The Impact of Social Capital on Economic and Social Outcomes

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The Impact of Social Capital on Economic and Social Outcomes

Proefschrift

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I'm not starting again just continuing the same asking what's the use of figuring it all out? I'm a question mark a walking talking question mark but what is the question again?

Jamie Lidell - What's the use, Multiply

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Doing a PhD is an interesting process. It is perhaps one of the few things that could simultaneously be associated with frustration, hell, joy, boredom, satisfaction and happiness. You start with an unknown, get lost and become a walking-talking question mark. If one of the lucky ones you found a way out. Many times I found myself thinking about a problem that was not central to my research which kept me asking, but what is the question again?

When I arrived to Maastricht I had much simpler worries, such as why shops close at 18:00 hrs. and where to find tasty olives. I was wondering whether I would be able to survive in a country where there is little sunshine, where the central element of the cuisine seems to be French fries and where there is everything on MTV but music, given the teaching and work load. But I was lucky again to find people (and people) who bring joy and make life easier.

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İ.S.A, Maastricht, November 2008

Chapter 1 Introduction

This thesis is an in depth investigation of the impact of social capital on socioeconomic outcomes such as innovation, growth and crime. There has been a recent surge in the literature on social economics and social interactions (e.g., Becker and Murphy, 2000; Scheinkman, 2008). Along those lines the concept of social capital has received extensive attention as it is accepted to "facilitate the achievement of goals that could not be achieved in its absence or could be achieved only at a higher cost" (Coleman, 1990, p.304). Mediating via the information channel and by reducing transaction costs, social capital is believed to increase efficiency of social exchange. How does social capital relate to physical and human capital? How does social capital affect economic outcomes? Can innovation be regarded as a mechanism that transforms social capital to income growth? Is it only the economic exchange that social capital improves, or are there other (social) outcomes that could be explained by presence or absence of social capital? Before going into depth and providing answers to such questions, it is important to see how social capital was utilized in European history.

The historical examples below highlight several important aspects that are central to the concept of social capital and show that this phenomenon is actually nothing new, only that the label 'social capital' has carried the discussion to another level. The examples are taken from British history because starting from the late 18th century the United Kingdom witnessed a massive economic and social change that, in some circumstances, produced its own informal social organizations. For instance, about 350 years ago the Royal Society of London played an important role in the development of science and technology by codifying information and by making information gathering less costly. Royal Society started from informal voluntary meetings that later turned into a semi-formal institution, which was complementary to the existing traditional universities in the 17th and 18th century. Its role as an information channel and its relation with formal institutions displays astonishing resemblance to how social capital is conceptualized nowadays. In a similar vein, English private prosecution societies that emerged in the mid 18th century due to inefficient law enforcement played an important role in making the criminal justice system more accessible, thus indirectly affecting criminality in 18th and 19th century Britain.

1.1 From informal societies to social capital

In mid 17th century Europe, there were over 160 universities in 150 cities. Beside their role in creating human capital, universities were also viewed as institutions of culture, thus acted as repositories where national (regional) identity and values were cultivated (Readings, 1996). Most universities were supported by the state, heavily relied on public funding, and were extensively controlled by the church. The existing 'traditional' university system witnessed a major organizational innovation in the second half of the 17th century. The emergence of academic learned societies brought a major change in how scholarly activities were organized and how information was disseminated. Learned societies sprang from informal meetings where philosophical discussions were held regarding the need for a new experimental design of research. This necessity created many learned societies within a short period of time. By the beginning of the 18th century there were already more than 25 learned societies operational in about 20 cities across Europe, such as Académie Française (1635), Royal Society of London (1660), Académie des Sciences (1666) and Accademia dei Dissonanti di Modena (1683). Although learned societies were based on a new approach and seemed distanced from traditional institutions, they were by and large complementary to universities.

Learned societies were a merger of two organizational structures (Hall, 1975). On the one hand, informal societies functioned as clubs where intellectuals met to discuss subjects relating to the natural philosophy and experimental science of the time. They were not based on an established organizational structure with rules, customs and fixed membership. On the other hand, some were more formal as they were given certain privileges by the governing bodies. The Royal Society of London is a good example to illustrate the crucial role that learned societies played in the 17th and 18th century. The Royal Society rose as an amateur body, an 'assembly of Gentlemen', but was also legitimized by Royal Charter as an incorporated body (Hunter, 1976). Its success was partially based on the reliance on experimental science and partially on the social background that brought people from different occupations and origins together setting up a collective environment where people share information.¹ But what really made the Royal Society a success story was its emphasis on collection and dissemination of information. The society also acted as an intermediary among scientists who live abroad and nothing existed in that

¹ For instance, the membership structure in the first phase shows that there were more than 200 members by 1670, 10 percent of whom were foreigners. Of the English fellows, 15 percent were politicians or diplomats; 14 percent were gentlemen scientists who were self-funding scientist with private means such as Robert Boyle; 14 percent were medical doctors; 13 percent were aristocrats; 10 percent were professional scholars or writers; 6 percent were merchants and 4 percent were lawyers (Hunter, 1976).

period that came close to this function. Without the Royal Society, gathering information about discoveries and scientific advancements in other countries was either impossible or possible only at a higher economic cost. Three tools were used for assembling and disseminating information: the regular meetings, letters and official publications.

The Society held meetings every week. However, the informal structure frequently showed itself as the meetings were not as organized as they seemed and there were significant fluctuations in attendance (Hunter, 1976). The meetings were based on informal discussions about new methods in experimental science and natural philosophy, which occasionally involved presentations by local and foreign scientists. One particularly interesting feature that shows the informality were the presentations on natural curiosities, which were referred as 'learned entertainments' (da Costa, 2002). These presentations that involved abnormalities in nature that fed curiosity, were highly informal and the presenter was often disturbed for questions and further elaborations like the custom at seminars today. For instance, anatomical preparations by physicians and surgeons of 'weird' and 'monstrous' births constitute a good example for learning with entertainment. Although the topics were most of the time extraordinary, it was quite common to see prominent scientists, such as Isaac Newton participating in the discussions.² However, the presentations were taken seriously and there was a common belief that the 'curiosities' were useful as they blend entertainment, diffusion of knowledge and learning. At some point the curiosities became so popular that the chief curator of experiments was asked to hold presentations in London coffeehouses and inns (da Costa, 2002).

Another interesting channel of communication was the letters. The letters received from researchers around the world were read out loud in the meetings followed by a discussion on the subject matter. A thorough investigation of the archives of the Royal Society reveals that starting from the early 1660s there were practical steps towards sharing information by means of letters.³ At first the information exchange was handled informally until Henry Oldenburg⁴ put effort in developing a more methodological recording system. All letters received and replies sent were recorded in the Letter Book. According to Hall (1975) this was of particular significance as it implied transmission as well as reception and collection of knowledge. As a further illustration of the significance of these letters, the first communication of Isaac Newton's mathematical work was made by Oldenburg to René François de Sluse (1622-1685), who was a prominent Belgian

 $^{^2}$ Sometimes the entertainment element was more pronounced as was in a case of a dog that 'pronounced several words in English, French and High Dutch and repeated all letters of the Alphabet very distinctly' (cited in da Costa, 2002, p. 152).

³ For instance, on 4 September 1661 "Sir Kenelme Digby...read...a French letter from Monsieur Frenicle to himself, dated at Paris, 31 August 1661, concerning that gentleman's hypothesis of the motion of Saturn; and was desired to write to Mr. Frenicle, and to return him the thanks of the society" (cited in Hall, 1975, p. 178).

 $^{^4}$ Henry Oldenburg served as the first secretary of the Royal Society of London and was the founding editor of the Philosophical Transactions of the Royal Society.

mathematician of the period (Hall, 1975). Oldenburg was also an intermediary between Newton and Leibniz for quite a long time until Leibniz visited England in 1673 and presented in the Royal Society meetings.⁵

One of the most interesting components towards codifying knowledge was the 'history of trades' programme, which was started in 1660 (e.g., Houghton, 1941). The mastermind behind the programme was Francis Bacon, who suggested forming 'histories of trade' to improve industrial practices. He argued that "the researchers who viewed nature through the lens of the crafts could more easily gain knowledge and improve the arts" (Ochs, 1985, p. 131). The 'histories' described a certain production process in detail based on facts, practical observations, accounts of travellers and craftsmen's techniques (Ochs, 1985). The aim was to codify knowledge of craftsmen that would transfer applied knowledge to science and, to a certain extent, the industry. In 1660 six histories began followed by eleven others in 1661 (Ochs, 1985). For instance, William Petty was given the task of writing a history of wool cloth and Christopher Merrett produced a history of glass. Individual contributions such as letters, comments and questions as well as the information arising from joint experiments were collected. All these were then merged with the partial history to form a complete history of trade.

Despite the efforts and involvement of scientists, such as Robert Boyle and William Petty, the programme failed to reach its immediate projections and did not benefit the contemporary industry of the period. There were various reasons for this: the 'histories' were very complex; the craftsmen were often difficult to communicate with and reluctant to share sensitive knowledge. Moreover the industrial structure operating in craft fashion lacked the absorptive capacity to acquire information. However, this does not necessarily mean that the programme was unsuccessful. For instance, Petty described the silk production and dveing process in great detail in a partial history titled "Apparatus to the History of the Common Practices of Dying", which was followed by other partial histories on textile (for details see Ochs, 1985). The impact on industrial practice was not immediate but it definitely provided useful insights that eventually resulted in England's industrial revolution a century later. As codified information, especially on innovative techniques, the 'histories' promoted transfer of manufacturing knowledge from the craftsman to the engineer and firms and moreover helped to create a receptive innovation-prone environment in England compared to other European countries (e.g., Ochs, 1985). It is an interesting irony to observe that scholars still try to understand the science-industry link, about 350 years after the histories of trade programme.

In some cases informal societies dealt with community wide problems such as

⁵ There were other means of codified communication such as the official publications. It was common for members to send letters, research notes, book reviews and accounts drawn from foreign journals to support information collection (Hall, 1975) which were summarized and put together. This informal practice soon led to a formal publication, the Philosophical Transactions of the Royal Society. Started in 1665, the Philosophical Transactions was important in setting the standards and accepted to be one of the oldest academic journals.

criminality. Private prosecution (or felons) societies as an extralegal approach to crime control are particular examples to this (Little and Sheffield, 1983). The industrial revolution in Britain had massive social and economic implications due to the creation of a large working class, mobile populations and increased urbanization. The criminal justice system in that period was unable to adapt to these changes, which created inefficiencies in dealing with the threat and treatment of crime. This was mainly due to the lack of personnel, the high (private) cost of prosecution and the lack of a central police authority (Frank, 1989; Emsley, 1996). The prosecution costs had to be covered by the victim, which by and large meant that only wealthy citizens had the opportunity to access legal authorities. Moreover, the increase in the number of offenses in the first half of the 19th century caused a huge increase in the burden on courts.

Private prosecution societies evolved as a community reflex to such an environment. There were about a thousand societies in the mid 17th century and the number increased after 1780 (Emsley, 1996). How these societies functioned was similar to how contemporary rotating savings and credit associations function (e.g., Geertz, 1962; Ardener, 1964). The monetary resources of the members were pooled and then used to assist members who became victims of crime. The costs of apprehension and prosecution through the legal criminal justice system were paid from this amount hence giving some form of insurance to members. As Little and Sheffield (1983) argue these societies were important in making the legal justice system accessible thus improving the enforcement of existing laws.⁶ Another function of the societies was to share information on suspicious acts or criminality against members. As in the previous example these informal societies were complementary to formal institutions by increasing access to the judicial system by sharing information about felonies and reducing the cost of prosecution. The private prosecution societies slowly became redundant in the second half of the 19th century with the establishment of the more effective police force and justice system (Taylor, 1998).

The disappearance of the private prosecution societies does not necessarily mean that they were ineffective. As has been emphasized, these informal societies complement the existing institutions, enabling the poor to access legal system. Extensive reform in the justice system surmounted the inefficiencies and these societies lost their main purpose of existence. However, most of them evolved through time and function in a different manner. Past and current world provide many examples of similar associations, such as the *neighbourhood (or crime) watch*. Crime watch is an informal organization formed by citizens who are devoted to the prevention of crime and vandalism. The major role of these organizations is to prevent crime and to make neighborhoods safer by working together with the

 $^{^{6}}$ These societies were very different from their American counterparts. It was not in the form of *vigilantism* in which the law was exercised by the community from prosecution to punishment. Among thousands of cases in England there were only few instances reported where punishment was also exercised in the society meetings.

police, legal authorities and other voluntary organizations. Such associations are operational in many countries especially in the US and the UK.⁷ This constitutes a good example for the existence of informal institutions even in environments where formal institutions function well.

The historical cases above illustrate how social capital improved efficiency centuries ago. Turning back to the contemporary world, the next section briefly discusses four hypotheses that this work is based on. The main contributions summarized in the conclusion also stem from these hypothesis. The research outline is presented in section 1.3.

1.2 Main argument

Economists have long been interested in explaining economic growth (e.g., Solow, 1956; Swan, 1956) and advancements in the literature emphasize the role of technical change in understanding economic growth (e.g., Romer, 1990; Grossman and Helpman, 1991; Aghion and Howitt, 1992, and the two-volume Handbook of Economic Growth edited by Aghion and Durlauf, 2005). In this literature the role of social interactions is limited and economic behaviour is based on utility maximizing homogeneous agents disengaged from social interactions. Nowadays, however, technological change and economic growth are understood within a socio-economic framework composed of interacting agents (e.g., Cowan and Jonard, 2004). According to systems perspectives, innovations emerge in complex systems composed of interacting actors that share knowledge and resources such as firms, customers, research agencies, universities and the government (e.g., Lundvall, 1992). This understanding is supported by a large body of research on repeated interactions. For instance, economists and biologists emphasize the role of repeated social interactions in solving free-rider problems and in reducing opportunistic and selfish behaviour (e.g., Abreu, 1988; Bowles and Gintis, 2004). By the same token, the "embeddedness" idea stresses the role of interpersonal interactions and networks of relations in comprehending how economic systems function, by generating norms, sanctions and trust (e.g., Granovetter, 1985).

To facilitate this multilevel and interdisciplinary research agenda, the borders of sociology and political science may shelter interesting contributions to the research on economic growth as Temple (1999) argues. In line with this argument, an important development in social science in the last decade is "the rise of interest in social capital as a mechanism for understanding socio-economic phenomena" (Durlauf, 2002, p. 459). It is believed that inter-agent interactions that form social capital are essential and have become more important for understanding socio-economic outcomes and further explaining social phenomena. Because they

⁷ See for instance the webpage of National Neighborhood watch Institute, http://www.nnwi.org/ for US and http://www.neighbourhoodwatch.net/ for UK. For a more organized version see Netherlands Centre for Crime Prevention and Community Safety webpage http://www.theccv.eu/.

can substitute missing institutions and complement existing ones in facilitating innovation and economic development.

Investigation of this complex interplay between institutions, social capital, innovation and socio-economic outcomes necessitates an understanding of how social capital affects outcomes. Where do the efficiency gains from social capital come from? For social capital to render socially and economically efficient outcomes the current state should not be a Pareto optimum (Durlauf and Fafchamps, 2005). The existence of information asymmetries and coordination failures creates room for social capital to improve efficiency. There are two major channels of efficiency gains. First, social capital addresses information problems that hinder trade and exchange of information. Second, it could reduce transaction costs, such as search and monitoring costs. Search and trust are fundamental elements of economic exchange (e.g., Hayek, 1945; Akerlof, 1970). Zak and Knack (2001) have shown that finding trade partners is costly as agents incur search costs while collecting information regarding the reputation of an agent to assess trustworthiness. Even after engaging transactions, lack of trust may further constrain economic exchange. Similarly, in environments where institutions are not binding trust is a lubricant that increases efficiency in economic exchange (e.g., Fafchamps and Minten, 1999). The importance of social networks in diffusing information on labour market opportunities (e.g., Granovetter, 1974) constitutes a good example of how social capital could create new ways for information exchange. Barr (2000), for instance, argues that social networks among small firms play a crucial role in exchanging information about new technological developments in Ghana. A third possible channel is that social norms and community codes may alter individual behaviour. We argue that this is an important channel that ties social capital to innovation. Mechanisms like shame, damage to reputation and guilt could act like social constraints that may cause changes in individual attitude (i.e., behaving cooperatively due to morality, telling the truth to build up reputation). As discussed in chapter 6, information exchange is also crucial to maintain social order. For instance, exchange of information on malignant behaviour could prevent future criminal behaviour which is only possible in communities with dense social relations and informal social control (e.g., Sampson, Morenoff, and Earls, 1999; Rosenfeld, Messner, and Baumer, 2001). This discussion leads to our first assertion.

Hypothesis 1: Social capital leads to positive socio-economic outcomes by reducing transaction costs, creating new forms of information exchange and by inducing change in individual attitudes.

The economics literature has identified social capital as an important determinant in explaining differences in income. Knack and Keefer (1997) and Zak and Knack (2001) have shown for a cross-section of countries that countries with higher levels of measured trust are richer. Since the seminal work of Putnam, Leonardi, and Nanetti (1993) the social capital-growth link has undergone several investigations (e.g., Helliwell and Putnam, 1995; Knack and Keefer, 1997; La Porta, Lopez-de-Silanez, Shleifer, and Vishny, 1997; Whiteley, 2000; Zak and Knack, 2001; Rupasingha, Goetz, and Freshwater, 2002; Beugelsdijk, de Groot, and van Schaik, 2004; Beugelsdijk and van Schaik, 2005a; Iyer, Kitson, and Toh, 2005). However, these papers mainly investigate correlations between growth and social capital, but it is still not clear *how* social capital improves economic outcomes.

In contrast to the existing literature, the research in this study focuses on social capital by analyzing its impact on innovation and through the channel of innovation on economic growth. It is widely accepted that economic performance is positively correlated with innovative activities, such as expenditure for research and development (R&D) and patent applications (e.g., Grossman and Helpman, 1994; Aghion and Howitt, 1998; Acs, 2003). Additionally, it is known that societies in which people enjoy each other's confidence experience a higher level of economic performance. By enabling information exchange and reducing transaction costs social capital may induce more effort toward inventive activity (chapter 3). The combination of these observations has not received attention but could imply that societies with a higher level of social capital are better able to manage the process of innovation and that creative effort will be more richly rewarded in relatively trusting societies.

Assume a scenario where entrepreneurs seek funding to conduct R&D and/or to commercialize invention. The process is characterized by information asymmetries and risk because the true quality of the project is only known by the entrepreneur. The venture capitalist incurs formidable risks because there may not be sufficient parameters to judge the real quality of the project and the trustworthiness of the entrepreneur. The venture capitalist would like to assess the quality of the idea and the capacity of the entrepreneur by asking questions, such as: Have you applied for a patent? Can you ensure that it is not possible to copy this product? How long did it take you to develop this product? How much does it cost to produce? How much have you spent so far to develop this product? What is the amount of turnover you expect in the next three years? What is the market for this product? Have you approached any major retailers or companies, if so are they interested? What is your background? Are you the sole owner of this project? Is this the only product of your company? If not how much time would you allocate only to develop for this product?⁸ The entrepreneur somehow has to signal that the project is worthy to invest by answering such questions and by revealing sensitive (technical) information regarding the project. Investing time

⁸ Such questions and many others are part of usual conversations between entrepreneurs and venture capitalists in a television programme on the BBC, Dragons' Den. The programme is based on negotiations between the entrepreneurs who seek funds to develop their businesses and five venture capitalists who are willing to finance projects in return for a share in the company, provided that the project is good enough. For more information see http://www.bbc.co.uk/dragonsden/.

and money and revealing information that could be valuable to competitors would eventually reduce the private return of the firm. Moreover inherited risks would lead to underinvestment in R&D activities. Leland and Pyle (1977), Bhattacharya and Ritter (1983), Myers and Majluf (1984), Boocock and Woods (1997), and Bougheas (2004) are examples amongst others who have argued that risk aversion, internal capital constraints, monitoring costs, information asymmetries and moral hazard hinder R&D financing.

Assume an extreme situation characterized by perfect trust i.e., the trustworthy entrepreneurs reflect the true quality of the project and information gathering is easy and free. In such a case there would not be any search and monitoring costs, consequently funding would be directed toward projects with a higher future stream of returns and moreover more funds would be available. When coupled with the fact that the quality and the quantity of information in circulation would increase due to social networks more innovative projects would be submitted and funded. This situation would be Pareto superior to the original one.

As discussed in chapter 2 and in chapter 3, the basic premise is that social capital induces innovation as it facilitates efficient ways of information exchange, reduces (or eliminates) transaction costs and as it alters the behavior of the entrepreneur and/or the venture capitalist. It could also reduce the element of risk if the relation between the venture capitalist and inventor is trust building. In certain situations (i.e., binding norms) it could even force agents to behave in certain ways. For instance, entrepreneurs with weak projects may cease to mimic entrepreneurs with good projects due to the fear of damaging their reputation. Hence the second assertion follows.

Hypothesis 2: *Higher social capital leads to higher innovation and innovation is a channel that transforms social capital to growth.*

Researchers in different disciplines have identified several other social outcomes, such as public health (e.g., Kawachi, Kim, Coutts, and Subramanian, 2004), individual mental health (e.g., Miller, Scheffler, Lam, Rosenberg, and Rupp, 2006), suicide (e.g., Helliwell, 2007) and homicide (e.g., Rosenfeld, Messner, and Baumer, 2001) that could be affected by social capital. A natural avenue to extend this research is to link social capital to crime as crime is both a social and economic phenomena. Crime is not only affected by social and economic factors, such as poverty, disadvantaged families and education but also has economic and social consequences (i.e., expenditure on crime prevention, social exclusion and deprivation). For instance, it has been estimated that an average inhabitant spends roughly 220 euros per year on crime prevention in the Netherlands.⁹ This amounts to about 2.4% of Gross Domestic Product (GDP) which is slightly lower than the total amount of investments in R&D. According to the Eurobarometer survey

 $^{^{9}}$ The total cost of crime is estimated to be much higher about 14 billion euros every year (Moolenaar, 2006).

2004, crime is the most important issue of concern (32%) according to Dutch residents even more important than health care (30%) and integration of foreigners (23%). To give a practical example of such concerns, TV series such as CSI: New York, Numbers and Criminal Minds have become so popular in the Netherlands that about 20 crime related TV series are broadcasted on Dutch TV channels. The Netherlands is an interesting case to investigate the relation between social capital and social dysfunction with regards to certain characteristics it possesses such as low unemployment, better economic means, lower income inequality, high concentration of foreigners and a free market for soft drugs. Despite these concerns there has not been a thorough investigation regarding crime and social capital in the Netherlands.

Social capital is linked to crime in three ways (chapters 2 to 4). First, social capital increases the opportunity cost of crime. By extending previous models on crime, Williams and Sickles (2002) show that social norms and stigma also influence the decision to commit crime. When deciding to participate in criminal activity individuals incorporate both social consequences, such as divorce and loss of social status as well as economic costs, such as loss of job, income and gains from crime. Mechanisms of guilt and shame and community norms could also prevent individuals from committing crime. These components constitute a self-control mechanism that deters individuals from committing crime. Second, there have been numerous studies arguing that communities with weak informal social control face higher crime (e.g., Kornhauser, 1978; Taylor, Gottfredson, and Brower, 1984; Sampson and Groves, 1989; Bursik and Grasmick, 1993; Messner, Baumer, and Rosenfeld, 2004). The idea is that, in communities where citizens are less attached and where individuals participate less in community activities people are unwilling to intervene in cases of crime (e.g., Sampson, Morenoff, and Earls, 1999). Similarly, Hirschi (1969) argues that strong attachment and involvement in community matters reduce the cost of conflict resolution and conflicts are therefore resolved in peaceful ways (which especially reduces non-property crimes by preventing them at the first place). This informal public control mediates via the information channel which makes up the third link. In communities with dense social networks citizens and neighbours continuously and informally exchange information on malignant behaviour which may facilitate active interference to prevent possible criminal behaviour (especially youth crime) (e.g., Sampson, Morenoff, and Earls, 1999). These arguments build up to the third assumption.

Hypothesis 3: By enhancing information exchange via network effects and by increasing the opportunity cost of crime, higher social capital is associated with lower crime.

One potentially interesting empirical contribution of the thesis is the role of formal institutions in setting up a transient environment that is conducive to the formation of common codes, cultural traits and thus social capital. As discussed above, social exchange improves by eliminating or reducing search costs and by fostering trust. Durlauf and Fafchamps (2005) argue that there are two ways that this can be achieved: (i) through formal institutions (e.g., legal and political institutions, venture capital market, stock exchange etc.). There is a long tradition of research on the role of formal institutions in facilitating economic exchange and social outcomes (e.g., North, 1981; Varughese and Ostrom, 2001; Acemoglu, Johnson, and Robinson, 2005; Tabellini, 2005); or (ii) through informal institutions (such as repeated interagent relations, reputation, enforceable norms, social trust etc. e.g., Zucker, 1986; Platteau, 1994a,b; Berg, Dickhaut, and McCabe, 1995). The two could complement each other as in the case of developed countries. But in most countries where formal institutions are not binding, informal institutions satisfy the conditions (search and trust) for exchange (e.g., Akerlof, 1970). For instance, in trade amongst Maghribi and Genoese traders in the 11th century, Greif (1994, 2006) shows how informal channels work to circulate information regarding breach of contract in the absence of formal institutions thus enabling cheaters to be punished (in the form of degrading reputation and trustworthiness). Studies by Douglas North and Daron Acemoglu show that institutions are crucial for economic exchange. In a similar vein, there have been attempts to show the effect of literacy on economic development and crime. For instance, Sandberg (1982) shows for a set of European countries that the literacy rates in 1850 are correlated with per capita income in 1970 but not with per capita income in 1850s. Gillis (2004) shows that rising levels of literacy in the 19th century caused a reduction in the crime rates several decades later. Most of these works, however, are silent about how institutions affect outcome variables. We argue that past formal institutions can explain variations in current social capital and their effects on socio-economic outcomes mediate via social capital. Thus formal institutions, such as education, literacy, the political system, institutionalized religion and universities create informal institutions in the long run. A policy recommendation that derives from this argument that would achieve dual objectives both in the short and the long run is then to foster formal institutions. Creating well-functioning and binding institutions is a first-best solution (e.g., Bowles and Gintis, 2002).

Hypothesis 4: Current social capital is to a degree shaped by the extent of formal institutions in the past.

1.3 Outline of the thesis

This thesis is an empirical investigation into the role of social capital in explaining economic and social outcomes. It revolves around the four hypothesis highlighted above and the structure of the thesis with short summaries of each chapter is presented below.

The following chapter is an introductory literature review on social capital.

The chapter builds on four strands of research prior to the social capital literature and, rather than defining the concept, identifies several elements that are common to most contemporary definitions. This search for commonalities is complemented by a detailed table comparing and contrasting physical, human and social capital. There are three issues that the current debate on social capital revolves around: (i) efficiency gains from social capital, (ii) social capital and institutions, and (iii) measurement of social capital. These issues are briefly discussed as this pave the way to the main arguments of the thesis and enables a benchmark for further elaboration. The chapter closes with an assessment of the social capital of social capital researchers. Research on social capital spans various disciplines and the concept has been further developed within each discipline with little communication between disciplines. This has led to multiple definitions, a certain level of ambiguity and sometimes misinterpretations. For a better understanding more cross-disciplinary work is necessary. This argument is illustrated by employing a social network analysis on the co-authorship structure of researchers who work on social capital. It is shown that cross-disciplinary collaboration is a rare phenomenon.

Chapter 3 investigates the interplay between social capital, innovation and per capita income growth in the European Union.¹⁰ Innovation is modelled and identified as an important mechanism that transforms social capital into higher income levels. In an empirical investigation of 102 European regions in the period 1990-2002, it is shown that higher innovation performance is conducive to per capita income growth and that social capital affects growth indirectly by fostering innovation. The estimates suggest that there is little direct role for social capital to foster per capita income growth in this sample of European Union countries. Another interesting finding is the role of past political and educational institutions in influencing current social capital. It is shown that the state of political institutions, literacy and universities in the 19th century in Europe formed the seedbeds of current social capital.

In chapter 4 the focus is on the role of government intervention and social capital in explaining differences in innovation output and economic growth in the regions of the European Union in the period 1990-2002.¹¹ Chapter 4 is organized as an extension to chapter 3 in two ways. First, the association between social capital and innovation is taken a step further as it is shown that social capital also has impact on growth of innovation output as well as the levels. Second, despite the amount of money involved in EU structural funds there has been little work on the effectiveness of these expenditures on innovation and growth. Using several

¹⁰ This chapter is based on the joint work with Bas ter Weel "Social capital, innovation and growth: Evidence from Europe" appeared as UNU-MERIT working paper and IZA discussion paper and is forthcoming in the *European Economic Review*. For details see Akçomak and ter Weel (2006, 2008d).

¹¹ This chapter is based on the joint work with Bas ter Weel "How do social capital and government support affect innovation and growth? Evidence from the EU regional support programmes" published as a book chapter in "Innovation Policy in Europe". For details see Akçomak and ter Weel (2008a).

measures of social capital and innovation and the European Union's Objective 1, 2 and 5b figures for EU regional support, the estimates suggest that EU funding does not significantly contribute to economic outcomes, while social capital does. Investigation of a possible complementary relationship between social capital and government support reveals that regions with higher levels of social capital are more likely to effectively gain from EU regional support programmes. This result implies that besides a direct effect of social capital on economic outcomes, social capital seems to be an important prerequisite for the effective implementation of government programmes. From a policy perspective it seems important to stimulate education to foster human capital formation. In regions that are rich in human and social capital, government policies are more likely to be effective in influencing economic outcomes.

A natural extension of the previous chapters is to see whether the main arguments and the findings also hold for other socio-economic outcomes. So far the focus is on economic outcomes such as innovation and economic growth. Chapter 5 investigates the relation between social capital and crime.¹² Crime is a social outcome with social and economic costs and driven by social as well as economic factors. By employing current and historical data for Dutch municipalities and by providing new indicators to measure social capital, it has been found that there is a a causal link between social capital and crime. The estimation results suggest that higher levels of social capital are associated with lower crime rates and that municipalities' historical states in terms of population heterogeneity, religion and education affect current levels of social capital.

Chapter 6 is organized as a case study and policy chapter building on the previous findings that formal institutions affect social capital formation in the (medium) long run.¹³ The application of this argument to EU-Turkey relations is interesting as one of the main arguments against Turkey's membership is that Turkey cannot adapt to European values and EU institutions. On the contrary, by following an institutionalist approach, this chapter provides evidence that European values relating to religion and democracy are not as common as they are believed to be and that many of Turkey's supposed cultural differences with the rest of Europe are in fact unsubstantiated. These so-called common European values, cornerstones in many of the arguments against Turkey's membership, differ greatly among the EU members and adding Turkey does not make any difference to increase the heterogeneity. More significant differences between Turkey and the EU are of an economic and political nature and, as such, could only be addressed through institutional capacity building with EU support in Turkey. The main argument is that institutional change, deliberately supported by the EU, will per-

¹² This chapter is based on the work with Bas ter Weel "The impact of social capital on crime: Evidence from the Netherlands" appeared as UNU-MERIT working paper and IZA discussion paper. For details see Akçomak and ter Weel (2008b,c).

¹³ This chapter is partially based on the previous work with Saeed Parto "How 'black' is the black sheep compared to all others: Turkey and the EU" appeared as UNU-MERIT working paper. For details see Akçomak and Parto (2006).

haps bring short term economic gains, but what matters is that it will also cause societal values to change. The combined affect of these two channels neutralizes the two cornerstone arguments against Turkey's membership (i.e., that Turkey is economically underdeveloped and that Turkey is culturally different).

The findings in chapters 2 to 6 are summarized in chapter 7 with further discussion on social capital and socio-economic outcomes. We conclude by presenting various implications for further research.

Chapter 2

Bridges in social capital: A review of the literature and the social capital of social capital researchers

...plunged into a whiteness so luminous, so total, that it swallowed up rather than absorbed, not just the colours, but the very things and beings, thus making them twice as invisible.

Jose Saramago, Blindness

I found myself chasing a target that moved and multiplied at a pace that defied my capacity to catch up

Ben Fine, Social capital versus social theory

2.1 Introduction

The last decade has witnessed a massive interest in non-economic explanations to economic phenomena that reach beyond neo-classical economics and the socalled *homo economicus*. In this new world the individual is not a mere rational agent disengaged from his social environment, but beyond that has the ability to affect the incentive structure that he faces by engaging in social interactions. The individual is embedded in various social environments characterized by certain norms and values and therefore could act voluntarily in the virtue of these norms and values contrary to the expected economic self interest. Individual egoistic behavior could also be constrained by the social environment itself. Therefore, in this world, community character is just as important as individual agents are. This line of reasoning has led to a revival in research bridging economics to sociology and in this respect the concept "social capital", coined first by Jacobs (1961) and Loury (1977), has become a major point of focus for economists as well as other social scientists. This revival could also be viewed as an awakening of the old sociology-economics bond that tends to be forgotten in the neo-classical tradition.

The literature on social capital has grown at an exponential pace in the last 20 years. After Glenn Loury's introduction of the term in 1977, further papers using different definitions of social capital appeared in the late 1980s (e.g., DiMaggio and Mohr, 1985; Bourdieu, 1986; Flap and De Graaf, 1986; Coleman, 1988; Fratoe, 1988). Since then about 2,500 papers have been published in the Social Sciences Citation Index (SSCI) on the topic. Social capital is now associated with higher economic growth (e.g., Knack and Keefer, 1997); higher education (e.g., Coleman, 1988); higher financial development (e.g., Guiso, Sapienza, and Zingales, 2004); better innovative outcomes (e.g., Akcomak and ter Weel, 2006); lower homicide rates (e.g., Rosenfeld, Messner, and Baumer, 2001); lower suicide rates (e.g., Helliwell, 2007); better public health (e.g., Kawachi, Kim, Coutts, and Subramanian, 2004); and higher value creation by firms (e.g., Nahapiet and Ghoshal, 1997). Scholars have also mentioned the possible adverse effects of social capital (e.g., Fukuyama, 1995; Gambetta, 1996; Portes, 1998). The literature is immense and spans sociology, economics, organization, management, political science, planning and development, and health sciences. Figure 2.1 shows the number of articles on social capital in the SSCI and the citation records of these papers in the period 1988 to 2007. Panels (a) and (b) depict the absolute number of articles in "title" and "topic" categories respectively. As visible from the graphs, prior to 1993, when Putnam promoted the concept in his book "Making Democracy Work: Civic traditions in Modern Italy", there were only 10 papers on social capital. In the last 15 years an average of 160 papers have appeared every year with, on average about 1,500 citations to them.¹ However the absolute numbers could be misleading as most likely other research topics display a similar trend. Therefore we also collected information on the articles on "human capital". Figure 2.1 panels (c) and (d) replicate the graphs in panels (a) and (b) in terms of number of social

¹ The search parameter 'social capital' in "topic" resulted in 2,556 articles from 1988 to the end of 2007. The search parameter 'human capital' returned 3,020 articles over the same period. The search for 'social capital' or 'trust' in "title" resulted in 1,594 hits and the search for 'human capital' or 'education' in "title" returned 3,995 articles. The search is limited to 10 areas: economics, sociology, management, business, political science, interdisciplinary social sciences, planning and development, business and finance, environmental studies and urban studies. Extending the search to other areas such as geography and public health improves the results and the increasing trend becomes much more visible. http://portal.isiknowledge.com/portal.cgi. Accessed 08.11.2008.





capital articles per human capital article.² This adjustment do not change the qualitative results. 20 years ago there were about 0.1 social capital articles per human capital article but now there are 1.2 social capital articles per human capital article. This is an additional evidence of the extent of the social capital research.

Despite this interest, there has not been an agreement on what social capital actually is. The concept is widely used both at the macro and micro level without really specifying the sources of it which makes the concept rather vague. It has been used as a catch-all term encompassing all social explanations to various socioeconomic phenomena. A number of scholars have already commented on the major contradictions and weaknesses regarding social capital that have to be resolved, clarified and developed, respectively (e.g., Portes, 1998; Fine, 2001; Durlauf and Fafchamps, 2005). The purpose of this chapter is to clarify certain aspects of social capital which will serve as a guide for the following chapters. Given the size of the literature, it is a tremendous task to review all the literature. This chapter makes an attempt to (i) shed light on the origins of the concept to find elements that are common to most definitions; (iii) compare and contrast different forms of capital; and (iv) elaborate on recent issues regarding social capital such as different approaches to measurement and how institutions affect social capital.³

The next section highlights four streams of research that developed prior to the concept of social capital, but very much in line with contemporary use of the concept. Section 2.3 discusses the concept at length providing a detailed comparison with other forms of capital. Section 2.4 highlights three issues that are novel and central to the thesis: efficiency gains from social capital; measurement of social capital; institutions-social capital link. Section 2.5 presents a social network analysis to assess social capital of social capital researchers. Section 2.6 concludes.

2.2 Origins of social capital

Before defining the concept of social capital, it is important to understand the origins of the concept. Therefore we summarize the findings of four different streams of research prior to the "social capital" literature that share common characteristics with the concept of social capital. First, there is a well-developed literature on whether interpersonal ties are conducive to better opportunities in the labour market (e.g., Granovetter, 1973; Lin, Walter, and Vaughn, 1981; Lin, 1982; Flap and De Graaf, 1986; Sprengers, Tazelaar, and Flap, 1988; De Graaf and Flap, 1988; Marsden and Hurlbert, 1988; Boxman, De Graaf, and Flap, 1991). More

 $^{^2}$ The numbers in panels (c) and (d) are calculated by dividing the absolute number of articles (or citations) on social capital by the absolute number of articles (or citations) on human capital.

³ The focus is on the literature linking social capital to economic growth, innovation, and crime. Most of the literature on social capital in development and planning, organization, and health sciences is discarded not because it is not important but simply because it is outside the scope of the thesis.
specifically, this research argues that an individual's family, friends and acquaintances form a social network that serves as a social resource, which can be utilized to gather information on job opportunities and find a new or better job. This literature also provides evidence that not only close family and friends but also "significant others" (i.e., strength of weak ties) are important in gaining higher status and income (e.g., Granovetter, 1973, 1974; Lin, Vaughn, and Walter, 1981). In this early literature, the resources provided by the social network were labelled as "social resources" (e.g., Lin, Walter, and Vaughn, 1981; Lin, Vaughn, and Walter, 1981; Marsden and Hurlbert, 1988) or as "social capital" (e.g., DiMaggio and Mohr, 1985; Flap and De Graaf, 1986; Sprengers, Tazelaar, and Flap, 1988), and the two terms were used almost as a perfect substitute to each other. ⁴

Second, the role of rotating savings and credit associations $(ROSCAS)^5$ in pooling risk and achievement of certain economic means was common knowledge in anthropology and sociology in the 1960s (e.g., Geertz, 1962; Ardener, 1964; Granovetter, 1985). Economists have re-discovered the importance of ROSCAS at a later stage (e.g., Besley, Coate, and Loury, 1993; Anderson and Baland, 2002; Klonner, 2003). Members of this institution contribute fixed amounts regularly. The resulting sum is then allocated to one of the members on a random basis (lottery) or on the basis of a bidding system. This process repeats itself until all contributers have received the sum once. Of course the system strictly depends on the existence of strong ties between members to enforce social sanctions and to punish deviant behaviour. Hence, trustworthiness of the members is important as it constitutes a guarantee that commitments will be kept. Geertz (1962) reviews how such traditionalistic forms of social relationships are mobilized to achieve certain economic functions in various countries,⁶ ranging from small-scale capital formation (Ardener, 1964) to the purchase of goods like bicycles (Geertz, 1962). Apart from enabling economic funds these institutions also strengthen solidarity in the community. As noted by Granovetter (1995) "micro-lending", better as known as "micro-credit", is almost a copy of rotating savings credit associations. As such they could be labelled as the formalized version of these informal institutions.

Third, there is a large body of work on how social relationships affect health and well-being, both at the individual and community level (e.g., Cassel, 1976). Several terms such as, social support, social networks, social ties, social activity, social integration (House, Umberson, and Landis, 1988) were used to explain this phenomena in the 1970s and 1980s. The basic argument of this body of work is that social support influences human health via two channels, first by reducing stress levels (or exposure to stress) in the presence of stress due to mental

⁴ At that time social capital was not conceptualized and was far from what we understand nowadays. Social capital was mostly associated with resources deriving from social networks and there was no differentiation between social capital and social resource.

 $^{^5}$ As noted by Geertz (1962) many terms are used to denote rotating savings and credit associations such as, contribution clubs, mutual lending societies, pooling clubs etc.

 $^{^{6}}$ Especially in the last decade there has been extensive work on rotating savings and credit associations: See Gugerty (2007) for Kenya, Guerin (2006) for Senegal, Scholten (2000) for Germany and Austria, Kan (2000) for Taiwan and Tsai (2000) for China.

or physical illness (e.g., Cassel, 1976; Kaplan, Cassel, and Gore, 1977), and second by enhancing health in general as the degree of embeddedness in a social network (e.g., church membership, formal and informal group affiliations) is associated with public health (e.g., Berkman and Breslow, 1979; Blazer, 1982). This work on social support, especially the second channel, can also be viewed as the ancestor of the current literature on social capital and (public) health and wellbeing (e.g., Lochner, Kawachi, and Kennedy, 1999; Kawachi, Kennedy, and Glass, 1999). Scholars have shown that social capital is associated with higher levels of public health (e.g., Kawachi, Kim, Coutts, and Subramanian, 2004; Veenstra, 2002; Poortinga, 2006), lower death rates from cardiovascular problems and cancer (e.g., Kawachi, Kennedy, Lochner, and ProthrowStith, 1997) and lower depression (e.g., Lin, Ye, and Ensel, 1999).

Fourth, within the literature of economic sociology there has been substantial work on immigration and especially on immigrant entrepreneurs (e.g., Light, 1972; Aldrich and Zimmer, 1986; Light and Bonacich, 1988; Borjas, 1992; Portes, 1995). For instance, Baker and Faulkner (1991) argue that an ethnic community could also be viewed as a social network that enables resources, such as cheap labour and start-up capital (i.e., via rotating saving and credit association for example). Immigrant entrepreneurs have privileges to utilize these resources for economic means, which could not be explained by standard physical and human capital theories (e.g., Wilson and Portes, 1980). The point that should be highlighted here is that most resources available in these ethnic communities are based on (i) group solidarity (For instance, see Portes (1995) on how the Cuban community prefers exiles from Cuba for start-up funds); and (ii) enforceable trust arising from the monitoring capacity and the effectiveness of internal communication within the ethnic groups (e.g., Light, 1972). As explained in detail in Portes and Sensenbrenner (1993), both enforceable trust and group solidarity, together with moral values and reciprocity constitute sources of social capital.

To conclude, at least four sources of social capital can be identified from these works: (i) individual's *social relations* could play significant role in status attainment (or in the case of preserving mental health); (ii) *identification* with a group or a voluntary organization could generate positive outcomes by producing a sense of belonging; (iii) solidarity that may render individuals to seek for community well-being rather than individual self-interest; and (iv) enforceable trust mainly arising from enhanced information exchange, social norms and monitoring capacity in social networks (with closure). These four components are also important elements of the concept of "social capital" that builds on this early literature.

2.3 Social capital

When Glenn Loury first mentioned social capital perhaps he had not imagined how popular the term would become. As an attempt to criticize neo-classical treatment based on individual investment in human capital and skills in explaining racial income inequalities, he wrote "An individual's social origin has an obvious and important effect on the amount of resources that is ultimately invested in his or her development. It may thus be useful to employ a concept of "social capital" to represent the consequences of social position in facilitating acquisition of the standard human capital characteristics" (Loury, 1977, p.176). He was well aware of the inherent measurement problems, however he argued that such an attempt would at the very least force scholars to seek other explanations for income differentials different from what neo-classical economics provide. Although Loury did not go further to conceptualize the term "social capital", there were signs in his approach that he actually meant social resources that are useful in acquisition of skills with economic value.⁷

2.3.1 Defining social capital

Given the treatment above, it is best to start approaching the concept first from the micro level. Scholars have defined social capital as;

"An individual's personal social network, and all the resources he or she is in a position to mobilize through this network, can be viewed as his or her social capital." (Flap and De Graaf, 1986, p.145)

"...someone's network and all the resources a person gets access to through this network can be interpreted more specifically as his "social capital" ...someone's social capital is a function of the number of people from whom one can expect support, and the resources those people have at their disposal. Here social capital is seen as a means of production, that can produce better conditions of life." (Sprengers, Tazelaar, and Flap, 1988, p.98)

"...social capital refers to friends, colleagues, and more general contacts through whom you receive opportunities to use your financial and human capital..." (Burt, 1992, p.9)

"...resources embedded in a social structure which are accessed and/or mobilized in purposive actions" (Lin, 2001b, p.29)

"...investment in social relations by individuals through which they gain access to embedded resources to enhance expected returns of instrumental and expressive actions" (Lin, 2001a, p.17)

⁷ This became clearer when at a later stage he asserted "...social capital refers to naturally occurring social relationships among persons which promote or assist the acquisition of skills and traits valued at the market place...it is an asset which maybe as significant as financial bequests in accounting for the maintenance of inequality in our society" (Loury, 1992, p. 100, cited in Woolcock (1998), footnote 2, p. 189). See also Portes (1998).

