.

Figure 5.2

Scatter Plot Between Social Expenditure per GDP and Interpersonal Trust
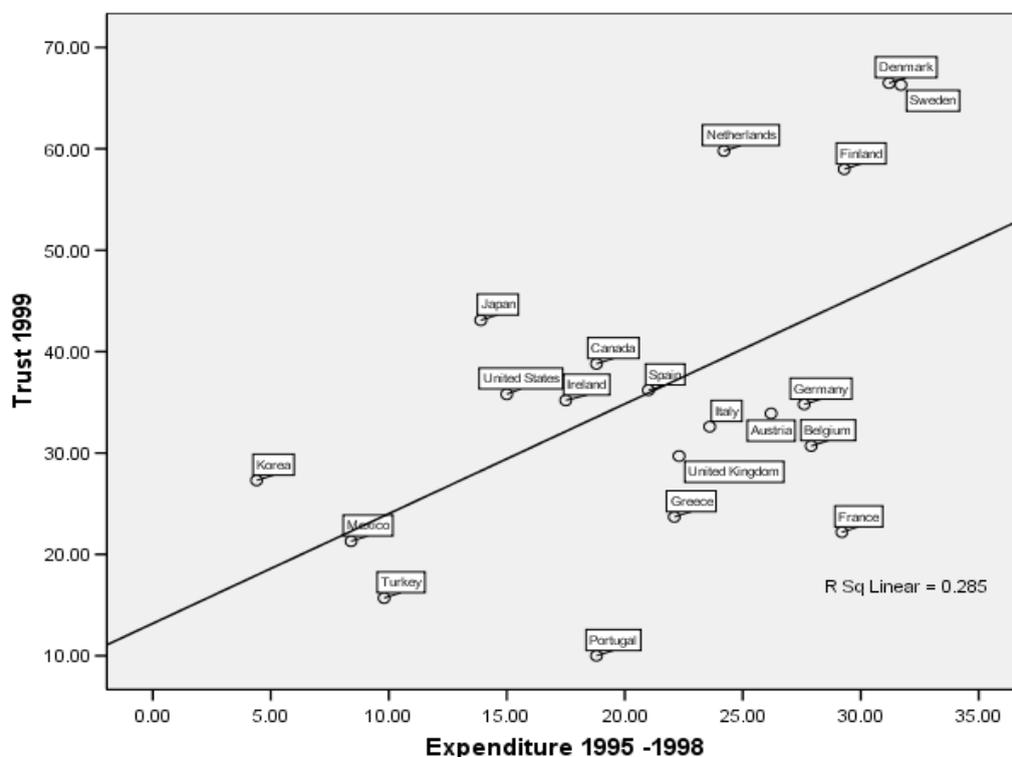
Figure 5.2 shows a scatter plot between Social Expenditure per GDP data (averages from 1995-1998) and Interpersonal Trust (WVS, 1999) data for 20 out of 23 countries in the sample. The R-Square value of 0.285 indicates that overall, while there is a significant positive relationship between these variables, it is not a strong one. The relationship is mainly driven by the three countries Mexico, Turkey, and South Korea which are located in the lower left corner, as well as the Netherlands and the three Scandinavian states, Finland, Denmark, and Sweden, which are located

in the upper right corner. Whereas Turkey, Mexico, and South Korea have low levels of social expenditure and low levels of trust, the Scandinavian countries and the Netherlands have high levels of both expenditure and trust.

However, when only considering the G7 countries, the relationship is negative. In that case, the US, Japan, and Canada would have the lowest values for Social Expenditure and the highest for Interpersonal Trust. In contrast to those three countries, France, with the highest level of Social Expenditure per GDP, would have the lowest values for Interpersonal Trust. Interestingly, France is one of the strongest outliers (right behind Portugal) in the country sample having one of the highest levels of social expenditure and fourth-lowest level of interpersonal trust, after Mexico, Turkey, and Portugal. Italy, the United Kingdom, and Germany are centered in the middle of the distribution.

Figure 5.3

Scatter Plot Between Δ Social Expenditure [9094-8689] and Δ Trust [1995-1990][105]

---
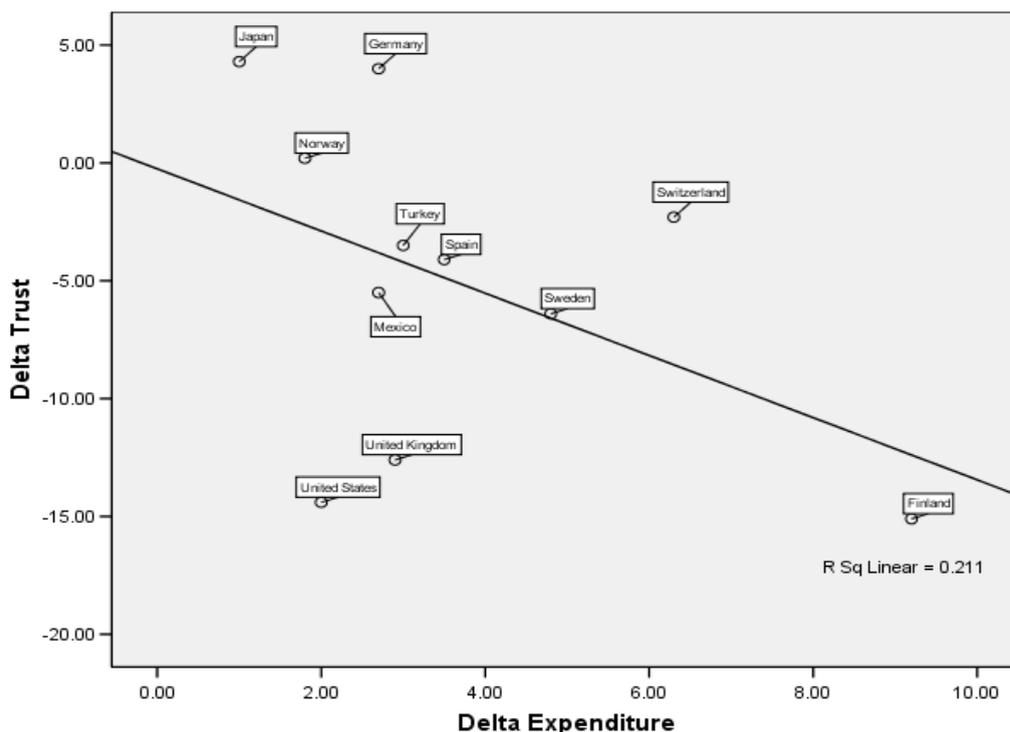
[105] Delta Trust [1995-1990] is constructed by subtracting the values of Interpersonal Trust taken from the WVS 1990 from the values of Interpersonal Trust taken from the WVS 1995. Delta Social Expenditure [9094-8689] is constructed by subtracting the value of the four-year interval of Social Expenditure per GDP for 1986 to 1989 (Time Period 3) from the value of the four-year interval 1990 to 1994 (Time Period 4) of Social Expenditure per GDP taken from OECD data on social security transfers.

Let us now focus on a scatter plot that investigates the relationship between changes in Social Expenditure per GDP and Interpersonal Trust. Figure 5.3 demonstrates that there is a negative relationship between changes in Social Expenditure per GDP and changes in Trust. That means a rise in the level of Social Expenditure per GDP is associated with a decrease in the overall trust level. A good example is the case of Finland. In Finland an increase in Social Expenditure per GDP from Time Period 3 (1986-89) to Time Period 4 (1990-94) of 9.2 percent goes hand in hand with a decrease in the overall level of Interpersonal Trust of -15.1 percentage points from 1990 to 1995. The same pattern is apparent for Sweden. In Sweden an increase in Social Expenditure of 4.8 percent is associated with a decrease in interpersonal trust of 9.5 percent. Overall there is an increase in social expenditure per GDP associated with a decrease in the level of interpersonal trust. In contrast to those two countries, Japan's data reflect an increase in Social Expenditure of 1.1 percentage points which is associated with an increase in interpersonal trust of 4.3 percentage points. In the United States and the United Kingdom an increase in social expenditure is associated with a decrease in levels of trust. Figures C2 and C3 compare the changes in social expenditure and trust over time. In both countries a change in social expenditure is diametrically related to a change in interpersonal trust.

Table 5.2

Summary Statistics

Variable	Year	Observations	Mean	Standard Deviation	Minimum	Maximum
Social	1980	15	19.32	6.05	10.2	29.1
Expenditure	1985	11	21.65	5.43	11.1	29
	1990	20	19.48	7.65	2.1	30.2
	1995	13	18.93	10.07	3.2	35
	2000	20	21.15	7.81	4.4	31.7
Income	1980	10	29.86	4.68	20.7	34.4
Inequality	1985	5	30.24	3.29	24.7	32.6
	1990	15	31.87	7.29	22.4	52.4
	1995	11	33.25	8.83	23.5	55.1
	2000	16	35.0	6.5	26.8	54.4
Interpersonal	1980	15	42.02	10.93	24.8	57.2
Trust	1985	11	38.63	12.26	21.3	63.5
	1990	20	42.27	15.19	10	66.1
	1995	13	38.64	14.9	6.5	65.3
	2000	20	36.08	15.84	10	66.5
Income	1980	15	9.76	0.18	9.25	10.03
	1985	11	9.70	0.23	9.32	9.98
	1990	20	9.81	0.42	8.55	10.25
	1995	13	9.81	0.51	8.64	10.29
	2000	20	9.90	0.41	8.73	10.36
Human Capital	1980	15	8.3	1.77	5.15	11.91
	1985	11	7.28	1.76	3.57	9.42
	1990	20	8.38	2.14	3.95	12
	1995	13	9.33	2.22	4.57	12.18
	2000	20	8.90	1.99	4.8	12.25
Systemic Trust-	1980	15	2.41	0.16	2.09	2.69
Parliament	1985	-	-	-	-	-
	1990	19	2.34	0.19	1.89	2.67
	1995	12	2.14	0.21	1.88	2.68
	2000	20	2.24	0.21	1.73	2.55
Associations	1980	16	8.06	3.39	3.8	15
	1985	-	-	-	-	-
	1990	20	8.85	4.1	2.6	17.1
	1995	-	-	-	-	-
	2000	20	9.9	7.1	0.94	25
Trade Unions	1980	4	36.1	14.32	21	55
	1985	1	49.9	-	49.9	49.9
	1990	9	53.08	28.43	16.4	96.1
	1995	10	49.0	39.1	14.5	122.2
	2000	12	49.7	34.3	11.9	105.1

3.   Econometric Analysis

3.1   Cross-Sectional Analysis

To begin, the model is estimated using a cross-section design[106]. Using a stepwise procedure, Regression 1 in Table 5.3 shows a positive relationship between welfare state effort and interpersonal trust for 20 countries out of the 23-country sample. This supports the first assumption from the scatter plot in Figure 3.1. Controlling for income and income inequality (Regression 2), however this relationship loses statistical significance. Including the proxy for human capital, average years of education, in Regression 3 renders the three other variables statistically nonsignificant. Stocks of human capital and interpersonal trust seem to be the most strongly associated. This relationship has already been discussed under Point 2. Taking the validity of Putnam's argumentation for granted, levels of interpersonal trust should be strongly associated with the density of associational activity in a nation. Regression 4 therefore includes the variable, Associations. In contrast to the result of Knack and Keefer (1997), who found that density of associational activity is not significantly related to levels of trust, the result here indicates that the variable, Associations, exhibits the strongest influence on levels of trust in an OECD country sample. All three socio-economic variables and Human Capital lose their statistical significance. Regression 5 presents the most parsimonies model with the best fit. The sensitivity analysis includes the Gini-Coefficient and Associations in the model[107].

---

[106] The cross-section data were constructed by using interpersonal trust data from the WVS 1999-2002. The data for Social Expenditure per GDP are taken from Period 5 (1995-1998). As there are only 13 observations for income inequality from the Luxembourg Income Study, data for Turkey and Austria were taken from the OECD (Förster & d'Ercole, 2005) and for Greece, Portugal, Japan, France, and Denmark, from the UN-WIDER dataset not taking the Luxembourg Income Study as a reference. As can be inferred from Table 5.1, three countries had to be excluded due to data restriction in the Interpersonal Trust variable. Norway, Australia, and Switzerland were thus excluded.