"...I take social capital to mean interpersonal networks. The advantage of such a lean notion is that it does not prejudge the asset's quality. Just as a building can remain unused and a wetland can be misused, so can a network remain inactive or be put to use in socially destructive ways. There is nothing good or bad about interpersonal networks; other things being equal, it is the use to which a network is put by members, that determines its quality." (Dasgupta, 2005, p.S10)

Tracing the commonalities in the definitions above results in the following list of four elements: (i) social capital arises from social networks; (ii) the social network itself is not social capital but utilizing it produces social capital (see Table 2.1): (*iii*) individuals can purposefully invest in social relations with an expected return; and (iv) social capital may have a negative as well as a positive impact on outcomes. Regarding the first and second elements, it should be clear that for social capital to arise the existence of a social network is a necessary but not a sufficient condition. To utilize the resources made available by the network, individuals have to engage in actions. For social capital to exist, three components -the social structure, resources and the action- must be present (Lin, 2001b) and social capital depends on the amount and quality of these resources (Portes, 1998). The third element highlights that one can actually invest in social relations which means that the agent's decision to act is calculative (see Table 2.1 (h)). In such a setting social capital works as it enhances information exchange and as it influences individual decision making. This strand of research on the concept treated social capital as a social resource and as Portes (1998) argues, it stands "for the ability of actors to secure benefits by virtue of membership in social networks or other social structures" (p.6). Although social capital is mostly associated with positive outcomes, for instance job search and status attainment (e.g., Lin, Cook, and Burt, 2001), social control (e.g., Coleman, 1988), and resources arising from immigrant networks (e.g. Portes and Sensenbrenner, 1993); it could also result in negative outcomes by restricting others (outside the network) to access opportunities (e.g., Waldinger, 1995) or by restricting an individual's attempt to connect to other social networks (i.e., restricting bridging social capital) (e.g., Portes and Sensenbrenner, 1993; Fukuyama, 1995; Beyerlein and Hipp, 2005).

At this stage we may consider two intermediary definitions. Definitions below by Pierre Bourdieu and Alejandro Portes could be placed somewhere in between the micro and macro level interpretations of social capital as they shelter characteristics that could be associated with both levels. These early definitions are important because they came very close to the economist point of view (e.g., Zak and Knack, 2001; Glaeser, Laibson, and Sacerdote, 2002).

"Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationship of mutual acquaintance and recognition -or in other words, to membership in a group- which provides each of its members with the backing of the collectivity-owned capital, a "credential" which entitles them to credit, in the various senses of the word." (Bourdieu, 1986, p.210)

"...those expectations of action within a collectivity that affect the economic goals and goal-seeking behavior of its members, even if these expectations are not oriented toward the economic sphere." (Portes and Sensenbrenner, 1993, p.1323)

Looking at these definitions, it is obvious that both reflect at least the first three elements discussed above: an individual's action within a social network could change the incentive structure and affect the behaviour of other agents in the social structure. For instance, enforceable trust and reciprocity may arise from individual actions within a social structure.⁸ However what differentiates these definitions from the first set of six is that they also refer to terms like 'collectivity' and 'credential'. This macro connotation is apparent especially in the last part of Bourdieu's definition as he bluntly writes "...a 'credential' which entitles them to credit, in the various senses of the word." Given this, a cautious reader could argue that accessing this collectivity owned capital does not require a deliberate action or investment. Once you are born to a social structure you may automatically possess this social capital (see Table 2.1 (h)). For instance, Portes (1995) presents various cases where ethnic business enclaves provide resources such as start-up capital and easy access to markets as long as one is a member of that particular ethnic community. Taking the concept a step further, among the four sources of social capital Portes and Sensenbrenner (1993) identified, norms and values and solidarity are closer to the macro perspective.⁹ For example, if a Norwegian firm deciding between employing a Swedish candidate or one from an African country, the probability of the Swedish to be employed is higher not because of his/her merits but perhaps because of the proximity of the Swedish norms and values to the Norwegian norms and values. Here belonging to a community is an asset and requires no particular sacrifice or investment from the individual (see Table 2.1 (i)and (h)). In this sense, all the positive aspects deriving from norms, values and solidarity could be viewed as a leasing from the social community to the individual who belongs to that community. In the long run, the individual is expected to behave in a certain manner to repay the leasing.

Turning to the macro level social capital, one could trace back the very origins of it to Jane Jacobs. To explain the important role of neighbourhood networks

⁸ Portes and Sensenbrenner (1993) argue that their definition (above) differs from Coleman's definition (below) "where the emphasis is on social structures facilitating individual rational pursuits" (p.1323).

⁹ Portes and Sensenbrenner (1993) and Portes (1998) identify four sources of social capital: value introjection (i.e., values and norms that govern a community), bounded solidarity, reciprocity of exchange and enforceable trust. Portes argues that first two govern individual behaviour by setting up the rules of the game or collective expectation, but last two need instrumental action to form.

in enabling self-governance she wrote "...networks are a city's irreplaceable social capital. Whenever the capital is lost...the income from it disappears never to return, until and unless new capital is... accumulated" (Jacobs, 1961, p.138). In various places in her book Jacobs mentions the importance of acquittance, knowledge of neighbour behaviour, public respect and public trust which all arise from social relations in a community but all at the same time have macro rather than micro association.¹⁰ Keeping this in mind the following definitions at the macro level arise:

"Social capital is defined by its function. It is not a single entity, but a variety of different entities having two characteristics in common: They all consist of some aspect of a social structure, and they facilitate certain actions of individuals who are within the structure. (p.302)...social organization constitutes social capital facilitating the achievement of goals that could not be achieved in its absence or could be achieved only at a higher cost" (Coleman, 1990, p.304)

"...features of social organisation, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam, Leonardi, and Nanetti, 1993, p.167)

"Social capital generally refers to trust, concern for one's associates, a willingness to live by the norms of one's community and to punish those who do not" (Bowles and Gintis, 2002, p.F419)

From the above definitions we can identify three additional common elements (v) norms, values and solidarity are sources of social capital, (vi) trust is a source of social capital. It either originates from repeated interactions (personalized trust) or it originates from enforceable community sanctions or knowledge common to all actors in a community (generalized trust), (vii) whatever the source of social capital, it is based on social networks and/or associations. Starting with (v), despite the ongoing debate, there is a consensus that norms, values, solidarity and trust are sources of social capital (e.g., Coleman, 1990; Portes and Sensenbrenner, 1993; Putnam, Leonardi, and Nanetti, 1993; Bowles and Gintis, 2002; Durlauf and Fafchamps, 2005). The main difference is that scholars who approach the concept from a micro perspective put stress on the individual action (and investment) to mobilize resources inherent in the social networks (e.g., De Graaf and Flap, 1988; Fratoe, 1988; Portes, 1998; Lin, 2001b,a; Zak and Knack, 2001; Glaeser, Laibson, and Sacerdote, 2002; Dasgupta, 2005), whereas scholars who view social capital

¹⁰ One can actually trace this track back to the writings of Tocqueville (1981)[1835] who stressed the role of civic associations and civil society in the United States in bonding the public for common purposes; Marx on how workers identify themselves with the working class to support each other (cited in Portes, 1998, original in 1894); Durkheim on involvement and participation in associations (cited in Portes, 1998, original in 1893); even to Weber (1958)[1905] on the Protestant ethic.

and social capital	Social capital	Is not embodied in the actors but rather in the relation (link) between the actors.	Created by (social) relations between agents such as indi- viduals, firms and other corporate bodies (micro founda- tion). It could also originate from community behaviour that governs the actions of the individuals within the com- munity by norms and values (macro foundation). It could arise as a by product, could be inherited or result from deliberate investment.	Even less tangible. It resides in the relations.	Yes. By making possible the achievement of certain ends that would not be possible (or possible at a higher cost) in its absence. For instance, a community with extensive trust is able to accomplish more than a community with low levels of trust or an individual could find a better job due to social connections.
arison between physical, human	Human capital	Embodied in human actors (i.e., en- trepreneurs, skilled workers etc.)	Created by changes in people (by ed- ucation, training and work experience etc.). A set of skills that enables indi- viduals to act in new ways and to ben- efit from them. Added value embedded in labourers with knowledge and skills that have economic value and that en- ables labourer to earn more than what is socially optimum or subsistence.	Less tangible. Embodied in skills and knowledge.	Yes.
Table 2.1: A comp	Physical capital	Embodied in tools, machinery etc.	Created by changes in materials to other forms of tools that facilitate pro- duction. Added value (profit) from pro- duction.	Tangible. Observable in material form.	Yes.
		(a) Embodiment	(b) Origins / How it is created	(c) Tangible?	(d) Productive?

l social capital (continued) ^{Social capital}	Yes. Certain aspects of social structure viewed as a re- source to actors that can be used to achieve certain goals. Functionality depends on use and application. A type of so- cial capital useful for X may not be useful for Y. However, contrary to other forms of capital, certain forms of social capital might be harmful for other activities. For instance, strong within group social capital may prevent individuals from establishing connections outside the group.	Fragile. Since it resides in the connection between agents, becomes obsolete if one party terminates the relationship so it could be lost without will which also makes it less reliable when compared to physical and human capital. It appreciates with use but depreciates with disuse.	Transferability is possible only in limited extent. For in- stance, a shop owner may change but the new owner could benefit from the reputation (brand) established by the pre- vious owner (Sobel, 2002).
between physical, human and ^{Human capital}	Yes. For instance, the function of a uni- versity education is creating better job opportunities. Functionality depends on use and application. For example, education in engineering would not help to be an accountant.	Durable. But, depreciates if left idle (for instance, people tend to forget knowledge if not used) and through time (as one grows old loss of certain capabilities). When used the value may appreciate (get accustomed to use of certain skill).	A simple way of transferring the ac- quired knowledge and skills is to sup- ply as labour. Another way is teaching other people.
Table 2.1: A comparison l Physical capital	Yes. For instance, the function of ma- chinery is to create (new) products. Functionality depends on use and ap- plication. For example, machinery for glass production may not be usable for weapon production.	Durable. But, depreciates if used, if left idle and through time.	Easily transferable to others ownership.
	(e) Defined by its function?	(f) Endurance / Durability	(g) Transferable?

1 and social capital (continued) ocial capital	Vot possible to put exact value on it. Not easy to convert to noney form although Bourdieu insisted that it is reducible to conomic capital. One could invest in social capital, for instance y investing in social relations, however different from other forms of capital reaping the benefits depends also other actor(s) and an the strength of the link. No material sacrifice to invest in it specially at the macro level, as it is mostly given or arise as a y-product. Therefore investment is not calculative. However, at he individual level investment in social capital maybe viewed as , calculative action.	¹⁰ ublic good character. Assume that social capital is non-rivalrous. If the actors could confine the benefits from an established relation t may be viewed as a club good, but if not as a public good Dasgupta, 2005). For instance, at the macro level, people who oring values and enforce social norms (or help to establish them) n a community may not be the main beneficiaries of resources arising from these values (e.g., parent-teachers associations in the Juited States, Coleman, 1988). Viewed as a social asset as well as an individual asset.
n between physical, huma Human capital	Could be estimated but not so 1 definite. Could be converted to 1 economic capital (money) rather easily. Investment is done by cal- culating future benefits.	Private good. People who invest 1 in time and resources could reap 1 the benefit in the form of better i status, high wages etc. Invest- ment or production of individual 1 actors (labourers).
Table 2.1: A comparison Physical capital	Could be estimated with a cer- tain definiteness. Could be converted to economic capital (money) easily and immediately. Characterized by deliberate sac- rifice for future benefits and in- vestment with calculation.	Private good. People who in- vest in it could reap the benefits (property rights). Investment or production of individual actors (capitalists).
	(h) Estimated worth	(i) Economic good character

as a communal asset highlight the role of community and social structure in facilitating (or constraining) certain individual behavior for the individual and/or communal well-being (Coleman, 1988, 1990; Putnam, Leonardi, and Nanetti, 1993; Knack and Keefer, 1997; Bowles and Gintis, 2002; Tabellini, 2005). Bourdieu's and Portes' attempts are a bridge between the two strands. The approach taken here is inclined towards the latter rather than the former school.

2.3.2 Is social capital a form of "capital"?

Another inexhaustible debate on social capital is whether social capital is "capital", in the sense that Marx refers to it. This issue received considerable attention from researchers trying to unveil social capital (e.g., Arrow, 1999; Fine, 2001; Lin, 2001b) and some of them even suggested other names such as "social capacity" (e.g., Smith and Kulvnych, 2002) to denote what social capital is referring to. In Kenneth Arrow's short introduction to the edited volume of Dasgupta and Serageldin (1999), he argues why it may not be correct to refer to social capital as "capital" by listing its various differences from physical capital (see also Sobel, 2002). In a book length discussion on social capital, Fine (2001) discusses the shortcomings of social capital in depth arguing that all forms of capital are social in a sense and he questions the validity of labelling a form of capital as "social". On the other hand, Lin (2001b) neutralizes these contentions simply by defining capital as "an investment with expected returns in the marketplace" (p.6).¹¹ Picking up from this he defines social capital as "investment in social relations with expected return in the marketplace" (p.19). In a recent assessment on whether social capital is really capital Robison, Allan, and Siles (2002) list the capital like properties of social capital and argue that social capital could be treated as capital.

Given the plenary discussions of these scholars one should avoid repetition and a monotonous discussion. Therefore, the following table (Table 2.1) lists commonalities and differences between physical, human and social capital. Social capital could be treated as a form of capital similar to the treatment towards human capital (e.g., Schultz, 1961; Becker, 1964). Knowing how social capital forms creates a basis for discussing the capital features of social capital. Social capital could form in several different ways. It could form as (i) a by-product. For example, due to higher status and education one's social network resources extend; (ii) arise as an endowment or inheritance. For instance, when an individual is born with status; and (iii) form as a result of deliberate investment. The argument is based briefly on four characteristics of capital.

Capital is transformative. It converts an input to an output. Social capital is productive in the sense that once utilized it is possible to achieve certain outcomes

¹¹ The sources cited above provide thorough discussion on this issue. For instance, Lin (2001b) starts with reviewing Marxian view of capital and continues with human, cultural and social capital, all of which he refers to as *neo-capital theory*. Fine (2001) has much wider concerns as he argues that the term "social capital" is just another expression (or evidence) to validate the attempt of economics to colonize other social sciences.

with lower cost (Coleman, 1990). We have listed many examples where social connections or community characteristics provide certain material benefits. The productive power of social capital comes from combining sympathetic relationships with other inputs, such as human capital to provide benefits and in some cases preferential treatment (e.g., Robison, Allan, and Siles, 2002).

Capital also represents a forgone consumption or could be labelled as savings for future use which makes it investable. In cases of physical and human capital, current activities are delayed for future use. Both cases involve deliberate sacrifice for future benefits and investment is calculative. Social capital could also be viewed as capital when one considers an important element in decision making: time. Agents invest their time for setting up and strengthening relations for future benefits that are expected to accrue from this investment. Time (diverted from other activities) is deliberately saved and then spent towards building social capital. Utilizing the time element also neutralizes criticism by Arrow (1999) that there is no material sacrifice in investing in social capital. Time could be converted to material resources. It should be noted, however, that only in the case of a deliberate sacrifice is the investment calculative as modelled and shown in several studies at the individual level (e.g., Zak and Knack, 2001; Glaeser, Laibson, and Sacerdote, 2002).

Another feature of capital is that it involves opportunity cost. The opportunity cost of investing in technology A could be technology B; amount that could be earned if invested otherwise; current production etc. In a similar manner investing in human capital has opportunity costs such as wages and leisure activities. It has been argued that social capital lacks this feature (e.g., Baron and Hannon, 1994). Referring once again to the time element social capital also has an opportunity cost. Setting up and strengthening relations takes time and the forgone time could be used in other useful ways, such as investing in human capital instead.

A final element of capital is durability (and decay). Physical and human capital are durable and their value depreciates if left idle and through time. This can be extended to social capital as well. A relation with a friend loses its strength in time if there is no particular attempt from either parties to continue face to face interaction. Human and social capital do have another feature which is not exactly shared by physical capital. Their values could also increase with use. For instance, due to repetition people usually master certain skills (i.e., learning by doing). Similarly, social capital appreciates with use and depreciates with disuse (or misuse) (e.g., Hirschman, 1984; Ostrom, 1999). However what makes social capital different from the other two is that social capital resides in the relation not on the nodes. This means that it is rather fragile when compared to physical and human capital as it becomes obsolete if one party terminates the relationship.

To summarize the discussion Table 2.1 shows that social capital: is a productive stock that arises from social interactions and community values and norms; resides in the relation (or an asset of the community) rather than in the actor which makes it intangible and fragile; has public good character and is not easy to convert to economic capital, nor is it easy to transfer ownership and it is therefore characterized also by underinvestment.

2.3.3 "Adverse" social capital

As should be clear from the discussion above social capital could also have a negative impact on socio-economic outcomes. Portes and Sensenbrenner (1993) and Portes (1998) list several cases ranging from strong norms, constraints on individual freedom to levelling pressures. For instance, the community may put pressure on individuals to keep potentially mobile individuals at the same level as their peers, in a way constraining them to reach a better opportunity set. In a related way, Fukuyama (1995) argue that although solidarity and levels of trust are high within communities in China, the same cannot be suggested in relations with people outside the kinship group, which may effect economic outcomes (e.g., Whitley, 1991). Collier and Garg (1999) argue that kinship groups have beneficial effects on bonding social capital but they might also become a threat to the economy as they might foster corruption. In research to differentiate between bonding and bridging social capital Beyerlein and Hipp (2005) follow a similar line of argument and show that Protestant groups such as the Calvinists have very high levels of within group solidarity but have weak intercourse with the community (for example, almost no voluntary work for the good of community). So what may be good for a small community may not be good for the overall. Regularly cited examples, such as the Klu Klux Klan and the Italian mafia have similar negative impacts on the society. In the mafia case, for instance, within and between group competition may destroy other forms of social capital, mainly due to violence imposed on the larger community (e.g., Gambetta, 1996).

2.4 Issues on social capital

There are several issues regarding social capital that are lively debated in the recent literature, and are central to the main idea of the thesis and the major contributions stem from these debates.

2.4.1 Efficiency gains from social capital

How does social capital affect outcomes? Durlauf and Fafchamps (2005) argue that for social capital to have a positive impact on economic outcomes the decentralized equilibrium must not be a Pareto optimum. So, social capital works in a second best world and it improves efficiency by fixing an imperfect information problem, by resolving a coordination failure or by altering individual incentives. These efficiency gains could mostly be achieved via two channels: (i) social capital enhances information exchange within and between social networks (e.g., Wade, 1988; Granovetter, 1995; Fafchamps and Minten, 1999; Barr, 2000; Lin, Cook, and Burt, 2001, and also the literature on spillovers and regional economic development e.g., Feldman, 2000; Glaeser, 2000; Porter, 2003; Iyer, Kitson, and Toh, 2005); and (*ii*) social capital induces altruism and group identity (e.g., the literature on rotation savings and credit associations discussed in the introduction or the literature on trust experiments e.g., Fershtman and Gneezy, 2001). Most of the observed beneficial effects of social capital broadly fall under one of these categories (e.g., use of reputation as signalling or gathering information through social networks that is obtainable at a cost in the absence of social capital). The economics literature raises trust as a source of social capital. Both empirically (e.g., Knack and Keefer, 1997; Beugelsdijk and van Schaik, 2005a) and theoretically (e.g., Zak and Knack, 2001) trust is shown to have effect on economic growth. In a very lax way trust could be defined as an optimistic expectation regarding other agents behavior (Fafchamps, 2004) or as Knack and Keefer (1997, p.1258) argue, trust reflects "the percentage of people in a society who expects that most others will act cooperatively in a prisoners dilemma context". In this regard, efficiency gains could also result simply because of trust between business partners. For instance, collaboration on joint research is easier in the existence of trust between partners, whereas absence of it may result in transaction costs due to monitoring. By way of these mediating channels social capital could render positive effects on individual and community level economic outcomes.

Turning to the link between social capital and crime, social capital affects crime through three mechanisms. First, social capital provides informal control that prevents crime in the first place. Second, social capital could be viewed a source of (family) support. The idea is that people lacking family or community support are more easily involved in criminal activities. Finally, benefits arising from social networks make involvement in criminal activity more costly and less probable. For instance, neighbourhoods in which people are involved in community activities face lower levels of crime because the opportunity cost of committing crime is higher.

Social capital and innovation

The literature linking social capital to economic growth is silent on how social capital transforms into growth. Innovation is identified as an important channel. The main argument is that in additions to the direct impact, social capital affects growth indirectly through innovation. Research linking social capital to innovation has taken off very recently and therefore is premature (e.g., Tura and Harmaakorpi, 2005; Hauser, Tappeiner, and Walde, 2007; Beugelsdijk, 2007). For instance, Landry, Amara, and Lamari (2002) show that a firm's social capital affects both the decision to innovate and the radicalness of the emerging innovation. In a similar vein, Murphy (2002) highlights the role of trust in improving the quality of information exchange and thereby enhancing innovation.

Previous research has linked social capital to innovation through two channels:

information and resources arising from networks. Management scholars have argued that social network effects such as acquaintance, reciprocal commitment and trust are positively associated with learning, strategic knowledge transfer and diffusion of information within large firms and in strategic alliances based on R&D (e.g., Tsai, 1998; Bouty, 2000; Reagans and McEvily, 2003; Muthusamy and White, 2005). Moreover information (gathering, exchange and diffusion) plays an important role in innovation and innovation is increasingly becoming a network phenomena (e.g., Rutten and Boekema, 2007). One way to associate social capital to innovation is to refer to the role of social interactions and trust in facilitating resource exchange and thereby affecting innovation outcomes. However, the argument in this study stems from a different approach as it derives from the literature on how R&D is financed. The novelty in the argument necessitates further discussion.

R&D projects are risky, which causes inefficiencies in financing R&D efforts. The investor may be unwilling to invest simply because of the high probability of failure of the emerging innovation. Forming expectations regarding the result of the R&D is challenging because it is not possible to define the nature of the R&D ex ante (e.g., Jones and Williams, 2000). In more complex scenarios, information asymmetries and moral hazard problems may severely hinder the financing of R&D. For instance, Leland and Pyle (1977) and Myers and Majluf (1984) argue that investors are not fully able to differentiate between "good" and "bad" R&D projects and this might constrain firms to attract external funding. Distinguishing lemons, to paraphrase Akerlof (1970), might become easier if the firm reveals the true quality of the R&D project. On the one hand, firms may disclose technological information and enable investors to assess the R&D project more easily. But, this information might be useful to other competitors and eventually decrease the private returns of the firm. Bhattacharya and Ritter (1983) show that, when the firm is large enough, it may choose to finance R&D projects internally to avoid this cost. Yet, for most innovative firms such costs are unavoidable. On the other hand, firms may reveal the quality of the project by investing more in it (in terms of using own financial resources or increasing effort). Signalling in this way would also produce a welfare loss resulting from investment in one's own project beyond the point that would be optimal if the true quality of the project could be communicated without incurring costs. Nevertheless, R&D projects may be financed by outside capitalists, at the risk of firms misusing the funds made available by the third party. Of course, one straightforward way to overcome such a problem is to monitor the firm (or the research unit) and to control whether the firm is investing in R&D rather than misusing the funds.¹² However, high monitoring cost may also make investors hesitant to invest in R&D projects as shown by Boocock and Woods (1997). Given that venture capital markets are critical for innovation (e.g., Kortum and Lerner, 2000), higher levels of social

 $^{^{12}}$ Bougheas (2004) shows that there are strong incentives for banks to monitor their clients in such cases.

capital may alleviate these problems and yield higher innovation output by

- *Preventing egoistic behaviour*: This is mainly achieved through the enforcement of informal norms. For instance firms with "bad" projects may cease to mimic firms with "good" projects because of the fear that this will affect their reputation.
- Changing expectations: Investors may finance an R&D project by considering the reputation of the firm. For example, if a firm exhibits a reputable character by signalling the true quality of its projects for a certain period, this would increase the trustworthiness of the firm in the eyes of the investors. Investors may change their expectations regarding the firm, which would increase the probability of financing the R&D project.
- *Reducing transaction costs*: Supposedly, if the relation between the financier and the firm is characterized by trust, monitoring costs are low. Hence, an environment of trust would reduce monitoring costs. By the same token, it may reduce the costs incurred by the financier to gather information about the quality of firms and the projects.

Social capital and crime

Economists argue that individuals involve in crime (especially property crime) due to calculative cost-benefit analysis (e.g., Becker, 1968; Ehrlich, 1973). Recently these models have been extended to incorporate social norms and stigma that may also influence participation in criminal activity (Williams and Sickles, 2002). The idea is that the individual gains utility from his/her social capital (for instance, reputation, family etc.) so he/she would not risk loosing utility generating social capital (loss of reputation, loss of a good job, divorce etc.) that may result from involvement in criminal activity. In a related sense and similar to the effects of low education and poverty on crime, the lack of social capital may also increase the probability of committing crime (e.g., Land, McCall, and Cohen, 1990).

As argued above social capital could be linked to crime in at least three ways. The argument is based on Portes' taxonomy regarding three functions of social capital: (i) as a source of social control; (ii) as a source of family support; (iii) as a source of social networks benefits (Portes, 1998).

First, social disorganization theory supposes that crime results from weak informal social controls (e.g., Kornhauser, 1978; Sampson and Groves, 1989; Bursik and Grasmick, 1993). In disorganized communities people are unwilling to provide informal monitoring therefore one can argue that communities with higher levels of social capital provide better social control hence face lower crime rates. If formal control is the issue, according to the *systemic model of crime* (e.g., Bursik and Grasmick, 1993) the effectiveness of law enforcement and public control is higher in communities with extensive civic engagement. Additionally control is understood as "individual self-control" in the sense that individuals incorporate utility resulting from social attachment and bonds into their decisions (Williams and Sickles, 2002). This utility generating social capital may deter an individual from committing crime. Once aggregated, these individual decisions that incorporate positive social network utility may lead to a well-connected community where civic engagement is high. It has been shown that crime rates are lower in communities where trust is high and civic engagement is widespread (e.g., Taylor, Gottfredson, and Brower, 1984; Sampson and Groves, 1989; Messner, Baumer, and Rosenfeld, 2004)

Second, disadvantaged families and persons (e.g., Case and Katz, 1991) invest less in the social community which they belong to. This may lead to disorganized communities with weak informal social controls where individuals participate less in community activities and are unwilling to intervene in cases of crime (e.g., Sampson, Morenoff, and Earls, 1999). Mechanisms such as learning effects, imitation and taking the peers as a role model play role in this link (e.g., Manski, 2000; Evans, Wallace, and Schwab, 1992). This is also partially due to changes in timing and order of life-course events (for example, early marriage, young parenthood and divorce). Macmillan (1995) and Sampson and Laub (1993) argue that changing timing of these events affect the transition from adolescence to adulthood and this in turn weakens family support and informal social control mechanisms for late teens and young adult which may lead to high juvenile crime.

Third, communities with strong attachments among citizens are better able to deal with the threat of crime. This is because exchange of information on malignant behaviour between citizens and neighbours may facilitate responsive action to prevent possible criminal behaviour in the first place (e.g., Sampson, Morenoff, and Earls, 1999). In these communities the cost of conflict resolution decreases (or conflicts are resolved in peaceful ways) due to strong attachment and involvement in community matters (e.g., Hirschi, 1969).

2.4.2 Social capital and formal institutions

Despite the growing literature on social capital the interplay between formal institutions and social capital (as an informal institution) has not been considered as a major research area. This study emphasizes the role of formal institutions in shaping social capital.

Throughout the thesis it is shown that historical institutions, such as education, literacy, past political institutions, state of universities and religiosity are important in forming current levels of social capital. This line of reasoning stems from the seminal work by North (1981) who argues that institutions and history matters for current economic outcomes and rests on recent empirical research by Acemoglu, Johnson, and Robinson (2005) and Tabellini (2005) who have verified the arguments developed by Douglas North. This argument could also be supported by the literature on experimental trust games (e.g., Berg, Dickhaut, and McCabe, 1995). Among the explanations for why subjects behave cooperatively, contrary to the expected Nash equilibrium Berg, Dickhaut, and McCabe (1995) suggest social history as an explanation since social history provides common knowledge to agents.

Starting with the issue of trust, the approach in this study is based on the efficiency gains resulting from trust at the macro level. However how trust forms is a complex issue as recently noted by Durlauf and Fafchamps (2005) and Beugelsdijk (2008a). The literature emphasized two sources. Trust could arise due to (a)repeated interpersonal interactions between two agents that could be labelled as individual (or micro) level trust; (b) enforceable community sanctions, norms or common knowledge about the population of agents (e.g., Platteau, 1994a,b) that could be labelled as generalized (or macro) trust. Chapters 3 and 4 suggest a third source of trust which is not directly arising from social networks and/or associations: (c) well-functioning formal institutions in the past. The difference between the first two is that, "the former takes time and effort to establish while the latter is instantaneous" (Durlauf and Fafchamps, 2005, p.1646). On the other hand the difference between the third and the first two is that both (a) and (b) originate from informal type of organizations such as social networks and associations, whereas (c) originates from formal institutions such as the justice system, education, the political institutions etc. In a related manner, Beugelsdijk (2006) argue that the generalized trust question measures well-functioning institutions rather than trust itself. This argument further led to a fruitful discussion on informal and formal institutions (Beugelsdijk, 2008b; Uslaner, 2008). The discussion here rests on previous works on trust which are summarized in Zucker (1986). Zucker identifies three forms of trust: (i) process-based, where trust depends on history of interpersonal exchanges; (ii) characteristic-based, where trust is associated with the common codes and values of the community that a person belongs to (i.e., ethnicity, family background etc.); and (iii) institutional-based, where trust is embodied in formal societal structures such as certification, legal and political institutions and education. Zucker further argues that due to immigration, internal migration, and instability in business corporations from mid 1800s to early 1900s processed based trust is slowly replaced (or supplemented) by institutional based trust.

The approach in this thesis differs from the rest of the literature in one important aspect, as the argument is that the history of institutional settings (and their evolution) plays a role in trust formation hence suggesting that (c) has an effect on (b) in the long run (due to see the empirical evidence provided in Chapters 3, 4 and 5). This approach also extends the argument of Williamson (2000) that informal institutions impose constraint on formal institutions in a way suggesting that informal institutions create formal institutions in an evolutionary setting. We argue that the causality runs in both ways in the long-run. The relation between informal and formal institutions, which are themselves long-run reflections of past values, beliefs and norms.

Chapter 5 shows that this suggestion does not only hold for trust but also

for social capital in general. When analyzing the social capital-crime link it is shown that the levels of religiosity (protestant ethic) and education a century ago are strongly correlated with current levels of social capital -measured by various indicators such as blood donation, voluntary contributions to charity and voter turnout.

This association between formal institutions and social capital has quite important implications for policy making as discussed in chapters 4 and 6. For instance, by investing in political and legal institutions governments can achieve dual objective at once: (i) first, by directly affecting economic structure as well-functioning institutions are associated with better economic achievement in the short and medium run (e.g., North, 1981); and (ii) second, by raising levels of social capital in the medium and long-run which translates into economic growth in the long-run, in a way institutionalizing economic well-being.

2.4.3 Measurement of social capital

Yet another major debate is on how to measure social capital (e.g., Paxton, 1999; Narayan and Cassidy, 2001; Grootaert, Narayan, Jones, and Woolcock, 2003). This is partly due to the fact that there has still not been a satisfactory definition of the concept. Even the 'generalized trust' question that has been used in various papers as a proxy to social capital led to a lively recent discussion (e.g., Beugelsdijk, 2006, 2008b; Uslaner, 2008). This study employs different indicators that at first sight seem loosely related to each other but that measure different aspects of social capital.

Trust has always been identified as a source of social capital. Portes (1998) argues that enforceable trust arising from enhanced information exchange, social norms and monitoring capacity in social networks is one of the main sources of social capital. Following the literature on social capital and growth we used 'generalized trust' as a proxy for social capital, which measures the degree of opportunistic behaviour (e.g., Knack and Keefer, 1997; Zak and Knack, 2001). Knack and Keefer (1997, p.1258) argue that trust "reflects the percentage of people in a society who expect that most others will act cooperatively in a prisoner's dilemma context". This trust indicator is obtained from the European Social Surveys and constructed from the answer to the following statement: "Most people can be trusted or you can't be too careful". The answer category ranges from (0) "you can't be too careful" to (10) "most people can be trusted", with nine levels in between. The database also provides various other indicators that were used as social capital indicators in various studies -such as membership to voluntary associations, membership to Putnam and Olson groups etc. These secondary indicators are not pivotal in this study. However analysing the robustness of these indicators yields potentially interesting findings (chapter 4).

Besides the 'generalized trust' question several other indicators have been employed. First, electoral turnout is hypothesized to capture civic involvement and consequently participation in decision making. This indicator has been employed previously as a proxy to social capital (e.g., Putnam, Leonardi, and Nanetti, 1993; Putnam, 1995; Rosenfeld, Messner, and Baumer, 2001). Second, voluntary contributions to charity are supposed to capture the strength of intermediate social structures such as charities, clubs and churches. Higher voter turnout and voluntary donations to charity contribute to a community's social capital. Third, social capital is higher when people care for each other or are more altruistic. To measure this dimension data on blood donations (e.g., Guiso, Sapienza, and Zingales, 2004) is used keeping in mind that people donate blood for altruistic reasons and in the expectation that other compatriots will behave in a similar way.

The indicators above attempt to measure the presence of social capital However as Fukuyama (1995) suggests one can also measure the absence of social capital using traditional measures of population heterogeneity and family structure. Two measures derive from the absence of informal controls and the extent of informal contacts and acquaintances. First, social capital in single-parent households is supposed to be low because of the fact that they lack the second parent at home. Family support is a major source of social capital (e.g., Portes, 1998) therefore the argument is that divorce reduces individual level social capital by breaking families, indirectly breaking connections among acquaintances to the family members and by limiting adult supervision. Second, population heterogeneity (or the percentage of foreigners in a community) is an important factor that affects social capital and trust due to closure (e.g., Coleman, 1990).

The empirical approach to the measurement of social capital is to a degree new as social capital is treated as a latent construct. In chapters 4 and 5 the indicators explained above are reduced to a single dimension -social capital index- by means of a principal component analysis.

2.5 Social capital of social capital researchers

Given the ambiguity in the definition(s) (section 2.3) and the measurement of social capital how should we approach social capital to unveil this vagueness? Given the multidimensional and interdisciplinary character of social capital can we propose a better strategy that would result in concrete understanding and clarification? This section shows that conducting cross-disciplinary work in terms of joint projects and co-authorship is necessary for a better understanding of the concept. But then what is the extent of current multi-disciplinary collaborations? What can we say about the current degree of social capital of social capital researchers? Simple social network analysis provides preliminary answers to such questions.

But first, how is social capital perceived in different disciplines? As we have already stressed, social capital builds on different concepts, most important of which is social networks. In sociology social capital is generally perceived to be a social resource deriving from social networks (e.g., Lin, 2001b). Other elements such as trust, solidarity, values and norms were included in the definition at a later stage (e.g., Coleman, 1990; Putnam, 1995; Portes, 1998). This expansion created a certain degree of ambiguity. There was a tendency for different disciplines to specialize on certain aspects of social capital. For instance, sociology literature builds on social resources, solidarity and values, while economists focus on trust and other elements of social capital are much less pronounced. On the other hand, research on public health almost solely depend on the concepts such as sympathy, caring and solidarity. Economists approach social capital in a calculative manner (i.e., benefits accruing from a relation is calculable), whereas for sociologists, psychologists and political scientists social capital is not calculative but rather learned in socialization (Robison, Allan, and Siles, 2002). Some management scholars argue that social capital has distinct forms. For example, Nahapiet and Ghoshal (1997) differentiates between three forms: (i) structural social capital that arises from social relations and networks; (ii) relational social capital which can be defined as elements that are rooted in the relations such as trust; and (iii) cognitive social *capital* that is shared codes and values. Moreover, in a recent assessment Robison, Allan, and Siles (2002) argue that the concept is vague because the definitions often include what social capital can be used to achieve and where social capital resides as well as what social capital is. Since each discipline focuses on a different element and since communication between disciplines is minimal (as shown below) the issues of what social capital is and what it includes become blurry even for researchers who work on social capital. This ambiguity could be reduced by interdisciplinary collaborations. So then, what is the extent of collaboration among disciplines?

Reviewing the literature one could come up with a framework like the one displayed in Figure 2.3, which depicts the most influential researchers who work on social capital in a time line starting from the seminal works of James Coleman in 1988 and 1990.¹³ The first 10 years in social capital literature led to a number of articles that influenced research that followed. A detailed look at the citation figures to these early works reveal interesting patterns. For instance, research by James Coleman is a seminal work for sociologists (as indicated by a bold line) but it was also influential for economists and management scholars (as indicated by solid lines). In contrast, early works of Nan Lin were highly cited by economists but not by management scholars. In a similar vein the management literature on social capital mainly refers to Alejandro Portes, but economists seldom do.¹⁴ One of the first reviews on social capital by Michael Woolcock is equally cited by economists and sociologists but hardly cited by the management literature. This is also true for Robert Putnam. His research is more valued by economists and

 $^{^{13}}$ Other scholars that are mentioned in section 2.2 had influence on the development of the concept. However, the starting point is taken as 1988 because Coleman's work is accepted to be the first one that conceptualizes social capital.

¹⁴ Nan Lin engaged in research on social networks -for instance, on labour market outcomes due to utilization of one's social network- which may explain why economists tend to cite him. Alejandro Portes is well-known for his research on immigrant networks and entrepreneurship which might partially explain the interest from management scholars.



Figure 2.2: Influential researchers in social capital

sociologists. Finally, outside the sociology literature only Ronald Burt seems to attract the attention of sociologists (as indicated by a dashed line).

Following the framework above and identifying the most cited articles on social capital nine researchers are selected as "influential" social capital scholars.¹⁵ Then a snowball technique is employed to locate the co-authors of these influential researchers and the co-authors of co-authors' as well. Only the articles that include "social capital" and/or "trust" in the title, abstract and keywords are included in the analysis. This produces a network consisting of 147 researchers with 171 distinct articles also covering the most cited 25 articles on social capital. These articles have received more than 10,000 citations and constitute roughly around 40 percent of the total citations to the literature. Figure 2.4 is a depiction of the network where the width of the nodes reflects the central position of the researcher in the network. We used betweenness centrality measures the influence a node has over the diffusion of information in a network and is calculated as the fraction of shortest distance between any two nodes that pass through the node of interest.¹⁶

¹⁵ A search was conducted in ISI Web of Science for articles (in English) including the term "social capital" in the keywords and then the articles were sorted according to the citations they receive. As a double check a similar search was performed within disciplines (economics, sociology, management and political science) to identify the most cited researches within each discipline. The social capital researchers selected are: Ronald Burt, James Coleman, Sumantra Ghoshal, Edward Glaeser, Stephen Knack, Nan Lin, Alejandro Portes, Robert Putnam and Michael Woolcock.

 $^{^{16}}$ This measure is more appropriate than other centrality measures that focus on reachability



Figure 2.3: Co-authorship network of influential social capital researchers

The most interesting observation in the network is the presence of isolates. Nan Lin, Robert Putnam and Michael Woolcock have authored influential papers on social capital but do not have co-authors.¹⁷ Another interesting finding is that, despite the initial start with nine researchers within the disciplines of economics, sociology and management/business the analysis have identified other disciplines and star researchers in them. Among them two are worth mentioning. First, the analysis identified Ichiro Kawachi (through a link with Putnam) and his network who extensively published on social capital and public health. Second, the anal-

of a node in a network as we are interested in bridges. It is also similar to Bonacich power index where the centrality is affected not only by the central position of the node itself but also by the centrality of its neighbours. The figure is obtained by energizing the network several times using Kamada-Kawai option in Pajek. Loops are allowed which means that the papers that have one author are also included in the analysis and could easily be seen from the figure as a line from a node to itself. For Pajek see http://vlado.fmf.uni-lj.si/pub/networks/pajek/

 $^{^{17}}$ It should be noted that the results are for 1988-2007 and only regarding articles on social capital and/or trust. For instance, Nan Lin has published extensively on social networks which are not included in the analysis

ysis identified Ernst Fehr (through a link via Paul Zak with Stephen Knack) and his network who initiated a new line of research on human social behaviour, trust and reciprocity using experimental designs and collaborating not only with other economists but also with sociologists and psychologists. The most influential researchers could easily be recognized in Figure 2.4 as the width of the node reflects how central these authors are within the network.¹⁸



Figure 2.4: Co-authorship network: Partitioned in to disciplines

After depicting the simple network the partitions within the network are analyzed further. Using the available information in ISI Web of Science (and also by web-searches) information was gathered on the affiliations of researchers. The network is partitioned in to six disciplines: economics, sociology, management/business, political science, health sciences (public health) and psychology.¹⁹ The ties between these disciplines could be seen in Figure 2.5. One can easily recognize the

 $^{^{18}}$ Each color in Figure 2.4 represents a different discipline. For the correspondence see Figure 2.5.

 $^{^{19}}$ Economics include planning and development and urban studies. Psychology includes clinical psychology.



Figure 2.5: Co-authorship network: Bridges among disciplines

links between economics, psychology and health sciences (and to a degree political science) largely initiated by Ernst Fehr. The research initiated by this network is promising and it is helpful in understanding how trust and reciprocity forms. Removing health sciences and psychology from the analysis tells a different story (see Figure 2.6). When only the links between economics, sociology, management and political science are analyzed one can argue that the extent of collaboration between disciplines is not as rich as it is expected to be (or it ought to be). The collaborations between economics, sociology and political science are rare and mainly initiated by scholars such as Ernst Fehr, John Helliwell, Stephen Knack and Robert Putnam. Collaborations between management science, sociology and economics are an exception rather than a rule of the game. To get a better picture of the extent of co-authorship in economics the network is reduced to one discipline and focused only on economics taking in to account the aggregated ties to other disciplines. Figure 2.7 clearly shows the bridges between disciplines strengthening the findings in Figure 2.6.

Table 2.2 presents summary statistics on the overall co-authorship network in economics, sociology, management and political science between 1988-2007.²⁰

 $^{^{20}}$ The data for this is gathered from ISI Web of Science by using the program made available by Loet Leydesdorff. For the first two rows the search parameter used is "social capital" in the "title" category. The network also include articles having "trust" in "title" and "social capital" in "topic". For details about the program see



Figure 2.6: Co-authorship network: Contextual view of economics

The second column lists the number of researchers in each discipline who work on social capital. The next two columns present two widely used statistics to assess the density of a network. Density of a network is defined as the number of ties in a network as a proportion of all possible ties. The higher the number the denser the network. Density measures when loops (articles with one author) are removed are also presented in the table for robustness reasons. At first sight it seems that political science and economics are much denser than sociology and management. However density measures are not appropriate in this case as they are negatively correlated with the size of the network. Since the size of each group differs substantially an alternative measure is presented in the last column based

http://users.fmg.uva.nl/lleydesdorff/software/coauth/index.htm.

no of	density	density	researchers	% of	average
nodes	loops	loops not	with max no	isolates	degree of
	allowed	allowed	of co-authors		nodes
224	0.00530	0.00532	6	29.02	2.37
758	0.00241	0.00241	11	20.18	3.64
231	0.00603	0.00606	7	24.4	2.78
319	0.00590	0.00591	11	22.8	3.76
525	0.00349	0.00350	12	10.8	3.66
131	0.00921	0.00928	5	32.8	2.41
	no of nodes 224 758 231 319 525 131	no of no of density loops allowed 224 0.00530 758 0.00241 231 0.00603 319 0.00590 525 0.00349 131 0.00921	$\begin{array}{c cccc} no \ of & density & density \\ nodes & loops & loops not \\ allowed & allowed \\ 224 & 0.00530 & 0.00532 \\ 758 & 0.00241 & 0.00241 \\ 231 & 0.00603 & 0.00606 \\ 319 & 0.00590 & 0.00591 \\ 525 & 0.00349 & 0.00350 \\ 131 & 0.00921 & 0.00928 \\ \end{array}$	$\begin{array}{c ccccc} no \ of \\ no \ of \\ no \ of \\ no \ of \\ loops \\ allowed \\ allowed \\ allowed \\ allowed \\ allowed \\ of \ co-authors \\ of \ co-authors \\ co-authors \\ 224 \\ 0.00530 \\ 0.00532 \\ 6 \\ 758 \\ 0.00241 \\ 0.00241 \\ 11 \\ 11 \\ 231 \\ 0.00603 \\ 0.00606 \\ 7 \\ 319 \\ 0.00590 \\ 0.00591 \\ 11 \\ 525 \\ 0.00349 \\ 0.00350 \\ 12 \\ 131 \\ 0.00921 \\ 0.00928 \\ 5 \\ \end{array}$	$\begin{array}{c c c c c c c c c c c c c c c c c c c $

Table 2.2: Summary statistics of co-authorship network on social capital

on the degree of nodes. The degree of a node is the number of ties associated with it (i.e., the number of co-authors that a researcher works with). Since a higher degree of nodes represents denser networks the average degree of all nodes is a reliable measure to compare disciplines. As can be seen from the table the social capital of social capital researchers in sociology and management is significantly higher than in economics and political science. One interesting finding is that when the network is divided in two, as before and after 2000, we see that coauthorship is increasing through time. A researcher currently working on social capital has three co-authors on average. Finally, the percentage of isolates within each discipline reveals for instance that, political scientist tend to work on their own, whereas most of the management scholars collaborate.