[107] One could now argue that on a micro-level, the relationship between associational activity and those people who trust other people are not associated. A χ^2 test for all ten items used in the analysis and the interpersonal trust item for the fourth wave of the WVS (European Values Study Group, et al., 2004), with a maximum of N=35,949 (the actual size of N varies according to the item), is significant at the 99-percent level, meaning that the independence assumption can be rejected. The category, "Belong to an association", and the category "Most people can be trusted", are positively associated. Fifty-one percent of the people who belong to a labour union trust most people, in contrast to 30 percent of those not belonging to a labour union, and in contrast to 36 percent of the total population (N=27,110). Forty-six percent of the people who belong to an association trust most people, in contrast to 23 percent who do not belong to an association, and 35 percent of the total population (N=18,897).

Table 5.3

Social Expenditure and Interpersonal Trust—A Cross-Sectional Analysis for 20 OECD Countries

Dependent Variable	Interpersonal Trust 1999				
Estimation Method	OLS Robust Estimators	OLS Robust Estimators	OLS Robust Estimators	OLS Robust Estimators	OLS Robust Estimators
Equation	1	2	3	4	5
Social Expenditure per GDP	1.08** (2.75)	0.12 (0.28)	0.62 (1.24)	0.29 (0.56)	
Income		5.7 (0.98)	-10.6 (-1.24)	-7.1 (-0.81)	
Gini-Coefficient		-1.16* (-1.77)	-0.8 (-1.48)	-1.0 (-1.72)	-1.09** (-2.73)
Human Capital			4.6*** (3.22)	1.12 (0.58)	
Associations				1.13*** (3.30)	1.24*** (4.62)
Constant	13.2* (1.75)	17.2 (0.26)	114.0 (1.56)	71.6 (0.74)	61.6*** (3.99)
Omitted-variable test	-	-	-	-	Passed
R-Squared	0.29	0.45	0.61	0.72	0.71
N	20	20	20	20	20

* 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.

Figure 5.4 shows a partial-regression leverage plot. As can be seen from Figure 5.4, the positive relationship between density of Associations and Interpersonal Trust is strongly influenced by the two countries, Sweden and the Netherlands, as well as France, Portugal, and the US. Whereas in Sweden and the Netherlands a high density of associations is associated with very high level of interpersonal trust, for France and Portugal, in contrast, a low density of associations is associated with a low level of interpersonal trust.

Figure 5.4

Partial Regression Plot—Trust (1999-2002) and Associational Activity
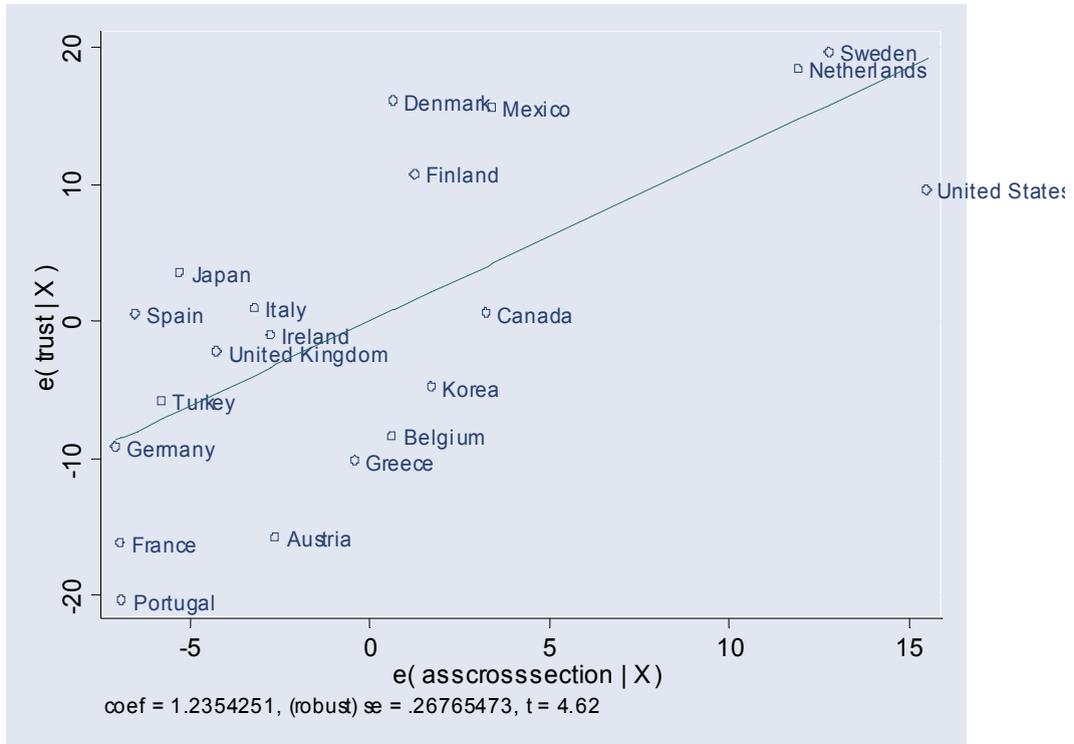
3.2　　Pooled Panel Analysis

The pooled time series reflects observations about 23 countries over five time points with a total of 79 observations. Using a pooled panel regression (Table 5.4), the conclusions confirm the results from the cross-section design. Regression 1 includes the two variables, Social Expenditure and Human Capital. Both variables are statistically significant (99-percent level) and have a positive coefficient. Forty-eight percent of the variance in Interpersonal Trust can be explained. An increase of one half a percent in Social Expenditure is associated with an increase of one percent in Interpersonal Trust.

　　　　As it is often argued that levels of interpersonal trust are strongly associated with whether a country is rich or poor, Regression 2 presents a model including Social Expenditure and Income to clarify this association. Income does affect levels of trust in an OECD sample. (The relationship is weaker for developing countries. If India and China are considered, for example, both countries are poor but demonstrate a considerable amount of trust[108]). The positive relationship between Social Expenditure and Interpersonal Trust however is not altered (but is weakened) by the inclusion of Income. Nonetheless, only 31 percent of the variance in international levels of trust can be explained. Regression 3 includes the Gini-Coefficient as a determinant of income inequality in the model. Interestingly, when controlling for the Gini-Coefficient, the relationship between Social Expenditure and Interpersonal Trust loses statistical significance. The Gini-Coefficient is negatively related to levels of interpersonal trust. An approximately one-percent increase in income inequality is associated with a one-percent decrease in interpersonal trust. The model is able to explain 32 percent of the variance in levels of interpersonal trust. However, due to data restrictions from the Luxembourg Income Study, the results are based on 19 countries and a total of 57 observations[109] only. Regression 4 includes Human Capital. When including Human Capital, the Income variable here renders

---

[108]Nevertheless, when regressing income on trust in the 41-country sample (129 observations), income and human capital are significantly associated with interpersonal trust. Results can be obtained from the author upon request. A closer look at the direct relationship between income and trust is shown in Figure A2.

[109]The four countries that were excluded are Turkey, Denmark, Switzerland and Austria. For three of them, Turkey, Denmark, and Austria there were no data reported in the UN-Wider database from the Luxembourg Income Study (LIS). For Switzerland there were only data available for the fifth period. In that period there were no interpersonal trust data available.

statistically significant but is now negatively related to Interpersonal Trust (This result is most likely the consequence of multicollinearity between Human Capital and Income). Human capital and income inequality are highly significantly related to interpersonal trust. Regression 5 includes the variable, Associations. The results are still based on the same 19 countries but this time there are only 41 observations due to data restrictions in this variable. When including Associations in the regression, Human Capital loses significance but the relationship between the Gini-Coefficient and Interpersonal Trust is strengthened.

Table 5.4

Social Expenditure and Trust—A Pooled Panel Analysis

Dependent Variable	Interpersonal trust 1981-2002					
Estimation Method	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel
Equation	1	2	3	4	5	6
Social Expenditure per GDP	0.57*** (3.62)	0.46** (2.15)	-0.06 (-0.25)	0.32 (1.34)	-0.19 (-0.58)	
Income		14.2*** (4.53)	5.48 (1.05)	-11.8* (-1.84)	-12.7 (-1.63)	
Gini-Coefficient			-0.98*** (-3.70)	-0.75*** (-2.76)	-1.31*** (-4.65)	-1.0*** (-3.75)
Human Capital	3.72*** (6.69)			4.06*** (5.04)	1.50 (1.42)	
Associations					1.15*** (4.28)	1.23*** (4.97)
Constant	-3.58 (-0.90)	-109.1*** (-3.73)	19.7 (0.37)	139** (2.18)	188.8** (2.52)	63.7*** (6.50)
R-Squared	0.48	0.31	0.32	0.50	0.64	0.59
Countries	23	23	19	19	19	19
N	79	79	57	57	41	42
Period	81-99	81-99	81-99	81-99	81-99	81-99

* 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.

Regression 6 reports the Parsimonies model. As with the cross-section analysis, the best model when trying to explain the international variance in Interpersonal Trust is a model that includes the socio-economic measure, income inequality, on one hand, and a cultural variable, the density of associational activity in a country, on the other hand. Applying these two variables can explain 59 percent of the variance in international levels of interpersonal trust in the pooled country sample.

The following sensitivity analysis stresses the relationship between income inequality and trust. (Doing a sensitivity analysis for associations showed that the relationship between associations and interpersonal trust responds very robustly to any kind of specification change[110].) To test the sensitivity of the results from the Gini-Coefficient, Table 5.5 shows several specification tests including the exclusion of influential observations and the alteration of case specifications. The first row of Table 5.5 (labelled "None") reports the results, standard errors, and regression coefficient, taken from Regression 6 in Table 5.4. The second row excludes the case of Finland. The relationship between income equality and interpersonal trust remains highly significant (-3.20) but does weaken (-0.9). The relationship becomes less significant and weaker when excluding Sweden or Norway from the country sample. However, the result is still statistically significant at the 95-percent level. Row 4 examines a sample of EU-15 countries. The relationship is highly significant and stronger. An one-percent increase in the Gini-Coefficient is associated with a decrease of one and a half percent in interpersonal trust. The liberal and Mediterranean country samples both show no statistical significance (When only including the Gini-Coefficient without controlling for group membership however, the relationship is significantly negative). CMEs reflect the strongest association (-1.81) between income equality and interpersonal trust. Row 7 includes the control variable, Union Membership, and row 8 controls the relationship when only observing the second and third time period (1990-93 and 1999-2002). The relationship remains statistically significant and negative.

---

[110]Results can be obtained from the author upon request. When excluding Scandinavian countries from the sample, the relationship between associations behaves stably. Thus the fact that in Scandinavian countries such as Sweden and Denmark the membership in labour unions is not voluntary does not influence these results (van Oorschot & Arts, 2005, p. 11).

Table 5.5

Sensitivity Analysis—A Pooled Panel Analysis

Specification Change	Coefficient on Gini-Coefficient	Standard Error	Countries	Observations	R-Square
Influential Cases					
None	-1.0***	(-3.75)	19	42	0.59
1 (Finland)	-0.90***	(-3.20)	18	39	0.57
2 (Sweden)	-0.78**	(-2.66)	17	36	0.46
3 (Norway)	-0.53**	(-2.17)	16	34	0.40
Country Samples					
EU-15	-1.34***	(-3.10)	14	28	0.69
Liberal	-1.12	(-1.69)	5	12	0.25
Coordinated	-1.81***	(3.57)	7	17	0.61
Mediterranean	-1.78	(-1.16)	5	10	0.22
Specifications					
Unions	-1.53***	(-2.98)	12	19	0.72
Restructuring of Data					
1990-2002	-0.94***	(-3.01)	18	31	0.59

* 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.

3.3   Panel Analysis

Using a panel analysis, the Hausman test indicates that a fixed-effects model should be used when including Expenditure and Income in the model[111] (Regression 1 in Table 5.6), but that a random effects model should instead be used when including all three variables[112], Social Expenditure, the Gini-Coefficient, and Income in the model (Regression 3 in Table 5.6).