2.6 Conclusion

This chapter has introduced the concept of social capital by first analyzing various definitions in the literature to identify common elements. Starting from the very early use and definitions of the concept in different disciplines seven common elements were identified. Second, as a complementary resource we summarized the main similarities and differences between physical, human and social capital. The rationale behind following such a structure is the argument that more crossdisciplinary collaboration is needed to circumvent the current confusion about what social capital actually is. A simple social network analysis shows that collaboration between disciplines on social capital in terms of co-authorship is a rare phenomenon. This chapter suggests that future cross-disciplinary work on social capital will lead to better understanding.

To summarize the current understanding that incorporates both micro and macro elements, social capital is a social resource arising from social networks or (social organizations) that leads to beneficial outcomes either by reducing costs or by creating new forms of information exchange. The following chapters more or less stick to this definition. As shown in chapters 3, 4 and 5 the extent of formal institutions in the past has a potential in forming current social capital. This does not contradict with the definitions suggesting that social capital arises from informal institutions (e.g., voluntary associations). It is more of an extension: formal institutions as well as informal institutions shape social capital. This argument has important policy implications as suggested in chapters 4 and 6.

Building up on the ideas in this chapter, the next two chapters (Chapter 3 and 4) show how social capital affects innovation and how innovation is identified as a mechanism that translates social capital to economic growth. The main arguments are then exploited to explain the social capital crime link (Chapter 5). The reason for this extension is simply that crime is an important social phenomenon with social as well as economic costs.

Chapter 3

Social capital, innovation and growth: Evidence from Europe

When there's trust there'll be treats

Karmacoma, Massive Attack

3.1 Introduction

Economists have long been interested in explaining economic growth. The advancements in the recent literature emphasize the role of technical change in understanding economic growth. Pioneered by the studies of Romer (1986, 1990) endogenous growth theory considers technical change as an endogenous variable that is affected from the economic decisions of the actors. Likewise its predecessor, so-called "new growth theory" models economic behaviour as disengaged from social interactions. Nowadays, technical change and economic growth are understood within a socio-economic framework and as Temple (1999) argues, the borders of sociology and political science may facilitate interesting contributions to the thinking on economic growth. In line with this argument, an important development in social science in the last decade is "the rise of interest in social capital as a mechanism for understanding socio-economic phenomena" (Durlauf, 2002:459).

In the economic literature social capital has been identified as an important determinant in explaining differences in income. Knack and Keefer (1997) and Zak and Knack (2001) have shown for a cross-section of countries that countries with higher levels of measured trust are richer. It is however not clear *how* social capital improves economic outcomes.

This chapter argues first that current levels of social capital are formed by historical institutions and investments, such as early literacy, past political institutions and universities. This follows important recent empirical research by Hall and Jones (1999), Acemoglu, Johnson, and Robinson (2005) and Tabellini (2005), who basically apply the arguments developed in North (1981) that history matters for current economic outcomes.

Second, the idea that social capital improves economic outcomes is appealing, but it is necessary to identify a factor through which social capital improves outcomes. This chapter suggests that innovation is an important channel by which social capital improves income growth. The idea is that more advanced historical institutions have established a higher stock of social capital. Social capital in turn influences the innovation process because the financing of risky innovative projects requires that researchers and capital providers trust each other. When they do so, more successful projects are carried out, which improves innovation outcomes by means of more patents. Finally, as shown by e.g., Grossman and Helpman (1991) and Aghion and Howitt (1992), higher innovation output yields higher income per capita.

In the theoretical background of this chapter social capital is integrated in a simple model of production. In this set up the accumulation of capital generates knowledge which benefits society and increases income. Knowledge grows because of research effort and the rate by which new discoveries are made. This way of modelling is consistent with the approach introduced by Romer (1986) and further developed by many others (see Aghion and Howitt (1998) for a review). The accumulation of knowledge is amended by introducing the stock of social capital. The stock of social capital has a positive effect on the accumulation of knowledge, which in turn increases output. The idea is that social capital has a positive effect on the investment in innovation. When researchers live in areas with a larger extent of social networks and have high norms, venture capitalists are more likely to invest in risky projects. This argument is similar to the one used by Guiso, Sapienza, and Zingales (2004), who argue that social capital yields higher financial development. In this chapter the argument is that it induces innovation.

The framework above is applied to the data collected for 102 regions in the EU-14 (Luxembourg is excluded). The regions of the EU-14 are from a homogeneous set of countries that have operated under similar judicial and financial-economic regulation for some time now. Hence, variability in current formal institutions and capital markets is less likely to be of major importance when investigating regional differences in economic performance. This is an important advantage of this approach, since the results presented in Knack and Keefer (1997) are based on a set of countries including next to OECD member states also less-developed countries (such as India, South Africa, Nigeria and Turkey) and a number of South-American countries that seem to be hard to compare in terms of economic conditions and institutions. Indeed, as shown by Beugelsdijk, de Groot, and van Schaik (2004), the presence of poor countries in cross-country samples affects both the significance and size of the effect of social capital on growth. So, showing that social capital affects welfare, even within a homogeneous group of countries, improves the credibility of the estimates.

There are important differences between EU regions and even between regions within a country in terms of social capital and innovation performance. Recent work by Moesen, Van Puyenbroeck, and Cherchye (2000), Beugelsdijk and van Schaik (2005a) and Iyer, Kitson, and Toh (2005) shows that nearly all dimensions of social capital display relatively large differences between regions. For instance, the ratio of the highest to lowest trust score is around 1.2 in Germany and the United Kingdom and about 1.6 in Spain and Italy (with trust measured by aggregating the information from individuals to the regional level on a scale from 1 to 10). In addition, there are also differences in innovation inputs and performance and income across and within EU countries (e.g., Gambardella, Mariani, and Torrisi, 2002; Bottazzi and Peri, 2003; Bilbao-Osorio and Rodriguez-Pose, 2004; European Commission, 2001). These differences are discussed in detail in Section 3. Finally, regional policies are increasingly strengthened and EU countries are delegating more responsibilities to regions for the design and implementation of innovation policies (e.g., European Commission, 2003). This adds to the importance of the regional dimension of this research.

The creation of social capital and its measurement over time is important for the validity of the empirical analysis. Countries such as Italy, Spain, the United Kingdom and Germany were once composed of self-governed small states. For instance in the 18th and 19th century there were important social and economic differences between Italian regions under Papal order and regions that were free, or between Hamburg and the other German regions under Prussian order. We collect data for past political institutions, the presence of universities, literacy, and urbanization from 1600 onwards and show how historical developments affect the current stock of social capital. In other words these historical institutions have contributed to the early development of social capital (e.g., Tabellini, 2005) and in Appendix A.2 we present the approach dealing with these historical data.

Information from the European Social Surveys (ESS) and the European Values Surveys (EVS) is used to obtain measures of the current stock of social capital. Innovation indicators are taken from Eurostat's regional database, which contains information on the number of R&D workers and the number of patent applications. Economic performance is measured as GDP per capita growth in the period 1990-2002.

The empirical analysis consists of three steps. First a causal link is established between social capital and income per capita. Running regressions using historical institutions as instruments for current social capital results in robust and significant positive effects of social capital on income per capita. These estimates are economically meaningful and consistent with estimates from the literature (see Durlauf and Fafchamps (2005) for an overview). Next, the relationship between innovation output and social capital is estimated, using the relative number of patent applications as the dependent variable. Again social capital is instrumented by using information about historical institutions. The estimates suggest that a higher stock of social capital yields higher levels of innovation. Finally, a 3SLS strategy is employed to estimate how historical institutions and investments influence current social capital, which in turn has an impact on innovation, which is a determinant of current income. Of course, social capital is also entered directly to address a possible direct link between social capital and income. The 3SLS estimates suggest a strong effect of innovation on income through social capital, but no direct effect of social capital on income. The estimates reveal that social capital is a determinant of innovation, which in turn explains on average approximately 15 percent of the change in income per capita in the 102 EU regions between 1990 and 2002.

This chapter proceeds as follows. Section 3.2 presents the theoretical background of the linkages among social capital, innovation and income. The data and descriptive statistics are presented and discussed in Section 3.3. Section 3.4 explains the empirical strategy. Section 3.5 contains the estimates and robustness and stability analysis. Section 3.6 concludes.

3.2 Theoretical background

Most of the existing literature focuses on the relationship between economic outcomes and innovation (e.g., Aghion and Howitt, 1998) or on the role of social capital for economic growth (e.g., Knack and Keefer, 1997; Zak and Knack, 2001). This chapter investigates the link between these theories by introducing the role of social capital in fostering innovation, which in turn plays vital role in explaining economic outcomes. This approach introduces a number of causal links, which are systematically analyzed in this section. Since the unit of analysis in the empirical work is an EU region, the model is constructed in terms of individuals living in regions with regions operating in autarky.

The model departs from one in which differences cannot be due to differences in market incentives and appropriability of innovation outcomes only, since the focus is the regions of the EU-14 operating in the same capital market. We conjecture that differences in the way in which historical institutions have shaped social capital are important in stimulating innovation. This approach is consistent with the notions summarized in Aghion and Howitt (1998) in which innovation occurs through incentives and is stimulated by creativity and market structure, which are determined by institutions. The improvement is that next to these channels the channel through which social capital influences innovative activity is important to explain differences in income.

The theoretical framework that this chapter builds on can be summarized as follows: A higher social capital stock, which is determined by historical institutions, increases the incidence of innovation. The reason for this is that investments in innovative activities are risky and capital providers want to receive commitment from researchers that their money is well spent. This is easier in an environment in which people trust each other. In turn, this increases income.

3.2.1 Framework

Production

Consider a simple model in which output in region $J(Y^J)$ is produced by using the inputs labour (L^J) and capital (K^J) :

$$Y = AK^{\alpha}L^{1-\alpha},\tag{3.1}$$

where the superscript J is suppressed for simplicity. In this set up, there are constant returns to capital and labour. A is accumulated endogenously, which implies that production is characterized by increasing returns.

Assume now that the accumulation of capital generates new knowledge, which benefits the whole region. Also assume that all individuals and firms take the level of A^J as given and cannot influence this effect when they invest in capital because they are small relative to the economy. For simplicity, this process takes the following form:

$$A = SK^{1-\alpha},\tag{3.2}$$

where S is the stock of knowledge or developed ideas, as modelled and explained by Jones (2005). This set up implies that the accumulation of capital yields external beneficial effects to the people living in the region as a whole even when capital is paid its marginal product $\alpha Y/K$.

If these two expressions are combined we obtain

$$Y = SKL^{1-\alpha}.$$
(3.3)

In this model the accumulation of knowledge is treated as a by-product of capital accumulation. When L is normalized to one, we obtain the simple standard growth equation: Y = SK Romer (1986). Note that in this simple model we abstract from the underlying economics of the model, but that the outcomes are consistent with a more elaborate model of e.g., creative destruction with temporary monopoly rents in which three sectors (final goods, intermediate products and research) compose the economy. In such a model, inspired by Aghion and Howitt (1992), a Cobb-Douglas production technology, a continuum of intermediate products and arbitrage in the research sector between investment in capital and research, show that equation (3.1) is an adequate representation of production. This level of sophistication is not necessary, however, for the analysis of income differences between EU regions.

The growth of the stock of knowledge (\dot{S}) is equal to the total effort (E) put

in research (e.g., spending on R&D or the number of researchers working on the development of new ideas) multiplied by the rate at which discoveries take place. The innovation of our approach is that this rate is not a constant (as in Romer, 1986) or dependant on (part of) the existing stock of knowledge (as in Jones, 2002), rather it also depends on the stock of social capital in a region (V): $\dot{S} = \chi E^{\beta} S^{\lambda} V^{\phi}$. For simplicity, we abstract from the effects of total research inputs and the existing stock of knowledge on the growth of the stock of knowledge and focus solely on the effects of social capital, which is equivalent to using the simplest version of the Romer-model extended with social capital:

$$\dot{S} = \Lambda V^{\phi}, \tag{3.4}$$

where Λ is a constant capturing the effects of the knowledge stock and total research inputs discussed above. In this equation $\phi > 0$ means that the productivity of research is increasing in the stock of social capital, which means that the existing stock of social capital contributes to the success of research. If $\phi < 0$, the stock of social capital is detrimental to research and if $\phi = 0$, the productivity of research is independent of the stock of social capital. It is assumed that $\phi < 1$ eliminates permanent growth differentials between regions, since we are more interested in changes in income levels and the fact that permanent growth effects are inconsistent with the data (Jones, 1995). The growth rate in this model along a balanced growth path is determined by the parameters of the production function for knowledge and the population growth rate (which is zero here).

The conjecture is that $0 < \phi < 1$, which means that the stock of social capital increases the productivity and success of research, which increases output. This argument now needs a microfoundation.

Innovation and social capital

Suppose that there is a constant stream of ideas and that researchers develop these ideas on their own in small one-person firms. Define the utility of researcher *i* as $U_i = U(e_i, N^J, \rho_i, k_i)$, where $e_i \in \{0, 1\}$ is the decision to put in effort (1) or not (0) in developing an idea into productive knowledge, N^J are the social ties or is the extent of the social network in region J, ρ_i are the individual norms of the researcher, which can be low ρ_L or high ρ_H (with $\rho_H > \rho_L$) and k_i are the cost of cheating. Following the approach developed in Guiso, Sapienza, and Zingales (2004), there exists a cost threshold \bar{k}_i below which the researcher is deciding $e_i = 0$. This decision is a function of his norms and the extent of the social network in the region: $\bar{k}_i = \bar{k}_i(\rho_i, N^J)$, where higher norms and a larger extent of a region's social network increase the threshold in the sense that it becomes harder for the researcher not to exert effort.

Venture capitalists are willing to invest in the idea of researcher i only if they know that the researcher is exerting effort. This effort is not observable by the venture capitalists, only the outcome of the innovation process is, where it is assumed that if $e_i = 1$ the innovation is successful. For simplicity it is assumed that many capital providers are searching for returns in a one period set up, with no opportunity to retaliate or learn. The probability that researcher *i* in region *J* will exert effort depends positively on the proportion of researchers with high norms ρ_H in region *J* (defined as Γ^J) and the social network in region *J* (N^J). Together, the fraction of researchers of the high type and the extent of the social network in region *J* determine the stock of social capital. The higher this stock is, the higher the willingness of investors to provide venture capital. The individual venture capitalist's investment in region *J* will then be

$$E_i = f(\Gamma^J, N^J) = g(V^J) \tag{3.5}$$

with $\partial E_i/\partial \Gamma^J > 0$, $\partial E_i/\partial N^J > 0$, $\partial E_i/\partial V^J > 0$. Here E_i is the amount of money the investor is willing to invest in innovation, which is either E_i or 0. We abstract from defining the investor's exact preferences and modelling the investor's utility but assume that the expected output of *i*'s investment is $E(Y_i) = (1 - \pi^J)Y_H + \pi^J Y_L \ge rE_i$, where $Y_H(Y_L)$ is the output when $e_i = 1$ ($e_i = 0$) and π^J is a function of Γ^J , with $\partial \pi^J/\partial \Gamma^J > 0$. This is similar to the exposition developed in Guiso, Sapienza, and Zingales (2004). Equation (3.5) now implies that investments in research are more productive in high social capital regions. Translating this to equation (3.4) implies that the social capital stock is a determinant of the translation of ideas into new knowledge.

Putting the arguments together

This relationship between social capital and innovation is novel and the interpretation of the model needs discussion. There is an element of risk involved in innovation projects that shows up in different ways. The investor may be risk averse, internal capital constraints may be too high in a competitive market, monitoring costs may be high, or information asymmetries and moral hazard problems may hinder the financing of R&D (e.g. Leland and Pyle (1977), Bhattacharya and Ritter (1983), Myers and Majluf (1984), Boocock and Woods (1997), and Bougheas (2004) for the development of these arguments). For the model it does not matter where the barriers are coming from, as long as social capital can lower them. This is possible in at least three ways. First, social capital prevents egoistic behaviour because of the enforcement of informal norms. In a signalling game researchers with "bad" projects can successfully mimic firms with "good" projects, leading to underinvestment in innovation. Social capital can alleviate this problem because of the fear that cheating affects reputation, which increases the threshold k_i below which the researcher is putting in effort and uses the effect of the strength of N^{J} on investment. Second, investors may finance an idea after considering the reputation of the firm. If a researcher displays an honest character by signalling the true quality of his ideas, his trustworthiness increases in the eyes of investors. As a consequence, investors may positively change their expectations regarding the researcher, which would increase the probability of financing ideas in the region. This has the effect of increasing Γ^J in a region. Finally, when the relationship between investor and researcher is based on trust, monitoring costs are low. Hence, an environment of trust would reduce monitoring costs and make innovation a more efficient investment. By the same token, social capital may reduce the costs incurred by the venture capitalist to gather information about the quality of firms and the projects. Note that this effect of innovation through social capital is included next to a direct effect of innovation on output. This direct effect is embodied in the Λ -term in equation (3.4).

It is also assumed that the formation of the stock of social capital is a long-run process. In this the recent work by Tabellini (2005) is followed. He shows for European regions that current culture is shaped by historical institutions in the period from 1600 to 1850. Research along similar lines by Acemoglu, Johnson, and Robinson (2005) and La Porta, Lopez-de-Silanez, Shleifer, and Vishny (1999) reveals that early institutions are important determinants of current economic outcomes, such as income. We follow this argument for the stock of social capital which is discussed in the next section in more detail.

This simple set up does not present a detailed analysis of the relationship between social capital and innovation, but is consistent with various channels that social capital is able to increase innovation. Rather, this model, which can be easily extended to a full-blown endogenous model with a separate research sector in the spirit of Grossman and Helpman (1991) and Aghion and Howitt (1992) without changing the outcomes, puts the proposed causal relationship between social capital, innovation and income together at the regional level. Regions with higher levels of social capital are more successful at innovating and are therefore richer.

3.2.2 Empirical implications

Turning now to measurement, the empirical approach ideally would contain measures of social networks and the norms of researchers on the one hand and measures of investment behaviour of venture capitalists on the other hand. These are not observed in big databases, so we turn to output measures applied in previous social capital studies starting from Knack and Keefer (1997) and to patent data as measures of successful innovation outcomes. An important prerequisite for empirical analysis is that one has to make sure that the social-capital output measures are picking up the direct effect of social capital on innovation outcomes and are unaffected by other environmental variables. To make sure that the estimates are reliable, an instrumental variables approach is used with historical social capital outcomes affecting the current stock of social capital but not current innovation and income changes. The empirical strategy is specified in Section 4 in more detail.
3.3 Data and descriptives

The data span 14 EU countries divided into 102 regions defined according to the Nomenclature of Territorial Units for Statistics (NUTS). Canarias (ES7), Ciudad Autonoma de Ceuta (ES63), Ciudad Autonoma de Melilla (ES64), Aland (FI2), Departments D'outre-mer (FR9), Provincia Autonoma Bolzano (ITD1), Provincia Autonoma Trento (ITD2), Luxembourg (LU), Regiao Autonoma dos Açores (PT2) and Regiao Autonoma da Madeira (PT3) is excluded due to limited data availability. For Austria, Belgium, Denmark, Germany, Greece, Finland, France, the Netherlands and the United Kingdom the NUTS1 definition is used and for Ireland, Italy, Spain, Portugal and Sweden NUTS2 is applied.

We employ as many disaggregated regions as the available data permit. The basic reason for this is to capture the existing differences even within relatively larger regions. For instance Navarra (ES22) and La Rioja (ES23) belong to the same NUTS 1 region Noreste (ES2), however for Navarra the trust score is 35 percent and patent applications are 4 times larger than La Rioja. There were quite a number of universities in Navarra in 19th century but no universities in La Rioja. Similarly in Italy Liguria (ITC3) and Piemonte (ITC1) belong to the same NUTS 1 region but in Piemonte the executives had unlimited authority between 1600 and 1750 compared to Liguria where there were substantial limitations on executive authority during the same period. Even in a relatively homogeneous country such as Sweden, Stockholm has much higher trust and innovation numbers when compared to regions such as Sydsverige and Norra Mellansverige.¹

3.3.1 Social capital

Measures of social capital are not without controversy. The fundamental premise behind the value-added contributions of social capital is that it complements traditional resources (physical capital, human capital, etc.) with other resources (social networks, trust, norms and values, etc.) to produce better outcomes (e.g., Coleman, 1988). Indeed, from an economist's point of view, the beneficial effects arise only in cases where social capital affects expectations. Granovetter (1985) stresses the networks of (social) relations in establishing expectations to generate trust to create and enforce norms. In a similar vein, Durlauf and Fafchamps (2005) argue that social capital yields positive externalities, which are achieved through shared values, norms and trust that affect expectations and behaviour. However, it is not easy to come up with a social capital indicator capturing the above aspects. For instance, Fukuyama (1995) provides various instances of why trust affects economic well-being. The empirical social capital literature focuses on explaining differences in economic growth and has benefited from "generalized trust" as a proxy for social capital, which measures the degree of opportunistic

¹ Similar investigation are done for 87 NUTS 1 regions and for 82 regions benefiting from the EU structural funds (e.g., Akçomak and ter Weel, 2008a). The results display a similar character and do not pose fundamental changes to the conclusions reached here.

	urban	(14)	10.16	19.74	9.97	0.00	11.96	19.62	13.84	5.98	6.76	10.38	7.61	9.20	5.60	26.65	12.71	60
	univPC	(13)	0.27	-0.15	0.28	-0.17	0.72	0.09	-0.57	-0.66	0.16	0.05	0.00	0.25	-0.70	-0.25	0.02	ins that belon
	univAVR	(12)	0.19	-0.11	0.20	-0.12	0.51	0.06	-0.41	-0.46	0.12	0.04	0.00	0.18	-0.49	-0.18	0.02	age of 10 regic
ountry	instPC	(11)	-1.70	0.56	-0.48	-1.90	-0.39	-1.23	-1.70	2.71	-0.96	3.60	-0.31	-0.87	0.52	3.98	0.03	as the aver
bles by c	instAVR	(10)	1.20	3.00	2.20	1.00	2.40	1.53	1.20	4.60	1.62	5.00	2.20	1.91	2.80	5.52	2.50	is calculated
cal varia	literacy	(6)	91.50	69.00	00.70	97.50	75.60	94.69	20.00	76.50	35.24	89.00	18.00	36.01	99.00	75.98	62.98	or Germany
historic	trust0	(8)		0.30	0.58		0.23	0.38		0.48	0.32	0.53	0.23	0.38	0.67	0.43	0.39	of trust0 fc
n and	trust	(-2)	5.10	4.68	7.05	6.46	4.45	4.57	3.69	5.47	4.57	5.69	4.46	4.94	6.06	5.06	4.88	an score o
innovatic	R&Dintns	(9)	0.35	0.48	0.50	0.61	0.34	0.38	0.07	0.29	0.12	0.35	0.03	0.10	0.47	0.28	0.25	untry. The me
ı, trust,	pat00	(5)	149.39	148.98	187.89	320.02	123.08	207.41	6.01	74.1	58.37	225.12	4.16	20.86	282.57	111.59	116.10	articular co
Growth	pat91	(4)	91.90	62.69	89.99	108.21	82.89	104.11	2.93	18.48	30.01	105.75	1.76	7.27	125.92	65.04	58.29	ures of a pa
le 3.1:	educ	(3)	14.40	15.47	14.51	19.11	13.91	12.17	14.86	11.53	14.55	14.03	11.69	12.40	11.91	11.44	13.08	gional fig
Tab	gdppc90	(2)	15680.07	17376.70	19762.00	21258.40	15828.25	15582.99	6403.90	9602.69	14236.47	14489.32	5405.60	10376.69	20955.79	13740.83	13872.62	rage of the re
	growth	(1)	0.47	0.47	0.52	0.22	0.41	0.54	0.72	1.12	0.36	0.60	0.79	0.48	0.23	0.61	0.50	y is the ave
			Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain	\mathbf{S} weden	UK	Overall	Note: Each entr

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Figure 3.1: Generalized trust scores, EVS vs. ESS

behavior (e.g., Knack and Keefer, 1997; Zak and Knack, 2001). Knack and Keefer (1997, p.1258) argue that trust "reflects the percentage of people in a society who expect that most others will act cooperatively in a prisoner's dilemma context".²

With this in mind, the main social capital indicator (trust) comes from the first round of European Social Surveys (ESS) conducted in 2002, a database designed to measure changes in and the persistence of people's social and demographic characteristics, attitudes and values. The original data are adjusted by population weights to reduce the possibility of complications that might arise due to over-sampling.³ The *trust*-indicator is constructed from the answer to the following statement: "Most people can be trusted or you can't be too careful". The answer category ranges from (0) "you can't be too careful" to (10) "most people

² One reason why we exclusively relied on this measure is the existence of studies for the United States and Germany that complement surveys with trust experiments. It is found that general trust questions are correlated with the actual behaviour from the experiments (e.g., Fehr, Fischbacher, von Rosenbladt, Schupp, and Wagner, 2003; Glaeser, Laibson, Scheinkman, and Soutter, 2000). Other questions that are employed in the literature to measure social capital are also incorporated. For instance, questions on whether individuals take part in social activities (*social*), whether individuals are politically active (*polactiv*) or whether they are active members of voluntary organizations (*putnam* and *olson* groups). Some of them are found to be significant. See Section 5.3 for the details of this exercise.

 $^{^3}$ Countries participating in ESS have very different populations, but the sample presents information from 1,200 to 3,000 individuals for each country. For instance, the German sample is composed of 2,919 and Dutch sample is composed of 2,364 individuals. However, Germany is almost five times larger than the Netherlands. Especially in studies that compare countries or regions it is advised to correct the data with the population weight provided by the ESS. This minimizes the risk of over-representation of some countries.

can be trusted", with nine levels in between. The individual scores are weighted and aggregated to the regional level and range from 1.67 [Cantabria, ES13] to 7.05 [Denmark, DK0] with a mean (std. dev.) of 4.88 (0.78) for all 102 regions. Previous studies also found large differences in social capital measures within countries (e.g., Beugelsdijk and van Schaik (2005a) for European regions and Iyer, Kitson, and Toh (2005) for US regions). Aggregating regions to countries reveals that *trust* is highest in Denmark and lowest in Greece as can be seen from column (7) in Table 3.1.

Previous studies mostly employed a trust indicator from the first round of European Values Study (EVS) conducted in 1990, in which the respondents were asked, "generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people" (trust0).⁴ The interviewees were given two choices: (i) most people can be trusted or (ii) you can't be too careful. The ESS measure is preferred over this one because respondents can choose a level on a 0-10 Likert Scale.⁵ The two trust scores from EVS and ESS are highly correlated as can be seen in Figure 3.1 (the correlation coefficient (0.65) is significant at the one percent level). Even though trust0 is not available for all the EU-14 countries it is apparent that both trust indicators, trust and trust0, reveal that the northern European countries such as the Netherlands, Sweden and Denmark are characterized by higher generalized trust scores when compared to the southern European countries (Table 3.1, column (7) and (8)). The next section reports estimates for both trust indicators.

3.3.2 Innovation, performance and education

The innovation, education and economic performance measures are taken from Eurostat's regional database. Two main indicators of innovation are used: patent data to measure innovation output and R&D intensity to capture inputs.

As a proxy, the innovation output is defined as the "total number of patent applications to the European Patent Office (EPO) by year of filing excluding patent applications to the National Patent Offices in Europe" per million inhabitants. These figures might not reflect the true regional innovative potential, but do reflect "commercially significant innovations at the world's technological frontier" (e.g., Furman, Porter, and Stern, 2002). Patents are an imperfect proxy for regional

⁴ The European Values Survey (EVS) is designed to measure fundamental values and norms in ordinary life such as social-economic life, politics, family, marriage, religion etc. Unfortunately, the first round of EVS in 1990 covers only 13 European countries (not covering regions of Austria, Greece, Finland, Luxembourg and former East Germany).

⁵ EVS incorporates two other trust questions, (i) trust in co-citizens, and (ii) trust in family. They are both measured on a 1-5 scale, (1) representing 'trust them completely' and (5) representing 'do not trust them at all'. When these scales are reversed so that higher scores would reflect higher trust, the mean (std. dev.) of trust in family, 4.73 (0.16), is much higher than trust in country citizens, 3.59 (0.30) for 72 EU regions. However, the latter also measures generalized trust similar to the trust measure employed by previous studies (*trust0*). This reveals that the respondents' perceptions are clearly different in each question, which can be seen as evidence that the trust question measures "generalized trust".

innovativeness (e.g., Pavitt, 1982, 1988), but are the only well-established source reflecting innovative activity (Trajtenberg, 1990). To avoid yearly fluctuations a three-year average around each point in time is used, so that pat91 is the average of patent applications per million population in 1990, 1991 and 1992; and similarly pat00 is the average of patent applications per million population in 1999, 2000 and 2001. Columns (4) and (5) in Table 3.1 present the country averages of these indicators.

The patent indicator reveals the following. First, the indicator displays considerable differences between regions supporting previous findings (e.g., Bottazzi and Peri, 2003), which also holds at the country level. The patent applications per million inhabitants in 1991 range from 0.6 [Centro, PT16] to 281.1 [Baden-Wurttemberg, DE1], with a mean (std. dev.) of 58.3 (61.6). In 2000, the indicator ranges from 1.8 [Kentriki Ellada, GR2] to 570.4 [Stockholm, SE01] with a mean (std. dev.) of 116.1 (124.4), which indicates that the differential is persistent in the 10-year period. Another observation is that patent applications of an average northern EU country such as Denmark, Finland and Sweden are almost ten times higher than an average southern EU country such as Greece, Portugal and Spain. Also, there seems to be convergence in patent applications in the 1990s, illustrated by a negative unconditional correlation of -0.589 (significant at 1 percent level) between the growth rate of patents between 1991-2000 and log of patents in 1991. This relationship is presented in Figure 3.2a. The horizontal axis measures the log of the number of patent applications per million inhabitants in 1991 and the vertical axis measures the growth of applications between 1991-2000.

R&D intensity is used as a proxy for innovation input. R&D intensity is defined as the percentage of R&D personnel employment in total employment in the business enterprise sector in 1995.⁶ This measure ranges from 0.06 [Valle D'Aosta, ITC2] to 3.53 [Stockholm, SE01], with a mean (std. dev.) of 1.16 (0.68). Comparison of the numbers in column (6) to the ones in column (4) and (5) in Table 3.1 shows that higher R&D intensity is generally associated with more patent applications. The correlation between the R&D measure and patent measures equals 0.748 in 1991 and 0.766 in 2000, both significant at the 1 percent level.

Economic performance is measured by the growth rate of Gross Domestic Product (GDP) per capita between 1990 and 2002. Column (1) in Table 3.1 presents this rate and column (2) shows GDP per capita in 1990. The data suggest convergence in economic performance over the 1990s because the correlation between the growth rate of per capita GDP and initial GDP is -0.701, which suggests regions which were lagging in 1990 are catching-up in the last decade. This relationship is presented in Figure 3.2b.

 $^{^{6}}$ Information on other measures, such as R&D expenditures, is not available for the full sample (more than 15 regions are missing). Earlier years could not be used because of the same problem. However, this measure is a satisfactory input measure considering the correlation between R&D intensity and other R&D measures. The correlations are 0.756 and 0.759 with total and business R&D expenditures for 89 regions. Both coefficients are significant at the 1 percent level.



Finally, human capital is proxied as the share of the students in tertiary level education (levels 5, 6 and 7) to all students in 1993, according to the International Standard Classification of Education 1976 (ISCED76) definitions. The reason for not following the literature (e.g., Barro, 2001) which uses differences in primary and secondary education level is that there is hardly any heterogeneity in these levels of education within the sample of developed EU-countries. There are significant differences between European regions and countries. Column (3) in Table 3.1 shows that Finland and Belgium have the highest proportion of tertiary students, while Ireland and the United Kingdom are among the lowest in our sample.

3.3.3 Institutions, literacy and universities

A set of instruments is needed to estimate causal links between social capital, innovation and per capita income growth. To find instruments we use historical information from institutions.

Historical data on literacy

Education is an important determinant of economic growth (e.g., Barro, 2001). Sandberg (1982) shows for 21 European countries that there is a relation between the literacy rates in 1850 and per capita income in 1970, but not between literacy and income in 1850, suggesting that literacy affects economic well-being in the very long-run. This finding is further supported by Nunez (1990) for 49 Spanish provinces. Unfortunately, in most of these studies it is unclear how literacy translates into better economic outcomes.

A not so emphasized aspect of education is that it facilitates an environment in which "good" cultural character can form. For instance, Cipolla (1969) argues that literacy in the 17th and 18th century served as a basic intellectual and cultural humus for the development of both mechanical and organizational innovations in the industrial revolution.⁷ So, regions lacking solid educational institutions several centuries ago are likely to have a poorer cultural character when compared to regions with well-established educational institutions (Tabellini, 2005) and these "good" cultural traits may have an impact on current income levels. For instance, Lazear (1999) argues that having a common culture and language facilitates trade between individuals. It is true that trade still exists in the case of multiculturalism but only with intermediaries and in a world of second best where transactions are costly. In the presence of higher social capital these transaction costs are falling. In other words, besides a direct effect of education on income, an indirect effect that operates through social capital exists as well.

Literacy rates in the 1870s and 1880s are used as a proxy for education. Although the information differs slightly for different regions, in most cases the col-

⁷ In his words "...widespread literacy meant not only an elastic supply of literate workers but also a more rational and more receptive approach to life on the part of the population" (Cipolla, 1969, p. 102).

lected information refers to the percentage of the population that is able to read and write —including the people who only can read— in 1870s and 1880s. Except for Austria, Greece, France, Portugal and Sweden the data is available at the regional level. The data reveals that literacy rates in northern countries were on average about three times higher than the southern countries in the 19th century. Moreover more-developed countries such as the UK, Germany and France are characterized by relatively homogeneous literacy rates across regions compared to countries such as Spain and Italy where differences are considerably higher. In Italy, Piemonte had a literacy rate of 68 almost five times higher than Calabria that only had 14.6. The data is collected from several different sources, which are discussed in Appendix A.2.1. Column (9) in Table 3.1 presents country averages, with low past literacy rates in Southern European countries and high ones in the Nordic countries.

Historical data on universities

Universities are institutions that blend educational, social and cultural elements. Readings (1996) argues that the evolution of culture can be understood in a framework of struggle between the state and the university. Especially until the end of 19th century universities have been the primary institution of national culture and identity and played a central role in national liberation movements. For instance, in the early 19th century after the battle of Jena, it was not surprising that one of the first actions of Napoleon was to suppress Halle University (in Saxony, Germany) (e.g., Rudy, 1984).

Universities not only create graduates with a common world view educated in the same cultural tradition but also indirectly shape the future of a region or a state by integrating their graduates in the existing social structure. If universities are successful in transferring this vision to the public, then this dynamic structure can serve to raise "good citizens" who behave well and act collectively to reach a certain state of solidarity. In this respect, universities provide an important public good that cannot be provided in other ways (e.g., Cowan, 2006).

Two different variables are employed regarding the history of European universities. First, univF is defined as "2000 minus the foundation date of the university" to measure the period of existence of universities in a particular region. The latter part refers to the date of foundation of the first university established in a region. By construction, higher values reflect the existence of universities in a region for longer periods. The second variable, univN captures the density of universities. It is defined as the number of universities per 100,000 inhabitants around 1850. A detailed inspection of the data shows that countries that are relatively richer such as Germany, the UK and Belgium had a more uniform distribution of universities per population. In countries such as Greece, Italy, Portugal and Spain, universities were clustered in particular regions. In northern countries such as Sweden and the Netherlands universities were generally clustered in regions close to the

sea.⁸ The main argument behind the hypothesized effects of these variables is that universities establish a basis where regional culture or identity nurture. This basis would eventually transform informal institutions and affect the formation of social capital.

Along the same line of argument two other historical measures were developed. First one is the average of the standardized values of univF and univN and the second is the first principal component of the standardized values of the two variables. The major sources for these variables are Ridder-Symoens (1996) and Jilek (1984). Further information can be found in Appendix A.2.4. Country means of these variables are displayed in Table 3.1.

Historical data on institutions

Tabellini (2005) argues that the current state of informal institutions is shaped by the history of its formal institutions, such as political, legal and economic institutions. This assertion becomes even stronger when we consider that EU regions belonging to the same country now, were governed by different political power and institutions especially before the 19th century. In other words, political liberalism has a positive impact by nurturing "good" cultural character, whereas "bad" cultural character might be a reflection of rigid autocratic political power in the past.

Several authors have argued that a political system inclined towards institutional liberalism, in which supreme authority is constrained, is beneficial for economic well-being. For instance, North and Weingast (1970) argue that England's unique political institutions play a major role in economic development at a later stage. In a study on European cities, De Long and Shleifer (1993) show that absolutist monarchs discouraged growth of commerce and industry in Western European cities in the period 1000-1880. In a similar vein, Acemoglu, Johnson, and Robinson (2005) argue that, during the period 1500-1850, substantial economic gains occurred only in nations where the existing political institutions were able to place significant checks and balances on political power. Most important to this research is the effect of past political liberalism on the evolution of cultural traits. In a seminal study that compares the Maghribi and Genoese traders in the late medieval period Greif (1994) argues that divergent political and social histories and cultural heritages between the Maghribis and Genoeses gave rise to different cultural beliefs that later affected the evolution of the societal organizations. He shows that collectivist cultural beliefs, characterized by the Maghribis, led to a societal organization in which the economic, social and moral sanctions against aberrant behavior were applied (and controlled) by certain group(s); whereas individualist cultural beliefs, characterized by the Genoeses, resulted in an organizational structure in which each group's ability to use economic, social and moral

 $^{^{8}\,}$ For a brief discussion of the state of the European Universities from 1500 to 1800 see Ridder-Symoens (1996).

sanctions against individual members was limited. In this respect, "the medieval Latin individualist society may have cultivated the seeds of the Rise of the West" (Greif, 1994, p. 943).

As a proxy for past political institutions, we employ data on "constraints on the executive" defined in the POLITY IV project, Political Regime Characteristics and Transitions, 1800-2002.⁹ It is coded on a scale of 1 to 7, (1) representing "unlimited authority" and (7) "accountable executive constrained by checks and balances". More information on the coding can be found in Appendix A.2.3. This variable presumably captures "institutionalized constraints on the decision making powers of chief executives, whether individuals or collectivities" and hence higher values are associated with a tendency towards democratic institutions and political liberalism.

Most of the observations in our data come from Acemoglu, Johnson, and Robinson (2005) and Tabellini (2005). In some cases the website of the POLITY IV project is consulted. Over 70 regions in the data set are coded using the above sources. We coded the variable "constraints on the executive" in the same way as POLITY IV for the remaining regions (or countries). If the region had no (or little) political autonomy then all regions are assigned the same value. In doing so, we consider the political institutions in a 40-year window around each date (for instance for 1850, the period of focus is 1830-1870). Information is available for five dates: 1600, 1700, 1750, 1800 and 1850. By the second half of the 19th century most countries in the sample had completed their unification process, so after 1850 the regional differences are expected to be less important. Detailed information on how the variables are coded is presented in Appendix A.2.3.

The data on institutions display some interesting features. More democratic institutions are associated with higher current social capital. Up to 1750 there were no considerable changes in constraints on the executive. Then, within a hundred years, European regions display a gradual movement towards limiting the power of the chief executives and move towards democracy. Countries such as Ireland, Belgium, Denmark and the UK rapidly moved towards a more democratic setting after 1700. Around the second half of the 19th century in the Netherlands, Ireland and the UK the chief executives were almost completely controlled either by the parliament or the governing body. On the other hand in countries such as Austria, Greece, Italy and Portugal change was relatively slow and even in the 19th century democracy in these countries were far below the level of the Netherlands and the UK. Lastly, in Germany, Greece and Italy there were important differences between regions as opposed to other countries that display more homogeneous distribution.

Following Tabellini (2005) two variables are defined. First, instAVR is the arithmetic average of five variables, inst1600, inst1700, inst1750, inst1800 and inst1850. The variables instXXXX are defined as the political institutions in year XXXX. Second, instPC is defined, as the first principal component of the five

 $^{^9}$ For more information see http://www.cidcm.umd.edu/inscr/polity/ and Eckstein and Gurr (1975).

Variable	Mean	Std. Dev.	Min	Max
growth	0.50	0.21	0.08	1.18
gdppc90	13872.62	5412.90	4389.00	30263.90
educ	13.08	4.77	1.88	24.95
pat91	58.29	61.64	0.60	281.17
pat00	116.10	124.42	1.82	570.44
R&Dintns	0.25	0.22	0.00	1.00
trust	4.88	0.78	1.66	7.05
trust0	0.39	0.13	0.05	0.77
literacy	62.98	29.90	14.60	99.00
instAVR	2.49	1.48	1.00	5.60
instPC	0.03	1.98	-1.90	4.10
univF	377.38	264.70	0.00	800.00
univN	0.15	0.20	0.00	1.43
univAVR	0.02	0.60	-0.86	1.71
univPC	0.03	0.84	-1.22	2.42
urban	12.71	20.35	0.00	100.00

Table 3.2: Summary statistics

variables.¹⁰ The final columns in Table 3.1 present country averages for these variables.

Appendix A.1 provides the definitions of all variables used in the empirical analysis. Table 3.2 shows summary statistics for the core variables applied in this chapter. Due to space limitations the data in Table 3.1 are published at the country level.

3.4 Empirical strategy

To show that social capital improves economic outcomes, the literature has used two strategies. The conventional method is estimating a growth equation using OLS, in which per capita GDP growth is regressed on standard determinants (such as the initial per capita GDP, investment, education) and a set of social capital indicators (for instance trust, membership to voluntary organizations etc.). However, the problem of reverse causation is fundamental in estimating these relations because current levels of social capital are likely to be influenced by past and current economic conditions. Hence, OLS correlates of the relationship between social capital and economic outcomes could be biased and cannot be interpreted as reflecting causal effects of social capital on per capita income growth. To estimate causal relationships Knack and Keefer (1997) use the number of law faculty graduates as an instrument for social capital and Tabellini (2005) employs

 $^{^{10}}$ The eigenvalue for the first component is 3.72 and describes 75 percent of the total variation in the five variables. The first eigenvector ranges between 0.39 and 0.50, suggesting a roughly equal weight for each variable.

information on the history of political institutions between the 17th to 19th century and literacy rates at the end of 19th century as instruments for culture.

The empirical implementation in this study differs in three ways from the existing literature. First, social capital is positively correlated with levels of education. Higher levels of education would generally result in denser networks in which social capital forms and higher social capital would also lead to better education opportunities. This dynamic relation has not been incorporated in previous research analyzing the effect of social capital on growth. In terms of the methodology, this suggests considering interaction terms between social capital and education. The coefficient of the interaction term is expected to be positive. In terms of the model this might show up as higher N^J or in a more elaborate version of the model relatively more skilled workers feeding back into higher N^J .

Second, it is known that economic performance is positively correlated with innovative activities. It is also known that societies in which people enjoy each other's confidence experience a higher level of economic performance. This implies that societies with a higher level of trust are better able to manage the process of innovation and that creative effort will be rewarded in relatively trusting societies. To illustrate this trust is plotted against patent applications in 1991 and 2000 and the results suggest a strong relation between the two indicators (see Figure 3.2c and 3.2d). The correlation coefficients equal 0.433 and 0.453, respectively. This relation is incorporated in the framework by employing a patent regression, in which patent applications are explained by R&D intensity, education and trust.

Third, combining these causal relations (i.e., from trust to growth; from trust to innovation; from innovation to growth) into one structure is difficult. In addition to simultaneity problems, both the growth and innovation equation contain trust, which is endogenous to the system either because of omitted variables or measurement error. For instance, regions with higher levels of social capital may facilitate a structure in which it is easier and more effective to implement policies to further foster economic development and boost innovation (Akçomak and ter Weel, 2008a). Nevertheless, it is hard to measure policy success. Assuming that such indicators on policy success are measurable and relevant, they are omitted from both equations (3.6) and (3.7). So, it is reasonable to assume that trust may be correlated with the error term. This suggests an estimation method in which trust is instrumented.