The basic regressions for the fixed-effects model can be seen in Regressions 1 through 2 and 4 through 5 in Table 5.6. The fixed-effects estimations use 23 cross-section observations with 79 observations. Regression 1 analyses the relationship between changes in Social Expenditure when including the control variable, Income. As already suspected from the scatter plot in Figure 5.2, a significant (-2.87), strong, negative coefficient of -1.0 results for the Social Expenditure variable. The value can be interpreted in the following way: an increase of one percentage point in social expenditure per GDP in a country at time period 1 results in a decrease in one percentage point of the overall level of interpersonal trust at time period 2.

Regression 2 includes the two control variables, Income Inequality and Income. The negative relationship between changes in Social Expenditure and in Interpersonal Trust remains significant and even gets stronger (-1.13). Regression 4 includes Income and Labour Unions. The negative relationship between Social Expenditure and Trust is still statistically significant. Income is positively related to Interpersonal Trust and, as already theoretically suspected, Labour Unions is positively related to Interpersonal Trust (However, due to data restrictions in all three variables, only 35 observations are examined.) Regression 5 analyses the model which worked best for the cross-section design, the Gini-Coefficient, and the density of associational activity. The model does a very poor job explaining the within-variation. Only six percent of the within-variation can be explained. Table 5.7 examines two types of sensitivity analysis, the exclusion of influential cases and the alteration of case specifications.

---

[111]   The test statistic is χ^2 (2) = 38.98. This rejects the null hypothesis at any standard of significance.
[112]   The test statisticis χ^2 (3) = 5.68. This does not reject the null hypothesis at any standard of significance. A random-effects model is more appropriate. This result is obvious as the Gini-Coefficient is not able to explain any country within-variation but is able to explain between-country variation, whereas social expenditure is not able to explain between-country variations but can explain country within-variation.

Table 5.6

Social Expenditure and Trust—Fixed and Random-Effects Estimation

Estimation Method	Fixed-effects robust estimation	Fixed effects robust estimation	Random effects robust estimation	Fixed effects robust estimation	Fixed effects robust estimation
Equation	1	2	3	4	5
Social Expenditure per GDP	-1.0*** (-2.87)	-1.13*** (-2.89)	-0.35 (-1.20)	-2.32*** (-4.15)	
Income	4.84 (0.73)		5.30 (0.70)	30.1** (2.42)	
Gini-Coefficient		-0.29 (-0.80)	-0.85*** (-3.27)		-0.58 (-1.25)
Human Capital		2.95 (1.39)			
Associations					0.26 (0.67)
Labour Unions				0.32** (2.13)	
Constant	12 (0.20)	46.9*** (3.05)	21.7 (0.31)	-226.0* (-1.87)	57.9*** (3.98)
R-Squared	0.17	0.21	0.34	0.36	0.06
Countries	23	19	19	15	19
N	79	57	57	35	42
Period	1980-2000	1980-2000	1980-2000	1980-2000	1980-2000

* 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.

The first row of Table 5.7 (labelled "None") reports the results, standard errors, and the regression coefficient, taken from Regression 1 in Table 5.6. As can be observed from Figure 5.3 and Figure C4, in Finland, a strong increase in the level of social expenditure is associated with a decrease in its level of interpersonal trust. Row 2 therefore deletes the case of Finland. Interestingly, the coefficient is now even stronger than before, although the regression is less significant. Rows 3 through 6 examine different regime typologies. When considering the sample of EU-15 countries, CMEs, and Mediterranean countries, the relationship between social

expenditure and trust remains negative and statistically significant (although in the Mediterranean-country sample significance is only given at the 90-percent level). However, when examining the regime typology, Liberal-Market Economies, the relationship loses statistical significance. LMEs seem to behave robustly towards a crowding-out effect[113].

The last row listed under the title, "Dependent Variable Systemic Trust", takes the systemic trust variable, Confidence in the Parliament, as a dependent variable. The result indicates that not only is interpersonal trust affected by the process of crowding-out but that systemic trust, here, the confidence in the parliament can also be affected.

Table 5.7

Sensitivity Analysis—Fixed-Effects Estimation

Specification Change	Coefficient on Social Expenditure	Standard Error	Countries	Observations	R-Square
Influential Cases					
None	-1.0***	(-2.87)	23	79	0.17
1 (Finland)	-1.10***	(-2.53)	22	75	0.16
Country Samples					
EU-15	-1.04***	(-1.89)	14	54	0.13
Coordinated	-0.93***	(-4.27)	10	35	0.46
Mediterranean	-2.94*	(-2.12)	6	21	0.34
Liberal	-1.56	(-1.68)	5	18	0.37
Dependent variable systemic trust					
Confidence in the Parliament	-0.02**	(-2.33)	23	69	0.23

* 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.

[113]This result is quite astonishing as Figures C2 and C3 show that for the liberal countries, the US and the United Kingdom, changes in social expenditure and changes in interpersonal trust are diametral. The result is influenced by the case of Ireland in which a strong decrease in social expenditure for Time Period 3 (1986-89) to Time Period 5 (1995-98) is associated with a strong decrease in trust of 12.2 percent. If Ireland is excluded from the country sample, LMEs, a significant (significance at the 90-percent level) and negative (-2.08) relationship between social expenditure and interpersonal trust is obtained.

4.   Conclusion

This section examined the relationship between welfare state effort and interpersonal trust as one dimension of social capital. Four important aspects were identified.

First, taking panel data and using a fixed-effects estimation in an OECD-country sample over the time period from 1981 to 2002 with a total of 79 observations, the section points out that social capital, measured as interpersonal trust, is negatively related to an increase in welfare state effort. A sensitivity analysis of the result points out that the inclusion of additional regressors, the alteration of case specifications, and the exclusion of influential observation does not alter the significant negative relationship between social expenditure and interpersonal trust. The result supports those authors arguing for a crowding-out effect between welfare effort and the overall level of solidarity in a nation.

Second, in the cross-section and pooled panel analysis, social expenditure is positively related to interpersonal trust. Countries with high levels of social expenditure inherit high levels of interpersonal trust. This positive relationship becomes statistically nonsignificant when controlling for the Gini-Coefficient and the density of associational activity. This result supports two kind of arguments. On one hand, Putnam seems to be correct in stressing the importance of associational activity when trying to explain levels of interpersonal trust in a cross-section of countries. On the other hand, Rothstein and Uslaner (2005), Knack and Keefer (1997), Knack and Zak (2002), and Delhey and Newton (2005) seem likewise to be correct when stressing that the income distribution of a country is a key to understanding its interpersonal levels of trust. The results here support theoretical assumptions which classical sociology authors traditionally promoted: there exists a trade-off between social inequality and social cohesion. This result remains statistically robust after the exclusion of influential cases, the alteration of case specifications, the inclusion of additional regressors, and the alteration of the data structure.

Third, the section points out that the systemic trust variable, Confidence in the Parliament, behaves similarly to the Interpersonal Trust variable here. Confidence in the parliament is negatively related to an increase in welfare state activity.

Fourth, these results show that when using a fixed-effects estimation, the variable, "workers embedded in labour unions", is positively related to interpersonal trust.

Chapter VI   Conclusion and Outlook for Further Research

1.   Conclusion

That interpersonal trust is crucial for economic growth has become common knowledge on the recent scientific agenda. The analysis herein clarifies that when analysing the relationship between trust and economic growth in a panel setting for 41 countries with a total of 129 observations, this commonly-accepted assumption should be questioned. Analysing how changes in trust levels affect changes in economic growth with the help of a fixed-effect estimation, a negative relationship between trust and growth is observed. This relationship is strongly driven by the OECD, the Liberal-Market Economies, and the Scandinavian countries. However, when considering a country sample which excludes the six transition countries, a curvilinear relationship is detected. Thus, it depends on the level of trust in a country as to whether or not it is important to invest in trust-building policies or not.

Further, taking an OECD-country sample consisting of 24 countries with the dependent variable being Economic Growth of GDP per Capita from 1990 to 2004 and using an cross-section analysis, it can be concluded that human capital measured as the average years of schooling plays an important role in explaining international variances in the growth rate of GDP per capita. This result is replicated when using either a pooled panel estimation or fixed-effects estimation. When including several dimensions of social capital into the cross-section analysis, it is apparent that those dimensions are able to explain a consistent degree of the variance in long-term growth in OECD countries. However, there seems to be no interaction effect between social and human capital, although social capital is somewhat supportive of human capital. The dimension of interpersonal trust appears to be the most important factor, as it is able to explain changes in economic growth over time. A factor analysis and an empirical analysis at the aggregated level show that items of systemic trust, interpersonal trust, and items taken out of the "norms item battery" of the WVS must empirically remain distinct from one another.

Finally, when analysing the relationship between welfare state effort and interpersonal trust in an OECD-country sample, preliminary evidence in favour of the crowding-out hypothesis appears. The common assumption that welfare state

effort is necessary to maintain social cohesion must now be questioned. When analysing this relationship with the help of a fixed-effects estimation, welfare state effort is demonstrated to be negatively related to trust. The result is contrary to the result of an analysis of a cross-section of countries, in which welfare effort is positively related to interpersonal trust. However, in a cross-section design, levels of trust seem to be highest in nations with a high density of associational activity and a more equally distributed income.

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

2.   Outlook

More research needs be conducted concerning the relationship between social capital and economic growth on the one hand, and the determinants of social capital on the other hand.

Firstly, the two additional dimensions of social capital, norms of reciprocity and networks, should be analysed with the help of a panel design and a larger country sample, preferably the 129 country sample which is introduced in this work. Research effort should continue to focus on the question of whether it is possible to replicate the negative relationship between networks and economic growth when using a fixed-effects estimation.

Secondly, the relationship between the dimensions of social capital (systemic trust, interpersonal trust, norms of reciprocity, associational activity, and networks) and economic growth should be further analysed. The results given in this work should be regarded as a first hint that researchers must be sensitive to the usage of a multidimensional concept of social capital when examining the effects on economic outcomes. Dimensions of social capital should be kept distinct from one another and should be tested separately.

Thirdly, the data on important determinants of trust such as welfare state effort, income inequality, union membership, and density of associational activity should be collected beyond the range of OECD countries and, if possible, for all 129 observations of trust. Cultural indicators such as ethnic homogeneity/fractionalisation, and religious denomination could be added, as well as data on the degree of corruption. Furthermore, research conducted on the crowding-out debate has to construct a research design focused particularly on associational activity.

Fourthly, it could be advantageous for further research effort to build a social capital index (similar to that of Robert Putnam for the US) for an OECD-country sample. It should be considered whether it is possible to replicate Putnam's results for the US when taking the nation state as a unit of observation.

Fifthly, one should think about conducting social capital research at the micro-level taking countries from different regime typologies into consideration. The research question should then focus on the background variables of those people who believe that "Most people can be trusted".

A. Appendix to Chapter III

Figure A1

Changes in Interpersonal Trust for Selected OECD Countries from 1980 to 2002

Variance in Trust for selected OECD Countries

Graphs by country
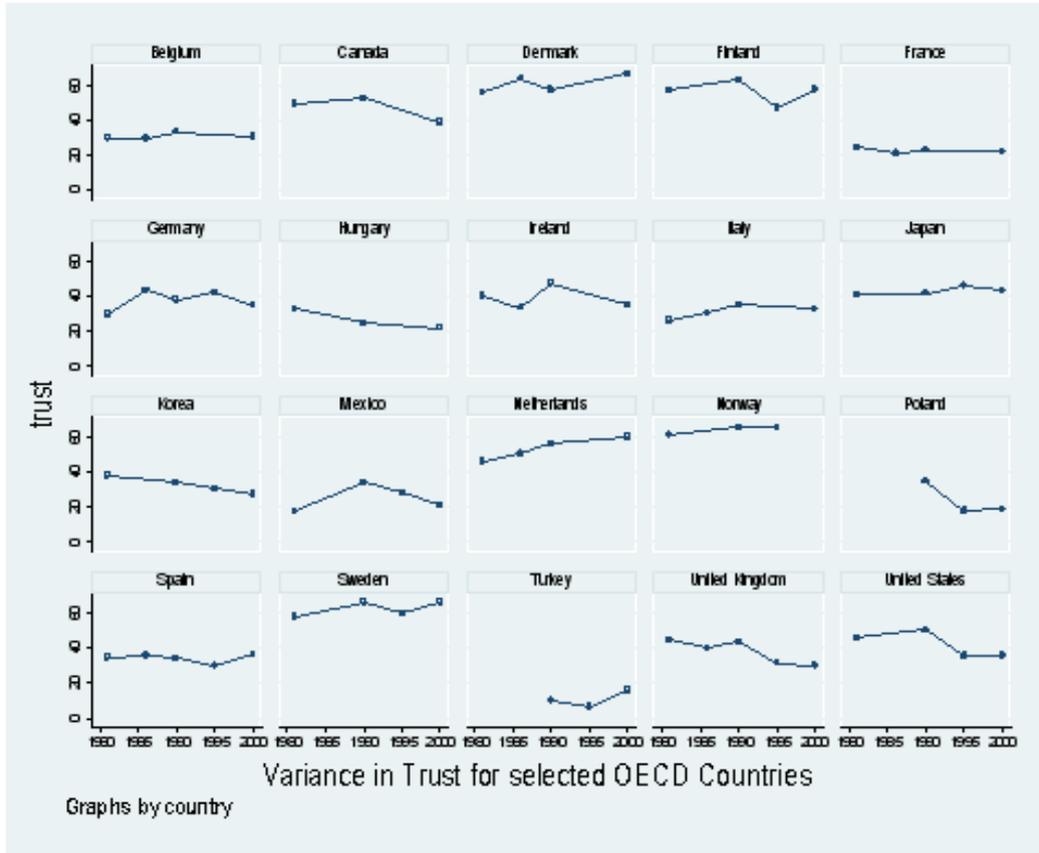
Figure A2

Scatter Plot Between Income and Interpersonal Trust with Pooled Observations from
1980 to 2002
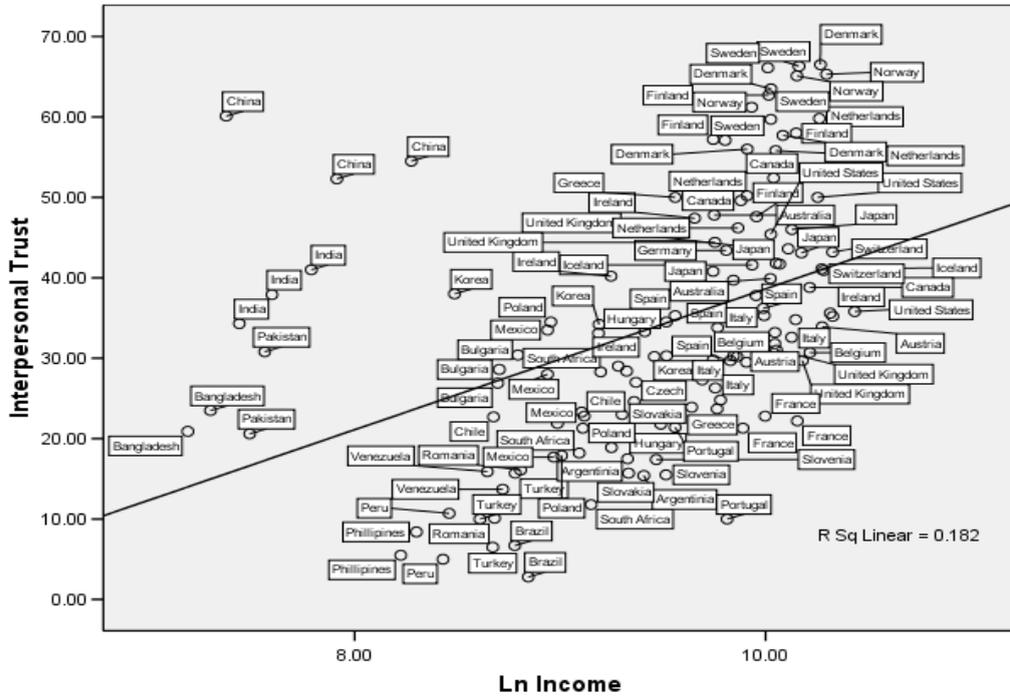
Figure A3

Changes in Trust and Changes in Economic Growth in the United States
—A Comparison
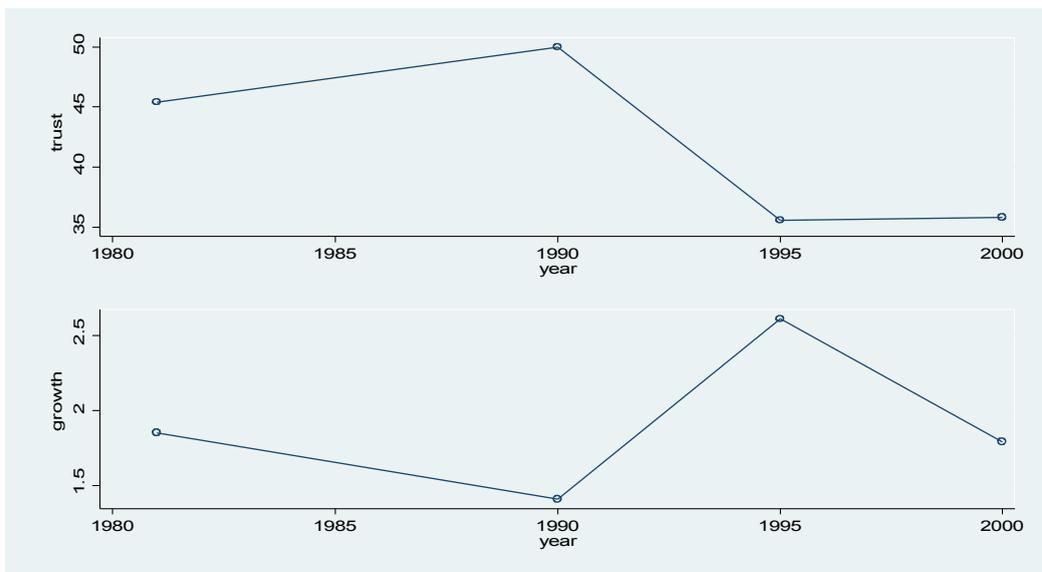
Figure A4

Changes in Trust and Changes in Economic Growth in Poland
—A Comparison
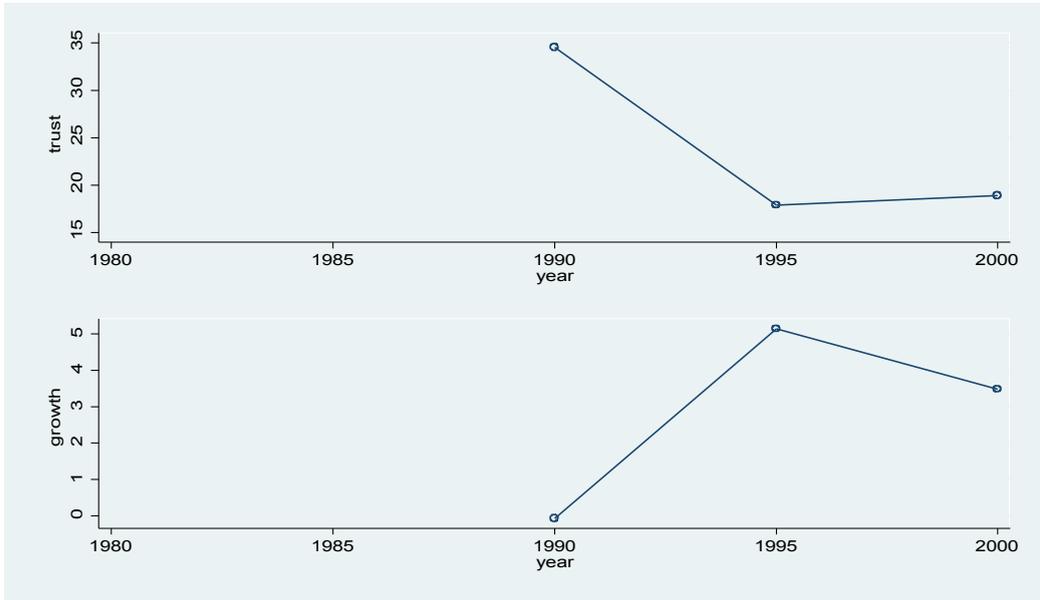
Figure A5

Changes in Trust and Changes in Economic
Growth in India—A Comparison
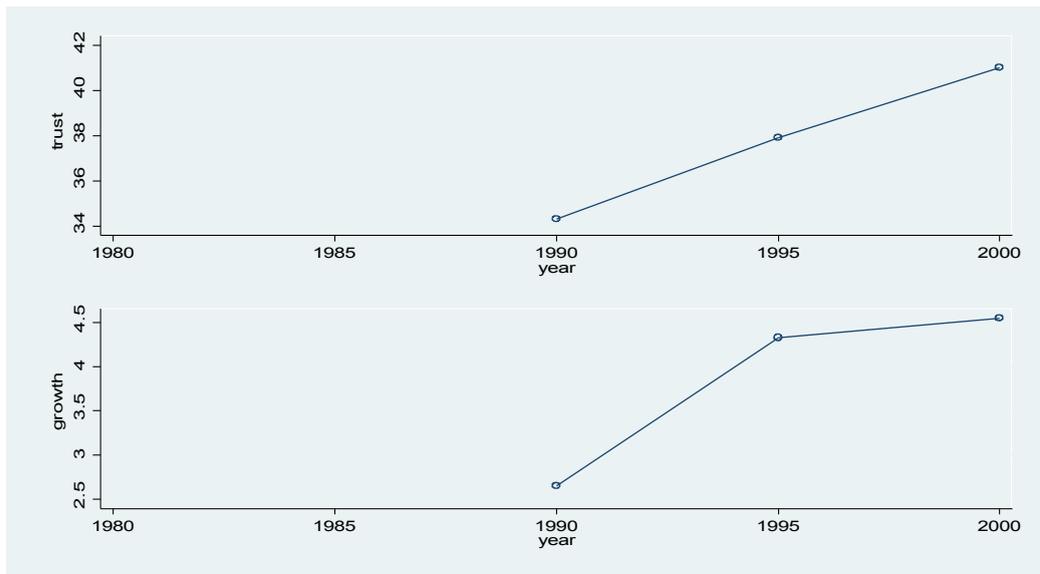
Figure A6

Changes in Trust and Changes in Economic Growth in the United States—
A Comparison After the Inclusion of Control Variables
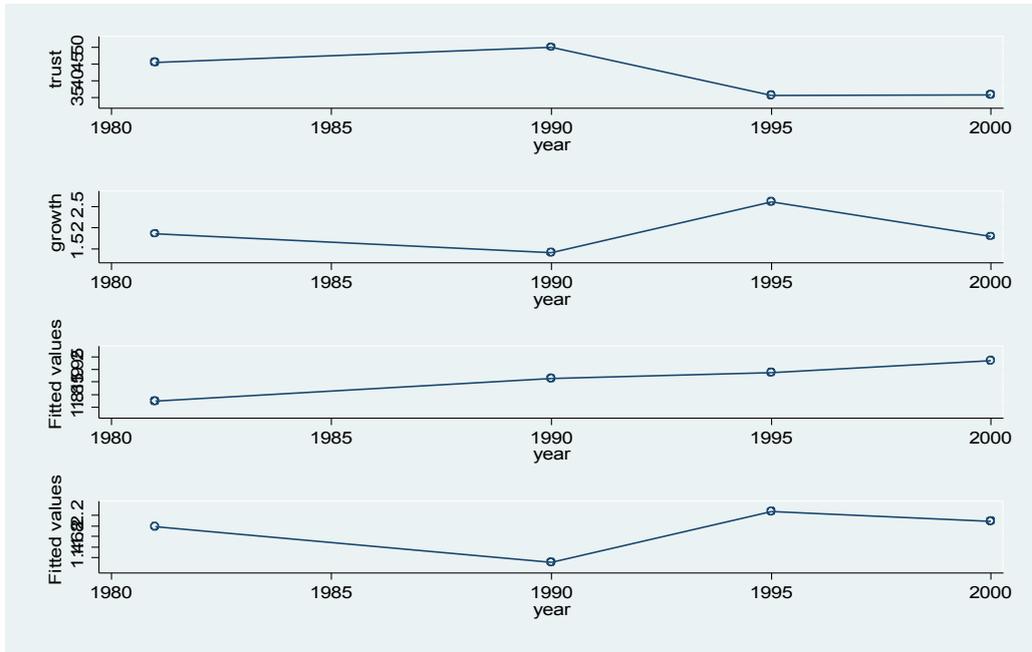
Figure A6 shows a comparison between changes in trust and changes in growth. The first diagramme shows the changes in trust over time, the second diagramme shows the changes in growth over time, the third shows the changes in growth over time when controlled for initial income, and the fourth shows the changes in growth when controlled for initial income and human capital. The fourth diagramme is similar to the second diagramme and is diametral to changes in trust.