A solution to this problem is to add a third equation to the system, i.e. a linear projection of the endogenous variable on all exogenous variables in the simultaneous system. In addition to the exogenous variables, including instruments that are correlated with *trust* would alleviate weak instrument problems. *Trust* is instrumented with the historical information collected on literacy rates, universities and political institutions. Estimating this system with 3SLS produces consistent estimates (Wooldridge, 2002, chap. 9).

The following system is then estimated:

$$growth = \beta_0 + \beta_1 gdppc90 + \beta_2 pat91 + \beta_3 trust + \beta_4 educ + \beta_5 urban + \epsilon$$
(3.6)

$$pat91 = \alpha_0 + \alpha_1 R \& Dintns + \alpha_2 trust + \alpha_3 educ + v \qquad (3.7)$$

$$trust = \delta_0 + \delta_1 literacy + \delta_2 instPC + \delta_3 univPC + \delta_4 X + \eta,$$
(3.8)

where the subscript J for regions has been suppressed for notational convenience, and the error terms comply with the assumptions described above. *Growth* is the per capita GDP growth in the period 1990-2002 and *pat91* is the log of patent applications per million inhabitants in 1991. Log of initial GDP per capita, qdppc90, is included as a measure of convergence. $R \notin Dintns$ represents the measure of R&D intensity. The *trust* measure from the ESS is used. The education variable educ captures the current effect of education on growth next to the effect through the historical data. Urban is a proxy for the economic development around 1850s. The reason for including this covariate is that Tabellini (2005) shows that the historical instruments influence current economic growth through social capital rather than a long-run process of per capita income growth. The last column in Table 3.1 shows country averages for this variable. In equation (3.8), X denotes the vector of variables exogenous to the system consisting of qdppc90, R & Dintns, educ and urban. The instruments are the following: *literacy* is the literacy rate in 1880; univPC is the first principal component of two indicators measuring the intensity and the period of existence of universities in the 19th century; and instPCrepresents the first principal component of five indicators measuring the state of political institutions between 1600 and 1850. All the equations include country fixed effects.

Table 3.3 presents the correlations between *trust* and the instruments. Literacy and trust are strongly and positively correlated as are trust and institutions. The correlations between trust and the measures for universities (the presence and the density of universities) are positive but less strong.

3.5 Estimation results

3.5.1 The effect of social capital on growth

Table 3.4 first presents estimates of the effect of social capital on per capita income growth for 102 regions by estimating

$$growth = \beta_0 + \beta_1 gdppc90 + \beta_2 educ + \beta_3 urban + \beta_4 trust + \epsilon, \qquad (3.9)$$

	trust	instPC	instAVR	univPC	univAVR	literacy
trust	1					
instPC	0.37^{***}	1				
instAVR	0.36^{***}	0.99^{***}	1			
univPC	0.02	-0.17^{*}	-0.16	1		
univAVR	0.02	-0.17^{*}	-0.16	1	1	
literacy	0.43***	0.31***	0.31***	-0.05	-0.05	1

Table 3.3:	Pairwise	correlations	between	the	instruments	and	trust
10010 0101	1 0011 000	00110101010	000000	0110	1110 01 011101100	correct or	or or o

* significant at 10%; ** significant at 5%; *** significant at 1%

Note: The PCA puts exactly the same weight for univF and univN and explains 62 percent of total variation. Therefore univAVR and univPC are perfectly correlated. The principal component analysis for the institutional variables also put similar weights on each variable. The first principal component explains 75 percent of the variation and it is calculated as: pca1 = 0.40(inst1600) + 0.49(inst1700) + 0.50(inst1750) + 0.44(inst1800) + 0.39(inst1850) after standardizing all five variables.

using OLS. The estimates suggest that higher levels of *trust* yield higher GDP growth in the period 1990-2002. The estimate suggests that a one standard deviation (0.78) increase in social capital increases regional per capita income growth by 14 percent.¹¹ This result is consistent with the estimates presented in Knack and Keefer (1997) for a cross-section of countries over the period 1980-1992. In column (2) an interaction term is included to capture the possible complementarity between social capital and education. The results do not change. Using *trust0* – the trust indicator from EVS90 – yields similar estimates.

Social capital is endogenous and column (3) in Table 3.4 reports the first stage of the instrumental variables strategy. The first-stage estimates suggest that all instruments are positively and significantly correlated with *trust*. This correlation is not surprising given the individual correlations between the instruments and *trust* from Table 3.3 above. F-tests for the joint significance of the instruments always exceed the critical value of 10, suggested by Staiger and Stock (1997). Finally, the 2SLS estimates reported in column (4) of Table 3.4 imply that there is a strong and significant impact of social capital on per capita income growth in the period 1990-2002. Hausman, Sargan and F-tests reported at the bottom of Table 3.4 suggest that these estimates are robust.

Table 3.5 reports first-stage and second-stage estimates using the instruments individually in three sets of regressions. The estimates suggest that the coefficient of social capital is somewhat sensitive to the use of different instruments, but the effects remain qualitatively similar compared to the estimates in Table 3.4. A number of alternative equations are estimated using instruments of groups of two or three and they always produced a *trust* coefficient significant at the five

 $^{^{11}}$ Most right hand side variables have different measurement units. Therefore these variables are standardized. This makes it hard to interpret the coefficients For this reason the analysis is based on marginal effects of trust by mentioning changes in terms of standard deviations. The standardized coefficients are presented in Table 3.10

percent level. There is not a case of weak instruments in the first stage because all instruments returned an F-test of joint significance greater than 10. Also the null-hypothesis that the over-identifying restrictions are valid is never rejected.¹²

3.5.2 The effect of social capital on innovation

Table 3.6 first reports the results from estimating

$$pat91 = \beta_0 + \beta_1 R \& Dintns + \beta_2 educ + \beta_3 trust + \epsilon, \qquad (3.10)$$

$$pat00 = \beta_0 + \beta_1 R \& Dintns + \beta_2 educ + \beta_3 trust + \epsilon, \qquad (3.11)$$

using OLS. The estimates suggest that a region's innovative output is higher when its level of social capital is higher. These estimates are consistent with the ones presented by Fritsch (2004). He finds that cooperation increases the efficiency of R&D activities, which most likely yields higher numbers of successful innovations and patents. To address the endogeneity of social capital the same three indicators are employed as instruments for the analysis reported in Tables 3.4 and 3.5. Both the first-stage (column (3)) and second-stage estimates (column (4) and (5)) are consistent with higher levels of social capital yielding higher levels of innovative output in terms of patents both in 1991 and 2000.

Table 3.7 reports a number of alternative specifications that include the three instruments separately.¹³ In addition, the behaviour of the instruments is analyzed, individually and as a group in 2SLS estimations in a similar fashion to the explained above, which resulted in estimating 17 2SLS regressions. All regressions produced a *trust* coefficient significant at the 5% percent level. The regressions do not suffer from weak instrument problems and the null-hypothesis that the over-identifying restrictions are valid is never rejected. Only *univPC* fails to produce a significant *trust* coefficient in the second stage for the patent regression (column (8) and (9)).

3.5.3 Stability

Despite its popularity, the empirical literature on economic growth is criticized regarding the robustness of the results achieved. Levine and Renelt (1992) assessed the robustness of the conclusions of cross-country growth regressions and found

 $^{^{12}}$ A detailed analysis is also conducted in which four university indicators are considered, univPC, univAVR, univF and univN. This analysis consists of estimating 29 regressions. In this case it is found that only the indicator univF has a relatively poor performance as an instrument for trust with significance only at the ten percent level.

¹³ In some cases where trust is instrumented by a single indicator the F-tests are lower which might point out to weak instruments. However, Tables 3.5 and 3.7 are only for robustness reasons and reveal that it is not only the combination of three instruments that turns out significant coefficients in the first and second stages. These instruments are credible on their own but are not strong statistically which is the primary reason to employ three instruments. Together, the three instruments explain more than one-third of the variance in trust.

	(1) OI S	(2) OIS	(2) OI S	(4) 281 8
	(I) OLS	(2) OLS	(3) OLS	(4) 25L5
1 00	growth	growth	trust	growth
gdppc90	-0.189	-0.184	0.326	-0.241
	(0.021)***	(0.021)***	$(0.144)^{**}$	$(0.033)^{***}$
_	$[0.045]^{***}$	$[0.045]^{***}$	$[0.110]^{**}$	$[0.046]^{***}$
educ	0.017	0.019	-0.101	0.016
	(0.015)	(0.015)	(0.109)	(0.020)
	$[0.008]^{**}$	$[0.009]^*$	[0.077]	[0.011]
urban	0.024	0.024	-0.119	0.040
	$(0.012)^{**}$	$(0.012)^{**}$	(0.079)	$(0.017)^{**}$
	$[0.012]^*$	$[0.012]^*$	[0.070]	$[0.013]^{***}$
trust	0.031	0.036		0.159
	$(0.015)^{**}$	$(0.015)^{**}$		$(0.047)^{***}$
	[0.011]**	$[0.013]^{**}$		[0.079]*
trust*educ	L J	0.017		
		(0.013)		
		[0 007]**		
instPC		[0.001]	0 455	
moor o			(0.184)**	
			(0.104) [0.174]**	
litoroov			0.202	
interacy			(0.392)	
			$(0.220)^{-1}$	
· DC			[0.135]**	
univPC			0.222	
			(0.092)**	
			$[0.083]^{**}$	
constant	0.357	0.506	0.066	0.308
	$(0.101)^{***}$	$(0.063)^{***}$	(0.473)	$(0.174)^*$
	$[0.056]^{***}$	$[0.066]^{***}$	[0.207]	[0.179]*
Hausman				20.43
				$(0.000)^{***}$
F-test			148.04	
			$(0.000)^{***}$	
Sargan-test			` '	0.69
0				(0.700)
N	102	102	102	102
R-squared	0.83	0.83	0.68	0.68
Adi R. sar	0.79	0.80	0.61	0.62

Table 3.4: Social capital and per capita income growth

Standard errors in parentheses and clustered standard errors in brackets. Clustered standard errors are clustered at the country level to allow arbitrary correlations within a country.
* significant at 10%; ** significant at 5%; *** significant at 1%. All the regressions include country dummies. Hausman is a test of endogeneity. Null hypothesis is that *trust* is exogenous.
F-test is a test of joint significance of the instruments. Sargan is a test of identification.
Null hypothesis: Over-identifying restrictions are valid.

	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS	(5) OLS	(6) 2SLS
	trust	growth	trust	growth	trust	growth
instPC	0.532	0		0		
	$(0.184)^{***}$					
	[0.226]**					
univPC	[0.220]		0.232			
univi e			(0.097)**			
			[0.065]***			
literacy			[0.005]		0.604	
interacy					(0.004	
					(0.227)	
tmist		0.160		0 192	[0.279]	0.100
trust		0.100		(0.123)		(0.097)**
		$(0.069)^{++}$		$(0.072)^{+}$		$(0.085)^{++}$
1 00	0.000	[0.133]	0.401	[0.081]	0.010	[0.091]***
gdppc90	0.289	-0.241	0.491	-0.226	0.312	-0.257
	(0.144)**	$(0.039)^{***}$	$(0.144)^{***}$	$(0.038)^{***}$	$(0.143)^{**}$	$(0.047)^{***}$
	[0.165]	$[0.067]^{***}$	$[0.246]^*$	[0.051]***	$[0.150]^*$	[0.030]***
educ	0.019	0.016	-0.109	0.016	0.005	0.015
	(0.102)	(0.020)	(0.115)	(0.018)	(0.103)	(0.023)
	[0.052]	[0.011]	$[0.049]^{**}$	[0.010]	[0.066]	[0.012]
urban	-0.158	0.040	-0.090	0.036	-0.127	0.045
	$(0.081)^*$	$(0.018)^{**}$	(0.083)	$(0.017)^{**}$	(0.081)	$(0.021)^{**}$
	$[0.067]^{**}$	$[0.012]^{***}$	[0.094]	[0.017]**	[0.075]	$[0.020]^{**}$
constant	0.150	0.304	2.301	0.567	-0.230	0.211
	(0.554)	(0.212)	$(0.682)^{***}$	$(0.098)^{***}$	(0.487)	(0.255)
	[0.259]	[0.310]	$[0.240]^{***}$	$[0.066]^{***}$	[0.377]	[0.229]
Hausman		7.83		2.58		11.72
		$(0.006)^{***}$		(0.110)		$(0.000)^{***}$
F-test	5.53		12.91		4.69	
	$(0.035)^{**}$		$(0.003)^{***}$		$(0.049)^{**}$	
N	102	102	102	102	102	102
R-squared	0.64	0.68	0.63	0.75	0.64	0.58
Adj R sqr	0.57	0.61	0.56	0.70	0.57	0.49

Table 3.5: Alternative specifications for per capita income growth

Standard errors in parentheses and clustered standard errors in brackets. Clustered standard errors are clustered at the country level to allow arbitrary correlations within a country. * significant at 10%; *** significant at 5%; *** significant at 1%. All the regressions include country dummies. Hausman is a test of endogeneity. Null hypothesis is that *trust* is exogenous. F-test is a test of joint significance of the instruments.

			1		
	(1) OLS	(2) OLS	(3) OLS	(4) 2SLS	(5) 2SLS
	pat91	pat00	trust	pat91	pat00
R&Dintns	0.292	0.292	0.035	0.239	0.243
	$(0.061)^{***}$	$(0.053)^{***}$	(0.099)	$(0.078)^{***}$	$(0.069)^{***}$
	$[0.094]^{***}$	$[0.061]^{***}$	[0.047]	$[0.099]^{**}$	$[0.060]^{***}$
educ	0.219	0.188	-0.028	0.182	0.154
	$(0.050)^{***}$	$(0.044)^{***}$	(0.084)	$(0.063)^{***}$	$(0.056)^{***}$
	$[0.052]^{***}$	$[0.049]^{***}$	[0.096]	$[0.045]^{***}$	$[0.050]^{***}$
trust	0.226	0.164		0.637	0.545
	$(0.062)^{***}$	$(0.054)^{***}$		$(0.174)^{***}$	$(0.155)^{***}$
	$[0.054]^{***}$	$[0.055]^{**}$		$[0.076]^{***}$	$[0.070]^{***}$
instPC			0.494		
			$(0.186)^{***}$		
			$[0.191]^{**}$		
univPC			0.194		
			$(0.090)^{**}$		
			$[0.093]^*$		
literacy			0.478		
			$(0.231)^{**}$		
			[0.187]**		
$\operatorname{constant}$	-0.303	0.164	-0.287	-0.238	-0.718
	(0.435)	(0.378)	(0.461)	(0.369)	$(0.328)^{**}$
	[0.198]	[0.145]	[0.264]	$[0.105]^{**}$	$[0.089]^{***}$
Hausman				11.72	13.57
				$(0.001)^{***}$	$(0.000)^{***}$
F-test			91.21		
			$(0.000)^{***}$		
Sargan				1.86	1.20
				(0.393)	(0.548)
N	102	102	102	102	102
R-squared	0.85	0.88	0.66	0.78	0.82
Adj R sqr	0.83	0.86	0.58	0.74	0.78

Table 3.6: Social capital and innovation

Standard errors in parentheses and clustered standard errors in brackets. Clustered standard errors are clustered at the country level to allow arbitrary correlations within a country. * significant at 10%; ** significant at 5%; *** significant at 1%. All the regressions include country dummies. Hausman is a test of endogeneity. Null hypothesis is that *trust* is exogenous. F-test is a test of joint significance of the instruments. Sargan is a test of over identification. Null hypothesis: Over-identifying restrictions are valid. that almost all results are fragile. To assess the robustness of our findings an investigation was conducted regarding how responsive the estimates of *trust* are to the inclusion of other relevant variables that might have an impact on GDP growth or patent growth.

The methodology simply involves assessing the fragility of an independent variable to a change in the information set. The analysis starts by estimating equations of the form

$$Y = F\alpha_i + \beta_{ij}X_i + \gamma_j S_j + \epsilon_j \tag{3.12}$$

where Y is a vector of GDP per capita growth rates or patent applications, F is a matrix of independent variables that are always included in the regressions, X is the social capital measure, S_j is a set of switch variables that are hypothesized to have a relation with the dependent variable and ϵ_j is the error term. The subscript *i* indexes *trust* and *j* indexes the different combinations of switch variables. The analysis assesses the sensitivity of β_{ij} when different sets of switch variables are added to the regression.¹⁴

Robustness analysis is conducted for both per capita GDP growth and patent models (equations (3.6) and (3.7), respectively). In the former model the dependent variable is the growth of per capita GDP 1990-2002 and the fixed variables are log of initial GDP, education, trust and urbanization rates in 1850 (Table 3.4, column (1)). For the latter the dependent variable is the patent applications to EPO 1991 and the fixed variables are R&D intensity, education and trust (Table 3.6, column (1)). The regressions also include a constant term and country dummies.

Following Beugelsdijk, de Groot, and van Schaik (2004) switch variables were selected from a pool of independent variables from the ESS and Eurostat databases that are exogenous to *trust*. Two criteria were considered in selecting these variables: (*i*) The correlation between a switch variable and *trust* should be less than 0.50 in absolute value and (*ii*) The correlation within switch variables is less then 0.50 in absolute value. 29 switch variables were identified, which are presented in Appendix A.1, Table A.2.¹⁵ These switch variables are introduced to the primary regression in all combinations of 1 to 3 variables at a time. First column

 $^{^{14}}$ A program designed specifically to assess robustness issues developed by Heijungs, de Groot, and Florax (2001), MetaGrowth, is used to pursue such a methodology. For an application of the program on the findings of Knack and Keefer (1997) and Zak and Knack (2001) see Beugelsdijk, de Groot, and van Schaik (2004).

¹⁵ Some of these indicators are highly correlated with trust and some of them are not. For instance, the correlation coefficient of some switch variables and trust is less than 0.10 and only in half of the cases the correlations between trust and the switch variables are statistically significant at the 5 percent. There are at least 10 indicators that are completely not correlated to trust. This logic of selection creates a balanced pool and enables us to analyse the impact of adding an indicator that is loosely correlated with trust as well as the impact that results from including an indicator that is highly correlated with trust.

of Tables 3.8 and 3.9 present how many times a variable appeared in a regression for the growth and patent regressions, respectively. For example, in assessing the robustness of *trust*, 4,090 regressions are estimated implying that *trust* appeared in all of these regressions and the statistics provided are calculated by taking all of these regressions into account. The robustness of the results were assessed by employing six different tests.

i) Strong sign test: All coefficients for trust have the same sign.

ii) Weak sign test: 90% of the coefficients for trust have the same sign.

iii) Strong extreme bounds test: This analysis was introduced by Leamer and Leonard (1983).¹⁶ The relationship between the dependent variable and trust is robust if all estimated coefficients for trust have the same sign and are statistically significant at the same time.

iv) Weak extreme bounds test: Sala-i-Martin (1997) relaxes the above criterion arguing that the relationship between the dependent and the independent variable is robust if 90% of the estimated coefficients for the independent variable have the same sign and are significant at the same time.

v) Weighted extreme bounds test: This test refers to the weighted weak extreme bounds test. The weights are defined as the value of the likelihood of the regression. It is robust if 90% of the estimated coefficients for *trust* have the same sign and are significant at the same time.

vi) Value of the cumulative density function: This test is based on the fraction that lies at the right side of zero of the cumulative density function. A variable passes the test (at a 10% significance level) if the test score is smaller than 0.10 or larger than 0.90.

The results of this exercise are summarized in Tables 3.8 and 3.9 and a number of points should be highlighted. First, the relationship between *trust* and per capita GDP growth is robust to inclusion of other variables. *Trust* passes 4 of the 6 tests and about 80 percent of the time the resulting coefficient is significant (Table 3.8). Furthermore, in the patent regressions (Table 3.9), *trust* passes all of the tests and for all of the estimated regressions the estimated coefficient is significant.¹⁷

 $^{^{16}}$ See also Leamer (1983) and Levine and Renelt (1992) for an application to growth literature.

¹⁷ The analysis was also replicated allowing arbitrary correlations within countries (i.e., with clustered standard errors at the country level). Employing normal or clustered standard errors does not display significant differences. Appendix A.4 presents the summary results for the stability of *trust* in different specifications when normal and clustered standard errors are interchangeably used. To maintain the similarity with the original paper of Beugelsdijk, de Groot, and van Schaik (2004) only detailed results with normal standard errors are presented in Tables 3.8 and 3.9.

Second, for the growth regressions two indicators from ESS, *help* and *opinion*, display robust results and both have a positive impact on growth. The former can be viewed as a social capital indicator since it is derived from a question asking "How often do you help others not counting work or voluntary work". The latter can be viewed as an indicator of culture. The respondents were asked to rate "To be a good citizen. How important is to form independent opinion?" on a scale from 0 "extremely unimportant" to 10 "extremely important". In addition, shares of agricultural and industrial employment seem to have robust impacts on growth. Finally, the indicators discussed above also display a robust character in the patent regression. But additionally, the indicator *skill* displays robust results. This can be viewed as a measure of openness and it is constructed from a question asking whether "all countries benefit if people can move where their skills are most needed".¹⁸

Appendix A.3 presents a more detailed discussion of the impact of the presence of certain switch variables on the probability of obtaining a significant *trust* coefficient. Most regressions in which the *trust* coefficient is insignificant were found to be including other statistically significant measures of social capital such as, *help*, *polactiv* and *opinion*.

3.5.4 Social capital, innovation and growth

Incorporating trust and innovation in a growth regression is possible by estimating a simple OLS regression in which growth is the dependent variable (see Table 3.10, column (1)). The results suggest that innovation and social capital have a positive but insignificant correlation with growth. However, *trust* and *pat91* are highly correlated and considering both of them as independent variables may result in misleading findings because of possible multicollinearity problems. The final step in the estimation of the model is to estimate the full model by using the 3SLS strategy. Table 3.10 reports the results from estimating this model. The core message from these estimates is that more advanced historical institutions, such as universities, stable political environments and early literacy, yield higher levels of present social capital (column (8)). Social capital is a strong determinant of innovation outcomes along with traditional inputs such as education and R&D investments (column (7)). Finally, innovation determines growth, but there is not a strong direct impact of social capital on growth (column (2) and (6)). The results of the full model are represented in columns (6) to (8) and the first stage in columns (3) to (5) in Table 3.10. The 3SLS estimation result only for growth when trust equation does not include country dummies are presented in column (2). The magnitude of the direct effect of *trust* on growth is rather similar, however not significant. A one standard deviation (0.77) change in *trust* is associated with a

¹⁸ For the indicator *help*, the answer categories ranges from (1) "everyday" to (6) "less often than" and for *skill*, the answer categories ranges from (1) "agree strongly" to (5) "disagree strongly". These scales were reversed so that higher values are expected to associate with better innovative and economic outcomes.

			Table 3.7:	Alternative	specificatio	ons for inne	ovation		
	(1) OLS trust	(2) 2SLS pat91	(3) 2SLS pat00	(4) OLS trust	(5) 2SLS pat91	(6) 2SLS pat00	(7) OLS trust	(8) 2SLS pat91	(9) 2SLS pat00
instPC	0.559 $(0.183)^{***}$ $[0.303]^{*}$								
literacy				$\begin{array}{c} 0.682 \ (0.230)^{***} \ [0.363]^{*} \end{array}$					
univPC							$\begin{array}{c} 0.164 \ (0.096)* \ [0.095]* \end{array}$		
trust		$\begin{array}{c} 0.573 \\ (0.231)^{**} \\ [0.179]^{***} \end{array}$	0.398 $(0.189)^{**}$ [0.227]		$\begin{array}{c} 0.859 \\ (0.303)^{***} \\ [0.240]^{***} \end{array}$	0.638 (0.243)** [0.080]***		$\begin{array}{c} 0.407 \\ (0.359) \\ [0.419] \end{array}$	$\begin{array}{c} 0.717 \\ (0.445) \\ [0.441] \end{array}$
R&Dintns	$0.072 \\ (0.102) \\ 0.12 \\ 0.1$	$\begin{array}{c} 0.247 \\ (0.062)^{***} \end{array}$	$(0.063)^{***}$	$\begin{array}{c} 0.068 \\ (0.103) \end{array}$	$(0.099)^{**}$	$(0.079)^{***}$	$\begin{array}{c} 0.130 \\ (0.103) \\ 0.201 \\ \end{array}$	(0.269) $(0.079)^{***}$	0.220 (0.098)**
	[0.041]	$[0.049]^{**}$	$[0.059]^{***}$	[0.048]	$[0.101]^{*}$	$[0.060]^{***}$	$[0.072]^{*}$	$[0.102]^{**}$	[0.096]** 2.1.2.3
educ	0.041 (0.084)	0.188 (0.069)***	0.167 (0.051)***	0.053 (0.084)	0.162 (^*	0.146 (0.064)**	0.046 (0.080)	0.202 (0.061)***	0.139 (0.076)*
	[0.057]	$[0.049]^{***}$	$[0.039]^{***}$	[0.071]	$[0.044]^{***}$	$[0.056]^{**}$	(0.086]	(100.0)	[0.082]
Constant	2.415	-1.141	-0.610	1.052	-1.893	-1.240	2.593	-0.581	-0.462
	$(0.736)^{***}$	(0.776) [0.436]**	(0.637) [0.620]	(0.735) [0.430]**	$(1.008)^{*}$ [0.640]**	(0.811) [0.101]***	$(0.714)^{***}$	(0.580) [0.638]	(0.717)
Hausman	[~~~]	3.52	2.10	[12.13	8.69	[0.28	3.67
		$(0.064)^{*}$	(0.150)		$(0.008)^{***}$	$(0.004)^{***}$		(0.594)	$(0.058)^{*}$
F-test	3.40			3.54			2.93		
	$(0.080)^{*}$			$(0.082)^{*}$			$(0.110)^{*}$		
N	102	102	102	102	102	102	102	102	102
R-squared	0.62	0.80	0.86	0.61	0.68	0.78	0.59	0.84	0.74
$\operatorname{Adj} R \operatorname{sqr}$	0.54	0.76	0.83	0.54	0.62	0.74	0.51	0.81	0.69
Standard errors	in parentheses an	id clustered stand	ard errors in brac	kets. Clustered s	tandard errors are	e clustered at the	country level to	allow arbitrary c	orrelations within a country.
* significant at	10%; ** significant	t at 5%; *** signi	ficant at 1%. All	the regressions in	aclude country du	mmies. Hausmar	i is a test of endo	geneity. Null hyp	othesis is that $trust$
is exogenous. F.	-test is a test of jo	int significance of	the instruments.						

		est 6	97	88	00	93	96	00	00	94								
		st 5 T	<u>SS 0.</u>	SS 0.	SS 0.	SS 0.	SS 0.	SS 1.	SS 0.	SS 0.								
		4 Tes	YE	ΥE	ΥE	ΥE	YE	YE	ΥE	YE							0.90.	
		Test	ON	ON	\mathbf{YES}	ON	ON	\mathbf{YES}	YES	ON	ummies.						than	
		Test 3	ON	NO	\mathbf{YES}	NO	ON	ON	NO	ON	country d						0 or high	
		Test 2	YES	\mathbf{YES}	\mathbf{YES}	\mathbf{YES}	YES	YES	YES	YES	ban and c						s than 0.1	
JS		Test 1	\mathbf{YES}	NO	\mathbf{YES}	NO	\mathbf{YES}	\mathbf{YES}	\mathbf{YES}	\mathbf{YES}	c, trust, u						core is les	
h regressio	fract. of signf. (+)	values	0.79	0.07	0.00	0.34	0.61	1.00	0.00	0.42	re gdppc90, educ						ue for the test s	
the growt	fract. of signf. (-)	values	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	ent variables a						level if the val	
oility of	fract. $of (+)$	values	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	independe					(¿	gnificance	
.8: Stał	fract. of (-)	values	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	The fixed			assed?)	passed?)	gn passed	at 10%sig	
Table 3.	right confid.	interv.	0.030	0.020	-0.192	0.020	0.051	0.065	-0.005	0.003	P 1990-02.			qual sign p	equal sign ₁	ind equal si	ses the test	
	left confid.	interv.	0.028	0.017	-0.196	0.017	0.045	0.060	-0.006	0.003	apita GD]		(;	cant and ∈	icant and	gnificant s	uriable pas	
	std.	dev.	0.004	0.006	0.010	0.006	0.008	0.008	0.001	0.001	te of per c	m passed?	gn passed	(all signifi	0% signif	st (90% si	test: A va	
	mean	value	0.029	0.019	-0.194	0.018	0.048	0.062	-0.005	0.003	growth rat	l equal sig	% equal si	inds test (nds test (9	bounds te:	^r function	
	no of regress.	appeared	4,090	4,090	4,090	4,090	407	407	407	407	ent variable is ₁	ng sign test (al	k sign test (90'	ng extreme boı	k extreme bou	zhted extreme	ulative density	
			trust	educ	gdppc90	urban	help	opinion	agremp	indemp	The depende	Test 1: Stro	Test 2: Wea	Test 3: Stroi	Test 4: Wea	Test 5: Weig	Test 6: Cum	

left right fract. fract. of fract. of	std. confid. confid. of $(-)$ of $(+)$ signf. $(-)$ signf. $(+)$	lev. interv. interv. values values values values Test 1 Test 2 Test 3 Test 4 Test 5 Test 6	0.021 0.200 0.209 0.00 1.00 0.00 1.00 YES YES YES YES YES 1.00	0.034 0.213 0.227 0.00 1.00 0.00 1.00 YES YES YES YES 100	0.025 0.282 0.293 0.00 1.00 0.00 1.00 YES YES YES YES YES 1.00	0.091 0.363 0.429 0.00 1.00 0.00 1.00 YES YES NO YES YES 1.00	0.042 0.261 0.292 0.00 1.00 0.00 0.96 YES YES NO YES YES 0.99	0.063 0.258 0.305 0.00 1.00 0.00 1.00 YES YES NO YES YES 1.00	0.003 -0.035 -0.032 1.00 0.00 1.00 0.00 YES YES YES YES YES 0.00	0.003 0.028 0.031 0.00 1.00 0.00 1.00 YES YES YES YES YES 1.00	plications in 1991. The fixed independent variables are $R \& Dintus$, $educ$, $trust$, and country dumnies.	assed?)	passed?)	significant and equal sign passed?)	s significant and equal sign passed?)	
ght fract	onfid. of (-)	iterv. value	.209 0.00	.227 0.00	.293 0.00	.429 0.00	.292 0.00	.305 0.00	0.032 1.00	.031 0.00	he fixed indepe			sign passed?)	l sign passed?)	
left ri	confid. c	interv. ir	0.200 0	0.213 0	0.282 0	0.363 0.	0.261 0	0.258 0	-0.035 -(0.028 0	ons in 1991. T.	(2	(2)	cant and equal	icant and equa	
	std .	dev.	0.021	0.034	0.025	0.091	0.042	0.063	0.003	0.003	t applicati	zn passed	ign passed	(all signifi	0% signit	10001
	mean	value	0.205	0.220	0.288	0.396	0.276	0.281	-0.033	0.030	the patent	l equal sig	% equal si	inds test	nds test (9	-
no of	regress.	appeared	4,090	4,090	4,090	407	407	407	407	407	it variable is	g sign test (a	sign test (90	g extreme bo	extreme bou	
			trust	educ	R&Dintns	$_{\rm skill}$	help	opinion	agremp	indemp	The depender	Test 1: Stron	Test 2: Weak	Test 3: Stron	Test 4: Weak	

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	(8) trust	0.412	$(0.096)^{***}$								-0.098	(0.085)		-0.143	$(0.048)^{***}$		-0.037	(0.088)	0.165	$(0.056)^{***}$	0.501	$(0.127)^{***}$	0.353	$(0.113)^{***}$	0.335	(0.435)		102	0.68				
mates)	(7) pat 91							0.724	$(0.149)^{***}$		0.174	$(0.062)^{***}$					0.228	$(0.076)^{***}$							-1.538	(0.637)		102	0.74	LS estimation	presents only	fication statistic	1.94(0.00).
(3SLS Esti	(6) growth	-0.279	$(0.027)^{***}$	-1.280	0.191	$(0.063)^{***}$	0.876	0.025	(0.053)	0.114	-0.017	(0.018)	-0.079	0.044	$(0.012)^{***}$	0.202									0.519	$(0.064)^{***}$	0.075	102	0.82	e results of the 3S	mies. Column (2)	Sargan overidentii	uation F -test = 6
nd growth	(5) 1st trust	0.336	$(0.151)^{**}$								-0.100	(0.109)		-0.117	(0.079)		-0.024	(0.101)	0.225	$(0.093)^{**}$	0.397	$(0.228)^{*}$	0.458	$(0.185)^{**}$	0.073	(0.476)		102	0.68	are the first stag	ude country dum	ummies. Hansen-	stage in <i>trust</i> eq
lovation ar	(4) 1st pat91	0.344	$(0.084)^{***}$								0.095	(0.061)		-0.110	$(0.044)^{**}$		0.192	$(0.056)^{***}$	0.110	$(0.052)^{**}$	0.413	$(0.127)^{***}$	0.178	$(0.103)^{*}$	0.097	(0.265)		102	0.89	olumns 3, 4 and 5	ie regressions incl	nclude country d	ments in the first
apital, inn	(3) 1st growth	-0.213	$(0.020)^{***}$								0.002	(0.014)		0.020	$(0.010)^{*}$		0.038	$(0.013)^{***}$	0.022	$(0.012)^{*}$	0.083	$(0.029)^{***}$	0.062	$(0.024)^{**}$	0.617	$(0.062)^{***}$		102	0.87	ents in italics. Co	ant at 1%. All th	equation do not i	nce of the instru
): Social c	(2)3SLS growth	-0.285	$(0.026)^{***}$	-1.309	0.194	$(0.062)^{***}$	0.890	0.034	(0.052)	0.158	-0.019	(0.017)	-0.089	0.050	$(0.012)^{***}$	0.229									0.513	$(0.064)^{***}$	0.435	102	0.81	dardized coefficie	t 5%; *** signific	tion when trust e	9). Joint significa
Table 3.10	(1)OLS growth	-0.228	$(0.022)^{***}$	-1.046	0.090	$(0.024)^{***}$	0.413	0.016	(0.014)	0.073	0.002	(0.014)	0.007	0.032	$(0.011)^{***}$	0.148									0.374	$(0.094)^{***}$	0.596	102	0.85	parentheses. Stan	6; ** significant at	r the growth equa	$\chi^2(6) = 3.16(0.7)$
		gdppc90			pat91			trust			educ			urban			R&Dintns		univPC		literacy		instPC		constant			N	R-squared	Standard errors in	* significant at 10%	the 3SLS results fo	for 3SLS estimation

	stability of	mean	std.	fract. sign.	
equation	variable	value	dev.	(+) values	
growth	trust	0.036	0.024	0.01	
growth	pat91	0.156	0.058	1.00	
patents	trust	0.655	0.076	1.00	

Table 3.11: Stability of *trust* in 3SLS estimations

Total number of 3SLS estimations is 1559.

change in patent applications of 0.94 of a standard deviation, much higher than the impact of R & Dintns and educ. The effect of social capital on growth seems to work through innovation. Together, our findings imply that social capital is a significant determinant of innovation, which in turn explains approximately 15 percent of per capita income growth in the EU regions between 1990 and 2002.

For the 3SLS estimates, a restricted version of the stability analysis of *trust* was conducted. Benefiting from the results in Section 5.3, 10 switch variables that never turned out to be significant either in the patent or in the growth stability analysis were omitted and the remaining indicators were included in the regression individually and in groups of two to estimate 1,559 3SLS regressions in total. The results for *trust* and *pat91* are summarized in Table 3.11. *Trust* returns a positive but insignificant coefficient for more than 99 percent of the cases in the growth equation. In all the estimations performed, *pat91* in the growth equation and *trust* in the patent equation are always found to be positive and significant. *Skill, agremp* and *indemp* were also found to be significant in some cases in the patent equation. Only the importance of obeying the law (*implaw*) and in some cases the heterogeneity in the population *minority* returns significant coefficients in the growth equation.¹⁹

These results have important implications for the literature on relating a region's (or country's) social capital to economic performance. Mostly these studies have been concerned with the causal relationship between social capital and economic outcomes, neglecting explicit definitions of why social capital should have a direct impact or indirect impact through a third factor on economic growth. The estimates suggest that innovation is an important third factor explaining how social capital increases economic outcomes, largely neglected by this literature.

 $^{^{19}}$ The results of the robustness analysis for 3SLS should be interpreted with some caution because each switch variable added in equation (3.6) or (3.7) automatically appears in the trust equation hence in some models trust is explained by another social capital indicator besides other variables. This may have produced complications in the analysis.

3.6 Conclusion

In cross-country comparisons measures of social capital have a direct effect on economic outcomes, such as growth and investments (e.g., Knack and Keefer, 1997). It is however not clear how social capital improves outcomes. This chapter identifies innovation as an important channel by which social capital influences per capita economic growth.

The framework provided in this chapter shows how social capital helps in the process of stimulating innovation. The model focuses on differences in social capital across regions and shows that a higher stock of social capital yields more innovation. The main reason for this is that innovation is a risky activity, so the venture capitalist and researcher are both helped if they can trust one another. This is easier in an environment in which people trust each other more. This positive relationship between social capital and innovation feeds back into the production process and increases per capita income.

The empirical contribution of this chapter is to show for 102 regions of the EU-14 that early institutions shape current social capital, which in turn influences innovation in regional comparisons. Innovation has an impact on per capita income growth, but the direct effect of social capital on per capita income growth vanishes. These results are obtained using 3SLS estimates in which it is assumed that past institutions and literacy rates are valid instruments for social capital. The methods and the estimates are found to be valid and robust.

An implication of this result is that historical differences between regions of an otherwise relatively homogeneous set of countries seem to have a lasting effect on social capital. The contribution of social capital to creating an environment in which capitalists and entrepreneurs are able to strike the best deals improves innovation outcomes, which are different between regions, holding constant any unobserved national variable and contemporaneous education and urbanization rates. Of course, social capital and innovation are not treated at the microeconomic level, so the exact transformation of social capital into innovation remains unclear. But, the estimates suggest that research in this direction is promising.

The idea that the effect of social capital on per capita income growth works through innovation has policy implications for Europe. The findings suggest that backward regions cannot improve fast in terms of innovation and per capita income growth, because the shaping of social capital is crucial and takes long to develop. It also suggests that public investments in R&D might not be beneficial because in all likelihood the private sector has trouble investing money efficiently. These regions would benefit probably more from investments in education, because human capital and social capital are likely to be complementary.

Chapter 4

How do social capital and government support affect innovation and growth? Evidence from the EU regional support programmes

Far beyond the shrinking skies Where money talks and leaves us hypnotised It don't pave the way

Half day closing, Portishead

4.1 Introduction

Do social capital and government support programmes, such as the European Union's (EU) Objectives 1, 2 and 5b regional support programmes, have a positive impact on regional economic outcomes? The previous chapter has considered social capital as an important determinant of innovation and economic growth. In this chapter, we investigate the role of social capital together with government intervention by analysing EU structural funds in the period 1989-1999 in explaining differences in innovation output and economic growth in the regions of the EU-12 in the period 1990-2002. The empirical results presented in this study suggest that European Union funding does not provide a significant contribution to the welfare of EU regions unless it is integrated with social capital. Why is this?

The research indicates that there is a positive interrelationship between levels of education, measures of social capital and effectiveness of government support programmes. As such, for any given level of economic development, regions with on average higher levels of education and greater social capital are more likely to be characterized by stronger networks where communication, norms and values, bonds and ultimately production are more effectively integrated and conducted. This improved structure facilitates a simpler and more effective implementation of policy which fosters economic development and boosts innovation.

More specifically, the estimates suggest that several forms of social capital contribute positively to economic growth and innovation. The results indicate that EU funding has no direct effect on economic outcomes, supporting previous studies which emphasized the failure of EU funding to foster development in relatively backward regions. The main contribution of the empirical analysis is that a complementary relationship between government spending and social capital exists and by itself contributes to economic development. Estimates suggest that the interaction between social capital and EU funding contributes positively and significantly to economic growth and innovation, which in turn implies that, given a current level of development, regions with relatively higher levels of social capital benefit more from EU support programmes. One major problem that comes to the surface when studying the causal link between economic outcome and social capital is related to the difficulties experienced when trying to infer causation from correlations in the data. For example, a correlation between social capital and funding might arise if the funding promoted social capital, if groups with more social capital were able to attract more funding, or if an outside factor influenced both funding and social capital. Similar to the empirical approach used in chapter 3, an IV approach was used to estimate the causal effects of social capital on economic growth and innovation, the results of which support robust estimates.

From a theoretical point of view, the results described in this chapter support that institutions are important for both growth and innovation and that this remains true when explaining differentials between relatively homogeneous regions of the EU-12 countries. While these regions are bounded by the same institutional rules and laws and, thus, are expected to perform similarly ceteris paribus, the research indicates that informal institutions such as trust are able to make institutions work more effectively in some regions than others. For example, social capital is able to reduce information frictions in investment decisions, which makes the financing of risky projects more transparent. Italy is a case in point, where differences associated with the social structure vary from one region to another and thus perform very differently in terms of economic growth and innovation.

The estimates are also interesting when referring to policy analysis. The correlation between social capital and education suggests that increasing investments in human capital not only exerts a direct impact on economic growth and innovation inputs, but also an indirect effect which increases levels of trust within societies. It is also important to note that EU programmes have been highly criticized for their

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inability to boost economic growth in relatively backward regions. For instance, Boldrin and Canova (2001) argue that the positive impact of structural funds on growth is due to re-distributional dynamics. In a similar manner, Ederveen, Gorter, de Mooij, and Nahuis (2002) argue that due to crowding out of private and other national regional aid, rent seeking and moral hazard problems structural funds are not spent efficiently. Their estimates show that backward regions could have grown half a percentage faster, had structural funds been spent efficiently. The estimates in this chapter suggest that the programmes administered as such are indeed not causal to economic growth, but when integrated with social capital and education, act as a highly effective means to boost performance. The findings support previous research by Ederveen, de Groot, and Nahuis (2006) who suggest that structural funds are conducive to growth in countries with the 'right' institutions. A strategy for future funding of relatively backward EU regions might be one that integrates education into the funding programme to increase programme effectiveness. Finally, it is noted that innovation output is higher in regions where more social capital exists. In these cases, EU funding helps stimulate innovative activities when combined with social capital and education. There are two ways in which innovation can be established: one way is to increase the level of education, which is likely to yield multiple effects on economic outcomes; the other way is to design and establish sound economic institutions to stimulate innovation. For example, provision for venture capital, tax credits for innovation and other benefit types for investors who work in relatively uncertain projects might be promoted and protected by formal institutions. The advantages associated with these types of institutions are manifold stimulating education, innovation, the creation of social capital and ultimately stimulating economic performance and prosperity.

This chapter is organised as follows. First, the theoretical background of the study is presented along with a discussion of previous studies on social capital and economic development and the effectiveness of EU funding. Then basic information on the datasets employed is presented and insight into the most salient details is provided by using a number of descriptive statistics. Third, the main findings associated with the estimation of several empirical models will be presented. Finally, policy implications associated with the estimates are discussed. In addition, Italy is used as a case study to illustrate the way in which social capital, education and government support, develop and act as a reinforcing mechanism that stimulates economic development and innovation.

4.2 Social capital and implementing policies

4.2.1 Theoretical background

As discussed in detail in chapter 2, two important conditions must exist for social capital to influence economic outcomes: the first condition states that the decentralized equilibrium is not first best and the second states that only a number of

cases exist where social capital is able to achieve better outcomes. The first condition implies that a role exists for government institutions to establish property rights, courts and law and to promote altruistic behaviour, stronger social bonds and trust so that opportunism is reduced and market transparency is increased. The second condition indicates that social capital is not a term or concept that can be used to explain all of the differences experienced between economic performances of different groups.¹ In this chapter, social capital is defined and analysed at the regional level with an understanding that it originates at an individual level due to the different forms of social interaction between people.

The role of social capital to implement government policy can be both positive and negative. Social capital is positively correlated with levels of education (e.g., Goldin and Katz, 1999) as it supports access to publicly provided education and to credit for the poor. This positive correlation is important because higher levels of education generally induce denser networks where social capital forms. In this situation, social capital generates positive externalities which are in turn generated by social interactions. These externalities increase knowledge associated with the behaviour of people, which in turn reduces the potential for opportunistic behaviour to take hold. In addition, and most importantly, these externalities are able to withstand the free-rider problem that occurs when information is limited resulting in coordination problems and failures. The free-rider problem can be reduced by providing public goods and other government initiatives that foster development and reduce friction; by creating banking and insurance institutions; and by creating mechanisms to penalize disobedient 'group members'. In general, regions with higher levels of education on average do better in terms of economic performance and thus receive less government support. This is certainly true in the case of EU structural funds. That said, it is important to note that, given a certain level of development, regions with higher levels of social capital are more likely to effectively implement support programmes because they are able to internalize the externalities generated by social interactions and networks. This implies that a positive correlation between the average level of education, the measure of social capital and the government support programme will exist, which is the predicted outcome of the empirical analysis. This analysis also predicts that regions with higher levels of education will be more likely to devote resources to innovative activities. So, the determinants of innovation are likely to be positively correlated to the interaction between social capital, education and government support.