A7

Regime Typologies and Case Specifications for 41 Countries
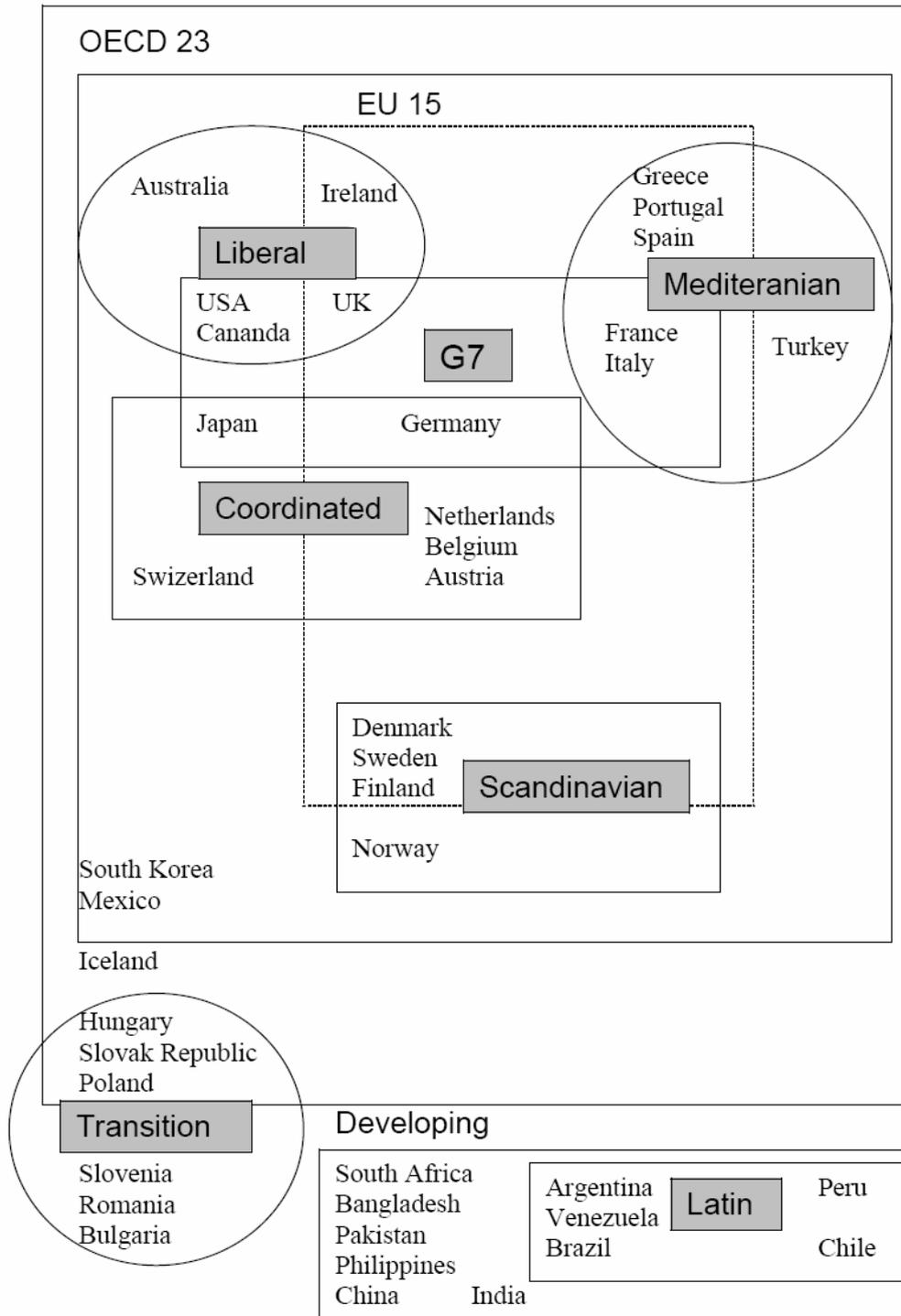
B. Appendix to Chapter IV

Figure B1

Levels of Systemic Trust in 20 OECD Countries in the 1990's
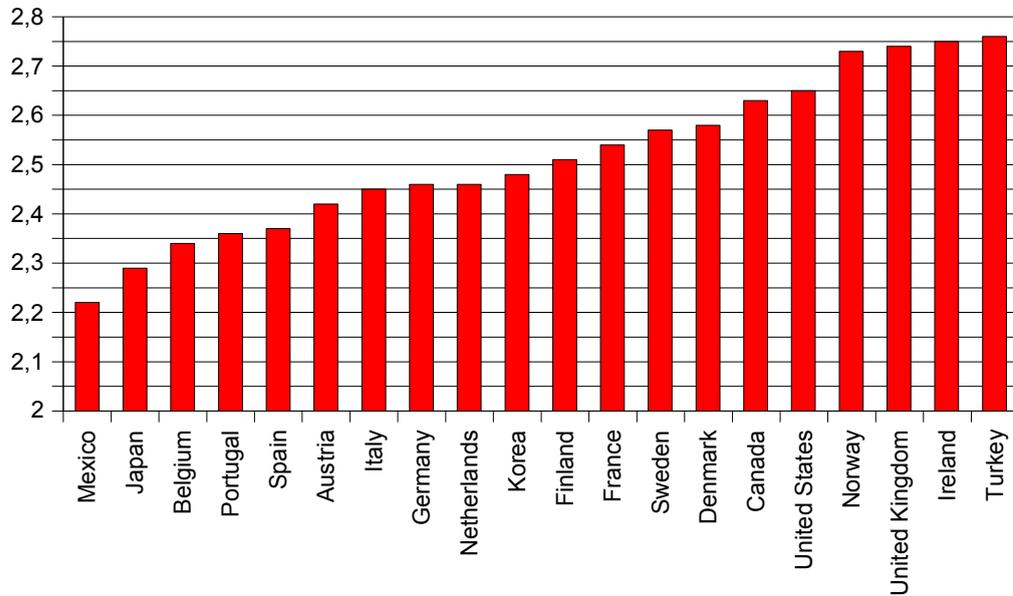
Figure B2

Levels of Norms in 21 OECD Countries in the 1990's
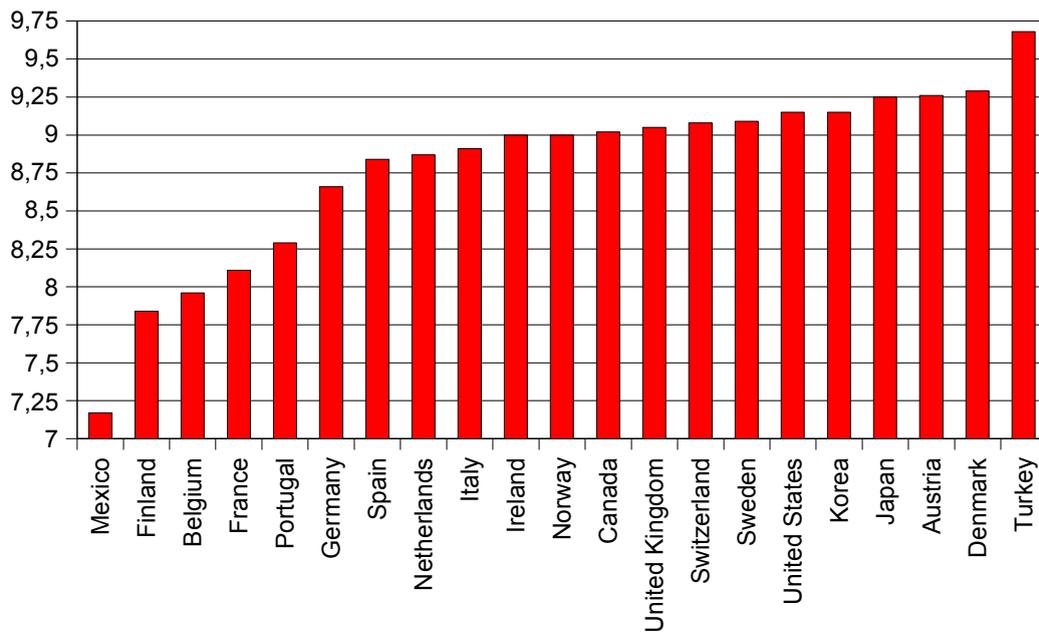
Figure B3

Levels of Interpersonal Trust in 21 OECD Countries in the 1990's
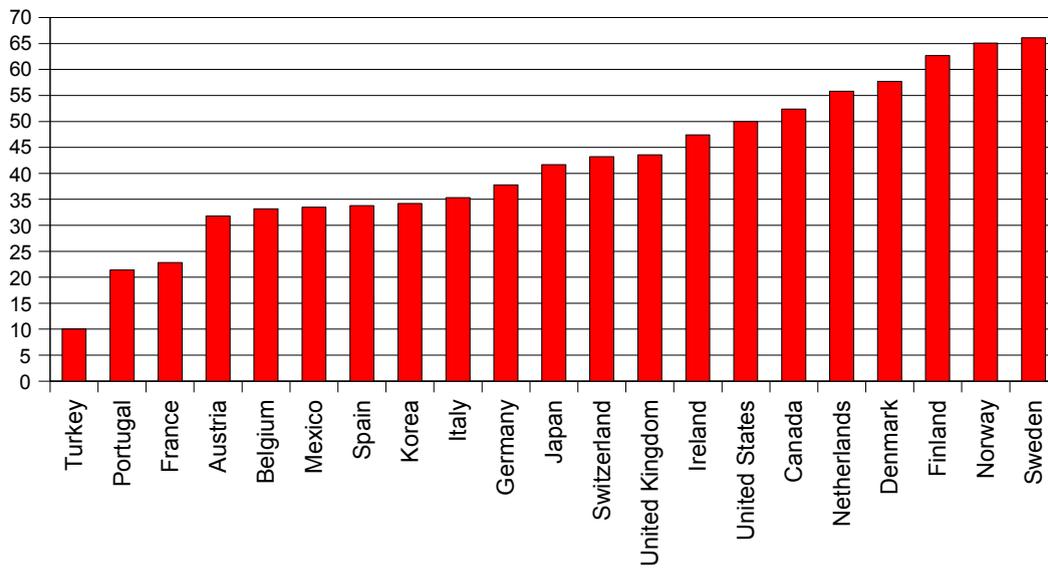
Figure B4

### Scatter Plot Between Systemic Trust and Interpersonal Trust in the 1990's
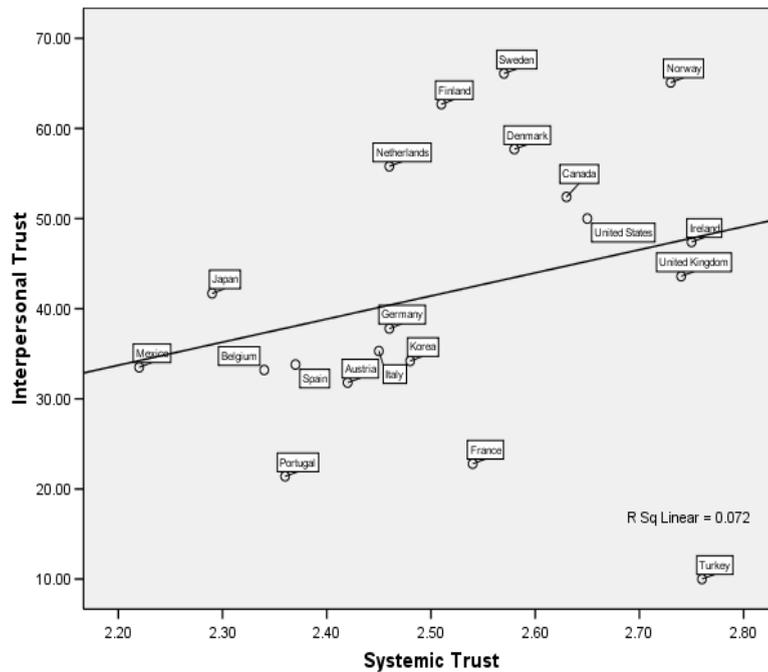
## Figure B5