Research also indicates that social capital has the potential to worsen economic outcomes if policy interventions undermine social capital instead of change incentive structures (e.g., Tirole, 1996). This is further exemplified in cases where external organizations, such as the Italian Mafia, become sources of civil social capital. In these cases, competition within and between groups destroys other

 $^{^1}$ Durlauf and Fafchamps (2005) review the literature and argue that social capital may help to resolve coordination problems, alter individual incentives or it may affect the technology of social interactions between economic agents.

forms of social capital, primarily due to the violence used to maintain the (information) monopoly (e.g., Gambetta, 1996). The presence of kin groups might also be detrimental to economic outcomes. Traditionally these groups have been a valuable resource for enforcing bonds but in modern market economies these 'dynasties' may be considered an economic threat as they might foster corruption (Collier and Garg, 1999). In most European regions these forms of detrimental social capital will not occur at a large enough scale and therefore are unlikely to influence the implementation and effectiveness of EU programmes. Reference to the Italian case is discussed in more detail at the end of this chapter.

4.2.2 Previous empirical research on social capital and economic outcomes

Although a thorough review of the literature on social capital is provided in chapter 2, the cornerstones of this literature are summarized below. Coleman (1990) and Putnam, Leonardi, and Nanetti (1993) initiated empirical research on social capital. Coleman presented the basic theory of how social capital and social interactions influence behaviour.² Putnam presented an analysis which emphasized the importance of noting the differences in social capital when explaining the differences of economic outcomes between the northern and southern regions of Italy. One of the first and most influential empirical studies in this area was conducted by Knack and Keefer (1997). Knack and Keefer estimated how the contribution of measures of social capital explained the differences in economic performance between countries. The estimates derived for 29 countries suggest a positive relationship between different measures of social capital, levels of education and economic performance. They find that more trusting societies not only have a stronger incentive to innovate and accumulate physical capital, but also experience higher returns to human capital investments.³

Others have applied this study to European economies including Guiso, Sapienza, and Zingales (2004), Tabellini (2005), Moesen, Van Puyenbroeck, and Cherchye (2000), Beugelsdijk and van Schaik (2005a,b) and Akçomak and ter Weel (2006). Guiso, Sapienza, and Zingales (2004) use data associated with blood donations and participation in local elections to measure social capital and demonstrate that there is a positive correlation between these measures and the financial development for a set of Italian municipalities. Tabellini (2005) examines the effects culture and institutions have on economic development in EU regions. He finds that culture, defined as norms and values created in the past, has a strong impact on current institutions and on the current economic performance of EU regions.

 $^{^{2}}$ Becker and Murphy (2000), Grootaert and van Bastelaer (2002) and Durlauf and Fafchamps (2005) provide overview studies of both the theoretical and empirical work in this area.

³ Beugelsdijk, de Groot, and van Schaik (2004) address the robustness of the results of Knack and Keefer (1997) and Zak and Knack (2001) and present some alternative explanations. Generally, the Zak and Knack's estimates survive the robustness analysis, but Knack and Keefer's estimates are only limitedly robust.

The next three papers investigate the extent to which differences in social capital contribute to differences in regional economic growth within regions of the EU. They find that regions with higher levels of 'trust' positively correlate to the level of economic growth for the period 1960-2000. Akçomak and ter Weel (2006) stress the importance of studying social capital to better understand and explain differences in innovation and regional development. A recent study by Fritsch (2004) adds the importance of cooperation in research and development (R&D) processes to make the uncertain process of pursuing innovation activities more transparent to investors and capital providers.

Bilbao-Osorio and Rodriguez-Pose (2004) take a more traditional approach to their study and analyse whether policies that are designed to foster R&D are in fact paying off. Results from their analysis did not support a strong correlation between innovation performance and economic growth. In addition to these findings, Gambardella, Mariani, and Torrisi (2002) observed that patents, employment density and openness affected labour productivity in European regions. However, these studies did not take into account the socio-economic variation in terms of social capital, which affects capacity to conduct R&D. Verspagen (1999) and Rodriguez-Pose (1999) investigate the degree to which regional clubs exist and cultivate innovation. Both authors find that clubs perform better overall and that there are economic spillovers to less advanced regions. While clubs and social networks share many similarities, they differ in that networks form spontaneously as free associations of economic agents, whereas clubs are organized and have a relatively defined membership structure. That said, clubs have the advantage of making group decisions, a possibility social networks of agents do not have.

4.2.3 EU regional support programmes

In 1957, the European Social Fund (ESF) was set up by the Treaty of Rome to improve job opportunities, by promoting employment and increasing the geographical and occupational mobility of workers. In 1962, the European Agricultural Guidance and Guarantee Fund (EAGGF) was created to promote the development of agricultural and rural structures. In 1975, the European Regional Development Fund (ERDF) was established to help alleviate regional disparities in the EU member states. Finally, in 1994, the Financial Instrument for Fisheries Guidance (FIFG) was set up to generate productivity and employment growth in the fisheries industry. These four funds are generally referred to as the 'Structural Funds', and are the funds of interest for this chapter.⁴ It is important to note that the main objective of an EU support programme is to act to decrease regional disparities in terms of economic cohesion and development.

 $^{^4}$ Other EU funds are the Cohesion Fund created in the aftermath of the Maastricht Treaty in 1993 and the European Investment Fund (established in 1994). The aim of the Cohesion Fund is help relatively poor countries to preserve fiscal targets. The European Investment Fund aims at the long run financing of projects to the development of small and medium-sized firms.

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The effectiveness of EU policy to foster economic development has been addressed in a number of different studies resulting in evidence that is generally mixed. Cappelen, Castellacci, Fagerberg, and Verspagen (2003) present estimates which suggest that regional support has had a positive impact on economic growth in the 1990s. Estimates for periods before 1990 appear to be less conclusive. Differing effects of regional policy on economic outcomes over a period of time are often attributed to the major reform of 1988 which was amplified during the enlargement of the EU by three relatively poor countries (i.e. Spain, Portugal and Greece).⁵ The objective of the reform was to make the funds more effective in reducing income inequalities between regions and, as such, more financial resources were made available to do so. Beugelsdijk and Eijffinger (2005) present estimates of the effect structural funds had on regional economic performance for the period 1995-2001 and find that poorer countries have caught up with richer countries. These results contrast with the estimates of Boldrin and Canova (2001) which provide the basis for their argument that structural funds serve re-distributional purposes and have little relationship to fostering economic growth. These differences in interpretation are most likely related to the splitting of data sets into different regions and the shortage of information for a number of countries (see e.g., Boldrin and Canova, 2001, pp. 241-42). Ederveen, Gorter, de Mooij, and Nahuis (2002) show that the backward regions could have developed much faster, had the funds been spent in a more efficient way. Moreover, they show that the estimates are not robust to different specifications and provide mixed evidence on the effectiveness of structural funds. In addition, Rodriguez-Pose and Fratesi (2004) found that the effects of structural funds on economic growth are positive but temporary and investments in education and human capital appear to be the only factors that have lasting effects in terms of regional convergence.

These studies have not linked the effectiveness of EU structural funds on economic development where differences in regional levels of social capital exist. The role of social capital is critical when considering effectiveness of policy implementation because regions with higher levels of trust in government programmes are more receptive to implementation of new policy. Cappelen, Castellacci, Fagerberg, and Verspagen (2003) note that a relationship between accompanying factors, such as a receptive environment, is likely to exist and affect the success of regional policies. Indeed, cross-country research conducted by Ederveen, de Groot, and Nahuis (2006) show that effectiveness of the structural funds depends on institutional settings (e.g., openness, corruption and trust). The remainder of this study emphasizes the importance of social capital when explaining the effectiveness of regional policy to foster innovation and economic growth.

 $^{^{5}}$ See e.g., Begg and Mayes (1993) for a detailed discussion of the reform and Begg (1997) for a discussion of the policy perspective of the structural funds after 1999. Nahuis and de Mooij (2001) argue that there is a new case for reform after the recent EU enlargement with former Communist Eastern European countries.

Variable	Description	Mean (s.d.)	Min	Max
SC	Index of social capital constructed by using	0.53(0.10)	0.13	0.76
	the five variables below.			
TRUST	Most people can be trusted or you can't be too	4.78(0.69)	1.66	7.05
	careful. Coded as 0 to 10 in ESS. Higher			
	number representing higher trust.			
PPLHLP	Most of the time people are helpful or mostly	4.59(0.74)	1.52	6.14
	looking out for themselves. Coded as 0 to 10			
	in ESS, 10: most people are helpful.			
PPLFAIR	Most people try to take advantage of you, or	5.37(0.75)	2.20	7.36
	try to be fair. Coded as 0 to 10 in ESS,			
	10: most people try to be fair.			
IMPVO	Important in life: voluntary organizations.	5.04(1.18)	2.91	7.45
	Coded as 0 to 10 in ESS. Higher numbers			
	representing higher importance.			
VOLUN	Index constructed from ESS measuring the	0.02(0.01)	0.00	0.06
	involvement of the respondents in active			
	voluntary work for different organizations.			

Table 4.1: The measurement of social capital

The number of regions equals to 83. Further information is provided in the main text.

4.3 Data description and strategy

4.3.1 Data and descriptive statistics

Regional and national data sets were available for the following 12 EU countries: Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Portugal and the UK.⁶ The EU is divided into 83 regions based on the nomenclature of territorial units for statistics (NUTS). Regional divisions for each country were defined by NUTS 1 for Belgium, Denmark, France, Germany, Luxembourg, The Netherlands and the UK, and by NUTS 2 for Spain, Italy and Portugal. Ireland and Greece lacked sufficient regional information of structural funds for regional assessment and were measured at the national level.

Social capital

Measures of social capital are not derived without controversy. The fundamental premise behind the value-added contributions of social capital is that it provides a forum where traditional resources (e.g. physical capital, human capital) can integrate with other resources (e.g. social networks, trust, norms and values) to produce better outcomes for individuals (e.g., Coleman, 1988). Indeed, from an economist's point of view, the beneficial impact arises only in cases where social

 $^{^6}$ The focus is on EU-12 countries due to data limitations. Therefore, Austria, Finland and Sweden were not taken into account.
capital affects expectations. ⁷ With this in mind, the following two indicators are used: (i) generalized trust (TRUST) and (ii) an index of social capital (SC). The data used to construct the measures of social capital are taken from the European Social Surveys (ESS), a database designed to measure change and persistence of people's social and demographic characteristics, attitudes and values. The number of observations listed for each region in the ESS varies and is not always representative for the size and demographic structure of the region, therefore, in aggregating the data weights are applied to reduce the possibility of over sampling.

Most studies that focus on the impacts of social capital on economic outcomes use generalized trust to measure the degree of opportunistic behaviour (e.g., Knack and Keefer, 1997; Zak and Knack, 2001). Knack and Keefer argue that trust 'reflects the percentage of people in a society who expect that most others will act cooperatively in prisoner's dilemma context' (p.1258 Knack and Keefer, 1997). Similarly, *TRUST* is constructed as the answer to the following questionnaire statement: 'Most people can be trusted or you can't be too careful'. The response category has eleven levels ranging from (0) 'you can't be too careful' to (10) 'most people can be trusted'. The mean (standard deviation) of this variable for the EU-12 countries as a whole equals 4.945 (2.395), with n=25,268.

The second indicator is an index of social capital that reflects different dimensions of social structure such as trust, solidarity and organizational membership. There are two main reasons for constructing such an index: First, many indicators of social capital are highly correlated with each other, so analysing the effects of different dimensions at the same time (by placing more than two of the indicators in the same regression, for instance) generally does not produce sensible results because of collinearity problems. Second, these variables are not only hypothesized to have individual impact on economic outcomes but may also reinforce each other. Five indicators have been integrated into one measure so that the several possible dimensions of social capital can be captured. The subsequent social capital index (SC) is the average of the re-scaled values of the five indicators, specifically:

$$SC_j = \sum_{i=1}^{m} \frac{X_{ij} - min(X_{ij})}{max(X_{ij}) - min(X_{ij})}$$
(4.1)

where X_{ij} is the value of indicator *i* for region *j* and *m* is the number of indicators. The mean (standard deviation) of this social capital indicator equals 0.53 (0.10) for the whole sample. The correlation coefficient between *TRUST* and *SC* is 0.81 (n=83).

Table 4.1 provides information and descriptive statistics concerning different social capital indicators. The first row depicts the mean, standard deviation, min-

 $^{^{7}}$ Granovetter (1985) put stress on the networks of (social) relations in establishing expectations, in generating trust so to create and enforce norms. In a similar vein, Durlauf and Fafchamps (2005) argue that social capital generates positive externalities, which are achieved through shared values, norms and trust that affect expectations and behaviour. Dasgupta (2003) discusses the importance of this latter argument in greater detail.

imum and maximum value of TRUST. Of particular interest is the relatively large dispersion in generalized trust between the EU-12 regions, with Spain having the lowest level (1.66) and Denmark having the highest (7.05). The next row depicts the social capital index which includes the following five indicators: TRUST, PPLHLP, PPLFAIR, IMPVO and VOLUN. These indicators incorporate different aspects of social capital referred to in the literature. PPLHLP is an indicator which measures the extent to which people are helpful or altruistic vs. unhelpful or egoistic. PPLFAIR measures a similar aspect with a slightly different focus on people being fair. Finally, IMPVO and VOLUN measure the attitude towards voluntary organizations and participation in voluntary organizations. Coupled with TRUST, these indicators are aggregated into the SC indicator, which is applied to the empirical analysis as a measure of social capital.

Structural funds

EU structural funds are designed to target six objectives, four of which have a clear regional focus.⁸ The regional objectives are: economic adaptation of less developed regions (Objective 1); economic recovery of regions affected by the industrial crisis (Objective 2); speeding up adjustment of agricultural structures (Objective 5); and regions corresponding to or belonging to regions at NUTS 2 level with a population density of eight inhabitants per squared kilometre or less (Objective 6). Objectives 1, 2 and 5b are taken into account when conducting the empirical analysis. Objective 6 is left out because its coverage is limited to regions in the northern parts of Finland and Sweden where funding is less than 1 per cent of the total money available making empirical analysis for all of the EU regions impossible. Objective 5a is also left out because it covers common agricultural policies which are not aimed specifically at the regional level. Objective 5b is included in the analysis, as it is aimed specifically at rural and agricultural regions where low levels of socio-economic development, high shares of agricultural employment, and relatively low population density and/or depopulation trends exist. As of March 1999 over 85 per cent of the overall EU structural fund budget is available for Objectives 1, 2 and $5b.^9$

Regional information is available for the period 1994-1999. The indicator used for the empirical analysis is the summation of structural funds for Objectives 1, 2 and 5b divided by regional GDP. Table 4.2 outlines a number of descriptive statistics for each of the EU-12 countries. The numbers reveal a variety of interesting trends regarding EU funds. EU structural funds as a percentage of GDP are increasing for all countries with the exception of Ireland and Luxembourg, reaching a level of 3 per cent of GDP in Portugal. In Greece and Portugal EU funds appear to be complemented by both private and public spending. This spending is

 $^{^8}$ The other two objectives involve reducing long-term unemployment (funding covers about 10 percent of the total available money) and facilitating the adaptation of workers to industrial changes and to changes in production systems and technologies (about 2 percent of total funding).

⁹ Authors' own calculation from the available structural funds data at the country level.

defined as matching funds, which are a prerequisite for obtaining EU funding. In Greece especially, private funding increased almost fivefold over the 1990s. This tendency in Greece can also be seen in the other EU-12 countries in terms of private expenditures. The share of EU funds is highly variable across the countries, with Spain, Portugal and Greece, consuming more than half of the total structural funds, mainly in the form of Objective 1 support. A more detailed analysis (not presented here) shows that there are significant differences between regions even within countries with relatively poor regions receiving a lot of Objective 1 support. For example in Germany, Baden-Württemberg received very little support (0.005 per cent of GDP) when compared to Mecklenburg-Vorpommern (1.3 per cent of GDP). The level of EU funds is as high as 6 per cent of GDP in the case of the Açores in Portugal.

Economic performance

Economic performance is measured using several indicators. All indicators were sourced from the Eurostat REGIO database. ¹⁰ GDP per capita dispersion from 1990 to 2002 is based on Cappelen, Castellacci, Fagerberg, and Verspagen (2003).¹¹ In addition, information on Gross Value Added (GVA) is used.¹² The resulting computations display a moderate form of catching-up especially after 1995 (e.g. the dispersion of GDP per capita drops from 0.160 in 1995 to 0.138 in 2002). This tendency towards convergence decreases when Greece, Spain and Portugal are excluded from the sample. The GVA figures for the three main sectors in the economy depict a different picture. They indicate an increased level of divergence in the agricultural sector accompanied by relatively strong convergence in the industrial sector. On the other hand, the service sector displays the strongest level of convergence compared to the other two sectors over the same period. The main indicator for empirical analysis is the growth of per capita GDP between 1990 and 2002.

Innovation

The innovation data was sourced from the Eurostat REGIO database and the Eurostat web pages. Expenditures for business R&D and government R&D are used as primary innovation indicators from the input side. R&D activity is measured by using the data on R&D expenditures as a percentage of GDP for government and business sectors in 1995. Both R&D BUS and R&D GOV have a minimum

 $^{^{10}}$ In addition, information available at http://europa.eu.int/comm/eurostat has been used as well.

¹¹ The per capita GDP dispersion figures are calculated by first computing the logs of regional GDP relative to EU averages for each year. The standard deviation of these numbers is used as a measure of dispersion.

¹² GVA is the net result of output valued at basic prices, minus intermediate consumption valued at purchasers' prices, of a resident producer unit in a region. More information is available from the Eurostat webpage.

		1994-1999			1989-1993	
	Total SF	Nat. Exp.	Priv. Exp.	Total SF	Nat. Exp.	Priv. Exp.
Belgium	0.29	0.38	0.25	0.09	0.13	0.06
Denmark	0.09	0.10	0.08	0.08	0.10	0.08
Germany	0.18	0.17	0.35	0.09	0.14	0.12
Greece	2.76	1.25	1.44	2.40	1.35	0.29
Spain	1.37	0.70	0.46	0.67	0.55	0.25
France	0.18	0.24	0.10	0.13	0.20	0.08
Ireland	1.74	0.65	0.61	2.38	1.52	1.48
Italy	0.34	0.30	0.26	0.26	0.26	0.10
Luxembourg	0.09	0.18	0.03	0.12	0.00	0.25
Netherlands	0.11	0.21	0.05	0.06	0.10	0.04
Portugal	3.10	1.22	1.24	2.82	1.62	1.28
UK	0.18	0.17	0.05	0.12	0.15	0.05
EU avrg.	0.64	0.36	0.47	0.48	0.36	0.28

Table 4.2: EU support as a percentage of GDP

Note: 'Total SF' is the total structural funds as percentage of GDP received by a country. 'Nat. Exp.' and 'Priv. Exp.' stand for the national public and private sector expenditures, respectively, that match structural funds.

value of 0 and a maximum of 3.13 (East England) and 1.05 (Berlin), respectively. The mean (standard deviation) for R&D BUS is 0.67 (0.66) and 0.20 (0.20) for R&D GOV, with n=83.

A composite innovation index, constructed by taking both the input and output side indicators into account, was added to the study. The innovation index (INNOV) is a version of the regional summary innovation index with different variables.¹³ The values for each indicator are re-scaled, summed and then divided by the number of indicators as explained above for the social capital index. INNOV consists of an index of ten variables:¹⁴ (i) R&D personnel relative to the active population (education, government and business sectors were applied separately as unique indicators); (ii) R&D expenditure as a percentage of GDP (education, government and business sectors were applied separately as unique indicators); (iii) human resources in science and technology (total, per population); (iv) European Patent Office (EPO) patent applications relative to the region's labour force; (v) employment in high-technology manufacturing (as a percentage of total employment); and (vi) employment in high-technology knowledge intensive services (as a percentage of total employment). INNOV has a mean (standard deviation) of 0.258 (0.130). The minimum value of INNOV is 0.046 (Valle d'Aosta, Italy)

 $^{^{13}}$ For details see European Innovation Scoreboard 2003-Indicators methodological report, available at http://trendchart.cordis.lu/tc_download_statistics.cfm.

 $^{^{14}}$ The innovation data are for 1995 except for the patent data. The selection of 1995 is due to data availability. Patent data are the average of 1990, 1991 and 1992 number of patent applications.

and the maximum is 0.647 (Baden Württemberg, Germany). Several indices using different variables were constructed to check the robustness of the innovation indicator. The correlation between them ranges from 0.94 to 0.99, adding confidence to the validity of the innovation measure.¹⁵

Patent data is used to proxy innovation output to assess the determinants of innovative output. More specifically, patent applications to the EPO by year of filing per inhabitant (and per labour force) are used in the regression analysis below. Patent data contained in the Eurostat database refers only to patent applications made to the EPO and do not include data associated with patent applications made to the National Patent Offices in Europe. Therefore, the figures associated with this data may not reflect the true regional potential of innovation. Following Furman, Porter, and Stern (2002), this measure nevertheless reflects 'commercially significant innovations at the world's technological frontier'. Keeping in mind that patent data may not be a perfect indicator for the innovative performance of a region (e.g., Pavitt, 1982, 1988), it remains the only well established source of data that reflects inventive activity (Trajtenberg, 1990). Patent applications display a trend of catching up revealed by a correlation coefficient of -0.54 between the growth of patents in the 1991-2000 period and the initial level of patent applications. A second innovation index, only including the innovation input indicators. has been computed as well. INNOV_input is based on four indicators; (i) R&D personnel relative to the active population (total); (ii) business R&D expenditure as a percentage of GDP; (iii) employment in high-technology manufacturing (as a percentage of total employment); (iv) employment in high-technology knowledge intensive services (as a percentage of total employment).

4.3.2 Empirical implementation

Two sets of equations were estimated to show that indicators of social capital are causal to economic outcomes. One equation was used to determine the effect social capital on economic growth for the period 1990-2002 and the other was used to determine the effect social capital on patent growth for the period 1991-2000. The difficulty associated with reverse causality is that an inherent fundamental problem remains when estimating these relationships, primarily due to the fact that current levels of social capital are likely to be influenced by past and current economic conditions. Simple OLS estimates depicting the relationship between social capital and economic outcomes might be biased; therefore they cannot be interpreted as a causal effect of social capital on economic growth and innovation. Problems associated with this bias were solved by using a 2SLS strategy where indicators of past political institutions between the 17th and 19th centuries were

¹⁵ Composite indices with different indicators may render different results; therefore several innovation indices were constructed by omitting and including different indicators. As mentioned above the correlations between the indices are high. Moreover, all of the indices behave similarly in the regression analysis (i.e. all the indices produce significant coefficients, at least at the 10 per cent significance level, when included in the regression).

used as instruments for social capital. These instruments are similar to those used by Tabellini (2005) in his study on the causal effect of culture on income.

Tabellini (2005) argues that it is highly probable that the formal institutions that belong to a region's historical past shape its current cultural state. This becomes even more apparent when one considers that there were EU regions located within the same country that were governed by different political institutions and powers, especially before the 19th century. His estimates show that political liberalism has a positive impact as it shapes 'good' cultural character, whereas past rigid autocratic political power may have had a negative impact resulting in 'bad' cultural character. In order to capture the impacts associated with past political institutions, we refer to Acemoglu, Johnson, and Robinson (2005) and, to a greater degree, Tabellini (2005), by using 'constraints on the executive' as a proxy to historical political institutions as defined in the POLITY IV project.¹⁶ This variable is meant to capture 'institutionalized constraints on the decision making powers of chief executives'. It is coded on a scale from 1 to 7, where 1 represents 'unlimited authority' and 7 represents 'accountable executive constrained by checks and balances'. Information is available for the following five dates: 1600, 1700, 1750, 1800 and 1850. The main data source for this variable is Tabellini (2005). In cases where data was missing, observations for some of the regions and countries were sourced from the POLITY IV data set located on the POLITY IV project webpage. Akcomak and ter Weel (2006) show in detail how these variables are constructed.

The following equations were estimated for a set of 83 EU regions, where the subscript r for regions has been suppressed for notational convenience, and where ϵ and v are error terms with the usual assumptions:

$$GDP_{1990-2002} = C + \alpha_1 GDP_{1990} + \alpha_2 SC + \alpha_3 EUFUND + \alpha_4 X$$

$$\alpha_5 EDUC + \alpha_6 INT_1 + \alpha_7 INT_2 + \epsilon$$
(4.2)

$$PAT_{1990-2002} = C + \beta_1 PAT_{1991} + \beta_2 SC + \beta_3 EUFUND + \beta_4 X$$

$$\beta_5 EDUC + \beta_6 INT_1 + \beta_7 INT_2 + v$$
(4.3)

GDP 1990-2002 is the average annual GDP per capita growth in the period 1990-2002 and PAT 1991-2000 is the average annual change in patent applications per inhabitant for the period 1991-2000. GDP1990 and PAT1991 are included as measures of convergence. SC either refers to trust or the social capital index as defined

¹⁶ For more information about the variable and the POLITY IV data set see the POLITY IV project webpage http://www.cidcm.umd.edu/inscr/polity/ and Eckstein and Gurr (1975). Tabellini (2005) provides a thorough historical appendix about the political state of EU regions between the 17th and 19th centuries. The appendix to chapter 3 (Appendix A) is an extension of the above literature. A brief description of the POLITY IV project and the "constraints on the executive" indicator could be found in Appendix A, together with the data on 102 EU regions.

above, and EUFUND is the total structural funds as a percentage of GDP. The variables INT1 and INT2 denote interaction terms. INT1 is the interaction between education and social capital, which are expected to reinforce one another. INT2 is the interaction between measures of education, social capital and EU funding. This interaction term captures complementary relationships that may exist between social capital and EU funding. Depending on the equation estimated, X denotes a vector of other variables. For the per capita GDP growth these are: share of employment in industry and agriculture sectors in 1990; education, as measured by the share of upper secondary students in total students as defined by ISCED97 for 1993; innovation indicators such as R&D expenditure as a percentage of GDP for business and public sectors; and the composite innovation index. The patent growth model does not include employment variables, and the share of students in tertiary education replaces the education variable since it is more plausible to hypothesize higher education as a proxy to represent education index.

4.4 Results

This section discusses the results of estimating equations (4.2) and (4.3). Second stage regression results of the 2SLS estimates are presented (first stage results are available upon request). As expected, first stage estimates generally depict a strong and positive relationship between the instruments and the measures of social capital. The first row of each table indicates whether the estimates are OLS or 2SLS. The standard errors reported in all tables have been adjusted for clustering. In addition, F-tests for the joint significance of the instruments always exceed the critical value of 10, as suggested by Staiger and Stock (1997). This adds confidence to the validity of the instruments by removing problems associated with weak instruments. Finally, the null-hypothesis that the over-identifying restrictions are valid is never rejected.

4.4.1 Economic growth

Estimates of equation (4.2) using different sets of independent variables are presented in Table 4.3. Average annual regional GDP per capita growth for the period 1990-2002 is explained in column (1) by GDP in 1990, shares of employment, business R&D activities, the region's share of students in upper secondary education, trust and EU funding. In addition, an interaction term between education and trust is included to show the complementary relationship between the two, as outlined previously. The estimates reveal convergence among the EU-12 regions reflected by a negative effect of initial GDP per capita on economic growth in the subsequent period. Furthermore, a higher share of agricultural employment is associated with low economic growth. The indicators of innovation, social capital, government support and education do not appear to have a significant correlation to growth during this period. It is interesting to note that the interaction between education and trust is positive and significant, pointing out the complementarities between the two. The results presented in columns (2) and (3) of Table 4.3 show the effects that occur when the interaction between structural funds, education and trust is added. This interaction term always significantly contributes to economic growth and it depicts the independent effect of trust on economic outcomes in the EU regions. Similar results are obtained for both social capital index (SC) and TRUST. These OLS estimates are reported in column (4).

Since problems associated with reversed causality between measures of social capital and economic growth are serious, a 2SLS strategy where the social capital variables are instrumented by the historical information on institutions is applied to present the same type of analysis. These results are listed in columns (5) to (8) of Table 4.3. The estimates presented in column (5) and (6) are the 2SLS equivalent of the OLS estimates presented in column (3) and (4) respectively. What is most interesting to observe is that instrumenting social capital increases the coefficients on TRUST and SC considerably suggesting a strong link from social capital to economic growth. The interaction effects also become more powerful and significant.

In addition, the effect that R&D has on economic growth is positive and significant, likely because the 2SLS approach removes measurement error from the social capital variables. The results presented in columns (7) and (8) replace the business R&D variable by an indicator of public R&D (R&D GOV). This is done because there might be cases where regions with more social capital not only benefit from policy initiatives that foster development, such as the EU funds, but also benefit from their ability to gain from public spending on innovation. Indeed, the estimates presented in columns (7) and (8) for TRUST and SC, respectively, suggest that government R&D significantly contributes to economic growth. The effects of social capital and EU funding on growth remain similar to the results presented for business R&D investments.

To further investigate the importance of innovation, the variable INNOV replaced R&D indicators resulting in the estimates presented in the final four columns of Table 4.3. The advantage of INNOV is that it captures both input and output characteristics of innovation. The results of this exercise suggest that innovation contributes to growth in a significant way and that when combined, social capital and EU funding also contribute positively to development throughout the 1990s.

A sensitivity analysis was carried out to determine the robustness of the estimates. This analysis was designed to examine the responsiveness of TRUST.¹⁷

 $^{^{17}}$ The methodology used is carried out using the MetaGrowth computer programme employed in Beugelsdijk, de Groot, and van Schaik (2004) and provided by Henri de Groot. The software is designed specifically to assess the robustness of estimating models of cross-country/region empirical analyses. For details about the programme see Heijungs, de Groot, and Florax (2001).

		Table	9 4.3: GI	owth in	EU regic	ons: per	capita G	DP grov	vth, 1990)-2002		
GROWTH 1990-2002	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)	(11)	(12)
	ols	SIO	ols	ols	2SLS	2SLS	2SLS	2SLS	OLS	SIO	2SLS	2SLS
INITIAL GDP	-0.461	-0.445	-0.415	-0.486	-0.471	-0.585	-0.440	-0.563	-0.433	-0.500	-0.494	-0.587
	(0.097)***	$(0.095)^{***}$	$(0.098)^{***}$	$(0.102)^{***}$	(0.077)***	$(0.118)^{***}$	$(0.062)^{***}$	$(0.112)^{***}$	$(0.085)^{***}$	$(0.088)^{***}$	(0.067)***	***(660.0)
AGREMP	-0.010	-0.012	-0.012	-0.012	-0.013	-0.013	-0.012	-0.012	-0.010	-0.010	-0.012	-0.012
	$(0.003)^{**}$	$(0.004)^{**}$	$(0.004)^{**}$	$(0.004)^{**}$	$(0.003)^{***}$	$(0.003)^{***}$	$(0.003)^{***}$	$(0.003)^{***}$	$(0.003)^{**}$	$(0.003)^{**}$	$(0.003)^{***}$	$(0.003)^{***}$
INDEMP	-0.001	-0.002	-0.002	-0.001	-0.002	-0.002	0.000	0.000	-0.001	-0.001	100.0-	-0.001
	(0.003) 0.005	(0.003)	(0.003) 0.000	(0.003)	(0.003) 0.000	(0.003) 0.007	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
K&D BUS	0.026 (0.015)	0.030 (0.014)*	0.029 (0.013)**	0.028 (0.013)*	0.028 (0.015)*	0.027 (0.013)*						
TRUST	0.014	0.037	0.026		0.078		0.078		0.024		0.081	
	(0.015)	$(0.012)^{***}$	$(0.014)^{*}$		$(0.017)^{***}$		$(0.011)^{***}$		$(0.010)^{**}$		$(0.024)^{***}$	
EU FUND	0.015	0.061	0.070	0.027	0.066	0.004	0.066	0.006	0.080	0.039	0.075	0.018
	(0.038)	(0.046)	(0.044)	(0.038)	(0.053)	(0.028)	(0.049)	(0.024)	$(0.036)^{**}$	(0.031)	(0.051)	(0.019)
EDU_second	0.030	0.049	0.046	0.031	0.060	0.026	0.059	0.027	0.054	0.040	0.069	0.035
	(0.041)	(0.033)	(0.036)	(0.036)	(0.044)	(0.045)	(0.041)	(0.043)	$(0.024)^{**}$	(0.023)	$(0.033)^{*}$	(0.032)
SC				0.029		0.103		0.114		0.024		0.092
				$(0.011)^{**}$		$(0.029)^{***}$		$(0.039)^{**}$		$(0.009)^{**}$		$(0.019)^{***}$
R&D GOV							0.028	0.025				
							$(0.012)^{**}$	$(0.011)^{*}$				
INNOV									0.061	0.061	0.058	0.056
									$(0.015)^{***}$	$(0.013)^{***}$	$(0.020)^{**}$	$(0.014)^{***}$
EDU*TRUST	0.022		0.020		-0.011		-0.009		0.023		-0.011	
	$(0.012)^{*}$	000	$(0.010)^{*}$		(0.021)		(0.020)		$(0.010)^{**}$		(0.031)	
EUF*EDU*TRUST		0.064 (0.030)*	0.062 (0.030)*		0.087 (0.049)*		0.081 (0.037)*		.0.091 (0.026)**		0.090 (0.039)**	
EDU*SC				0.000		-0.037	()	-0.039		0.007	()	-0.027
				(0.007)		(0.023)		$(0.020)^{*}$		(0.010)		(0.021)
EUF*EDU*SC				0.025		0.049		0.052		0.025		0.046
				$(0.010)^{**}$		$(0.013)^{***}$		$(0.016)^{**}$		$(0.007)^{***}$		$(0.012)^{***}$
CONSTANT	5.052	4.887	4.559	5.362	4.954	6.419	4.601	6.164	4.671	5.434	5.089	6.086
	$(0.883)^{***}$	$(0.878)^{***}$	$(0.919)^{***}$	$(1.023)^{***}$	$(0.861)^{***}$	$(1.160)^{***}$	$(0.662)^{***}$	$(1.108)^{***}$	$(0.790)^{***}$	$(0.857)^{***}$	$(0.706)^{***}$	$(0.958)^{***}$
N	83	83	83	83	83	83	83	83	83	83	83	83
ADJ $R2$	0.86	0.87	0.87	0.86	0.85	0.82	0.85	0.80	0.90	0.88	0.87	0.85
OVERID					4.26(0.37)	4.39(0.36)	5.03(0.28)	3.89(0.42)			3.58(0.47)	4.90(0.30)
Standard errors in pare	intheses are rc	bust in the se	inse that arbit	brary correlati	ons within cou	intries are allc	wed.					
To asses whether instru OVERID stands for Sa	uments are joi rgan over ider	ntly significan itification test	t in the first s . The number	stage F-tests a 's in parenthe	re performed. ses are the p-v	The F-tests a alues (chi2(4)	vre significant) associated w	for all the mc ith each mod	dels at the 1 ⁹ el. *** signific	% level and th ant at 1%, **	e values range significant at	<pre>from 21.57 to 61.77. 5%, * significant at 10%</pre>

The methodology basically involves assessing the 'fragility' of TRUST with respect to additional independent variables that have the potential to reflect the cultural characteristics of a region and, as such, explain GDP growth. The first step is to estimate a GDP growth model. This model includes initial GDP, the share of agricultural and industrial employment, the composite innovation index, education, trust, interaction terms and the set of 12 country dummies. The number of switch variables were determined by selecting indicators that are exogenous to TRUST and have low correlations with each other to avoid any problems associated with multi-collinearity. Fifteen switch variables were introduced to the base model in groups of one to three variables at a time. This exercise resulted in 575 regression estimations. The results show that the relationship between TRUST and per capita GDP growth is robust with respect to inclusion of other relevant variables. TRUST has a mean coefficient of 0.027 with a confidence interval of [0.025 to 0.029]. More than 85 per cent of the estimated coefficients of TRUST are significant at least at the 10 per cent level. The only noteworthy effect of switch variables on growth were those related to religion (i.e., belonging to a certain religion).

When combined, these results suggest that EU funding did not have a direct effect on economic performance during the 1990s. This finding corroborates earlier evidence presented by Boldrin and Canova (2001) which suggest that monies already spent do not make a positive contribution to the economic development of relatively backward regions. That said, it is important to note that the main finding of this analysis is that in order for EU policy to be effective, social capital must be present. Given a certain level of economic development, regions with higher levels of social capital benefit more from EU funding than regions with lower levels of social capital.

4.4.2 Innovation

The estimation results of equation (4.3) are presented in Table 4.4. The table shows only the second stage results of the 2SLS estimations. The dependent variable is defined as the growth of the number of patent applications per million inhabitants between 1991-2000. Results using the number of patent applications relative to a region's labour force yield similar qualitative results.

The table is divided into two sets of results. The first four columns list estimates including those related to business R&D, and the second set of columns reports estimates that used INNOV input as an indicator for technology related activities.¹⁸ The estimates suggest a positive role for TRUST and SC in explaining changes in innovation output, which stresses the importance of these variables for carrying out successful research projects. If the level of social capital is high, then there will likely be a decrease in the number of information frictions that

 $^{^{18}}$ Estimates for government R&D suggest similar outcomes. These results are available upon request.

occur between the capitalists (i.e., those who finance the innovation project) and the entrepreneurs (i.e., those who implement the project). Higher levels of trust between these parties will work to increase penalties to those who continue to cheat investors, so that any further damage to reputation can be avoided. It is more likely that there will be less cheating and more (venture) capitalist project investment in regions where higher levels of trust and social norms occur.

This exercise also suggests that there is a direct negative effect of EU funding on innovation output. This is partly due to the fact that many of the funded regions are backward and as such, are not doing much in terms of innovation as is reflected in the number of patents. In these cases it appears that an increase in funding does not benefit innovation. This direct estimate supports the doubts many academics and policy-makers have had during their pursuit for effective regional policy that fosters development. That said, it appears that a complementary relationship between social capital and policy effectiveness exists due to the strength and significance of the effects associated with the interaction between social capital and EU funding. Interpretation of these results supports the fact that certain levels of trust must be present to carry out innovation. If trust is high, then more funds will be devoted to innovation. As trust increases, problems associated with information decrease and as such, prescribed funding is spent more appropriately. This also holds true for EU funding which is spent more effectively when information problems are reduced, improving the potential for innovation and growth.

Finally, the sensitivity analysis of TRUST in the patent growth regression model suggests similar findings to those found in the case of GDP per capita growth. The OLS version of model (6), Table 4.4, is used as the base model. Twelve switch variables were selected to assess the robustness of the estimates presented in Table 4.4. A total of 298 regression equations were estimated to determine robustness. The findings suggest that a robust relationship between TRUST and patent growth exists. The analysis produced a mean coefficient of 0.117 ranging from 0.108 to 0.126. Over 80 per cent of the estimated coefficients of TRUST are significant at least at the 10 per cent level. Two of the twelve switch variables are worth mentioning when explaining patent growth: they include (i) indicators measuring different aspects of the importance of obeying laws and (ii) regulations. This would appear to make sense, since patent protection and intellectual property rights are known to be important for innovation output growth.

Table 4.4:	Growth o	f patent a	pplicatio	ns 1991-20	00: Resu	lts of $2SL$	S estimat	ions
	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)
INITIAL PAT.	-0.527	-0.681	-0.536	-0.642	-0.552	-0.727	-0.557	-0.695
	$(0.127)^{***}$	$(0.136)^{***}$	$(0.123)^{***}$	$(0.139)^{***}$	$(0.136)^{***}$	$(0.129)^{***}$	$(0.119)^{***}$	$(0.132)^{***}$
EDU_higher	0.105	0.163	0.103	0.124	0.091	0.15	0.09	0.113
	$(0.035)^{**}$	$(0.046)^{***}$	$(0.029)^{***}$	$(0.038)^{***}$	$(0.028)^{***}$	$(0.035)^{***}$	$(0.025)^{***}$	$(0.034)^{***}$
EU FUND	-0.333	-0.885	-0.328	-0.653	-0.323	-0.899	-0.321	-0.716
	$(0.109)^{**}$	$(0.197)^{***}$	$(0.099)^{***}$	$(0.178)^{***}$	$(0.113)^{**}$	$(0.174)^{***}$	$(0.108)^{**}$	$(0.195)^{***}$
R&D BUS	0.161	0.174	0.141	0.164				
	$(0.075)^{*}$	$(0.075)^{**}$	$(0.069)^{*}$	$(0.078)^{*}$				
INNOV_input					1.344	1.611	1.147	1.420
					$(0.603)^{*}$	$(0.499)^{***}$	$(0.497)^{**}$	$(0.589)^{**}$
TRUST	0.114	0.305			0.109	0.308		
	(0.093)	$(0.113)^{**}$			(0.084)	$(0.096)^{***}$		
$_{\rm SC}$			0.228	0.297			0.225	0.314
			(0.134)	$(0.134)^{*}$			(0.136)	$(0.129)^{**}$
EDU*TRUST	0.120	0.188			0.111	0.180		
	$(0.031)^{***}$	$(0.020)^{***}$			$(0.026)^{***}$	$(0.027)^{***}$		
EUF*EDU*TRUST		0.550				0.578		
		$(0.119)^{***}$				$(0.108)^{***}$		
EDU*SC			0.122	0.151			0.114	0.149
			$(0.012)^{***}$	$(0.022)^{***}$			$(0.015)^{***}$	$(0.028)^{***}$
EUF*EDU*SC				0.203				0.247
				$(0.078)^{**}$				$(0.087)^{**}$
CONSTANT	2.123	5.130	2.800	2.317	2.235	5.030	1.851	4.357
	$(0.243)^{***}$	$(0.900)^{***}$	$(0.399)^{***}$	$(0.325)^{***}$	$(0.306)^{***}$	$(0.756)^{***}$	$(0.189)^{***}$	$(0.673)^{***}$
N	83	83	83	83	83	83	83	83
Adjusted R-sqr	0.52	0.61	0.48	0.45	0.54	0.64	0.49	0.46
OVERID	0.14(0.93)	$0.82\ (0.66)$	0.44(0.80)	$1.01 \ (0.61)$	$0.27\ (0.87)$	1.48(0.48)	$0.45\ (0.80)$	1.35(0.51)
Standard errors in par	entheses are ro	bust in the sen	se that arbitra	ry correlations	within countrie	s are allowed.		
To asses whether instr	uments are joir	thy significant	in the first stag	ge F-tests are p	erformed. The	F-tests are sig	nificant at 1%	evel for
all the models and the	e values range fi	com 34.41 to 72	1.95. OVERID	stands for Sarg	an over identifi	ication test. Th	ne numbers in I	arentheses
are the p-values (chi2(4)) associated	with each mode	ol. *** significa	unt at 1%, ** si	gnificant at 5%	, * significant a	at 10%	

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4.5 Discussion and implications

This section discusses the implications of the results in three ways. First, policy implications associated with the results are discussed with a focus on education policy, EU support programme effectiveness, institutional design and establishment. Second, the case of Italy is presented as an illustration of how social capital works within a country to make a difference in economic outcomes, further stressing the importance to stimulate the creation of social capital. Finally, there is a brief summary of the main findings followed by a discussion of the potential of the estimates for wider applications.

4.5.1 Policy implications for innovation

Education

What does the future hold for education in Europe? The estimates in this chapter have shown the positive effects education has had on economic outcomes. It is important to note that the educational variable was not split up into different educational categories. This was for two reasons: first, data availability limited the number of regions that had sufficient information for each of the specific fields of education; second, from a theoretical and empirical point of view, specific fields of education are not considered critical for the formation of social capital. Recall that the effects of education interact directly with social capital, and that previous work indicated that the level of education is more important than the field. The policy perspective for education is simple: an increase in the levels of education in backward regions will increase norms and values, bonds and connectivity in the form of networks, which will in turn increase the level of social capital. Policymakers should make this their primary goal given the fact that a relatively large dispersion in educational levels exists.

A second effect associated with an increase in the levels of education is that it serves as an input into the process of innovation. Perhaps in this case, a focus on technical ability coupled with an increased inflow into technical studies would help to increase innovation efforts. On the other hand, past examples of specific labour market policies which aim to make labour flow towards innovation have not been very effective. This is primarily due to the fact that when labour flows from one sector to another the associated supply and demand must be adjusted to yield different prices. Goolsbee (1998) has shown that an increase in the wages for scientists and engineers in innovative sectors results in a flow of workers towards these sectors and a labour shortage in the sectors where these workers were originally employed. This increases the overall level of wages for these occupations thereby rendering only a price effect. A better approach would be to stimulate education in specific fields of study.

EU programme effectiveness

What does the future hold for programmes in Europe? The debate surrounding EU funding effectiveness is complicated because it has been going on for a long period of time and because it is difficult to assess empirically. From an econometric point of view it is difficult to distinguish cause and effect and to address the effectiveness of exogenous variation which is required to estimate EU funding contributions to economic development. From a more practical point of view the correlations presented in this research suggest that the EU policies are ineffective in their direct contribution to innovation and development, but effective in combination with social capital. The policy implication of this strong and significant result is that the Objectives 1, 2 and 5b EU programmes should come with an appropriate amount of education and dissemination of information in the regions at stake. While a provision of education from specific fields would be advantageous to a region, an increase of the overall level of education within a region would likely provide a better situation having both direct and indirect effects on economic outcomes. Increasing levels of social capital is only possible if problems associated with information are solved. Policies targeted at solving such issues should take into account the length of time it takes to establish trust and, perhaps more importantly, should ensure that the right design of institution is established.

Institutions

What institutions should Europe develop in the future? While social capital is useful when explaining potential economic outcomes, it is difficult to transform social capital into formal institutions. Traditional approaches that were implemented to increase innovation and growth include the establishment of intellectual property rights protection, courts of justice and law. While there is no question that these institutions help increase the potential for innovation and growth, it remains unclear how they interact with social capital. Generally speaking, these institutions work to increase the probability that start-up firms will be established and will innovate and produce with great success. However, if a situation occurs where the people of a region have little or no trust in the government, then the institutional framework will be perceived as detrimental to innovation and growth. Currently, Europe has a sound and homogenous institutional framework but a considerable level of heterogeneity in terms of social capital throughout all of its regions. The fight against corruption and opportunism should be realized so that increased levels of social capital coupled with strong institutional frameworks can serve as an engine to growth and innovation.

Provision for venture capital is primarily based on trust between the innovator and the capitalist. The provision of venture capital by the market is more effective if the capitalist is protected from corruption and if incentives are such that the innovator is punished when he defaults. In addition, the expenditure of government monies must be held accountable by providing detailed follow-up

	North Italy	South Italy	Italy
Trust	0.321	-1.000	-0.246
Composite social capital index (SC)	0.208	-0.947	-0.339
Share of students in upper secondary level, 1993	0.648	0.292	0.488
Share of students in tertiary level, 1993	0.838	-0.125	0.405
Composite innovation index (INNOV)	-0.318	-0.591	-0.447
Total R&D as a percentage of GDP 1995	-0.383	-0.585	-0.479
Business R&D as a percentage of GDP 1995	-0.295	-0.725	-0.499
Government R&D as a percentage of GDP 1995	-0.365	-0.037	-0.210
Patent application per population, 1995	0.098	-0.686	-0.274
Gross value added, total, 1995	0.396	-0.746	-0.093
Gross value added, services, 1995	0.328	-0.534	-0.042
Gross value added, industry, 1995	0.471	-1.011	-0.164
Gross value added, agriculture, 1995	0.063	0.060	0.062
Total EU structural fund as a percentage of GDP	-0.503	-0.007	-0.280
Objective 1 EU structural fund as a percentage of GDP	-0.505	0.045	-0.258
Objective 2 EU structural fund as a percentage of GDP	0.174	-0.650	-0.197
Objective 5B EU structural fund as a percentage of GDP	0.146	-0.413	-0.106

Table 4.5: Case of Italy

Note: All values are standardized meaning that a value of 0 equals the mean of the sample n=87 $\,$

North Italy: Piemonte, Valle d'Aosta, Liguria, Lombardia, Trento, Veneto, Friuli-Venezia, Emila-Romagna, Toscana, Umbria, Marche. South Italy: Lazio, Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia, Sardegna

reports outlining the results and merits of the expenditure, to promote confidence in the EU governing bodies and effectiveness of their associated policies. This can only be accomplished by supporting a cooperative and transparent exchange of information throughout the entire process. The current growth and extension of the EU into other countries provides an excellent opportunity to improve the exchange of information by revising the monitoring and information system in Brussels. Decentralized funding from investors who are trusted by the public and support for improved access to information at 'the construction site', are likely to boost confidence in both the EU and local government authorities.

4.5.2 Italy

Italy is one of the more prominent examples of a country where society is stratified along the lines of income, development and crime: the rich and trustworthy north, and the poor and corrupt south. Putnam, Leonardi, and Nanetti (1993) based his study of social capital on Italy, and Guiso, Sapienza, and Zingales (2004) based their study on the differences between regional patterns of economic development and social cohesion in Italy, with an emphasis on the split between the northern and southern regions. Table 4.5 lists a number of core variables associated with the empirical analysis. Note that all numbers in the table are standardized means, so that the average of the 83 regions in the sample is equal to zero for all indicators. The first two rows depict the discrepancy between the measures of social capital found in the north and south. The next two rows similarly depict a huge difference in the levels of education found in the North and South. Taken together, these four indicators imply that development in the southern areas of Italy should be far less than the economic development in the northern areas. An examination of the GDP indicators and innovation measures determines that this is certainly the case.¹⁹

What should Italy's policy look like in the future? First and foremost, policy should focus on increasing levels of education which in turn will increase the level of social capital. The complementarity between these will boost innovation and output in the long-run. Note that Italy had the greatest regional difference in levels of education (i.e., between its northern and southern regions) for all EU countries in the data. A secondary effect associated with increasing levels of education is that it provides a means for people to make a living on their own so that they might escape involvement with illegal acts and crime. Final observations indicate that social capital in southern Italy is almost non-existent. This implies that the theoretically detrimental effects of social capital on society should be absent. Social capital and bonds can be high within the gang structure, but levels of trust for society as a whole will be exceptionally low.

4.5.3 Conclusion

The estimates discussed in this chapter suggest that there is a positive correlation between social capital and government support programmes designed to foster economic development and economic outcomes. There appears to be a greater capacity to implement government support programmes in specific regions where higher levels of social capital exist. As such, the region benefits in terms of higher levels of economic growth and increased innovative activity. The empirical analysis indicates that there is an interplay between social capital and government investments in the EU regions. This is an important finding as it suggests that norms and values that have not been institutionalized by property rights or integrated into other legal institutions, play a critical role in the effective implementation of support programmes. In summary, the EU Objectives 1, 2 and 5b programmes for EU regional support do not appear to foster economic development on their own but when combined with higher levels of social capital, they benefit both economic development and innovation.

One of the main advantages of this study is that it has used information from a

¹⁹ One could argue that the differences in economic development between the north and the south of Italy are due to differences in institutional landscape in the past rather than social capital. However the differences in social capital are more or less persistent through time. For instance, Putnam, Leonardi, and Nanetti (1993) and de Blasio and Nuzzo (2006) argue that the regions that were rich in social capital in the 19th century are also well-endowed nowadays. Moreover, as shown in chapter 3 the historical variables affect income growth through social capital not by any other mechanism (in statistical terms). To explain differences in these variables only with historical variables (institutions) is only a part of the story. Adding culture that governs social, institutional and economic outcomes is a more complete and interesting argument.

set of relatively homogeneous countries and/or regions, which decreases the influence of other (unobserved) factors on the estimates. While it would be premature to draw firm conclusions for other countries or regions based on these estimates, it is likely that these estimates suggest that a certain level of social capital is necessary for successful implementation of government support. Indeed, case study evidence from Kenya suggests that if social capital cannot be created in the short term then it can be in the long term by investing in education so that there is an increase in the levels of participation in groups, social capital and trust (Gugerty and Kremer, 2002). In addition, fostering investment in human capital appears to be an effective way in which levels of social capital might be increased. Aside from the direct impact of human capital on economic performance and its role as an input into the process of innovation, its indirect contribution to the promotion of social cohesion and compliance with norms and values is an effect that should not be overlooked. Currently there is a difference of about 8.2 years in the average level of education between the most advanced regions of the EU (i.e., located mostly in the northern parts of the EU) and the least advanced regions of the EU (i.e., located mostly in the southern areas of the EU). It would appear the EU's capacity to support future development would be improved greatly if this education gap was closed. This, of course, would require a commitment to invest in resources to support education. Human capital must be viewed as an investment good that requires effective policy programmes to support skills acquisition from an early age onward. Investment in schools and training, coupled with a campaign to promote awareness of the importance of education within the family unit, will foster technological progress and human capital as a whole.

Chapter 5

Social capital and crime: Evidence from the Netherlands

The larger and more colorful a city is, the more places there are to hide one's guilt and sin; the more crowded it is, the more people there are to hide behind. A city's intellect ought to be measured not by its scholars, libraries, miniaturists, calligraphers and schools, but by the number of crimes insidiously committed on its dark streets...

Orhan Pamuk, My name is Red.

5.1 Introduction

One of the most puzzling elements of crime is its heterogeneity across space and not its level or inter-temporal differences (e.g., Glaeser, Sacerdote, and Scheinkman, 1996; Sampson, Raudenbush, and Earls, 1997).¹ Even after controlling for economic and social conditions and population characteristics, there remains a high variance of crime across space. Homicide rates across comparable and more or less equally developed nations in the European Union (EU-15) in the 1990s range from on average 12 cases of homicide per million inhabitants in Sweden, to 28 homicides per million in Finland. Within a sample of Dutch municipalities (>30,000 inhabitants) crime rates per capita vary between 1.60 in Hof Van Twente (Overijssel) and 14.60 per capita in Amsterdam. Observable factors, such as population density, the youth unemployment rate, the mean level of education and income

 $^{^{1}}$ See Freeman (1999) for an overview of the crime literature in economics. Early contributions in economics by Becker (1968) and Ehrlich (1973) explain the level of crime and the decision to commit crime from an economic perspective.

inequality can account for only a small fraction in explaining these differences. ² Utrecht and Leiden are similar in most socio-economic indicators, but Utrecht has a crime rate per capita of 14.3 compared to Leiden, which has a crime rate of only 6.3 per capita.

How can we explain these differences in crime rates across space? This chapter argues that differences in social capital can account for a significant part of the observed differences in crime rates across cities. Criminal behaviour depends not only on the incentives facing the individual but also on the behaviour of peers or others surrounding the individual. Given the same opportunity and expected returns from crime, an individual is less likely to commit crime if his peers and the community he belongs to punish deviant behaviour. If one individual decides not to commit crime, it is less likely that others will do so, which creates an external effect of one person's behaviour on the others. Informal social control by which citizens themselves achieve social order increases the level of well-being in a community. This in turn raises the level of trust among citizens, altruistic behaviour (e.g., involvement in charity and voluntary contributions or donations) and participation in activities that serve the community at a more abstract level (e.g., voting). Although informal social control is often a response to unusual behaviour, it is not the same as formal regulation and thus should not be equated with formal institutions that are designed to prevent and punish crime, such as the police and courts. It rather refers to the ability of groups to realise collective goals and, in this setting, to live in places free of crime.

The empirical part of this research focuses on municipalities (>30,000 inhabitants) in the Netherlands. A variety of social capital measures is employed. Previous work in economics and sociology treats social capital as a positive sum.³ Instead of measuring social capital as a positive value, it might be easier to measure the absence of social capital through traditional measures of social dysfunction such as, family break down, migration and erosion in intermediate social structures (Fukuyama, 1995). This approach hinges on the assumption that just as involvement in civic life is associated with higher levels of social capital, social deviance reflects lower levels of social capital. This study benefits from different indicators such as voluntary contributions to charity, electoral turnout and blood donations as well as traditional measures of social capital. ⁴

These indicators seem unrelated and plagued by measurement error if used

 $^{^2}$ Glaeser, Sacerdote, and Scheinkman (1996) argue that only about 30 percent of the variance in crime rates across space in the United States can be explained by observable differences in local area characteristics.

³ Higher social capital is associated with higher economic growth (e.g., Knack and Keefer, 1997); more investment in human capital (e.g., Coleman, 1988); higher levels of financial development (e.g., Guiso, Sapienza, and Zingales, 2004); more innovation (e.g., Akçomak and ter Weel, 2006) and lower homicide rates (e.g., Rosenfeld, Messner, and Baumer, 2001).

⁴ Various indicators have been employed to proxy social capital, e.g., generalized trust and membership to associations, gathered from different surveys like the World Values Survey (WVS) and the European Social Survey (ESS). Although these indicators result in consistent and robust findings, their use has received criticism due to inherent measurement error.

as individual indicators of social capital. However, they turn out to be highly correlated and a common denominator of all these indicators combining several multi-facet dimensions may serve as a useful and a robust measure of social capital (e.g., Table 5.1 and Figure 5.1). This problem is tackled first by treating social capital as a latent construct. Several social capital indices are constructed by using principal component analysis (PCA). Second, this chapter shows that social capital, both represented by individual indicators and by an index, is an important determinant of crime after controlling for other covariates. We also show that the historical state of a municipality in terms of population heterogeneity, religiosity and education has an impact on the formation of current social capital. The findings reveal that on average a one standard deviation increase in social capital would reduce crime rates by 0.32 of a standard deviation and that social capital explains about 9 percent of the total variation in crime rates.

The approach in this chapter contributes to the literature in several aspects. First, social capital is treated as a latent construct. Both the presence (e.g., blood donations, voluntary giving and trust) and the absence of social capital (e.g., family breakdown and population heterogeneity) are measured, which differentiates this study from the existing literature. Simple correlations between various survey and non-survey indicators of social capital display quite high coefficients. For instance, the average of the correlation coefficients between survey based trust and non-survey based social capital indicators - charity, blood and vote - is roughly 0.40. Second, we try to provide an explanation for how social capital forms. This aspect is largely ignored in the literature and only took attention recently. In line with Tabellini (2005) and Akcomak and ter Weel (2006) this chapter argues that the history of a municipality a century ago has a significant impact on current levels of social capital. Third, though crime is a global phenomenon most of the literature is based on the evidence from the United States (US), the United Kingdom (UK) and Canada.⁵ The Netherlands has an interesting setting with homogeneous economic conditions, high concentration of foreigners and a free market for soft drugs. Finally, the units (municipalities) are much smaller in scale and much more homogeneous when compared to other studies. Thus, the results are less likely to be affected from differences in government policies, laws and regulations. Given the high level of homogeneity, the probability of finding a significant correlation between social capital and crime is low, making us confident of the robustness of our estimates.

This chapter proceeds as follows. Section 5.2 presents the conceptual framework and develops our arguments. We present information on the data in Section 5.3. The empirical strategy is presented in Section 5.4. Section 5.5 presents the estimates and a number of robustness checks. Section 5.6 concludes.

⁵ For US see for instance, Glaeser, Sacerdote, and Scheinkman (1996), Freeman (1996), Grogger (1998), Glaeser and Sacerdote (1999), Gould, Weinberg, and Mustard (2002), Levitt (2004) and Lochner and Moretti (2004). For UK see, Wolpin (1978) and Sampson and Groves (1989) and for Canada see, Macmillan (1995) and McCarthy and Hagan (2001).

	movers													1.00
	emmig												1.00	0.87
	immig											1.00	0.69	0.96
indicators	divorce										1.00	0.47	0.37	0.47
	foreign									1.00	0.74	0.53	0.59	0.59
al capital	trustplc								1.00	-0.25	-0.15	-0.03	-0.14	-0.08
Correlations among soci	fair							1.00	0.61	-0.19	-0.11	-0.03	-0.17	-0.09
	help						1.00	0.48	0.49	-0.13	-0.19	-0.01	0.02	0.00
	ppltrust					1.00	0.56	0.61	0.72	-0.15	-0.04	-0.04	-0.11	-0.07
e 5.1: (trust				1.00	0.90	0.59	0.84	0.88	-0.23	-0.11	-0.04	-0.16	-0.09
Tabl	vote			1.00	0.36	0.28	0.24	0.35	0.31	-0.73	-0.66	-0.28	-0.42	-0.36
	blood		1.00	0.12	0.24	0.23	0.23	0.18	0.20	-0.10	-0.01	0.01	-0.05	-0.01
	charity	1.00	0.11	0.70	0.24	0.12	0.26	0.26	0.24	-0.74	-0.68	-0.41	-0.49	-0.47
	(obs=142)	charity	blood	vote	trust	ppltrust	help	fair	$\operatorname{trustplc}$	foreign	divorce	immig	emmig	movers





5.2 Conceptual framework

The conceptual framework in this chapter studying the link between social capital and crime to explain the heterogeneity of crime across space is based on social capital as a source of control and community organization. To explain this framework, it is better to start first by providing a concise definition of social capital. After that the chapter proceeds by developing the conceptual framework and the approach taken to explore the link between social capital and crime.

5.2.1 Defining social capital

The definition of social capital is based on four different measures from several different literatures.

First, social capital is an increasing function of participation in civic life. For instance, higher voter turnout and more voluntary donations to charity contribute to a community's social capital. Voter turnout is hypothesized to capture civic involvement and participation in community decision making. This indicator is also used by Putnam, Leonardi, and Nanetti (1993), Putnam (1995), Rosenfeld, Messner, and Baumer (2001) and Gatti, Tremblay, and Larocque (2003). Voluntary contributions in money terms are supposed to capture the strength of intermediate social structures such as charities, clubs and churches and could be employed as another indicator that measures the presence of social capital. In this study, city's voter turnout rate and its monetary contribution per household to charity are used as indicators for social capital.

Second, social capital is higher when people care more for each other or are more altruistic. To measure this dimension of social capital, Guiso, Sapienza, and Zingales (2004) suggest to use voluntary blood donations as an indicator for social capital. Although charity and blood seem to measure similar phenomena there is one particular difference. Experimental research reports that voluntary contributions may incorporate elements of warm glow (e.g., Andreoni, 1995) and reciprocity at the same time. For instance, most charity organizations send or give small gifts (pens, postcards, etc.) and it has been shown that the contributions increase with the size of the gift (Falk, 2004). However monetary compensations for donating blood may even crowd out blood donation as suggested by Titmuss (1970) and recent studies have shown that this could well be the case (e.g., Mellstrom and Johannesson, 2008). In the Netherlands there is no monetary compensation of any kind for donating blood, so we suggest that blood donation captures a pure warm glow effect. In this sense, voluntary blood donations per capita is employed as a measure of social capital.

Third, security and trust increase the stock of social capital. When there is more conformist behaviour, more respect for each other and when norms are institutionalized, the level of social capital is higher. Trust has been identified as a source of social capital. Economists defined the concept in a rather lax way, as an optimistic expectation regarding other agents behaviour (Fafchamps, 2004). Both sociologists and economists have benefited from the survey-based 'generalized trust' indicator as a proxy to social capital and as an alternative indicator to social relations in general, which measures the degree of opportunistic behaviour (e.g., Putnam, 1995; Knack and Keefer, 1997; Zak and Knack, 2001; Rosenfeld, Messner, and Baumer, 2001; Messner, Baumer, and Rosenfeld, 2004). The trust indicator is found to be highly correlated with other measures of social capital such as memberships to associations, extent of friendship and neighbourhood networks and voting (Putnam, 1995).⁶ To capture this dimension generalized trust index and trust in the police is used as indicators for social capital.

Finally, informal controls and the extent of informal contacts and acquaintances increase social capital. So far our indicators assume to measure the presence of social capital. However, the absence of social capital can be measured by using measures of population heterogeneity and family structure. First, the literature on disadvantaged youth and juvenile crime suggests that most criminals come from single-parent households (e.g., Case and Katz, 1991). Social capital in single-parent households is supposed to be low because of the fact that they lack a second parent and because they change residence frequently. It has been shown that single-parenthood has a negative impact on various outcomes, such as educational attainment, juvenile crime and teenage pregnancy, affecting children's social development (e.g., McLanahan and Sandefur, 1994; Parcel and Menaghan, 1994). Second, population heterogeneity is an important factor that affects social capital and trust as it breaks closure. As indicators of (lack of) informal control and population heterogeneity, this chapter benefits from divorce rates and the percentage of foreigners.

Empirically, social capital is viewed as a latent construct that consists of these elements. In Section 5.3 the empirical methodology is described in great detail.

5.2.2 Social control and community organization

Studies of the social environmental characteristics of crime have shown that there exists a lot of heterogeneity. Disadvantaged neighbourhoods and communities are not equally plagued by high crime rates. Sampson and Groves (1988) have developed a theory of social organization in which communities are empowered through their trust in each other to take action against crime and to cooperate with formal control, such as the police.⁷ Consistent with this theory, Sampson, Raudenbush, and Earls (1997) report significantly lower crime levels and self-reports of victimization in neighbourhoods characterized by social or collective efficacy in their study of informal social organization and violent crime in Chicago. Similarly, Bursik and Grasmick (1993) argue that the effectiveness of law enforcement and

 $^{^6}$ Research has shown that the survey-based trust question may measure trustworthiness (Glaeser, Laibson, Scheinkman, and Soutter, 2000) or well-functioning institutions (Beugelsdijk, 2006) rather than trust itself.

⁷ See also Kornhauser (1978), Sampson and Groves (1989) and Bursik and Grasmick (1993).

public control is higher in communities with extensive civic engagement.⁸ Strong attachment and involvement in community matters also lead to strong social bonds by which conflicts are resolved in a more peaceful way compared to communities with weak social bonds (e.g., Hirschi, 1969). Hence, the cost of conflict resolution decreases and more conflicts will be solved.

Communities are stronger when there is lower population turnover and density, because turnover and density negatively affect the ability to know others and to observe and intervene in trouble making activities. Glaeser and Sacerdote (1999) explain why there is more crime in larger cities by arguing that larger communities have a more transient and anonymous character, which reduces social cohesion. This makes it harder to enforce social sanctions, which reduces the cost of crime and thus results in more crime. Similarly, Williams and Sickles (2002) find that by being caught an individual risks to loose the utility generating social capital (loss of reputation and job, divorce etc.). This means that the more social capital an individual possesses the higher the expected cost of committing crime, which reduces the probability to engage in criminal activities. Consequently, given the probability of being caught and formal control, higher levels of social capital seem to reduce crime.

When people know each other better, they are also more likely to participate in community organizational life. This is expressed in participation in voluntary organizations and charity (e.g., Putnam, 1993) and support. The opposite is true for disadvantaged families and disadvantaged neighbourhoods in which deprivation of any kind feeds further deprivation through mechanisms of social interactions and peer effects such as learning effects, imitation and taking the peers as a role model (e.g., Case and Katz, 1991; Manski, 2000; Evans, Wallace, and Schwab, 1992). Individuals who belong to these families are more likely to be unemployed, have low incomes and education and have personal problems. In most cases divorce rates are higher and families are single-parent families headed by women. They are also more likely to live in dense areas with a heterogeneous population and more likely to change residence. Hence, disadvantaged families and persons invest and participate less in the social community they belong to.

5.2.3 Operating the concept

Most research on social capital struggles with causality. In this research, it could be the case that higher crime rates result in out-migration and constrain positive social interactions. It might also be the case that criminal activity erodes social capital because it engages individuals in crime networks and keeps them away from educational and occupational opportunities. This chapter argues that social capital is a positive sum and founded by historical institutions. Institutions promoting

 $^{^8}$ See e.g., Taylor, Gottfredson, and Brower (1984), Sampson and Groves (1989), Land, McCall, and Cohen (1990), Rosenfeld, Messner, and Baumer (2001), Lederman, Loayza, and Menendez (2002) and Messner, Baumer, and Rosenfeld (2004) for empirical evidence.

the formation of social capital in the past are positively correlated with current levels of social capital but not with current levels of crime. Finally, higher levels of social capital now, result in lower crime rates.

This implies an instrumental variable strategy in which a city's current social capital is instrumented by its past level education, population heterogeneity and religiosity. Recent studies have shown the validity of such an approach (Tabellini, 2005; Akçomak and ter Weel, 2006). The argument here is that population heterogeneity, the contribution of religion to human and social capital investments, and education in the past contribute to the formation of a city's social capital, hence shape current social capital.

If social capital is an asset paving the way to community governance (Bowles and Gintis, 2002) or to achieve goals that could be not be achieved or could be achieved only at an higher cost (Coleman, 1988), then any factor that leads to disorganization and dis-attachment in the community would eventually reduce social capital. Population heterogeneity is such a factor that may trigger dis-attachment as higher levels of heterogeneity would break closure, reduce acquaintance among residents and may result in lower trust among members of the community (e.g., Rose and Clear, 1998; Rosenfeld, Messner, and Baumer, 2001). The effects of racial and/or ethnic heterogeneity on socio-economic outcomes are well documented in the literature. It is shown that heterogeneity has an effect on corruption (Mauro, 1995), rent seeking and low educational attainment (Easterly and Levine, 1997), and lower provision of public goods (Goldin and Katz, 1999). However, this chapter argues that ethnic and religious heterogeneity may result in circumstances where formal and/or informal institutions are not binding. Therefore, our argument is more in line with the literature that links heterogeneity to social capital in the wider sense. For instance, both Easterly and Levine (1997) and Alesina, Baqir, and Easterly (1999) argue that ethnic fragmentation may increase polarization in a community and create difficulty in the provision of public goods such as public education, libraries, and sewer systems. In a similar vein Alesina and La Ferrara (2000) argue that racial composition affects the degree in participation in social activities. Zak and Knack (2001) and Rupasingha, Goetz, and Freshwater (2002) also show that higher levels of ethnic diversity may result in less trusting societies.

Protestant belief may have a dual effect on the formation of social capital, which is beyond simply saying that being more religious is associated with higher social capital. First, Beyerlein and Hipp (2005) differentiate between bonding and bridging social capital and argue that groups characterized by bonding social capital are not effective in creating an environment of informal social control to deal with the threat of crime, whereas groups with extensive bridging social capital are more effective in creating such foundations.⁹ The results show that crime

⁹ Bonding social capital are links mainly or exclusively among members of the same group, whereas bridging social capital links members of different groups among communities. Bonding social capital increases community social capital within groups, but may also reduce overall social capital by restricting links among groups. Beyerlein and Hipp (2005) use the percentage of mainline Protestants as a proxy for bridging social capital as they involve in community wide

rates are lower in societies with higher levels of bridging social capital. Given this finding that mainline Protestants are more likely to be involved in community wide volunteering, which in turn refers to higher levels of social capital, we argue that communities where more Protestants reside are characterized by a certain environment and 'ethic' to paraphrase Max Weber, in which social capital may nurture. This view stresses the institutional aspect of Protestantism. A second link is the human capital aspect. Becker and Woessmann (2007) argue that Protestant instructions to read the Bible in ones own language and the support for universal schooling boosted the literacy levels early on and hence created human capital as a side effect. Previous research by Coleman (1988) and Goldin and Katz (1999) help to explain differences in human capital by relating it to historical differences in social capital. ¹⁰

The interaction between human and social capital is well documented in the literature (e.g., Coleman, 1988; Goldin and Katz, 1999). Here we base our argument on the fact that human capital affects social capital with a lag. For instance Goldin and Katz (1999) show that high school movement in the 1930s in various states in the U.S affects current levels of social capital. Recent analyses by Tabellini (2005) and Akçomak and ter Weel (2006) support this finding. They show that for different samples of European regions literacy rates in 1880s do have an impact on current levels of social capital and on a set of cultural indicators. The idea here is that education builds human and social capital at the same time. As shown by Gradstein and Justman (2000, 2002) education affects social capital because education is an important socializing instrument. It builds common norms and facilitates interaction between community members who might be different along cultural, religious or ethnic lines.

5.3 Data and descriptives

The data span 142 municipalities with more than 30,000 inhabitants in the Netherlands. We employ the 2002 geographical definition of Dutch municipalities and each municipality is matched to a NUTS regional definition.¹¹ Most of the socioeconomic variables come from Statistics Netherlands (CBS). The analysis is restricted to municipalities with populations of more than 30,000. For smaller municipalities and for earlier years some variables are not available. Table 5.2

volunteering, and the percentage of Evangelical Protestants as a proxy for bonding social capital because Evangelical Protestants are more likely to involve in voluntary activities within their group but not in a wider community.

¹⁰ A possible third mechanism may be the 'guilt' mechanism. As suggested by Fafchamps (1996) and Platteau (1994a), contractual obligations could be enforced via several mechanisms such as loss of reputation and guilt. Starting from Max Weber numerous studies emphasized how religion might play a role in individual or firm decision making.

¹¹ The 2002 geographical definition of Dutch municipalities is available at Statistics Netherlands (CBS), http://www.cbs.nl. The NUTS definition is available at eurostat http://ec.europa.eu/eurostat. The Netherlands is divided into 4 NUTS 1, 12 NUTS 2 and 40 NUTS 3 regions. See Akçomak and ter Weel (2008b) for details.

presents summary statistics for all variables used in the empirical analysis. The most salient details of the most important variables are discussed below, and other variable definitions, sources and details could be found in Appendix B.

5.3.1 Social capital

Several indicators is used to proxy social capital. Information on voluntary giving, *charity*, is obtained from the national fundraising agency (Centraal Bureau Fondsenwerving, CBF). The data is available in euro terms and defined as voluntary contributions per household averaged over the term 2000-2005.¹² For the electoral turnout we use the voter turnout for the elections of the Lower House (Tweede Kamer) in 2003. Following Guiso, Sapienza, and Zingales (2004) data on blood donations is collected. *Blood* is defined as the blood donations per 100 inhabitants in 2005. Higher values of *charity*, *vote* and *blood* are associated with higher levels of social capital.

To support the data and for robustness purposes data is gathered also from the ESS - a database designed to measure persistence and change in people's social and demographic characteristics, attitudes and values. These survey-based indicators are widely used in the social capital literature. To increase the sample size first and the second round of ESS conducted in 2002 and 2004 were merged. The merged data include information on more than 4,000 individuals. The data is adjusted by population weights to reduce the possibility of complications that might arise due to over-sampling. An equal weight trust indicator is constructed from the answers to the following three questions and labelled it as trust, (i) most people can be trusted or you can't be too careful *ppltrust*, (*ii*) most people try to take advantage of you, or try to be fair (fair), (iii) most of the time people are helpful or mostly looking out for themselves (*help*). For all three indicators higher values represent higher levels of social capital. To capture the confidence in institutions we use "trust in police" (formed from the question "How much you personally trust the police") from the same source. Unfortunately all these five indicators are only available for 40 NUTS 3 regions and it is not possible to collect similar information at the municipality level. However, these measures are included in the analysis by creating variables that have the same value for municipalities in the same NUTS 3 regional definition.¹³

The absence of social capital is measured using traditional measures of het-

 $^{^{12}}$ Voluntary givings *per inhabitant* is also calculated for each year and then averaged over time to see whether there is any significant difference between this measure and the indicator above. As expected there is no effect on the results. This calculation introduces some bias because the municipality definitions change every year from 2000 to 2005 and for this reason correspondence tables are used to match municipalities and in cases that there is missing population or household information we interpolate the data. Due to these shortcomings the original version of the indicator is used as available from the source.

¹³ For instance, Heerlen (917), Sittard (1883), Maastricht (935), Landgraaf (882) and Kerkrade (928) are all in Zuid-Limburg, hence all five municipalities share the same value for the above indicators from the ESS database.

erogeneity and family structure. Information on the percentage of foreigners in each municipality is collected as a proxy to population heterogeneity.¹⁴ Related to this measure a new indicator is formed (*movers*) to represent mobility in a municipality. It is defined as the sum of the absolute value of immigration and emigration divided by the population. To reflect erosion in family induced social capital divorce rates are used as an indicator.¹⁵

The correlations among all these indicators are displayed in Table 5.1 and depicted in Figure 5.1. The simple correlations suggest that measures of social capital are strongly correlated. Correlations between the individual indicators, *charity*, *blood*, *vote*, *trust*, *foreign* and *divorce*, are in a range between 0.01 to -0.74 with an average of 0.36.¹⁶ As shown in Akçomak and ter Weel (2008b) these observations are not restricted to a specific group of municipalities and hold for different subsamples (see section 5.5.3 on Robustness).

To get an idea of how regions and municipalities are distributed along these social capital indicators a k-means cluster analysis is performed to see whether the data differentiates between regions with high and low social capital. If the analysis is restricted to two groups there is a clear distinction between the north and east of the Netherlands, which are rich in terms of social capital and the south and the west, which are relatively poor in terms of social capital. If the cluster groups are increased to 4 this distinction still prevails although it is not that clear anymore. Municipalities in the northern part of the Netherlands tend to have values that are above the mean for *charity*, *blood*, *vote* and *trust* and values below mean for *foreign* and *divorce*. In the southern part this pattern is the other way around. In the west and the east there are mixed groups. This simple preliminary analysis gives another hint that the social capital indicators tend to move together supporting simple correlations.

The fundamental premise in this paper is that these variables capture different dimensions of social capital and even though they may not be very good proxies for social capital individually, a common denominator of them may stand as a good indicator of social capital. The final goal is to treat social capital as a latent construct and to form social capital indices by using principal component analysis (PCA). First PCA analysis includes *charity*, *blood*, *vote*, *trust*, *foreign* and *divorce*. The first principal component is labeled as SC1 which explains about 55 percent of the total variation. This is an overall index merging both presence and absence of social capital in one measure. Then another index is formed in a similar way, SC2, only capturing the presence of social capital hence including the first four indicators above. Due to reasons mentioned above about the availability of *trust*

¹⁴ To support this measure we also collected data on immigration, emigration and detailed data on foreigners differentiating between males and females and between first and second generation immigrants. Introducing such differences does not yield different results.

¹⁵ Using the percentage of single parent families/households also yields similar results.

 $^{^{16}}$ The average calculated by taking the absolute value of each correlation. For NUTS 3 regions the correlations range from 0.19 to -0.86, with an average of 0.46.

Variable	Mean	Std. Dev.	Min	Max
density	1369.31	1231.36	95.00	5511.00
charity	6.38	3.18	0.73	19.06
blood	2.69	1.67	0.21	14.41
vote	80.49	4.59	67.70	91.20
divorce	5.31	1.68	0.55	9.96
trust	5.77	0.25	5.30	6.20
ppltrust	5.76	0.31	5.13	6.32
help	5.32	0.29	4.79	5.91
fair	6.22	0.27	5.75	6.76
trustplc	5.89	0.19	5.23	6.41
foreign	16.30	7.30	4.61	45.39
immig	0.72	0.38	0.17	2.59
emmig	0.37	0.21	0.12	1.31
movers	1.09	0.55	0.31	3.78
SC1	0.00	1.80	-5.27	3.92
SC2	0.00	1.40	-3.50	3.70
SC3	0.00	1.32	-2.98	3.43
protestant1859	54.95	33.19	0.02	99.77
foreign1859	2.07	2.16	0.00	12.94
#school1859	0.05	0.04	0.00	0.18
crime	4.99	2.49	1.60	14.53
homicide	0.00	0.00	0.00	0.02
assault	0.58	0.30	0.13	2.01
rape	0.01	0.01	0.00	0.04
robbery	0.06	0.08	0.00	0.55
theft	1.23	0.74	0.23	5.31
autotheft	1.47	1.03	0.20	7.64
burglary	0.55	0.24	0.13	1.29
domestic burglary	0.47	0.21	0.05	1.09
drug	0.01	0.03	0.00	0.18
young	18.81	3.23	9.96	32.47
inequality	0.90	0.45	0.23	2.56
unemp	1.60	2.66	0.00	16.84
education	51.72	7.55	34.76	71.34
cofshop	0.35	0.45	0.00	3.67
shop	21.61	7.69	7.34	49.53
recrat	27.08	8.72	13.45	66.53

Table 5.2: Summary statistics for municipalities>30,000 inhabitants

at the municipality level, a final index is constructed, *SC3*, including only *charity*, *blood* and *vote* for robustness reasons. The first component explains more than 60 percent of the variation in these three variables. Further details on the social capital indicators, the principal component loadings and the explained variance for all included indicators are presented in Appendix B.1.2.

5.3.2 Crime

Information about crime is constructed from the 2002 crime monitor of the *Algemeen Dagblad*. The data yield information on 27 different types of crime.

The crime indicator covers all recorded crimes and is defined as overall crime per 100 inhabitants (crime). In the literature there is a tendency to use data for crime that have minimal reporting inconsistencies such as, motor vehicle theft, robbery and burglary. This is indeed important because the crime numbers include a category for bicycle theft, but especially in the Netherlands bicycle theft is so common that many people do not even report if they are victim of bicycle theft. In a similar vein, crime numbers on handling soft drugs could also be biased since there is a relative free market for soft drugs in the Netherlands. On the other hand, citizens are more likely to report if their car is stolen. Therefore, as well as analyzing overall crime rates nine categories of crime are specified according to the 2006 European Sourcebook of Crime and Criminal Justice. These are homicide, serious assaults, rape, robbery, theft, motor vehicle theft, burglary, domestic burglary and drug related crimes. Appendix B.1.3 defines each of these categories and presents descriptive statistics for a number of subsamples. The most common reported crimes are robbery, theft and drug related crimes, whereas the least common are homicide and rape.

A more detailed investigation of the crime data produces two main insights. First, most recorded crime falls into one or two subcategories. For example, overall theft is roughly 55 percent of all recorded crime and roughly 11 percent consists of assaults; whereas serious crime such as rape and homicide is only 1 percent of overall crime rate. Second, in the Netherlands most criminal activities take place in larger agglomerations. For instance, among all recorded homicides 51 percent occurred in the 22 largest cities and about 85 percent were observed in municipalities with more than 30,000 inhabitants. In extreme cases like robbery and drug related crimes 3 out of 4 attempts are observed in the 22 largest Dutch cities. This pattern more or less prevails for all categories and even for overall crime rates as 53 percent of all recorded crime is observed in the 22 largest agglomerations and 83 percent occurs in municipalities with more than 30,000 inhabitants. Appendix B, Table B.4 provides the distribution of criminal activities for different subsamples. It seems appropriate to argue that criminal activity in the Netherlands is an urban phenomenon, which supports the choice of the sample. The selection of 142 municipalities represents only about 35 percent of all the municipalities in the Netherlands but covers about 90 percent of overall crime.

5.3.3 Instrumental variables

In line with Tabellini (2005) and the findings in the previous chapters, this chapter suggests that historical factors do have an impact on the formation of social capital. Three indicators are used as instruments for social capital all of which are observed at the municipality level in 1859: (i) population heterogeneity, (ii) percentage of Protestants, (iii) number of schools. All three variables are taken from the population archive (*Volkstellingen*), which provides historical data on household, population, occupation etc. starting from 1795 onwards. 1859 is selected because this is the earliest date for which data at the municipality level are available. More information about the population archive and the three instruments can be found in Appendix B.1.4. Table B.5 lists the data for the 142 municipalities with more than 30,000 inhabitants.

The percentage of foreigners in 1859 is used as an instrument for current social capital as it is a proxy for trust in 1859. Municipalities that were well endowed in terms of social capital 150 years ago may still be rich in social capital, which emphasizes the importance of initial presence. In this case, past social capital directly affects current social capital but has no direct impact on current crime levels. *Foreign1859* is defined as the percentage of foreigners living in a municipality in 1859. *Protestant1859* is defined in a similar manner as the percentage of inhabitants belonging to any of the Protestant denominations in 1859. Finally data on the number of schools in 1859 is collected as a direct proxy for human capital investment different from the effect of Protestantism on human capital formation as discussed in Section 5.2. Although it may not be a perfect indicator for human capital the results reveal that it is still a credible instrument to current social capital. #school1859 is defined as the number of schools per 1,000 inhabitants.

5.4 Empirical strategy

The empirical strategy in this chapter hinges on the assertion that social capital is an important determinant of crime and that social capital is hard to measure thus should be best treated as a latent construct. Social capital is different from other forms of capital in the sense that it is not directly observable. Therefore, first strategy is to measure social capital as a single index composed of different indicators that could act as an individual proxy for different dimensions of social capital. For this purpose, a principal component analysis (PCA) is used that estimates

$$Y_i = \beta_i social \ capital + \epsilon_i, \tag{5.1}$$

where i corresponds to different indicators of social capital, Y is the latent construct composed of a number of social capital indicators. Estimating this equation yields a number of principal component factors and a number of principal component loadings, β_i , which could be viewed as weights. Since the indicators are highly correlated with each other we only use the first principal component as a measure of social capital and label it SCx, where x ranges from 1 to 3 and denotes the inclusiveness of the index. As discussed above we construct three indices where SC1 is the most inclusive consisting of six indicators and SC3 is the least inclusive consisting of three indicators. Table B.2 lists the principal component loadings and the explained variance for each index and for each sample. The first principal component explains 50 to 65 percent of the variation induced by the indicators.¹⁷

Having constructed the indices of social capital the analysis starts by estimating the following base model with OLS using usual explanatory variables of crime:

$$crime = \beta_0 + \beta_1 density + \beta_2 education + \beta_3 unemp + \beta_4 young + \beta_5 SC + \epsilon, \qquad (5.2)$$

where subscript m for municipalities has been suppressed for notational convenience, and the error term complies with the usual assumptions. *Crime* represents crime rates depending on the type or group of criminal activity. *Density* refers to population density. To normalize the data we took the natural log of population density. Higher crime rates are expected in densely populated areas. *Education* is the percentage of people with medium and high levels of education. As criminal activity is concentrated within relatively younger age groups, the percentage of people between 15-24 years old is also included as a regressor. *Unemp* represents the unemployed under age 30. Education is expected to be negatively correlated with crime and the percentage of population 15-24 years old and youth unemployment are expected to be positively associated with crime. *SC* represents not only the three indices but also the six individual indicators to construct the indices.

The next step is to replicate the analysis above for an extended model:

$$crime = \beta_0 + \beta_1 density + \beta_2 education + \beta_3 unemp + \beta_4 young + \beta_5 SC + \beta_6 X + v,$$
(5.3)

where X consists of a set of control variables which are; (i) income inequality, (i) controls for the percentage of area devoted to shopping and recreation activities, and (iii) number of coffeeshops per 10,000 inhabitants. We expect these variables to be positively correlated with crime rates.

Endogeneity and the possibility of reverse causality could bias the estimates of the above models when using OLS. Putnam (2000) has argued that low social capital may result in higher crime, which in turn may result in even lower levels

 $^{^{17}}$ Recently, a similar strategy was used by Fryer, Heaton, Levitt, and Murphy (2005) to measure the impact of crack cocaine on crime in U.S. cities.

of social capital. For example, a third unobserved variable could affect both crime and social capital. Certain policies implemented by the local government could reduce crime but at the same time have an impact on social capital. Or, it could be the case that crime reporting rates are correlated with social capital levels, so inhabitants living in high social capital areas may be more likely to report crime (e.g., Soares, 2004). To deal with such problems a 2SLS strategy is followed in which social capital is instrumented with the historical proxies discussed in Section 5.3. We use the percentage of foreigners and Protestants, and the number of schools in 1859 as instruments for social capital. This yields the following model:

$$crime = \beta_0 + \beta_1 density + \beta_2 education + \beta_3 unemp + \beta_4 young + \beta_5 SC + \beta_6 X + \nu,$$

$$SC = \delta_0 + \delta_1 foreign 1859 + \delta_2 protestant 1859 + \delta_3 \# school 1859 + \delta_4 Z + \eta,$$
(5.4)

where foreign 1859 stands for the percentage of foreigners and protestant 1859 denotes the percentage of Protestants in a municipality in 1859. # school 1859 is the number of schools per 100 inhabitants in 1859. The matrix Z includes all other exogenous variables. We expect foreign 1859 to be negatively, and protestant 1859 and # school 1859 to be positively correlated with social capital. Since almost all the variables have different measurement levels all the indicators are standardized so that the mean and variance equals 0 and 1, respectively. Therefore the estimated coefficients are also standardized coefficients measuring how the dependent variable responds when an independent variable changes by one standard deviation.

5.5 Results

5.5.1 OLS estimates

The empirical investigation starts by estimating the base model (equation 5.2) using OLS. Table 5.3 presents the estimates. The dependent variable is defined as the overall crime rates. The mean of this crime measure has been standardized to zero. The results from the base model reveal that individual indicators of social capital have significant impact on overall crime rates. *Charity, blood, vote, trust* and *trustplc* are negatively associated with crime, whereas *foreign, divorce* and *movers* are positively correlated with crime rates. With the exception of *trust* all coefficients are significant at the 5 percent level.¹⁸ The findings are in line with the previous research that reports negative effects for trust, civicness and electoral

¹⁸ As mentioned before *trust* scores are available at the NUTS 3 level and are merged with the data at the municipality level. This adjustment likely partly explains why the coefficient is statistically insignificant. Similar analysis at the NUTS 3 level (with n = 40) returns a significant coefficient for *trust*.

turnout (e.g., Sampson and Groves, 1989; Rosenfeld, Messner, and Baumer, 2001; Lederman, Loayza, and Menendez, 2002; Messner, Baumer, and Rosenfeld, 2004); a positive link between crime and population heterogeneity (e.g., Jobes, 1999) and single parenthood and crime (e.g., Sampson, Morenoff, and Earls, 1999). Moreover, all three social capital indices have significant negative effects on crime as can be observed from the last three columns in Table 5.3. These indices imply that a one standard deviation increase in the social capital index reduces crime by between 0.29 and 0.35 of a standard deviation. This effect is economically meaningful, since it means that a one standard deviation increase in social capital would reduce crime rates by about 2 percent on average.