Scatter Plot Between Norms and Interpersonal Trust in the 1990's
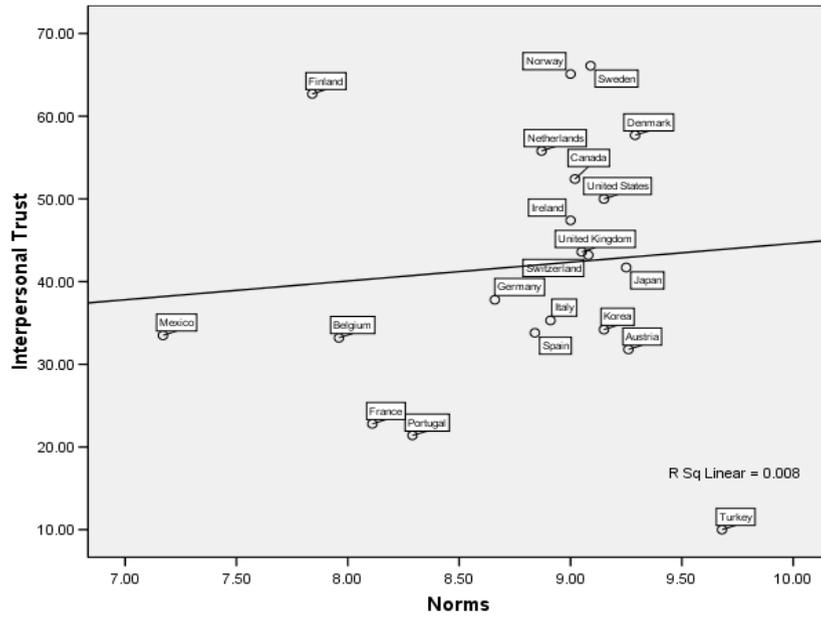
Figure B6

Scatter Plot Between Density of Associations and Interpersonal Trust in the 1990's

126
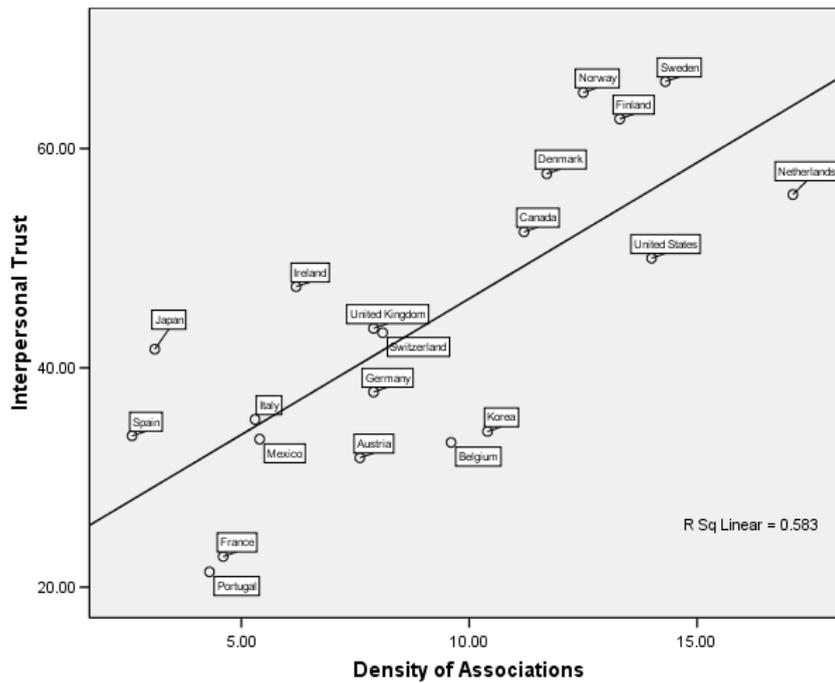
Table B1

Human Capital, Social Capital, and Economic Growth—A Pooled-Panel Analysis for EU Countries

Dependent Variable	Growth GDP per Capita 1990-2004				
Method	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel	Pooled Panel
Equation	1	2	3	4	5
Income	-0.68 (-0.36)	-3.09*** (-3.08)	-2.43 (-1.41)	-2.59 (-1.71)	-2.46** (-2.06)
Investment	-0.40*** (-4.44)	-0.33*** (-5.65)	-0.37*** (-4.86)	-0.36*** (-5.31)	-0.40*** (-5.35)
Population Growth	1.56** (2.13)	1.67** 2.11	1.93* (1.77)	1.95* (1.92)	1.83* (1.95)
Human Capital	-0.08 (-0.52)	0.36*** 2.45	0.24 (1.69)	0.34** (2.29)	0.12 (0.78)
Interpersonal Trust		-0.04*** -3.45			
Associations			-0.07*** (-2.89)		
Associations+ Interpersonal Trust				-0.40*** (-3.15)	
Social Capital					-0.48* (-2.05)
Constant	17.8 (0.97)	38.1*** 3.88	32.3* (1.93)	32.3** (2.19)	33.9*** (2.88)
R-Squared	0.46	0.71	0.65	0.69	0.66
F-Test	5.26***	10.27***	7.61***	7.91***	8.27***
N	42	32	27	27	31

* 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.

C. Appendix to Chapter V

Figure C1

Changes in Social Expenditure Costs per GDP for Selected OECD Countries from
1980 to 2002


Graphs by country
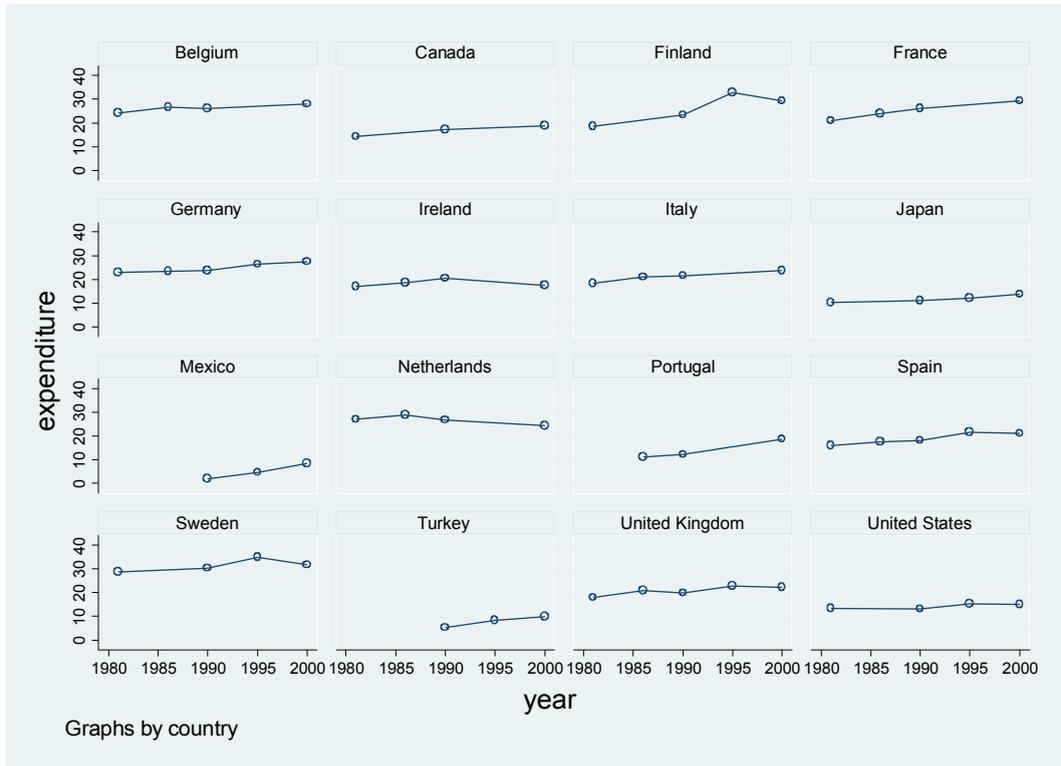
Figure C2

Changes in Social Expenditure and Changes in Trust in the United Kingdom—A Comparison
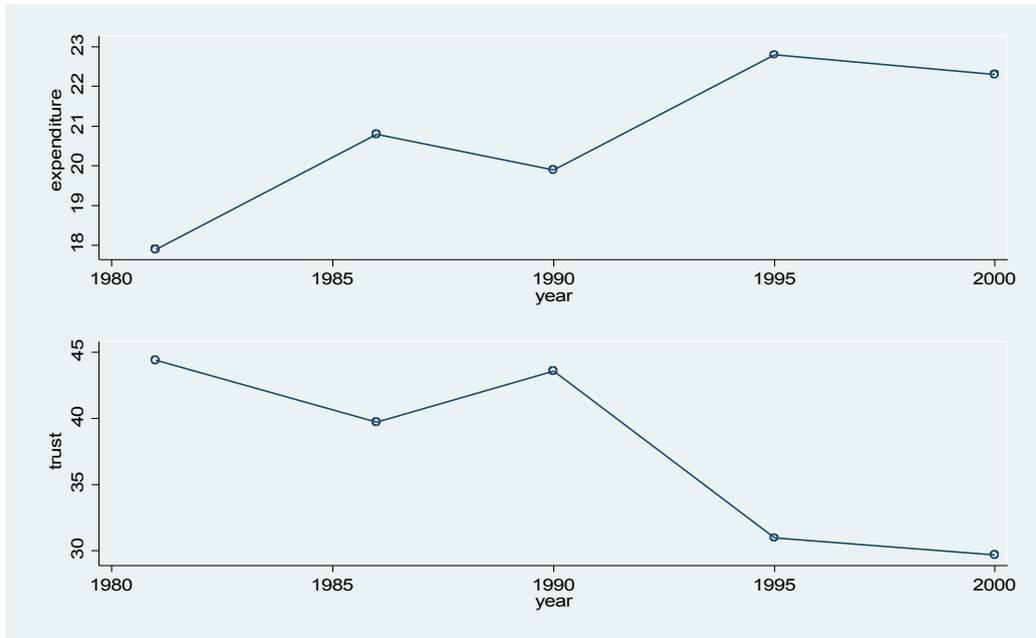

Figure C3

Changes in Social Expenditure and Changes in Trust in the United States—A Comparison
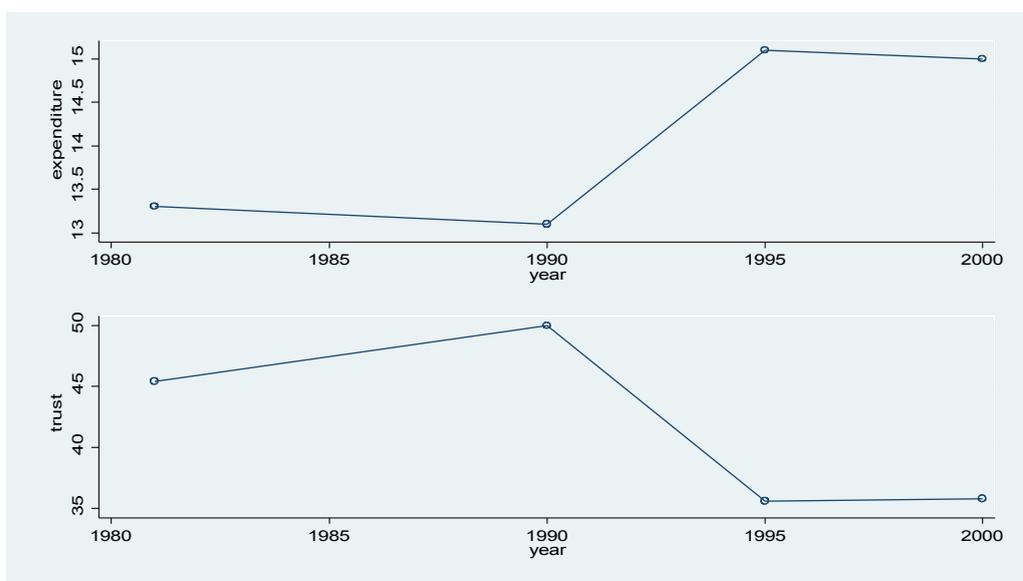
Figure C4