The findings on ordinary determinants of crime also support prior evidence. Population density generally has a positive and significant effect on crime suggesting that densely populated areas are more likely to be vulnerable to crime than relatively rural areas (e.g., Wolpin, 1978; Macmillan, 1995). This results because heterogeneity and residential instability reduce the effectiveness of community sanctions. In addition, urban areas attract criminal activity as there are more opportunities for such activities in cities where they can act rather anonymously (e.g., Glaeser and Sacerdote, 1999). The estimations turn out a negative coefficient for education suggesting that the higher the level of education the lower the crime rate, which is also consistent with the literature (Lochner and Moretti, 2004; Wolpin, 1978). This is first because higher education is associated with better labor-market outcomes hence increasing the opportunity cost of crime and possibly because school attendance keeps young people away from the street conditional on the fact that young people commit more crimes (Lochner and Moretti, 2004). However, only in a few specifications the coefficient is statistically significant.

The results also show that crime rates are increasing with the percentage of young people, which is consistent with earlier work (Wolpin, 1978; Freeman, 1996; Grogger, 1998). The only contradicting result of the estimates is the negative coefficient for the youth unemployment rate, although the coefficient is statistically insignificant. Öster and Agell (2007) and Gould, Weinberg, and Mustard (2002) show for a panel of Swedish municipalities and American cities that a fall in unemployment led to a drastic decrease in drug possession, auto theft and burglary. However, these results also reveal that changes in youth unemployment have no particular effect on crime.

After the inclusion of a number of additional control variables the results are qualitatively similar as Table 5.4 shows. All social capital indicators have a statistically significant impact on crime rates. In the extended model, income inequality has no significant effect on crime and the sign alternates depending on the specification. Previous research on the effect of income inequality on crime also shows contradicting results (e.g., Soares, 2004). However, recent research shows that changes in the distribution of income inequality rather than income inequality
	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)	(11)
	charity	blood	vote	trust	trustplc	foreign	divorce	movers	SCI	SC2	SC3
lensity	0.211	0.442	0.325	0.448	0.443	0.072	0.253	0.393	0.139	0.286	0.233
	$(0.068)^{***}$	$(0.061)^{***}$	$(0.060)^{***}$	$(0.063)^{***}$	$(0.062)^{***}$	(0.078)	$(0.084)^{***}$	$(0.056)^{***}$	$(0.072)^{*}$	$(0.062)^{***}$	$(0.064)^{***}$
education	-0.076	-0.207	-0.065	-0.166	-0.177	-0.051	-0.145	-0.165	-0.027	-0.055	-0.052
	(0.085)	$(0.098)^{**}$	(0.085)	$(0.098)^{*}$	$(0.097)^{*}$	(0.070)	$(0.086)^{*}$	$(0.092)^{*}$	(0.072)	(0.084)	(0.080)
nemp	-0.053	-0.051	-0.06	-0.059	-0.087	-0.043	-0.049	-0.029	-0.07	-0.082	-0.064
	(0.037)	(0.041)	$(0.034)^{*}$	(0.041)	$(0.044)^{**}$	(0.035)	(0.035)	(0.038)	$(0.034)^{**}$	$(0.037)^{**}$	$(0.034)^{*}$
7oung	0.246	0.292	0.230	0.249	0.252	0.222	0.136	0.130	0.232	0.299	0.271
	$(0.069)^{***}$	$(0.094)^{***}$	$(0.082)^{***}$	$(0.080)^{***}$	$(0.075)^{***}$	$(0.080)^{***}$	(0.099)	(0.089)	$(0.083)^{***}$	$(0.080)^{***}$	$(0.080)^{***}$
C	-0.449	-0.165	-0.371	-0.203	-0.478	0.618	0.417	0.370	-0.319	-0.290	-0.352
	$(0.094)^{***}$	$(0.077)^{**}$	$(0.071)^{***}$	(0.129)	$(0.202)^{**}$	$(0.096)^{***}$	$(0.112)^{***}$	$(0.106)^{***}$	$(0.051)^{***}$	$(0.053)^{***}$	$(0.058)^{***}$
Constant	0.014	0.014	0.014	0.029	0.051	0.014	0.014	0.014	0.014	0.014	0.014
	(0.055)	(0.061)	(0.057)	(0.065)	(0.067)	(0.051)	(0.056)	(0.055)	(0.051)	(0.056)	(0.054)
7	142	142	142	142	142	142	142	142	142	142	142
R-squared	0.57	0.47	0.55	0.46	0.48	0.64	0.56	0.57	0.63	0.57	0.59
Adj R sqr	0.55	0.46	0.53	0.44	0.46	0.62	0.54	0.56	0.62	0.55	0.58

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itself affect property crime (Bourguignon, Nuñez, and Sanchez, 2003; Chiu and Madden, 1998). Another point is that the cross-section analysis throughout this chapter may not be such a suitable approach to assess the importance of inequality and unemployment on crime rates. Unfortunately, in this setting it is not possible to pursue panel analysis. This is because there is no adequate data to do so and more importantly because social capital is a stock that does not change from year to year, whereas inequality and unemployment do.

As expected the percentage of recreational and shopping area has a positive and significant effect on crime (e.g., Jobes, 1999). This is because there are more opportunities for criminals in such areas and the returns are higher (e.g., Glaeser and Sacerdote, 1999). The results also display quite a strong effect for the percentage of coffeeshops in a municipality. This could be due to several reasons. First, the probability of committing crime may increase under the influence of soft drugs. Second, coffeeshops attract disadvantaged persons, gang activity and drug dealers which sets up an environment that supports criminal activity. Finally, to buy drugs, addicted people often have to commit crime. Inclusion of the four control variables increases the explanatory power by one third suggesting that about 65 percent of the variation in crime is explained by the extended model. The added-variable plots are presented in Figure 5.2, which reveal the strong conditional correlations except for trust.

Table 5.5 is a summary table presenting the coefficients of all social capital indicators we consider for different subsamples. It is apparent that all six (charity, blood, vote, foreign, divorce and movers) non-survey social capital indicators have a significant effect on crime. The survey indicators, trust, ppltrust, help, fair and trustplc, do not return a significant coefficient all the time. Another potentially interesting result is the impact of emigration as well as immigration on crime rates. Immigration has a negative effect because it reduces 0.1cm closure in a community (e.g., Jobes, 1999). Considering the fact that social capital originates from social interactions within a network, any factor breaking links between actors is harmful for social capital. In this respect emigration may also increase crime rates. It could also be the case that individuals who are less integrated in a society are more likely to commit crime, which is why both immigration and emigration are positively associated with crime rates. Our indicator movers (capturing both effects) reflects residential instability in a community and it is positively related to crime suggesting that the higher instability the higher crime rates, which is consistent with earlier work (e.g., Rose and Clear, 1998). The social capital indices are always significant at the one percent level regardless of the specification and the sample considered.

	Tabl	le 5.4: OL	S results fo	or crime a	ıd alternat	ive indica	tors for so	cial capita	l (extende	d)	
	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)	(11)
	charity	blood	vote	trust	trustplc	foreign	divorce	movers	SC1	SC2	SC3
density	0.203	0.370	0.263	0.363	0.366	0.063	0.280	0.340	0.124	0.225	0.197
	$(0.067)^{***}$	$(0.059)^{***}$	$(0.062)^{***}$	$(0.063)^{***}$	$(0.059)^{***}$	(0.071)	$(0.075)^{***}$	$(0.058)^{***}$	$(0.069)^{*}$	$(0.063)^{***}$	$(0.063)^{***}$
education	-0.047	-0.127	-0.051	-0.086	-0.096	-0.036	-0.107	-0.112	-0.025	-0.028	-0.039
	(0.064)	$(0.069)^{*}$	(0.061)	(0.071)	(0.068)	(0.053)	(0.066)	(0.073)	(0.056)	(0.062)	(0.059)
unemp	-0.025	-0.021	-0.029	-0.030	-0.061	-0.021	-0.02	-0.013	-0.043	-0.050	-0.035
	(0.033)	(0.035)	(0.032)	(0.033)	$(0.036)^{*}$	(0.034)	(0.033)	(0.034)	(0.033)	(0.033)	(0.033)
young	0.098	0.114	0.095	0.072	0.073	0.106	0.029	0.031	0.118	0.145	0.132
	(0.080)	(0.095)	(0.088)	(0.086)	(0.070)	(0.085)	(0.097)	(0.092)	(0.091)	(0.088)	(0.088)
inequality	-0.030	-0.099	0.068	-0.065	-0.081	0.016	-0.058	-0.044	0.045	0.028	0.038
	(0.055)	$(0.057)^{*}$	(0.060)	(0.056)	(0.057)	(0.052)	(0.058)	(0.055)	(0.054)	(0.054)	(0.055)
shop	0.117	0.146	0.148	0.147	0.133	0.178	0.092	0.146	0.145	0.165	0.143
	$(0.056)^{**}$	$(0.058)^{**}$	$(0.054)^{***}$	$(0.062)^{**}$	$(0.058)^{**}$	$(0.052)^{***}$	-0.057	$(0.060)^{**}$	$(0.053)^{***}$	$(0.057)^{***}$	$(0.054)^{***}$
recrat	0.136	0.178	0.177	0.163	0.176	0.139	0.155	0.112	0.135	0.146	0.154
	$(0.062)^{**}$	$(0.067)^{***}$	$(0.065)^{***}$	$(0.071)^{**}$	$(0.065)^{***}$	$(0.056)^{**}$	$(0.059)^{***}$	$(0.058)^{*}$	$(0.056)^{**}$	$(0.063)^{**}$	$(0.062)^{**}$
cofshop	0.244	0.248	0.241	0.282	0.280	0.147	0.216	0.201	0.190	0.245	0.226
	$(0.069)^{***}$	$(0.063)^{***}$	$(0.068)^{***}$	$(0.070)^{***}$	$(0.066)^{***}$	$(0.055)^{***}$	$(0.068)^{***}$	$(0.081)^{**}$	$(0.060)^{***}$	$(0.064)^{***}$	$(0.065)^{***}$
SC	-0.331	-0.170	-0.317	-0.206	-0.518	0.514	0.252	0.236	-0.260	-0.240	-0.286
	(060.0)	$(0.073)^{**}$	$(0.070)^{}$	$(0.121)^{*}$	$(0.181)^{***}$	$(0.089)^{***}$	**(20.0)	***(060.0)	$(0.047)^{***}$	$(0.049)^{***}$	$(0.055)^{***}$
Constant	0.014	0.014	0.014	0.029	0.054	0.014	0.014	0.014	0.014	0.014	0.014
	(0.050)	(0.052)	(0.050)	(0.055)	(0.056)	(0.046)	(0.051)	(0.051)	(0.047)	(0.049)	(0.048)
N	142	142	142	142	142	142	142	142	142	142	142
R-squared	0.67	0.63	0.66	0.62	0.64	0.71	0.64	0.65	0.7	0.67	0.68
$\operatorname{Adj} \operatorname{R} \operatorname{sqr}$	0.64	0.61	0.63	0.59	0.62	0.69	0.62	0.62	0.68	0.65	0.66
Dependent varial	ole is overall crime	rate. Coefficient	s are standardized	d coefficients.							

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.





	Table 5.5: Su	ummary re:	sults for alt	ernative in	dicators fo	r social ca	pital (OLS)	_
	pop>30,000	NUTS3	pop>50,000	pop>40,000	pop>30,000	NUTS3	pop>50,000	pop>40,000
	$_{\mathrm{base}}$	$_{\rm base}$	$_{\rm base}$	\mathbf{base}	extended	extended	extended	extended
charity	-0.449	-0.455	-0.373	-0.460	-0.331	-0.398	-0.400	-0.421
	$(0.094)^{***}$	$(0.125)^{***}$	$(0.082)^{***}$	$(0.080)^{***}$	$(0.090)^{***}$	$(0.078)^{***}$	$(0.078)^{***}$	$(0.079)^{***}$
blood	-0.165	-0.361	-0.162	-0.175	-0.170	-0.390	-0.208	-0.190
	$(0.077)^{**}$	$(0.150)^{**}$	$(0.077)^{**}$	$(0.077)^{**}$	$(0.073)^{**}$	$(0.116)^{***}$	$(0.075)^{***}$	$(0.076)^{**}$
vote	-0.371	-0.533	-0.288	-0.308	-0.317	-0.463	-0.339	-0.316
	$(0.071)^{***}$	$(0.118)^{***}$	$(0.081)^{***}$	$(0.075)^{***}$	$(0.070)^{***}$	$(0.117)^{***}$	$(0.102)^{***}$	$(0.079)^{***}$
trust	-0.203	-0.315	-0.363	-0.343	-0.206	-0.241	-0.575	-0.420
	(0.129)	$(0.111)^{***}$	(0.265)	$(0.182)^{*}$	$(0.121)^{*}$	$(0.102)^{**}$	$(0.266)^{**}$	$(0.171)^{**}$
ppltrust	-0.148	-0.385	-0.238	-0.260	-0.105	-0.291	-0.389	-0.297
	(0.124)	$(0.153)^{**}$	(0.255)	(0.182)	(0.112)	$(0.136)^{**}$	(0.257)	$(0.167)^{*}$
help	-0.130	-0.162	-0.185	-0.233	-0.172	-0.135	-0.360	-0.301
	(0.105)	(0.098)	(0.176)	$(0.129)^{*}$	$(0.101)^{*}$	(0.093)	$(0.200)^{*}$	$(0.128)^{**}$
fair	-0.196	-0.248	-0.391	-0.296	-0.194	-0.173	-0.479	-0.365
	(0.134)	$(0.093)^{**}$	(0.255)	$(0.171)^{*}$	(0.118)	$(0.081)^{**}$	$(0.253)^{*}$	$(0.164)^{**}$
trustplc	-0.478	-0.230	-0.363	-0.446	-0.518	-0.215	-0.652	-0.677
	$(0.202)^{**}$	$(0.100)^{**}$	(0.360)	(0.269)	$(0.181)^{***}$	$(0.093)^{**}$	(0.419)	$(0.272)^{**}$
foreign	0.618	0.569	0.386	0.523	0.514	0.431	0.388	0.471
	$(0.096)^{***}$	$(0.166)^{***}$	$(0.095)^{***}$	$(0.095)^{***}$	$(0.089)^{***}$	$(0.139)^{***}$	$(0.094)^{***}$	$(0.093)^{***}$
divorce	0.417	0.570	0.167	0.296	0.252	0.497	0.132	0.210
	$(0.112)^{***}$	$(0.146)^{***}$	(0.134)	$(0.114)^{**}$	$(0.097)^{**}$	$(0.151)^{***}$	(0.123)	$(0.111)^{*}$
immig	0.362	0.341	0.215	0.288	0.217	0.160	0.137	0.179
	$(0.099)^{***}$	$(0.134)^{**}$	$(0.076)^{***}$	$(0.086)^{***}$	$(0.083)^{**}$	(0.133)	(0.082)	$(0.077)^{**}$
emmig	0.310	0.464	0.204	0.246	0.207	0.335	0.150	0.169
	$(0.093)^{***}$	$(0.141)^{***}$	$(0.068)^{***}$	$(0.082)^{***}$	$(0.076)^{***}$	$(0.133)^{**}$	$(0.074)^{**}$	$(0.076)^{**}$
movers	0.370	0.535	0.223	0.299	0.236	0.409	0.153	0.195
	$(0.106)^{***}$	$(0.154)^{***}$	$(0.071)^{***}$	$(0.090)^{***}$	$(0.090)^{***}$	$(0.125)^{***}$	$(0.073)^{**}$	$(0.081)^{**}$
SC1	-0.319	-0.376	-0.237	-0.270	-0.260	-0.339	-0.255	-0.255
	$(0.051)^{***}$	$(0.072)^{***}$	$(0.050)^{***}$	$(0.050)^{***}$	$(0.047)^{***}$	$(0.083)^{***}$	$(0.050)^{***}$	$(0.047)^{***}$
SC2	-0.290	-0.427	-0.240	-0.257	-0.240	-0.365	-0.285	-0.257
	$(0.053)^{***}$	$(0.086)^{***}$	$(0.050)^{***}$	$(0.052)^{***}$	$(0.049)^{***}$	$(0.075)^{***}$	$(0.054)^{***}$	$(0.049)^{***}$
SC3	-0.352	-0.473	-0.266	-0.317	-0.286	-0.402	-0.289	-0.305
	$(0.058)^{***}$	$(0.094)^{***}$	$(0.056)^{***}$	$(0.058)^{***}$	$(0.055)^{***}$	$(0.080)^{***}$	$(0.058)^{***}$	$(0.055)^{***}$
N	142	40	63	95	142	40	63	95
The coefficient:	s in the first four colum	ins derive from the	estimation of the b	ase model for each	ı social capital indi	cator and the coe	fficients in the last f	our

to the control and use in the first out contains deriver four the sectimation to the owse induced to each approximation of and an an an and are interesting to the strandard model for each social capital indicator. Coefficients are standardized coeff. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 10%.

5.5.2 2SLS estimates

The OLS estimates above could be biased because of causality problems. Therefore it is better to explore a 2SLS strategy instrumenting social capital with the percentage of foreigners, percentage of Protestants and the number of schools in 1859. Table 5.6 presents the 2SLS estimates. Columns (1), (3) and (5) present the first stages of the 2SLS estimations for the three social capital indices, respectively. The instruments in the first stage have the expected effect on social capital. The quality of the instruments is important as they should be correlated with social capital but not with the error term in a way that the instruments should be on the 'knife's edge'. If the correlations of the instruments and social capital are not strong enough in the first stage we run into weak instrument problems. On the other hand, if they are too strong we cannot safely assume that they are not correlated with the error term. The joint F-tests in the first stage show that our instruments are valid as they pass the F-test threshold of 10 suggested by Staiger and Stock (1997). Moreover the over-identification tests show that the effect of the instruments on crime are operationalized only through their effect on social capital, not by any other mechanism.

The second stage results reveal that the coefficients of the social capital indices are somewhat larger than their OLS counterparts and significant at the 1 percent level. These estimates imply that a one standard deviation increase in social capital reduces crime by between 0.30 and 0.34 of a standard deviation. This effect is economically meaningful and not far from the estimates from the OLS exercise above (Table 5.4). The estimates suggest that the causality runs from social capital to crime and the historical state of a community shape current social capital.

Complementary to the OLS results above Table 5.7 presents summary information on how individual indicators of social capital behave in 2SLS specification. Table 5.7 is comparable to Table 5.5 and for each subsample the first column shows the 2SLS coefficient derived from the estimation of the base and the extended models. The second column shows the associated joint significance test of the instruments in the first stage. In all specifications the estimations return a significant coefficient in the second stage. However, the F-tests illustrate an interesting pattern. As can be seen from Table 5.7 F-tests for *foreign*, *divorce*, *vote* and *charity* are larger than (or within the proximity of) 10. Given this, one can argue that these indicators can be labeled as good indicators of social capital, since they display consistent and quite robust estimates in their relationship with crime. Blood donations do not perform as good as the ones above.

The methodology employed in this chapter allows us to discuss which indicators of social capital perform best. This is potentially interesting for future research as we can identify social capital indicators and also their relation to crime. This and the previous sections have summarized the results for 14 potential social capital

					1	
	(1) 1st stage	(2) 2SLS	(3) 1st stage	(4) 2SLS	(5) 1st stage	(6) 2SLS
	SC1	crime	SC2	crime	SC3	crime
density	-0.841	0.089	-0.511	0.167	-0.524	0.162
	$(0.133)^{***}$	(0.086)	$(0.111)^{***}$	$(0.072)^{**}$	$(0.098)^{***}$	$(0.074)^{**}$
education	0.294	-0.013	0.314	0.003	0.230	-0.025
	$(0.091)^{***}$	(0.048)	$(0.077)^{***}$	(0.057)	$(0.073)^{***}$	(0.053)
unemp	-0.085	-0.048	-0.129	-0.065	-0.059	-0.039
	(0.060)	(0.035)	$(0.063)^{**}$	$(0.036)^*$	(0.048)	(0.035)
young	0.134	0.128	0.279	0.182	0.167	0.149
	(0.127)	(0.089)	$(0.099)^{***}$	$(0.091)^{**}$	$(0.093)^*$	$(0.086)^*$
inequality	0.318	0.063	0.314	0.069	0.301	0.062
	$(0.104)^{***}$	(0.061)	$(0.099)^{***}$	(0.063)	$(0.080)^{***}$	(0.062)
shop	0.024	0.148	0.121	0.180	0.030	0.146
-	(0.095)	$(0.051)^{***}$	(0.097)	$(0.056)^{***}$	(0.076)	$(0.053)^{***}$
recrat	-0.026	0.129	-0.001	0.135	0.045	0.149
	(0.111)	$(0.056)^{**}$	(0.081)	$(0.063)^{**}$	(0.072)	$(0.061)^{**}$
cofshop	-0.330	0.179	-0.130	0.235	-0.188	0.217
-	$(0.097)^{***}$	$(0.062)^{***}$	$(0.077)^*$	$(0.062)^{***}$	$(0.064)^{***}$	$(0.064)^{***}$
foreign1859	-0.366	· · · ·	-0.309	· /	-0.237	· /
0	$(0.090)^{***}$		$(0.085)^{***}$		$(0.066)^{***}$	
protestant1859	0.315		0.321		0.396	
	$(0.086)^{***}$		$(0.087)^{***}$		$(0.067)^{***}$	
#school1859	0.185		0.172		0.106	
<i>"</i>	$(0.093)^{**}$		$(0.082)^{**}$		(0.079)	
SC1	()	-0.295	()		()	
		(0.076)***				
SC2		(0.010)		-0.328		
~ ~ -				(0.081)***		
SC3				(01001)		-0.341
500						(0.081)***
Constant	0.000	0.014	0.000	0.014	0.000	0.014
comotant	(0.088)	(0.046)	(0.080)	(0.048)	(0.069)	(0.047)
N	142	142	142	142	142	142
Adi B sor	0.66	0.68	0.53	0.64	0.61	0.66
R-squared	0.69	0.00	0.57		0.64	0.00
F-test instrm	16 18***		17 43***		25 16***	
overid	10.10	4 14 (0 11)	11.10	3.28(0.19)	20.10	211(034)
5.01u				0.20 (0.10)		

Table 5.6: 2SLS results for crime and social capital

Dependent variable is overall crime rate. All variables are standardized. Columns 1, 3 and 5 are the first stage results.

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

F-test is a test of joint significance of the instruments.

overid is a test of over identification. Null hypothesis: Over-identifying restrictions are valid.

indicators and three indices constructed from these indicators. Indicators related to social support, solidarity and civicness perform quite well as indicators of social capital. However, electoral turnout and donations to charity stand out from the rest. Although their relation to crime is mostly significant, blood donations and trust are found to be rather inferior when compared to *charity* and *vote*. This can be seen from Table B.2 in Appendix B. When constructing the indices, the principal component analysis yields more or less the same weight for *charity* and vote, but blood and trust receive only about one third of the weight attached to charity and vote. This discrepancy becomes visible and significant as the sample moves from NUTS3 regions to smaller municipalities. The results also show that indicators of social control (divorce rates) and population heterogeneity (percentage of foreigners, immigration, emigration and movers) can be labeled as good social capital indicators. When the principal component loadings of the most inclusive index (SC1) is inspected carefully one can easily see that *charity*, vote, foreign and divorce receive similar weights in magnitude. In almost all specifications charity, vote and most of the measures of social control and heterogeneity are important determinants of crime. Blood donations and trust indicators from the ESS database are found to be not as important as the others.

5.5.3 Robustness

Subsamples

Several robustness checks are performed to validate the results. First, the analysis is replicated using different subsamples: 95 municipalities over 40,000 inhabitants; 63 municipalities over 50,000 inhabitants; 40 NUTS 3 regions and finally 22 largest agglomerations in the Netherlands. This exercise do not change the previous findings and reveals that the findings are not bound to a specific subsample. The results are summarized in Table 5.5 and the detailed results are presented in Akçomak and ter Weel (2008b).

Different Types of Crime

Besides analysis on the overall crime rates the extended model (equation 3) is also estimated for 9 different crime categories. The rationale behind this is the argument that overall crime rates are biased due to under reporting of certain crime types. Therefore, one has to show that these results also hold for crime that is supposed to have minimum reporting inconsistencies such as auto theft, robbery, serious assaults and homicide. Table 5.8 presents the expected sign and the significance levels of the impact of different social capital indicators on crime subcategories and Figure 5.3 depicts the added-variable plots. The results highlight several interesting points. With the exception of the social capital indices, only in the case of homicide the individual social capital indicators seem to have weak effect. The only subcategory of crime that is found to be affected by all social capital indicators is serious assaults. The difference in the effect of social capital on property and violent crimes is also not that important. The only exception to this is that *trust* and *divorce* seem to have more effect on violent crimes when compared to property crimes. Another interesting result is that *charity*, *vote* and *foreign* have a significant impact on almost all of the crime categories. The other indicators are sometimes loosely related to crime rates. This point could also be taken as a point for caution for researchers who employ a single (or few) social capital indicator, as the results would highly depend on the selection of that particular indicator.

Social Capital Indicators

One of the main arguments in this chapter is that the indicators seemingly unrelated are in fact correlated with each other and represent different dimensions of social capital. Previous research argues that blood donations and electoral turnout can safely be considered to be exogenous (e.g., Guiso, Sapienza, and Zingales, 2004). By the same token, one could argue that divorce rates are exogenous too. However, it could be the case that because of higher crime municipalities become more transient and heterogeneous as opportunities attract outsiders or it could be the case that because of high crime residents are afraid to leave their homes which affects their civic participation and reduces interpersonal trust (e.g., Liska and Warner, 1991). As a further robustness check Figure 5.4 shows what happens if one employs indicators of social capital as instruments for each other. The upper and the lower panel represent the 2SLS coefficients and the t-ratios respectively. To make this point clear one can explain the methodology as following. Each social capital indicator is instrumented by the remaining five social capital indicators to estimate 2SLS models. For instance, for the first box-plot in the upper panel, all possible combinations of blood, vote, trust, foreign and divorce – is used individually, and in groups of 2, 3, 4 and 5 – as instruments for charity and the 2SLS estimation is replicated over and over again until all possible combinations are consumed. This produces a set of 2SLS coefficients and t-ratios for *charity* and the distribution of these coefficients and t-ratios are depicted as the first box-plot in the upper and lower panel respectively. This is done for all six indicators and for each case there are 31 observations (i.e., 31 2SLS coefficients and t-ratios for each social capital indicator). The (*) indicates the coefficients and the t-ratios of the social capital indicators from the OLS estimation of equation 3 (see Table 5.4). The three vertical lines in the lower panel indicate the significance levels at the 1, 5 and 10 percent level.

From Figure 5.4, the following observations stand out. First, as can be seen from the lower panel, all the 2SLS coefficients are significant at least at the 5 percent level. This supports the argument that all these indicators are related to each other and could be used as instruments for each other. Including them in the same regression would render serious multicollinearity problems.

	,000 (extended)	F-test	16.18^{***}		17.43^{***}		25.16^{***}		8.23^{***}		3.03^{**}		38.80^{***}		7.84^{***}		2.61^{*}	
T	pop>30	2SLS	-0.295	$(0.076)^{***}$	-0.328	$(0.081)^{***}$	-0.341	$(0.081)^{***}$	-0.684	$(0.191)^{***}$	-0.821	$(0.263)^{***}$	-0.387	$(0.101)^{***}$	0.543	$(0.190)^{***}$	0.777	$(0.367)^{**}$
specification	00 (extended)	F-test	17.73^{***}		17.55^{***}		20.88^{***}		6.71^{***}		3.42^{**}		31.37^{***}		7.89^{***}		6.07^{***}	
ators in 2SLS	pop>40,00	2SLS	-0.288	$(0.073)^{***}$	-0.340	$(0.081)^{***}$	-0.383	$(0.085)^{***}$	-0.744	$(0.197)^{***}$	-0.878	$(0.274)^{***}$	-0.456	$(0.122)^{***}$	0.524	$(0.204)^{**}$	0.486	$(0.214)^{**}$
capital indic	0,000 (base)	F-test	28.92^{***}		27.61^{***}		32.54^{***}		10.27^{***}		3.52^{**}		44.86^{***}		16.64^{***}		6.91^{***}	
fferent social	pop>30	2SLS	-0.321	$(0.074)^{***}$	-0.375	$(0.083)^{***}$	-0.393	$(0.081)^{***}$	-0.776	$(0.182)^{***}$	-1.375	$(0.451)^{***}$	-0.432	$(0.101)^{***}$	0.632	$(0.188)^{***}$	0.878	$(0.271)^{***}$
able 5.7: Dif),000 (base)	F-test	20.75^{***}		19.11^{***}		22.32^{***}		7.65^{***}		4.25^{***}		32.15^{***}		12.50^{***}		9.35^{***}	
L	pop>4(2SLS	-0.323	$(0.084)^{***}$	-0.409	$(0.098)^{***}$	-0.453	$(0.099)^{***}$	-0.900	$(0.224)^{***}$	-1.166	$(0.354)^{***}$	-0.487	$(0.133)^{***}$	0.591	$(0.216)^{***}$	0.576	$(0.208)^{***}$
			SC1		SC2		SC3		charity		blood		vote		foreign		divorce	

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All coefficients are obtained from the 2SLS model (equation 4) when it is estimated with different social capital indicators. For each subsample and model the first column presents the 2SLS coefficients for different social capital indicators. The second column presents the F-test -a test of joint significance Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. of the instruments in the first stage. Detailed results are available from the authors on request.

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N=142	charity	blood	vote	trust	trustplc	foreign	divorce	movers	$_{\rm SC}$	SCI	SC2
expected sign	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(+)	(-)	(-)	(-)
crime	**	*	***	*	**	**	*	**	**	**	***
homicide	*	**	*		*		*		**	*	**
assault	***	***	***	***	***	***	***	*	***	***	***
rape	***		* *	***		***	***	**	***	***	***
robbery	***		***	*	**	***	**	*	***	***	***
theft	***	***	***		*	***			***	***	***
autotheft		***	***		*	***	*	**	***	***	***
burglary	***		**		**	***			***	***	***
drug	*	***	***		**	***	*	**	***	***	***
The significance levels der	ive from estima	tion of the ext	ended model (equation 3) for	: each crime cate	sgory and each	social capital	indicator.			
Robust standard errors in	parentheses. *	significant at 1	10%; ** signifi.	cant at 5%; ** [,]	* significant at 1	%.					

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5.5 Results









It was specifically for this reason that social capital indices were constructed. Second, the 2SLS coefficients and t-ratios are somewhat higher than their OLS counterparts. Third, the 2SLS coefficient of *trust* varies to a large extent but this is expected as *trust* figures are adjusted for the use at the municipality level as explained before in Section 5.3.1. As a further robustness check the 2SLS model is estimated by instrumenting social capital with the three instruments including them individually rather than as a group to see their individual effect on social capital in the first stage. The summary results are provided in Table 5.9. One can easily see that the percentage of Protestants in 1859 is a powerful instrument for social capital. Population heterogeneity and number of schools in 1859 do not perform as well as religiosity when used as instruments individually.

	SC	C1	SC	C2	S	C3
	(1) 1st stage	(2) 2SLS	(3) 1st stage	(4) 2SLS	(5) 1st stage	(6) 2SLS
	\mathbf{SC}	crime	\mathbf{SC}	crime	\mathbf{SC}	crime
foreign1859	-0.472	-0.145	-0.418	-0.164	-0.378	-0.182
	$(0.098)^{***}$	(0.102)	$(0.088)^{***}$	(0.115)	$(0.075)^{***}$	(0.128)
F-test instrm.	23.01^{***}		22.59^{***}		25.26***	
protestant1859	0.450	-0.407	0.436	-0.419	0.481	-0.380
	$(0.084)^{***}$	$(0.102)^{***}$	$(0.081)^{***}$	$(0.112)^{***}$	$(0.062)^{***}$	$(0.093)^{***}$
F-test instrm.	28.63^{***}		28.74^{***}		60.40***	
#school1859	0.216	-0.467	0.207	-0.486	0.156	-0.646
	$(0.099)^{**}$	$(0.262)^*$	$(0.089)^{**}$	$(0.283)^*$	$(0.086)^*$	(0.420)
F-test instrm.	4.76^{**}		5.37^{**}		3.30^{*}	

Table 5.9: Different 2SLS specifications for crime and social capital

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

All coefficients are obtained from the 2SLS model (equation 4) when it is estimated by including instruments individually. rather than as a group of three. F-test is a test of significance of the instrument in the first stage.

Detailed results are available from the authors on request.

Differences in Income

Fourth robustness exercise involves including income measures to the extended model. It might be the case that income levels rather than income inequality explain variation in crime. Five different indicators of income are included separately in the regression to assess the responsiveness of the coefficients of three social capital indices. These are, (i) income_p: income per person (no distinction between full time and part-time employment), (ii) income_t: income per person (of those who work 52 weeks a year), (iii) income_w: income per person of western origin (of those who work 52 weeks a year), (iv) income_nw: income per person of non-western origin (of those who work 52 weeks a year), (iv) income_nw: income per person of non-western origin (of those who work 52 weeks a year), and (v) income_gap: income_w / income_nw. Figure 5.5 displays summary results of this exercise. Original standardized coefficients are compared to coefficients resulting from five different estimations for three SC indices. The inclusion of income indicators does not change the previous findings. Including income per person of full-time em-

ployees and income of non-western foreigners tends to reduce the SC coefficients slightly.



Figure 5.5: Standardized coefficients of SC when controlled for different indicators of income

Population Heterogeneity

Next, crime rates could display variance across ethnic communities. For instance, keeping all other factors constant assume that there are two communities with similar level of foreigners residence but one has higher crime. The mix of foreigners might explain this difference. There might be less crime in municipalities where the majority of foreigners are from European countries. To test this, the extended model is re-estimated by differentiating between foreigners of western and non-western origin. When comparing different groups standardized coefficients could be misleading, so the actual impact on crime is calculated instead. Presence of one percent of non-western foreigners is associated with 0.18 percent higher crime, whereas this is only 0.13 for western foreigners. The results are meaningful as on average the foreign population is about 15 percent of total population. So for instance, presence of 10 percent non-western foreigners in a municipality accounts for 1.8 percent crime on average.¹⁹ One possibly expects this trend to persist for

 $^{^{19}}$ On average the overall crime rate is about 5 percent, so 10 percent of non-western foreign population accounts for about 30 percent of overall crime



Figure 5.6: Origin of foreigners and differences in crime rates

different crime categories. Figure 5.6 depicts the effect of the presence of nonwestern and western foreigners, with the original effect for different crime types.²⁰ As can be seen from the graph this is not exactly true. Only in the case of theft and robbery presence of non-western foreigners is associated with higher crime. There are negligible differences between non-western and western foreigners for other categories of crime.

The empirical strategy in this chapter incorporates heterogeneity and divorce rates in a social capital index, so in a way the argument is that these indicators affect outcomes through social capital. However, most empirical crime models assess the effect of these variables individually. For this reason, the extended model is re-estimated by OLS and 2SLS by including *divorce*, *foreign* and *SC3* index in the same equation. The results are summarized in Table 5.10, rows (3) and (4). The first two rows present the coefficients from the original estimations. The presence of social capital still seems to be an important indicator even after including *divorce* and *foreign* as independent variables. The effect of *SC3* reduces considerably but this does not change our conclusions.

 $^{^{20}}$ Murder and rape are omitted from the graph as the effects are very small and the differences between western and non-western foreigners are minor.

	Table	0.1U: Aller	nauve spec	CHICALIOUIS	to exprant	crime anne	renuals		
		SC1	SC2	SC3	foreign_1859	prot_1859	educ_1859	foreign	divorce
Original coefficients of	(1) OLS	-0.260	-0.240	-0.286 /0.0553***					
OLD and 20L5	SIS6 (6)	(0.047) -0.905	0.049) -0.398	(0.00) -0.341					
CTIOIDATTICO		(0.076)***	$(0.081)^{***}$	$(0.081)^{***}$					
When divorce and	(3) OLS	~	~	-0.144				0.400	-0.029
foreign is included				$(0.064)^{**}$				$(0.105)^{***}$	(0.095)
as independent	(4) 2SLS			-0.227				0.345	-0.066
variables				$(0.121)^{*}$				$(0.134)^{***}$	(0.096)
When historical	(2) OLS	-0.249			-0.081	-0.092	-0.029		
variables are		$(0.055)^{***}$			(0.058)	$(0.051)^{*}$	(0.054)		
included as	(9) OLS		-0.213		-0.056	-0.102	-0.039		
independent variables			$(0.057)^{***}$		(0.057)	$(0.052)^{*}$	(0.056)		
4	(2) OTS		~	-0.263	-0.053	-0.067	-0.047		
				$(0.067)^{***}$	(0.056)	(0.055)	(0.056)		
When the most influential	(8) OLS	-0.239	-0.229	-0.269					
observation is removed		$(0.045)^{***}$	$(0.047)^{***}$	$(0.053)^{***}$					
(according to Cook's D)	(6) 2SLS	-0.299	-0.336	-0.349					
)		$(0.076)^{***}$	$(0.080)^{***}$	$(0.080)^{***}$					
When the first five most	(10) OLS	-0.240	-0.223	-0.263					
influential observations		$(0.043)^{***}$	$(0.045)^{***}$	$(0.050)^{***}$					
are removed	(11) 2SLS	-0.288	-0.329	-0.339					
(according to Cook's D)		$(0.072)^{***}$	$(0.078)^{***}$	$(0.078)^{***}$					
When the most influential	(12) OLS	-0.240	-0.220	-0.268					
observation is removed		$(0.044)^{***}$	$(0.045)^{***}$	$(0.053)^{***}$					
(according to DFBetas)	(13) 2SLS	-0.300	-0.333	-0.348					
		$(0.075)^{***}$	$(0.079)^{***}$	$(0.079)^{***}$					
When the first five most	(14) OLS	-0.236	-0.220	-0.275					
influential observations		$(0.043)^{***}$	$(0.043)^{***}$	$(0.047)^{***}$					
are removed	(15) 2SLS	-0.324	-0.358	-0.377					
(according to DFBetas)		$(0.081)^{***}$	$(0.085)^{***}$	$(0.082)^{***}$					
The significance levels derive from	the estimations of	different specificat	ions of the extende	ed model (equation	3). Dependent vai	riable is overall cri	me rates.		
Robust standard errors in parenthe	ses. * significant s	ut 10%; ** significa	nt at 5%; *** sign	ificant at 1%.					

ovnlain arimo difforentiale enocifications to Table 5 10: Alternative

5.5 Results

Another assumption that the empirical strategy rests on is that the exogenous variation in social capital depends on historical instruments. The 2SLS estimations only take this exogenous variation into account, which in a way assumes that historical instruments are the only indicators that matter. This is of course not true. One way to deal with this problem is to run OLS estimations controlling for historical instruments (e.g., Bloom, Sadun, and Van Reenen, 2007). Rows (5) to (7) display summary results for the estimations when three instruments are included as independent variables. Comparing rows (5) to (7) with the first two rows it can be observed that the results change slightly. Moreover, the findings also reinforce the quality of the instruments as it is clear that the instruments do not have impact on current crime levels.

Finally, as a further robustness check, the most influential observations are omitted using two criteria: Cook's D and Df Betas. For each criterion first the most influential observation and then the first five most influential observations are taken out and the extended model is re-estimated. Table 5.10, rows (8) to (15) summarize the results of these exercise. The coefficients of the three social capital indices remain significant at the 1 percent level.

5.6 Conclusion

From a community governance perspective, communities play an important role in crime prevention by providing informal social control, support and networks. As Dilulio (1996) puts it, the presence of social capital provides community-oriented solutions to the crime problem and these solutions are more important than increasing expenditure on police or incarceration.

The estimates in this chapter suggest that communities/cities with higher levels of social capital have lower crime rates. These estimates are robust and the causality of this relationship has been addressed carefully. Generally, a one standard deviation increase in social capital reduces crime by roughly around 0.30 of a standard deviation. These estimates contribute to finding an explanation for why crime is heterogeneous across space.

Institutional development in the past is employed as a proxy for current social capital. Hence, social capital is treated as a long-term phenomenon, which stock has been build during a long period of time. From a policy perspective, this makes this study difficult to apply because the measures of social capital cannot be changed rapidly but need long-term investment. On the positive side, for instance, the results reveal that crime is higher in municipalities where more youth is present. Informal education in the early stages of the life cycle provided by the family and community control and support could act as an important mechanism to reduce youth crime and later on to build networks.

Chapter 6

Investing in institutions: The case of Turkey and the EU membership

Daddy watch your little black sheep run.

Sweet Dreams, Tori Amos.

6.1 Introduction

Chapters 3 and 5 have shown the interplay between formal and informal institutions by arguing that formal institutions shape informal institutions in the long run. In chapter 4, to utilize these findings, we have devoted attention on the policy aspects of informal and formal institutions and seek answers regarding what kind of institutions are necessary to maintain and improve the current state of EU countries in terms of innovation and economic development. One implication is that, especially in developed countries formal institutions (e.g., education) and informal institutions (e.g., social capital) are of complementary nature. However, given the fact that research along this line is still premature it is not easy to draw policy conclusions. This chapter is an attempt to unveil further policy implications arising from this study. The main argument is that investing in institutions assists countries to achieve dual objective. On the one hand, creating and supporting "right" formal institutions has short and medium run implications, such as improvement in labour and financial markets. On the other hand, formal institutions also have an impact on how society functions thus indirectly affecting values, norms and informal institutions. To materialize these arguments, the issue of Turkey's membership to the EU is taken as a case not only because of the timely debate on this issue but also that investing in institutions is a credible and sustainable suggestion to resolve the ongoing discussion for the past 50 years regarding Turkey's membership.

We wish to advance the argument that getting passed the near-stalemate in negotiations over Turkey's membership to the EU needs to be more explicitly based on recognition of the key role played by formal and informal institutions in structuring the modes of governance in Turkey and between Turkey and the EU member states. This recognition does not imply acceptance or rejection of certain core values that for long have governed and given identity to each and every one of these states. Such recognition is the first step toward seeking solutions that work through and build on, rather than dismiss, the institutions through which governance is exercised. Working through institutions entails embracing some institutions in both camps as legitimate while recognizing that others need to be counter-balanced in the medium term through economic and other incentives and neutralized in the long term through development programmes and macroeconomic policy with a potential to pave the way for the formation of desirable institutions in a (still) emerging market economy such as Turkey. The premise is that strengthening institutional ties between Turkey and the EU will not only increase the probability of Turkey becoming an EU member but also will boost Turkey's capacity to strengthen its position in social and economic aspects. Cooperation along these lines also offers an important opportunity to start a process of understanding and healing to thwart a potentially serious cultural divide (along religious lines) with quite significant global implications.

This chapter focuses on the relations between Turkey and the European Union. It begins with an historical overview of the Turkey-EU relations to highlight some of the pertinent facts that underlie the analysis. To illustrate the latest mood in the debate, the arguments for and against Turkey's membership to the EU are examined. By using data from the European Values Study (EVS), section 6.2.2 shows that many of Turkey's supposed cultural differences with the rest of Europe are based more on (mis)perception rather than evidence and contrary to the general belief (e.g., Jose Manuel Barosso's recent speech referring to Europe's common values). European values relating to religion and democracy are not as common as they are believed to be. The differences between Turkey and the EU are more of political and economic nature and, as such, could only be addressed through increased integration of Turkey into Europe by strengthening institutional ties which in turn would lead to a formal and equitable membership, rather than pressures that could lead to Turkey's isolation. Put differently, further work to bring Turkey into the EU's fold can only be done through institutional capacity building with deliberate EU support in Turkey and within the EU based on full recognition of diversity and multi-culturalism.

6.2 Historical context, past and present

Post-Soviet political change in Europe in the 1990s, the rise of Islamic fundamentalism in the Middle East and other regions culminating in the attack on the World Trade Centre Towers on September 11, 2001, the subsequent wars in Afghanistan and Iraq, and increased anxiety about the large number of Muslims in Western Europe are some of the key factors that have redefined the parameters of the discourse on Turkey's EU membership. Other issues include the banning of the Islamic head-cover for women in French schools, the politically motivated murder of Theo van Gogh in Amsterdam by a Muslim extremist, and the anti-Danish and anti-European demonstrations in Islamic countries following the printing of caricatures of the prophet Mohammad in Denmark and other European countries. In addition, there has been a general "hardening" of the position on the Armenian question by some governments.¹ There are those, like Nicolas Sarkozy of France and Angela Merkel of Germany who have openly opposed Turkey's membership or called for a special status arrangement - the so-called "privileged partnership" between the EU and Turkey. The opposition is based in part on the premise that the Muslim immigrants have not integrated well into the European way of life and thus are a threat to social cohesion in smaller countries like Denmark and the Netherlands.² Another major issue is the prospect of a significant increase in the number of Muslims in formal European institutions if Turkey, with a population of 72 million, becomes a member of the EU. A related concern is the projected financial burden imposed on the EU by the much poorer Turkey. However, in the EU's official assessment these projections "have been based on current EU policies and the present performance of the Turkish economy, ... [and] are ... highly speculative" (Report of the Independent Commission on Turkey, RICT, pp. 25-26).