Changes in Social Expenditure and Changes in Trust in Finland—A Comparison
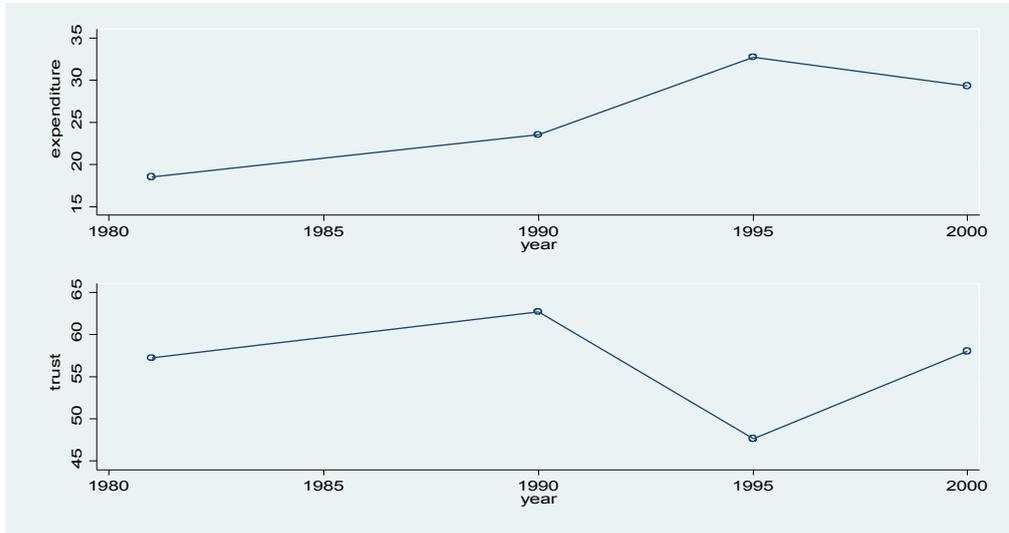
BIBLIOGRAPHY

Alesina, A. & La Ferrara, E. (2000). The Determinants of Trust. *NBER Working Paper, 7621.*

Arellano, M. & Bond, S. (1991). Some Tests for Specification for panel data: Monte Carlo Evidence and an Application to Employment Equations. *Review of Economic Studies,* 58, 277-97.

Arrow, K. (1972). Gifts and Exchanges, *Philosophy and Public Affairs,* 1, 343-362.

Atkinson, A.B. (1999). *The Economic Consequences of Rolling back the Welfare State*. Cambridge, MA and London: MIT Press.

Aust, A., Leitner, S., & Lessenich, S. (Eds.). (2000). *Sozialmodell Europa— Konturen eines Phänomens.*Opladen: Leske + Budrich.

Baici, E., & Casalone, G. (2006). Can human capital be accounted for the regional growth in Italy? A panel analysis of the 1980-2001 period. Paper presented at the *2006 Workshop Economic Policy and Open Economy Macro* at University A. Avogardo (Novara)*.*

Baltagi, B. H. (2005. *Econometric Analysis of Panel Data.* West Sussex: Wiley.

Barro, R. (1991). Economic Growth in a Cross-Section of Countries, *Quarterly Journal of Economics,* 106, 407-443.

Barro, R., & Sala-i-Martin X. (2004). *Economic Growth.* Cambridge, MA and London: MIT Press.

Barro, R., & Lee, J.-W. (1997). Schooling Quality in a Cross Section of Countries, *NBER Working Paper,* 6198.

Barro, R. & Lee, J.-W. (2000). International Data on Educational Attainment: Updates and Implications. (*CID Working Paper,*42, April 2000) - HUMAN CAPITAL UPDATED FILES.

Beck, U. (1983). Jenseits von Stand und Klasse. In: Kreckel, R. (Ed.). Soziale Ungleichheiten (*Soziale Welt*: Sonderband 2), Göttingen, 35–74.

Berggren, N., Elinder M., & Jordahl H. (2007). Trust and Growth: A shaky relationship, *Empirical Economics*, forthcoming.

Beugelsdijk, S., de Groot, H., & van Schaik, A. (2004). Trust and economic growth: a robustness analysis, *Oxford Economic Papers,* 56, 118-134.

Bonatti, L., & Bartolini S. (2007). Endogenous growth, decline in social capital and expansion of market activities. Paper presented at the Workshop *Social Capital,*

Corporate Social Responsibility and Sustainable Economic Development at the University of Trento.

Bourdieu, P. (1983). Ökonomisches, kulturelles und soziales Kapital. In: Kreckel, R. (Ed.). Soziale Ungleichheiten (*Soziale Welt*: Sonderband 2), 183–198.

Bryman, A., & Duncan C. (2005). *Quantitative Data Analysis with SPSS 12 and 13.* London and New York: Routledge.

Carey, B. (2004). Fear in the working place: The Bullying Boss, *The New York Times*, June 22.

Caselli, F., Gerardo, E., & Lefort, F. (1996). Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics, *Journal of Economic Growth,* 1, 363-389.

Coleman, J. (1988). Social Capital in the Creation of Human Capital, *American Journal of Sociology,* 94, 95-120.

Coleman, J. (1990). *Foundations of Social Theory.* Cambridge, MA and London: Belknap Press of Harvard University Press.

Coleman, J. (1993). The Rational Reconstruction of Society, *American Sociological Review,* 58, 1-15.

Dasgupta, P., & Serageldin, I. (1999). *Social Capital—A Multifaceted Perspective.* Washington, D.C.: The World Bank.

Dasgupta, P. (1999). Economic Progress and the Idea of Social Capital. In: Dasgupta, P., & Serageldin, I. (Eds.). *Social Capital—A Multifaceted Perspective.* Washington, D.C.: The World Bank, 325-424.

Delhey, J., & Newton K. (2005). Predicting cross-national levels of social trust: global pattern or Nordic exceptionalism?' *European Sociological Review,* 21, 311-327.

Deutsche Bank (2005): Humankapital als wichtigster Wachstumstreiber, *Deutsche Bank Research* 324, http://www.dbresearch.com/PROD/DBR_INTERNET_DE-PROD/PROD0000000000188568.pdf.

Djistera, A. (2006). The Role of Human Capital in the Asian High Economic Growth. Paper presented at the *2006 Workshop Economic Policy and Open Economy Macro* at University A. Avogardo (Novara).

Durlauf, S. N., & Fafchamps, M. (2005). Social Capital. In: Aghion, P., & Durlauf, S. (Eds.). *Handbook of Economic Growth: Volume 1B.* Amsterdam: Elsevier,1639-1699.

Durlauf, S. N., Johnson, P., & Temple J.R. (2005). Growth econometrics. In: Aghion, P. & Durlauf S. (Eds.). *Handbook of Economic Growth: Volume 1A.* Amsterdam: Elsevier.

Durkheim, E. (1996). *Über soziale Arbeitsteilung*: *Studie über die Organisation höherer Gesellschaften.* Frankfurt am Main: Suhrkamp Verlag.

Esping-Andersen, G. (1990). *The Three Worlds of Welfare Capitalism.* Princeton, NJ: Princeton University Press.

Etzioni, A. (1993). *The spirit of community: Rights, responsibilities, and the communitarian agenda new*, New York: Crown Publishers.

European Values Study Group & World Values Survey Association (2004). EUROPEAN AND WORLD VALUES SURVEYS INTEGRATED DATA FILE, 1999-2002, RELEASE I [Computer File]. 2nd 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: Analysis Sociologicus 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, K.J. (2000). A Reassesment of the Relationship Between Inequality and Growth, *American Economic Review,* 87, 869-887.

Förster, M., & d'Ercole M.M. (2005). Income Distribution and Poverty in OECD countries in the second half of the 1990s, *OECD Social, Employment and Migration Working Papers,* 22.

Frees, E.W. (2004). *Longitudinal and Panel Data – Analysis and Application in the Social Sciences.* Cambridge: Cambridge University Press.

Freitag, M. (2001). Das soziale Kapital der Schweiz: vergleichende Erzählungen zu Aspekten des Vertrauens und der sozialen Einbindung, *Schweizerische Zeitschrift für Politikwissenschaft,* 7, 87-117.

Fukuyama, F. (1996). *Trust—The Social Virtues and the Creation of Prosperity.* New York: Free Press Paperbacks.

Fukuyama, F. (2000). Social Capital and Civil Society, *IMF Working Paper,* WP/00/74, Washington D.C.

Gabriel, O.W., Kunz V., Roßteuscher, S., & Van Deth, J.W. (2002). *Sozialkapital und Demokratie—Zivilgesellschaftliche Ressourcen im Vergleich.* Wien: WUV Universitätsverlag.

Glaeser, E., Laibson D.I., Scheinkman, J. A., & Soutter, C.L. (2000). Measuring Trust, *The Quarterly Journal of Economics,* CXV, 811-846.

Giddens, A. (2006a). Debating the Social Model: Thoughts and Suggestions. In: *The Hampton Court Agenda: A Social Model for Europe*. London: Policy Network, 95-150.

Giddens, A. (2006b). *Towards a new European Social Model.* Department of Sociology Research.

Greene, W. H. (2003). *Econometric Analysis.* New Jersey: Prentice Hall.

Habermas, J. (1973). *Legitimationsprobleme im Spätkapitalismus.* Frankfurt am Main: Suhrkamp Verlag.

Hall, P. (1999). Social Capital in Britain, *British Journal of Political Science,* 19, 471-61.

Hall, P., & Soskice D. (2001). *Varieties of Capitalism.* Oxford: Oxford University Press.

Hamilton, L.C. (2003). *Statistics with Stata Updated Version 7.* Belmont, CA: Duxbury.

Hamilton, L.C. (2006). *Statistics with Stata Updated Version 9*, Belmont, CA: Thomson.

Hardin, R. (1982). *Collective Action.* Baltimore, MD: Johns Hopkins University Press.

Hauser, C., Tappeiner, G., & Walde J. (2007). The Learning Region – The Impact of Social Capital and Weak Ties on Innovation, *Regional Studies,* 41.1, 75-88.

Hausman, J. (1978). Specification tests in econometrics, *Econometrics,* 46, 1251-1271.

Heliwell, J. (1996). Economic Growth and Social Capital in Asia, *NBER Working Paper,* 5470.

Hellmann, K.-U. (2004). Solidarität, Sozialkapital und Systemvertrauen: In: Klein, A., Kern, K., Geißel, B., & Berger, M. (Eds.). *Zivilgesellschaft und Sozialkapital —Herausforderungen politischer und sozialer Integration.* Wiesbaden: Verlag für Sozialwissenschaft, 131-150.

Heston, A., Summers, R., & Aten, B. (2002). *Penn World Table Version 6.1.*Center for International Comparisons at the University of Pennsylvania (CICUP).

Human Development Report (2005). New York: Oxford University Press.

Inglehart, R. (1990). *Culture Shift.* Princeton: Princeton University Press.

Inglehart, R. (1997). *Modernization and Postmodernization – Cultural, Economic and Political Change in 43 Societies.* Princeton, NJ: Princeton University Press.

Inglehart, R. (1999). Trust, Well-Being and Democracy. In: Warren, M. E. (Ed.). *Democracy and trust.* Cambridge: Cambridge University Press, 88 -120.

Inglehart, R. 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].

Islam, N. (1995). Growth Empirics—A Panel Data Approach, *Quarterly Journal of Economics,* 110, 1127-1170.

Jagodzinski, W., & Kazufumi M. (2005). How to Measure Interpersonal Trust? A Comparison of two different Measures, *ZA-Information* 55, 85-96.

Jerven, M. (2006). Social Capital as a Determinant of Economic Growth in Africa, *Scandinavian Working Papers in Economics,*http://swopec.hhs.se/ratioi/abs/ratioi0108.htm.

Kaelble, H., & Schmid, G. (2004). *Das europäische Sozialmodell—Auf dem Weg zum transnationalen Staat.* Berlin: Edition Sigma.

Keynes, J.M. (2000). *Allgemeine Theorie der Beschäftigung, des Zinses und des Geldes.* Berlin: Duncker & Humblot.

Klasen, S. (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 Bank Economic Review,* 16, 345-373.

Knack, S., & Keefer, P. (1997). Does Social Capital have a Payoff? A Cross-Country Investigation, *Quarterly Journal of Economics,* 112, 1251-1288.

Knack, S. & Zak P.J. (2002). Building Trust, Public Policy, interpersonal trust and Economic Development. *Supreme court Economic Review,* 10, 91-107.

Knowles, S. (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.

Kohler, U., & Kreuter, F. (2001). *Datenanalyse mit Stata.* München: Oldenbourg Verlag.

Kuhnle, S., & Alestalo, M. (2000). Growth, Adjustments and Survival of European Welfare States. In: Kuhnle, S. (Ed.). *Survival of the European welfare state.* London: Routledge, 3-18.

Kumlin, S., & Rothstein, B. (2005). Making and Breaking Social Capital – The Impact of Welfare State Institutions, *Comparative Political Studies,* 38, 339-365.

Krueger, A.B, & Lindhal M. (2001). Education for Growth: Why and for Whom?, *Journal of Economic Literature,* XXXIX, 1101-1136.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny R.W. (1999). Trust in Large Organizations. In: Dasgupta, P.,& Seregaldin, I. (Eds.). *Social Capital – A Multifaceted Perspective.* Washington D.C.: The World Bank, 310-324.

Levin, R., & Renelt, D. (1992). A Sensitivity Analysis of Cross-Country Growth Regressions, *The American Economic Review,* 82, 942-963.

Lijphart, A. (1971). Comparative Politics and the Comparative Method, *The American Political Science Review,* 65, 682-693.

Lijphart, A. (1975). The Comparable-Cases Strategy in Comparative Research, *Comparative Political Studies,* 8, 158-175.

Lucas, R.E. (1988). On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22, 3-42.

Luhmann, N. (2000). *Vertrauen.* Stuttgart: Lucius and Lucius.

Mankiw, N.G., Romer D., & Weil D.N. (1992). A Contribution to the Empirics of Economic Growth, *The Quarterly Journal of Economics,* 107, 407-437.

Marcuse, H. (1994). *Der eindimensionale Mensch – Studien zur Ideologie der fortgeschrittenen Industriegesellschaft*. München: dtv.

Marx, K. (1998). Das Kapital – Kritik der politischen Ökonomie. In: Marx, Karl und Friedrich Engels, *Marx Engels Werke - Band 23*. Berlin: Dietz Verlag.

Minkoff, D. (1997). Producing Social Capital, *American Behavioural Scientist,* 40, 606-619.

Misztal, B.A. (1996). *Trust in Modern Societies – The Search for the Bases of Social Order*, Cambridge: Polity Press.

Newton, K. (1997). Social Capital and Democracy, *American Behavioral Scientist,* 40, 575-586.

Noelle, E. (2005). Vertrauen ist besser, *Frankfurter Allgemeine Zeitung,* 166, 5.

North, D.C. (1990). *Institutions, Institutional Change and Economic Performance.* Cambridge: Cambridge University Press.

Nunner-Winkler, G. (1997). Zurück zu Durkheim? Geteilte Werte als Basis gesellschaftlichen Zusammenhalts. In: Heitmeyer, W. (Ed.). *Was hält die Gesellschaft zusammen?*. Frankfurt am Main: Suhrkamp Verlag, 342-360.

OECD (2001). *The Well-being of Nations – The Role of Human and Social Capital.* Paris: OECD.

OECD (2004). *Social Expenditure Database* (SOCX), www.oecd.org/els/social/ expenditure.

OECD (2006). *National Accounts of OECD Countries: Main Aggregates*. Paris: OECD.

Offe, C., & Susanne F. (2001). Schwund des Sozialkapitals? Der Fall Deutschland. In: Putnam, Robert (ed.): *Gesellschaft und Gemeinsinn.* Gütersloh: Verlag Bertelsmann Stiftung, 417-506.

Olson, M. (1982). *The Rise and Decline of Nations: Economic Growth, Stagflation and Social Rigidities.* New Haven and London: Yale University Press.

Ostrom, E. (1990). *Governing the Commons: the Evolution of Institutions for Collective Action.* Cambridge: Cambridge University Press.

Ostrom, E. (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.

Ostrom, Elinor (1999). Social Capital: A Fad or a Fundamental Concept?. In: Dasgupta, P., & Serageldin, I. (Eds.). *Social Capital—A Multifaceted Perspective.* Washington D.C.: The World Bank, 172-214.

Paldam, M. (2007). Generalized Trust – The macro perspective. Article presented at the Workshop and Summer School *Social Capital, Corporate Social Responsibility and Sustainable Economic Development* at the University of Trento.

Piazza-Georgi B. (2002). The role of human and social capital in growth: extending our understanding, *Cambridge Journal of Economics,* 26, 461-479.

Paxton, P. (1999). Is Social Capital Declining in the United States – A Multiple Indicator Assessment?, *American Journal of Sociology,* 105, 88-127.

Paxton, P. (2002). Social Capital and Democracy: An Interdependent Relationship, *American Sociological Review,* 67, 254–277.

Portes, A. (2000). The two Meanings of Social Capital, *Sociological Forum,* 15, 1-11.

Pritchett, L. (2001). Where Has All the Education Gone?, *The World Bank Economic Review,* 15, 367-391.

Putnam, R.D. (1993). *Making Democracy Work: Civic Traditions in Modern Italy.* Princeton, NJ: Princeton University Press.

Putnam, R.D. (1995). Bowling alone: America's Declining Social Capital, *Journal of Democracy,* 6, 65-78.

Putnam, R.D. (2000). *Bowling alone: The Collapse and Revival of American Community.* New York: Simon & Schuster.

Putnam R.D. (Ed.). (2001). *Gesellschaft und Gemeinsinn.* Gütersloh: Verlag Bertelsmann Stiftung.

Putnam, R.D., & Heliwell, J (1999). Economic Growth and Social Capital in Italy. In: Dasgupta, P., & Serageldin, I. (Eds.). *Social Capital—A Multifaceted Perspective.* Washington D.C.: The World Bank, 253-268.

Rabier, J.-R., Helene, R., & Inglehart, R. (1988). *Eurobarometer 25*, Holiday Travel and Environmental Problems. April 1986 [Computer File], ICPSR Study Number 8616.

Roemer, P.M. (1986). Increasing Returns and Long-Run Growth, *The Journal of Political Economy*, 94, 1002-1037.

Roemer, P.M. (1990). Endogenous Technological Change, *The Journal of Political Economy,* 98, 71-102.

Roth, F., & Tonkiss, F. (2007): Welfare, Inequality and Trust—Evidence from the European Social Survey. Working Paper, June 2007.

Rothstein, B. (2001). Social Capital in the Social Democratic Welfare State, *Politics and Society* 29, 207-41.

Rothstein, B., & Uslaner E.M. (2005). All for all: Equality and Social Trust, *LSE Health and Social Care Discussion Paper Number,* 15, London School of Economics and Political Science.

Sabatini, F. (2007): The Role of Social Capital in Economic Development. Article presented at the Workshop *Social Capital, Corporate Social Responsibility and Sustainable Economic Development* at the University of Trento.

Scheepers, P., Grotenhuis, M.T., & Gelissen J. (2003). Welfare States and Dimensions of Social Capital: Cross-national Comparison of Social Contacts in European Countries, *European Societies,* 4, 185-207.

Sen, A.K. (1977). Rational Fools: A Critique of the Behavioural of Economic Theory, *Philosophy and Public Affairs,* 6, 317-344.

Sen, A.K. (1999). *Development as Freedom.* New York: Anchor books.

Serageldin, I. (1999). Foreword. In: Knack, S. Social Capital, Growth and Poverty: A Survey of Cross-Country Evidence, *Social Capital Initiative Working Paper,* 7, iii.

Serageldin, I., & Grootaert C. (1999). Defining Social Capital: An Integrating View. In: Dasgupta, P. & Ismail Serageldin, I. (Eds.). *Social Capital—A multifaceted Perspective.* Washington D.C.: The World Bank, 40-58.

Sobel, J. (2002). Can we trust social capital?, *Journal of Economic Literature,* XL, 139-154.

Solow, R. (1956). A Contribution to the theory of Economic Growth, *The Quarterly Journal of Economics,* 70, 65-94.

Solow, R. (1995). But Verify?, *The New Republic,* 11, 36-39.

Solow, R. (1999). Notes on Social Capital and Economic Performance. In: Dasgupta, P., & Serageldin, I. (Eds.). *Social Capital—A Multifaceted Perspective.* Washington D.C.: The World Bank, 6-10.

Stata Corporation (2005). *Stata Statistical Software Release 9.* College Station, TX: Stata Press.

Stata Corporation (2005a). *Stata Reference Manual Release 9 – Reference A-J.* College Station, TX: Stata Press.

Stata Corporation(2005b). *Stata Reference Manual Release 9 – Reference R-Z.* College Station, TX: Stata Press.

Stata Corporation (2005c). *Stata Longitudinal/Panel Data Reference Manual Release 9.* College Station, TX: Stata Press.

Swan, T. (1956). Economic Growth and Capital Accumulation, *Economic Record,* 32, 334-361.

Teachman, J.D., Kathleen P., & Carver K. (1997). Social Capital and the Generation of human Capital, *Social Forces,* 75, 1343-59

Temple, J.R.W. (2001). Heterogeneity and the Growth Process – Generalizations that aren't? Evidence on education and growth, *European Economic Review,* 45, 905-918.

Toennies, F. (1887). *Gemeinschaft und Gesellschaft*, Leipzig: Fues.

Tonkiss, F. (2000). Trust, Social Capital and Economy. In: Tonkiss, F., & Passey, A. (Eds.). *Trust and Civil Society.* Basingstoke: MacMillan, 72-89.

Uslaner, E.M. (1999). Democracy and social capital. In: Warren, M.E. (Ed.). *Democracy and trust.* Cambridge: Cambridge University Press, 121-150.

Vale, S. (2006). Human Capital and Economic Growth – The Portuguese Case. Paper presented at the *2006 Workshop Economic Policy and Open Economy Macro* at University A. Avogardo (Novara).

Van Oorschot, W., & Arts W. (2005). The social capital of European welfare states: the crowding out hypothesis revisited, *Journal of European Social Policy,* 15, 5-26.

Von Weizsäcker, C. (1999). Sozialstaat und soziales Kapital. In: Graf, F.W. (Ed.). *Soziales Kapital in der Bürgergesellschaft.* Stuttgart: Kohlhammer.

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

Williams, B. (1988). Formal Structures and Social Reality. In: Gambetta, D. (Ed.). *Trust: Making and Breaking Cooperative Relations.* Oxford: Basil Blackwell.

Woolcock, M. (1998). Social capital and economic development: Toward a theoretical synthesis and policy framework, *Theory and Society,* 27, 151-208.

World Values Study Group (1999). World Values Survey, 1981-1984 AND 1990-1993 [Compuer file]. 2nd ICPSR version. ICPSR Study Number 6160. Ann Arbor, MI: Institute for Social Research [producer], 1999. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor].

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

Versicherung an Eides Statt

„Ich versichere an Eides Statt, dass ich die eingereichte Dissertation *Social Capital, Trust, and Economic Growth – A Cross-Sectional and Panel Analysis* selbstständig verfasst habe. Anderer als der von mir angegebenen Hilfsmittel und Schriften habe ich mich nicht bedient. Alle wörtlich oder sinngemäß den Schriften anderer Autorinnen und/oder Autoren entnommenen Stellen habe ich kenntlich gemacht.“

Göttingen, den   Felix Roth