Another parameter is the mismatch between civilizations. It has been argued that "a multi-ethnic, multi-cultural and multi-faith Europe could send a powerful message to the rest of the world that the 'Clash of Civilisations' is not the ineluctable destiny of mankind...Europe could play an inestimable role in future relations between the 'West' and the Islamic world" (Report of the Independent Commission on Turkey, RICT, p. 16). On the other hand, excluding Turkey from Europe may aggravate the already uneasy relations with Islamic nation states. According to Wallerstein (2004), barring Turkey from European Union membership increases the likelihood that the moderately Islamic and pro-Europe government of Turkey might give way to a less moderate regime and something that would rebound on Europe significantly. Indeed, despite the reservations expressed by some of the EU members, the official view of the EU is consistent with this line

¹ The French and Canadian governments, for example, have been insisting with increasing intensity that the Turkish state must own up to its historical role in the injustices suffered by the Armenians during the World War I.

 $^{^2}$ However, that many second and third generation immigrants still see themselves and are generally treated as "the other" is testament to the inadequacies in policies and programmes to institutionalize multi-culturalism in these countries.

of reasoning. The official EU position cautions against disappointing Turkey's hopes for membership. Failure to accommodate Turkey is likely to provide fuel for the advance of ultranationalist as well as Islamist currents, leading to further destabilization of an already volatile region (RICT, p.22).³

Arguments for:	Arguments against:
Turkey is considered to be a large and dynamic	Increasingly, anti-EU membership proponents
emerging market with a liberalized market-	in Turkey argue that the EU is not sincere
based economy.	about accepting Turkey as a member.
Turkey enjoys a high degree of economic inte-	Turkey's large and poor population would cre-
gration with the EU (as indicated by its mem-	ate direct (e.g., EU budget, structural funds)
bership of the Customs Union, for example).	and indirect (e.g., flow of Turkish workers) fi-
	nancial burden to the other members.
Turkey's membership would validate the claim	Cultural and religious differences as well as po-
that the EU is an open and inclusive com-	litical volatility and weak democracy represent
munity of nations capable of drawing strength	insurmountable barriers to Turkey's member-
from cultural and religious diversity.	ship of the EU. (This sentiment is shared by
	both EU members and different anti-EU mem-
	bership groupings in Turkey).
Turkey's parliamentary system is compatible	Turkey's large population would create a bias
with the western European political systems.	in favour of Turkey in EU decision making:
	Turkey would be the second most powerful
	state in terms of the number of votes.
Turkey is a geopolitical bridge between the	
west and the east bordering the major oil	
fields.	

Table 6.1: Arguments for and against Turkey's membership

The arguments against Turkey's membership fall under two headings: (i) economic and political reasons, and (ii) the belief that Turkey is culturally different and that Turkey can not be associated with European values. Given this brief historical summary, we wish to summarize the arguments for and against Turkey's membership of the EU (Table 6.1) and contextualise them in a framework to carry out a preliminary institutional analysis.

6.2.1 Economic and political issues governing membership

Turkey's application for full-membership in 1987 was rejected on the grounds that Turkey was not as yet a sufficiently developed economy. The EU recommended that Turkey should put efforts into increased economic integration with Europe, suggesting that Turkey enters a Customs Union agreement with the EU as a prerequisite for being considered for membership. Turkey signed a Customs Union

³ The Turkish government has taken a series of measures to counter the arguments against its membership. One such measure is the publication in 2000 of the results from a survey conducted by TESEV, Turkey's leading think-tank. A key finding of the survey is that the secular system of government in Turkey has the overwhelming support of the Turkish people. While the majority of those surveyed considered themselves as devout Muslims, they also believed that religion should not interfere with political life (RICT, p.28). This conclusion is consistent with the findings, based on the analysis of the EVS, reported later.

agreement with the EU in 1995 and became the only non-member state of the European Customs Union.

Nowadays, Turkey has come to be considered one of the world's ten most promising emerging markets (Rouleau, 2000). The economic structure is marketbased and liberalized, in line with the current trends in majority of the industrialized countries and recently has been described as a "functioning market economy" for the first time by the European Commission (European Commission, 2005, p. 54). With the signing of the Customs Union, Turkey's economy became progressively integrated into the European economy (e.g., Togan, 2000, 2004) as depicted in Figure 6.1. For example, around 50% of all imports into Turkey in the past ten years have come from the EU countries. Approximately 55% of Turkey's exports are destined for EU countries.⁴ There are numerous joint ventures with European companies, notably in the automotive sector, such as Fiat-Tofas and Oyak-Renault.



Figure 6.1: Share of EU25 in Turkey's trade and FDI

More than 60% of foreign owned companies operating in Turkey are European companies. Foreign Direct Investment (FDI) from European firms stands

 $^{^4}$ For a detailed analysis of Turkey-EU economic relations with a special attention on customs union, see Togan (2000, 2004). All the figures are calculated from original data available from Turkish Statistical Institute and Undersecretariat of Foreign Trade.

at roughly 60% of the total FDI received while Turkish FDI is clearly directed towards the EU and other European countries: 53% of total Turkish FDI in the last 25 years has been invested in the EU countries. In monetary terms the share of FDI in Turkey by the EU countries has doubled from 1986 to 2002, reaching 65% of all FDI Turkey received in the period 1986-2002.⁵

However, by the time of the 1997 Luxembourg meeting the priorities of the EU had changed, resulting in the decision to turn down Turkey's membership application because Turkey did not meet the Copenhagen Criteria, laid down by the European Council in Copenhagen in 1993. There were now political as well as economic conditions to be met by Turkey prior to being considered for membership.

Currently, opposition to Turkey's membership is expressed in terms of Turkey having a weak and volatile democracy, a much larger population and much lower standards of living. The question of democracy in Turkey notwithstanding, Turkey's membership will impose a financial burden on the EU while the country assumes a strong voice in the decision making process due to its large population. In assessing the impact of Turkey's membership on the EU voting Baldwin and Widgren (2005) argue that under the Constitutional Treaty scheduled to come into effect on November 1, 2009 Turkey would be the second most powerful member state after Germany superseding other member states such as France, the United Kingdom, and Italy. There is also a general concern that on membership, Turkish workers would "flood" western European labour markets. It is worth pointing out that similar concerns were raised about Polish workers moving to Western Europe in search for better employment prospects after Poland became a member of the EU. While there was some movement in the short-term from Poland to Western European countries, this did not persist. For instance, since the last enlargement in 2004 a monthly average of 14,000 people have been immigrating to the United Kingdom from the eastern EU countries. However, the British economy seems to have had the capacity to absorb them and there has been little sign of disruptions in the labour market as a result of these developments.⁶

Another key argument against Turkey's membership, although sounds ridiculous, is its geographical location. It is argued that only 5% of Turkey's total area lies in Europe and therefore Turkey cannot be considered as European. However, the condition of being in Europe geographically is not applied to Cyprus, which is geographically located rather to the east of Turkey, or Malta, which is closer to Africa than to Europe. Cyprus is considered as "European" because of its historical (economic and political) links with Europe not because of geography. The same argument can be applied in support of Turkey's membership.

 $^{^{5}}$ Unfortunately, this integration has drawbacks. Under the Customs Union agreement Turkey is expected to act in accordance with the common trade policy of the EU. But, as Manisali (2004) points out, because Turkey does not have membership privileges, complying with the agreement restricts Turkey's policy space. Moreover, Turkey has not received most of the 2.5 billions of euros promised by the EU as a compensation for the adverse effects of Customs Union on the Turkish economy.

⁶ Internet source. Accessed 13.03.2006

 $http://www.ukimmigration.com/news/2006_03_01/uk/slowdown_in_jobseekers.htm.$

The geographic argument is particularly redundant when one views Europe as a "dynamic social construct" or "an imagined community that can change according to circumstance and political leadership" (Wetenschappelijke Raad voor het Regeringsbeleid, WRR, p. 25). There are numerous political, economic, and social reasons for the construct to include Turkey.

Many of the opponents of Turkey's membership point to the weaknesses of the Turkish legal system, which remains ineffective. As well, almost everyone agrees that corruption is rife in the country and there is a sizable informal economy (see Table 6.3). The Turkish government's efforts in recent years to reform its judicial system and set up functioning state institutions to effectively structure and regulate the economy have been lauded by the European Commission but deemed insufficient to warrant grounds for membership talks. But there is a limit to how much of the institution building can be "engineered" and imposed by the Turkish state in a top-down and isolated fashion. At any rate, there are numerous historical examples that suggest that top-down institution building runs the risk of never becoming fully embedded and is prone to reversal or implosion, as was the case with many state-enforced formal institutions in the former Soviet Union and the Eastern Bloc. In section 6.3 we argue that embedding new institutional forms, such as the legal system to align Turkey with the rest of the EU, will require support from the ground up and external impetus which, in the case of Turkey, can come from the European Union.

The strength of the 'against' camp in Turkey

A recent phenomena that has affected the EU-Turkey relations is the rise of the "against" camp within Turkey. In the past numerous appearances against Turkey's membership have occurred in Turkey. Lately the arguments of this anti-EU camp have reached a level of maturity, are more reasonable and more pronounced in the Turkish public and media. As an evidence, the recent Eurobarometer survey shows that only %48 of the Turkish citizens think that EU membership is good as opposed to about %75 when Turkey received candiditate country status in 2004. Fail to address these allegations might create serious problems leading to a slow down in the negotiations.

Cultural differences are played up by both Europeans and Turks opposed to Turkey's membership. Religious fundamentalists in Turkey promote the view that Turkish Islamic culture would decline under pressure from the non-Muslim Europe. The ultra-Nationalists in Turkey play on the insecurity of Turks about their national identity and threats to its stability. Dissolution of a Turkish state is feared as a possible consequence of complying with the EU vision and rules about minority rights and the need for a more inclusive mode of governance that gives stronger voice to national ethnic and religious minorities. Recently the Nationalist Movement Party (MHP) changed its policy towards the EU and Turkey's membership by arguing that neither Turkey nor the EU would benefit from Turkey's membership, labelling the negotiations as a "tactical distraction" that would undermine Turkey's current position.⁷ The ultra-left and the Communist Party of Turkey argue that the EU is nothing more than an instrument that rapidly integrates Turkey into world capitalism and the global market.⁸

Khan (2005) argues that anti-Islamic sentiments in Europe strengthen anti-EU sentiments in Turkey which might play a significant role in undermining the accession talks:

"The more Turkey's culture is criticized by voices in Europe, the tighter Turks may pull the blanket of national and cultural identity around themselves. Ultimately, the real danger to Turkey's bid for EU membership may not lie in the difficult negotiations ahead in Luxembourg, but among those Turks who believe they will never really be accepted in the EU club - and who say good riddance." (Khan, 2005, p. 41)

There is a strong sentiment among many Turkish intellectuals (and a large proportion of the public) that the EU-Turkey relations are not based on reciprocity and shared interests. The EU is said to be benefiting more than Turkey from this relation with no demonstrated willingness to help Turkey with some of its many worries about national security and economic stability. Emre Kongar, a well-known Turkish intellectual, states that the EU would stand to benefit the most from the accession talks since the talks are largely focused on what Turkey should do in terms of reforms to meet the EU's approval without the EU making any commitments to help Turkey in seeing to its domestic priorities including potential ethnic strife, Cyprus, and the diplomatic chasms with Greece.⁹ Ismail Cem, the former Minister of Foreign Affairs of Turkey, has complained that the EU has formed a seemingly deliberate habit of bringing specific issues such as Cyprus, relations with Greece, and the treatment of Kurds and Armenians in Turkey into the discussions over and again, even if a consensus has been reached on these issues in previous negotiations (Cem, 2005). Although the EU stresses that membership decision is objective, i.e., tied to economic and political criteria, it is a fact that the EU has given priority to some countries over others in their efforts to fulfill these criteria (e.g., Sjursen, 2002). Unfortunately, Turkey has never been in such a privileged status.

On the contrary, Turkey has been given a long list of unwritten criteria. These include the demand by some member states that accession talks be "open-ended" and not necessarily result in full membership, that there should be "permanent" limitations on (Turkish) labour-mobility, insistence on the recognition of Cyprus,

⁹ Internet source. Accessed 16.12.2005.

http://www.kongar.org/aydinlanma/2004/448_AB_nin_Deli_Olmasi.php

⁷ Internet source. Accessed 16.12.2005.

http://www.yenisafak.com.tr/arsiv/2005/agustos/09/p05.html. ⁸ Internet source. Accessed 16.12.2005.

http://www.tkp.org.tr/index.php?kat=585&yazi=725.

	Ottoman Empire vs Europe, 19th	Turkey vs European Union, 20th cent.
	cent.	
Economic	Starts with extending capitula-	Starts with the agreement of Ankara
demands	tions in the 18th century and ends	(1963). The attempts to liberalize the
	with Baltalimani trade agreement	capital markets were finalized by full
	with the United Kingdom in 1838,	capital mobility in 1989. This acceler-
	(and later with other European	ated economic integration and eventu-
	countries) which grants certain	ally led to customs union with the EU
	privileges to UK traders. Conse-	in 1995. As a result, Turkey is entitled
	quently, local traders and produc-	to act in accordance with the common
	ers were unable to compete with	trade policy of the EU, but is not able
	foreigners that later caused eco-	to shape the policy since Turkey is not
	nomic bankruptcy of the empire at	a member state. This means that the
	the end of the 19th century.	economic relations are based on one-
		way economic integration.
Political	Most of the political demands	Most of the political demands (human
demands	by the Europeans regarding the	rights, the issue of Cyprus etc.) were
	rights of Christian minorities and	granted by amendments in constitu-
	foreigners (living in Ottoman ter-	tion, civil law and variety of other ad-
	ritory especially foreign traders)	justments within a period of 10 years
	were granted with the moderniza-	(the process is still pending). This
	tions attempts 'Tanzimat' (1839)	resulted in meeting the terms of the
	and 'Islahat' (1856).	Copenhagen criteria.
Recognition	Ottoman Empire was recognized	Turkey was recognized as a candidate
as a	as a part of the 'European Con-	country (The period from December
European	cert'. Paris Peace Agreement	1999 to 17 December 2004).
state	(1856).	

Table 6.2: Turkey-EU relations from Ottoman era to Republic of Turkey

Note: For a thorough discussion see Kazgan (1999).

admission by Turkey to responsibility for the killing, displacement, and persecution of Armenians in the aftermath of the first world war, and a willingness to address the unresolved Kurdish question. Given this long list of complex issues, it is perhaps little wonder that many of the EU member states have no intention of embracing Turkey as a member. The key question here is not whether or not these issues should be used against Turkey's membership but how the membership of the EU will accelerate and strengthen Turkey's attempts to address these issues.

A public opinion survey conducted by the Turkish Economic and Social Studies foundation in 2002 reveals that although around 65% of the respondents support EU membership, the question on sincerity of the EU regarding Turkey's membership rated as 3.7 on a scale of 1 to 10 (Kirisci, 2002).¹⁰ It is perhaps not

¹⁰ This disappointment is noted by Ahtisaari and Rohan of the Independent Commission on Turkey: "The same is true of the reported intention of some Governments to have the so called 'Privileged Partnership' concept explicitly included in the negotiating framework as alternative to full membership. This proposal has also been discussed at last December's [2001] European Council meeting and was rejected, resulting in a reference to 'open-ended negotiations' in the Council's conclusions. Such wording, which has never been used in previous enlargement rounds, may have somewhat ruffled Turkey's feathers, but was finally accepted as constructive ambiguity

very surprising that the public opinion in Turkey is increasingly turning against Europe, harking back to the historical distrust in relations between Turkey and its European neighbours.¹¹ Many of the Turkish opponents of membership draw parallels between the Turkey-Europe relations in the second half of the twentieth century and the relations between the Ottoman Empire and European powers in the 19th century, arguing that joining Europe now could well result in the demise of the Turkish Republic just like closeness to Europe undermined the Empire in the nineteenth century (Table 6.2).

6.2.2 How common are European values and how different is Turkey?

Approach

Twenty-five years ago Geert Hofstede in his influential study, 'Culture's Consequences: International difference in work related values', investigated the work related values of people in over 50 countries, who worked in local subsidiaries of IBM. He identified four-dimensions of national culture. In all four dimensions Turkey was grouped with other European countries such as Belgium, France, Greece, Portugal and Spain. This section shows that many of Turkey's supposed cultural differences with the rest of Europe are in fact unsubstantiated by analyzing the data from the European Values Study, 1999 (EVS). There is extensive support for the argument that the social and cultural differences between Turkey and the EU are largely exaggerated, based more on (mis)perception and unsupported by empirical evidence. Moreover, European common values are not as common as they are believed to be and Turkey fits reasonably well within this range of heterogeneity. The analysis focus on fundamental values such as individual's views on religion and democracy, since these values seem to feature strongly in statements against Turkey's EU membership.

EVS was designed to measure change and persistence in people's social and demographic characteristics, fundamental value orientations and norms in ordinary life. The study provides detailed data on social structure, family, religious affiliation etc. One common problem in such datasets is that the sample size for each country may not reflect the true population of the country. Since our intention is to compare countries we adjusted the original data using population weight as a remedy to complications that may arise from over-sampling. This adjustment ensures that each country is represented in proportion to its population size. We formed seven country groups for comparison:¹²

so often used in international diplomacy".

¹¹ In a recent study Ulagay (2005) argues that there has been an increase in anti-EU sentiments in Turkey and anti-integration sentiments in EU countries. He also points out that there is general disappointment with what the EU has delivered to date, which was manifested in the rejection of the European Constitution in the referenda in France and the Netherlands

 $^{^{12}}$ EVS does not provide data on Cyprus.

- EU15: 15 EU member countries prior to the latest enlargement.
- EU27: All current EU member states excluding Cyprus.
- EU12: All member states joined EU since 2004, excluding Cyprus.
- EUNORTH: Four northern European member states in the EU15: Denmark, Finland, Netherlands and Sweden.
- EUSOUTH: Four southern European member states in the EU15: Greece, Italy, Portugal and Spain.
- LATE COMERS: Two new member states Bulgaria and Romania, and Croatia.
- FORMERSOV: Three former Soviet countries: Belarus, Russia and Ukraine.

Appendix C, Tables C1 and C2 present the detailed average scores, standard errors and the measurement scale of each variable for Turkey and the 7 groups defined above. To highlight the heterogeneity within the EU27, we make use of the range and present in brackets the code for the country corresponding to the maximum and minimum scores. The detailed results in the appendix are summarized in Figures 6.2, 6.3 and 6.4. To compare all variables on a similar measurement scale the indicators were standardized so that the mean of each indicator is zero. The figures present the distribution of each indicator for 26 EU countries plus Turkey. The figures represent the median, 25th and 75th percentile as indicated by the upper and lower hinges of the box and the smallest and the largest value (excluding the outliers) as indicated by the spikes. The average of each variable is zero and the position of Turkey is shown by the symbol "o".

Empirical findings

This section questions the validity of the arguments against Turkey's membership based on cultural differences. The perceived belief in European public is that (i) Turkey is overwhelmingly religious and religion is supported by the family, the education system and the government, (ii) mix of weak democracy, political system and importance of religion renders individual value orientations that are incompatible with the EU member states. The discussion below shows that these beliefs are in fact unsubstantiated.

A key finding is that for almost all the variables relating to religion, Turkey falls within the range of values representing the importance of religion among the EU27. However, for a better understanding we need to compare the variables (v6, v101 and v115) which relate to questions on believing in god and on whether the respondents belong to a religious denomination. As expected the proportion of respondents who believe in god or who at least belong to a religion is higher in Turkey when compared to the average of the EU15 or the EU27 (Appendix C, Table C.1 and Figures 6.2 and 6.3). This early observation is supported by two sets

of detailed questions on individuals' view on the importance of the church/mosque in individual, family and social life, and on the importance of religious services. For most of the indicators, Turkey's scores are still somewhat larger than the EU average but are in moderate levels oscillating between the minimum and maximum score of the EU27.

A striking finding is that Turkey's scores are close to the EU average when respondents are asked how religious they are or how often they attend religious services (v110 and v105). This indicates that Turkey's population is not as religious as commonly perceived or, to put it in another way is only as religious as the other EU countries.



Figure 6.2: How different is Turkey from the EU25: Religion (main variables)

A suggested extension is to examine the role of religion in education (v106 and v172). In European countries attendance in religious services is higher in childhood than in adulthood. However, Turkey's scores do not display such a structure. When the responses to the two questions are combined it is hard to assert that the children in Turkey are exposed to more religious education (either from the family or the from education system), than their European counterparts. This finding is also supported by an optional question. Respondents were asked whether they support the argument that time should be set aside for prayers and meditation in schools on a scale 1 'strongly disagree' to 5 'strongly agree'. The

averages for seven countries for which the data is available are as follows: Italy (3.78), Austria (3.64), Turkey (3.54), Bulgaria (3.06), Lithuania (3.05), Germany (2.94) and Czech Republic (2.62). The findings show that the respondents from Italy and Austria support this argument more strongly than the respondents in Turkey. With respect to parental views on religion in education, we find that Turkey is also not that different from the rest of the EU.

Turkish respondents' position regarding the questions assessing the effect of religion on public office and government decision making is in line with the above findings (Figure 6.3). This is further supported by an optional question that asks the respondents to assess the involvement of church/mosque in national politics on a scale 1 'no, absolutely not' to 4 'yes, absolutely'. The mean scores for seven countries are as follows: Luxembourg (2.98), Germany (2.89), Croatia (2.79), Turkey (2.79), Finland (2.71), Austria (2.68), Lithuania (2.66), Czech Republic (2.58) and Romania (2.52).



Figure 6.3: How different is Turkey from the EU25: Religion (secondary variables)

Turkey's scores on the indicators regarding individuals' responses about the democratic political system are promising when compared to the other EU countries (v220 - v223, Appendix C, Table C.2 and Figure 6.4). For all of the four cases Turkey's position is comparable to 12 new member states and the three new comers. This finding is a clear indication of the importance of democracy in Turk-

ish political system despite the young age of the republic and despite occasional deficiencies in preserving democratic system.

It seems that the idea of a political system with a strong government and where the army is a major ruling factor receives more support in Turkey than its European counterparts (v216 and v218). While significant, this finding needs to be contextualized: The army is viewed by many in Turkey as a major force to ensure the sustenance of a modern, secular (though authoritarian) nation state. It is only recently that the Turkish political system has been able to function without explicit reference to or intervention from the army. There is strong popular support for the army as a major stabilizing force in Turkey's system of governance despite human rights concerns as a major issue for Turkey due to the army's periodic use of excessive force and political suppression to bring about order and maintain the state apparatus. In this case our findings show that Turkey's score falls significantly out of the range for the EU27 (v224).



Figure 6.4: How different is Turkey from the EU25: Democracy

These findings show that Turkey does not stand out when compared to other European countries regarding basic values. Relating to indicators on religion, in only 2 out of 20 indicators Turkey's scores are outside the range of EU27. In most cases the scores oscillate between the minimum and the maximum of EU27 and for seven indicators they are comparable to EU15. However the most important finding is that in practical terms respondents in Turkey are not as religious as they are believed to be as reflected by the indicators on attendance in religious services (v105 and v106) which are close to the EU15 average. The evidence provided also supports the view that religious belief system does not have significant impact on the ideology of the state (e.g., Balkir, 2001). Concerning the indicators on democracy the results reveal mix evidence. The results reveal that more has to be done to institutionalize democracy in Turkey (see Figure 6.6).

The most legitimate criticisms of Turkey's weak democracy notwithstanding, it appears that the objection by some EU member countries to Turkey's membership is based on a misperceived belief that Turkey's mix of ethnicity and culture (including religion) is incompatible with that of Europe in general (e.g., Lino, 2004; Wood and Quaisser, 2005). Unfortunately these misperceptions are systemic and shared by the European public, even those who hold a conciliatory view on Turkey's membership. For example, a recent speech by Jose Manuel Barroso, the president of the European Commission, on the issue of the cartoons of the prophet Mohammad makes reference to Europe's "common values and traditions" such as respect for personal life and freedom, freedom of speech and a clear distinction between politics and religion (Barroso, 2006). However, as the analysis clearly shows there are significant differences in the common values and traditions of the EU member states, including the relation between politics and religion (v129-v132). Moreover, given the ongoing debate on what these common values are and the questions of 'what is Europe?' and 'what is its identity?' (e.g., Paasi, 2001) it makes little sense to argue against Turkey's membership based on as-yet-undefined European values and identity characteristics.

These misperceptions even have historical roots reaching back to 16th century. In De bello turcico (On the war against the Turks, 1530) Erasmus refers to the Turks as "wicked barbarians" who are trying to confine Christianity to a narrow land.¹³ According to Erasmus the Turks have established an immense empire not because of their own merits but due to Christian sins as he wrote "... we have angered God and caused him to send the Turks against us, just as he sent frogs, lice and locust upon the Egyptians long ago...". Having made such sharp comments about the Turks the document as a whole has a rather positive conclusion that war must never be undertaken unless, as a last resort, it cannot be avoided. Nevertheless his conclusions do not change the fact that his perceptions regarding the Turks were negative in nature. Since then, social, economic and political climate has changed in great extent. But have the perceptions regarding the Turks changed as well? Is the European software of the mind, to paraphrase Geert Hofstede¹⁴, is programmed against the Turk? The ongoing debate on Turkey, Islam, clash of civilizations and the EU is a fine piece of evidence that in essence such perceptions have not changed much in the past 500 years, although they have softened and evolved to another dimension. These questions invite a European wide

 $^{^{13}}$ For an English translation see Erasmus ([1530] 1990).

¹⁴ See Hofstede (1997).

public discussion that would enable a healthy negotiation process between Turkey and the EU. Given the strength of the against camp within Turkey, it is best to complement these efforts by enhancing Turkish public approach to Europeans and EU institutions.

To sum up, there is significant heterogeneity of views on basic values in EU15 and EU27, particularly when we compare northern and southern European countries. Rather than disappoint, this finding should be the beacon call for the EU policy makers to recognize the differences and look for common grounds based on a vast reservoir of strengths. The success of the European project significantly depends on the performance of the EU in bonding, bridging and managing this heterogeneity. It is clear that a well-designed institutional system is a prerequisite for success in this regard.

6.3 A sustainable institutional framework

There are two opposing views regarding Turkey's EU membership: (i) why should Turkey become a member, and (ii) why should not (Table 6.1). This section provides evidence that differences between Turkey and the EU are of institutional nature and thus best be addressed by investing in formal institutions. In other words, unless Turkey is integrated in the EU institutionally, these two opposing arguments will become obsolete. The real question then is whether Turkey will or will not become a member rather than whether it should or should not.

As discussed in the previous sections there are two legitimate reasons against Turkey's membership. Frankly, the most important amongst them, i.e., that Turkey is economically underdeveloped and poor, has been ruled out by the EU itself by granting Bulgaria and Romania membership status. This has become highly questionable now given the fact that the level of economic development in Turkey is comparable (and even better) to these two recent EU member states. If the reason is that Turkey's 'wrong' cultural and religious mix as put forward by many others, it has been shown in the previous section that this is largely exaggerated and based on historical perceptions rather than facts. Even if this is the case, as the French anthropologist Claude Levi-Strauss argues "one culture has no absolute criteria for judging the activities of another culture as low or noble" (cited in Hofstede, 1997, p. 7). What, then, is keeping Turkey away from the EU? Is there a sustainable path toward Turkey's membership?

Figure 6.5 depicts a framework that enables a healthy discussion. The first 40 years of EU-Turkey relations can be viewed as a game with repeated interactions and information asymmetries (e.g., Spence, 1973; Axelrod and William, 1981) which expected to be trust building in cooperation (e.g., Durlauf and Fafchamps, 2005) and which would eventually have resulted in Turkey's membership. However the rules of the game changed considerably due to political reasons (e.g., end of cold war and expansion of the EU towards eastern Europe). What really put an end to



Figure 6.5: A framework for EU-Turkey relations: Past, present and sustainable future

this period, labeled as the 'past' here, was the negative signals that both parties sent to each other. For instance, Turkey did not meet the economic criteria to be considered as a candidate country although having accomplished advancements, such as the financial liberalization and the customs union with the EU. Moreover, state of emergencies and military takeovers have undermined the democratic values (see Figure 6.7). The EU displayed a matching negative attitude towards Turkey's membership. Especially after the collapse of the Soviet Union the attention shifted towards eastern European states and away from Turkey signaling how Turkey's membership was valued by the EU officials thus giving a fine impression that EU was not serious regarding the membership. There were other factors accumulated through time that were seemingly unimportant but turned Turkish public opinion against the EU.¹⁵ Consequently, membership expectations were not realized and the rejection of Turkey's application as a candidate country in 1997 marks the end of this period.

The current situation resembles the past except the fact that now Turkey holds

¹⁵ For example, most of advancements of the 1958 Ankara agreement, such as the freedom of movement of people, was never realized and Turkey is yet to receive most of the 2.5 billions of euros promised by the union to compensate for possible adverse effects of customs union on the Turkish economy (see Manisali, 2004, for details).

a candidate country status. Current EU 'wait and see' position is that if Turkey successfully deals with its shortcomings, the membership could be discussed. This 'left-alone' and 'open ended' policy pursued by the commission coupled with frequent pronouncements that Turkey should rather be given a 'privileged member' status cast doubts on the sincerity of the EU. Under these conditions the ongoing negotiations are unsustainable for two reasons. According to the first scenario, Turkey continues to struggle meeting Maastricht criteria. Moreover, the political issues such as the problems in eastern Turkey with the Kurdish minority, the Armenian genocide and the unresolved Cyprus issue will continue to be a burden. We reckon that, in isolation, Turkey will have difficulty in dealing with this long list of political and economic demands. Hence, negotiations will be delayed and with a high probability Turkey will not become a member not even in the medium-long run. This might result in a privileged membership, what most current contestants pronounce these days. A more interesting scenario is that Turkey deals with its major economic, social and political problems in isolation, follows a successful negotiation round and fulfills the criteria to be an EU member. Most contestants would argue that the ultimate outcome would be an EU membership in such a case. But we do not because of a simple cost-benefit analysis. If Turkey follows such a path, Turkish public would inevitably question whether Turkey should become an EU member and constrain its possibility space given the fact that Turkey is able to solve major problems in isolation without deliberate help from the EU. This inquiry is surely not idle. Well played by certain political parties and the "against" camp, this seemingly innocent questioning may cause Turkey rejecting an EU membership. This second scenario, if ever realized, would perhaps be a shock to the European Union with rather important regional and global implications.

What labelled as "future" here relies on a more sustainable path that would most probably result in Turkey's membership. A preliminary analysis of the formal and informal institutions in Turkey shows that many pieces of the institutional puzzle for Turkey's membership are in fact in place but require additional external impetus to become fully embedded. Here institutions are viewed as structuring phenomena and manifest at different levels of inter-relation, scales of governance, and spheres of the political economy (e.g., Parto, 2005b). Applying the levelsscales-spheres perspective to institutions yields a loose but necessary typology of institutions (Figure 6.6).

Implicit in the arguments that Turkey is not yet ready for the EU membership is the largely justified claim that Turkey has fewer and less effective formal institutions for democratic government than industrialized economies of Western Europe. Figures 6.7 and 6.8 depicts constraints on executives and institutionalized democracy for three EU member countries together with Turkey.¹⁶ As can be

 $^{^{16}}$ Both indicators are taken from POLITY IV data set. The former has already been employed in chapter 3 and discussed in details in the appendix to chapter 3. The latter is an index of 11 point (0 to 10) that is composed of four variables and measures at what degree democracy is
Behavioural Institutions as standardized (recognizable) social habits – manifest in instinctive behaviour of individuals and groups as reflections of social norms	Cognitive Institutions as mental models and constructs or definitions, based on values and embedded in culture – aspired to by individuals and groups	Associative Institutions as mechanisms facilitating prescribed or privileged interaction among different private and public interests – manifest in activities of groups of individuals	Regulative Institutions as prescriptions and proscriptions – manifest as the immediate boundaries of action by individuals and groups	Constitutive Institutions setting the bounds of social relations – manifest as the ultimate boundaries of action by individuals and groups
Informal; Social				Formal; Societal
Adapted from Parto	(2005b)			

Figure 6.6: Characteristics and manifestations of institutions

seen from the figures Turkey displays high degree of volatility in both indicators as opposed to other countries that display a gradual shift (except Italy). This is a preliminary evidence on how fragile the Turkish institutional landscape is. To support this preliminary evidence data has been gathered from CESifo Database for Institutional Comparisons in Europe (DICE). Table 6.3 presents data on formal (legal, political, economic and education) and informal institutions (trust, social capital, corruption) comparing Turkey with selected EU member states.¹⁷ To make the comparisons easier each indicator is rescaled so that '0' represent the lowest and '1' to highest value. These figures reveal that for all indicators of institutional landscape Turkey's position is poor compared to other EU member states. Table 6.3 and Figures 6.7 and 6.8 provide fine piece of evidence that some of the key existing formal institutions such as the military, the National Security Council, and the Constitutional Court tend to serve an authoritarian state while others such as the various amendments to the judicial code remain ineffective or poorly implemented. A significant portion of socio-economic activity is governed

institutionalized in a country. Higher values indicate that democracy is institutionalized. The selection of these countries is due to the fact that they resemble to Turkey in some aspects and also because that most other European countries do not display large variations in these indicators. For more information see http://www.systemicpeace.org/inscr/p4manualv2006.pdf.

¹⁷ The detailed description of each indicator is given in Appendix C.

through "clientalism" and patronage (Sözen and Shaw, 2003). However, Turkey is not alone in this characterization. To illustrate, corruption is often cited as one of the key undesirable institutions that play a major role in Turkish society. No attempt has been made, as far as we have been able to determine, to compare corruption in Turkey with well-documented corruption and organized crime in southern Italy. That Turkey should be singled out for having an abundance of detrimental informal institutions is arguably one-sided.



Figure 6.7: Constraints on executives in selected European countries

The use of the typology of institutions depicted in Figure 6.6 in analysis elsewhere has illustrated that managing fundamental change will require government intervention as a main catalyst. However, such intervention succeeds only if it resonates with the pre-existing behavioural and cognitive institutions (Parto, 2003). In the context of the EU and in the case of Turkey, governing change as a role needs to be assumed jointly by the European Commission and the Turkish government. The former can provide structural support (including funds, expertise, and incentives) while the latter can ensure that any and all proposed changes are cognizant of the nature and importance of behavioural and cognitive institutions, i.e., knowing what "works" in the local environment and what is acceptable to the general populace. The impetus required for embedding associative, regulative, and constitutive institutions in Turkey needs to come from a higher level of government that includes the European Commission as a major player. Put differently, insti-



Figure 6.8: Institutionalized democracy in selected European countries

tutional change-making in Turkey requires policy making at a supra-national scale of governance. The mode of governance at the EU scale is not (yet) conducive or committed to institutional change-making in Turkey.

However, it is important to recognize that commitment by the EU to accept and integrate Turkey as a full member will serve only as a first step, albeit an important one, in a long and challenging process of institutional change in Turkey. The Republic of Turkey continues to be governed by a strong-handed, centralized, and bureaucratic state apparatus inherited from the Ottoman Empire. Under this system of governance, the society belongs to, and is expected to, serve the state. This mode of governance severely limits the emergence and sustenance of independent civil society organizations and other institutional forms characteristic of democratic governments. Sözen and Shaw (2003) point to the autonomous military, the National Security Council, the Constitutional Court, and the civil service as the (regulative and constitutive) institutions (Figure 6.6) of the state to maintain the status quo through their dominant role in the policymaking structure. In Turkey "the views of the military normally dominate the decisions of the [National Security Council] whose recommendations...have always become national policies" (Yücel, 2002, cited in Sözen and Shaw, 2003, p. 110).

		LEGAL 1	SNOILUTITSN		POLITICAL II	NSTITUTIONS	ECO	NOMIC INSTIT	LUTIONS
	Rule of law	Impartial	Judicial inde-	Protection of	Government ef-	Voice and ac-	Business regu-	Economic	Bariers to en-
		courts	pendence	property rights	fectiveness	countability	lation	freedom	trepreneurship
Austria	0.89	0.84	0.62	0.76	0.82	0.80	0.64	0.22	0.18
Belgium	0.74	0.50	0.45	0.74	0.79	0.86	0.24	0.29	0.64
Denmark	0.97	0.97	0.93	1.00	1.00	1.00	0.63	0.06	0.05
Finland	1.00	1.00	1.00	0.97	0.96	0.95	1.00	0.15	0.32
France	0.67	0.56	0.24	0.88	0.66	0.80	0.28	0.55	0.68
Germany	0.84	0.91	0.83	0.97	0.64	0.88	0.59	0.20	0.41
Greece	0.37	0.31	0.34	0.38	0.34	0.61	0.12	0.65	0.23
Ireland	0.82	0.53	0.52	0.56	0.69	0.83	0.51	0.02	0.00
Italy	0.36	0.34	0.24	0.53	0.27	0.70	0.10	0.33	0.68
Netherlands	0.90	0.91	0.90	0.82	0.93	0.93	0.92	0.00	0.09
Portugal	0.58	0.38	0.69	0.56	0.43	0.84	0.23	0.40	0.14
Spain	0.56	0.28	0.03	0.56	0.60	0.76	0.43	0.36	0.27
Sweden	0.94	0.81	0.79	0.94	0.89	0.96	0.86	0.12	0.27
Turkey	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
United Kingdom	0.87	0.91	0.79	0.97	0.86	0.87	0.57	0.05	
All the figures are re	scaled so that 1 r	epresents the high	hest and 0 the lowest	value. For impartia	l courts, judicial inde	spendence, protection	of intellectual proj	perty rights and h	ousiness
regulation, figures a	re for 2002. Decisi	ion making in edu	ication, trust and soci	al capital figures ar	e for 1999. The rema	ining figures are for 2	2004. All data on f	ormal institutions	s is
sourced from CESife	DICE. See Appe.	ndix C for details							

Table 6.3: Institutional comparisons between European countries

	Table	6.3: Instituti	ional compa	urisons betwee	in Europea	n countries (cor	tinued)	
		EDU	JCATION			INFORMAL I	SNOITUTITSN	
	Г	Decision making in	education syste	m (in %)				
	Central	Regional	Local	School	Trust	Social capital	Corruption per-	Control of cor-
							ception	ruption
Austria	27	22	23	29	0.45	0.39	0.80	0.84
Belgium		32	25	43	0.38	0.43	0.66	0.64
Denmark	19		38	44	1.00	0.67	0.97	0.95
Finland	2		71	27	0.85	0.60	1.00	1.00
France	24	10	35	31	0.25	0.23	0.60	0.61
Germany	4	47	17	32	0.48	0.27	0.77	0.77
Greece	80	4	33	13	0.28	0.45	0.17	0.29
Ireland					0.48	0.42	0.66	0.67
Italy	23	16	15	46	0.43	0.30	0.25	0.32
Netherlands				100	0.88	0.85	0.85	0.84
Portugal	50	8		41	0.07	0.04	0.48	0.53
Spain		72		28	0.53	0.27	0.60	0.61
Sweden	18		36	47	0.98	1.00	0.92	0.88
Turkey	49	27		24	0.00	0.00	0.00	0.00
United Kingdom	11		4	85	0.37	0.26	0.83	0.83
All the figures are re rights and business r	scaled so that equilation. figur	1 represents the high es are for 2002. Dec	hest and 0 the low vision making in e	vest value. For impar aducation, trust and s	tial courts, judi social canital fig	cial independence, prote mes are for 1999. The r	ction of intellectual p emaining figures are f	roperty or 2004.
All data on formal in	astitutions is so	ourced from CESifo	DICE. See Appen	idix C for details.	D		0	

The insistence by the state apparatus that constitutive and regulative institutions of governance should serve the sovereignty and authority of the Turkish state above all else has had significant repercussions for the emergence and legitimization of civil society-based associations. For example, trade unions and business associations are strongly discouraged from voicing opinions about public policy. This could clearly be seen in Table 6.3. For instance, "voice and accountability" measures the extent to which citizens and civil societies are able to participate in the selection of governments and Turkey's position is unquestionably low compared to other EU countries. The modus operandi for engaged participation in matters of policymaking seems to be through "a wide variety of clientelistic relationships" (Özbudun, 1981), patronage, and sometimes corruption. Informal institutions such as patronage, kinship, and even corruption play important instrumental roles in Turkey and numerous other less democratic societies. Change in informal institutions is often slow and requires a time perspective that spans generations rather than elected governments. Policy aimed at further integration of Turkey into Europe needs to recognize the likely persistence of older, culturally embedded informal (behavioural and cognitive) Turkish institutions and devise innovative incentives and disincentives to catalyze the formation of new institutional forms that minimize or neutralize the role of older and less desirable institutions.

Where "culture" (e.g., Tabellini, 2005), or behavioural and cognitive institutions according to this typology (Figure 6.6), acts as a major impediment to better economic performance, policy should provide for investments in education, affordable finance to facilitate the emergence of local entrepreneurs, and decentralization of administrative and political powers to lower scales of governance to stimulate the accumulation of social capital. For instance in decision making in education Turkey's system is mainly governed by the central authorities and only one fourth of decision making is done at the school level (Table 6.3). More generally, institutions are created formally through actions of authority or emerge organically to bring order and predictability to interactions among individuals and organizations (e.g., Parto, 2005a). In either case, institutions are reflections of learning by individuals and organizations and created to structure inter-relations (and thus determine the mode of governance) among individuals and organizations. Much of what remains to be done for Turkey in its attempts to develop institutional capacity for the EU membership has to be prompted by the EU, not only as ideal type models to be adopted by Turkey (as was the case with the legal system, for example) but also through "interactive learning" and "learning by doing", to paraphrase Bengt Lundvall and Richard Nelson. To continue on its path of learning from the EU member states, Turkey needs to interact with the EU Community socially, economically, and politically as an equal partner in need of direct assistance from the other members. EU membership for Turkey is likely to provide a much-needed impetus for the emergence of an institutional landscape more compatible with Europe's liberal democracies and capable of facilitating further economic expansion of Turkey and its integration with the EU.

6.4 Discussion and Conclusion

The analysis in this chapter has established that many of Turkey's supposed differences with EU in terms of fundamental values are exaggerated and unsupported. Turkey is less likely to effectively address the outstanding membership requirement issues in isolation from the EU. The critical point is that it would be at best difficult for Turkey to overcome barriers to membership and integration into the EU without the support from the EU. If the question is simply "why should the EU help Turkey overcome its challenges?" it has been argued that there are numerous political benefits for Europe and the global community to justify direct and overt assistance by the EU to integrate Turkey into Europe through full membership.

However, the formal acceptance of Turkey into the EU and the commitment to assist Turkey to overcome its many issues are only the start of a long process of structural and institutional change likely to span generations. The slowness in the process of change is largely attributable to Turkey's institutional landscape. Turkish institutions, like institutions in other countries, are manifestations of historical circumstances, learning, and evolution. One policy implication is that the EU should recognize the many similarities between Turkey and the EU, as indicated in the analysis, and assist Turkey to overcome its institutional capacity deficiencies for membership through cooperation. It has been shown that regarding values on religion and democracy, Turkey is not that different from other EU member states. Moreover, section 6.2.1 has shown that there is a high degree of economic integration between Turkey and the EU. Given the poor record of Turkey in various indicators assessing the institutional landscape and institutional effectiveness, we argue that policies towards institutions should be the focus that govern the relations between Turkey and the EU. Major improvements could be accomplished in this arena that would also affect informal institutions in the medium long-run.

It has been shown in chapters 3, 4 and 5 that historical institutions and the educational system have played significant roles in shaping the current state of European regions through their effect on social capital. Collectively, these arguments underline the importance of historical record of institutions and education in shaping current social capital and thereby explaining the differences in regional economic development. An immediate implication of these findings is that EU policies such as provision of structural funds and framework programs should be complemented with specific programs to enhance institutional capacity and human capital. In the long run, such policies will nurture the formation of formal institutions in such arenas as education which in turn encourages the emergence of informal institutions manifested as changed values and increased social capital. The question is not which set of cultural values is "better" but to identify them and find ways to engage parties of fundamentally different creed and religion in equitable discourse about the future. To illustrate the main argument we note that Turkey has experienced a similar change not so long ago. The early political, social and economic reforms in the 1920s and 1930s, have successfully transformed an authoritarian, traditional and religious society in to a modern society. Representative democracy, secularism, reforms in family law and especially unification of education in the late 1920s have had immense impact on Turkish society and at a later stage on societal values. Given this record of successful change, the question whether Turkey is able to adapt European values and EU institutions is idle. It was accomplished before, it could be done again.

That Turkey does not have a stellar record in modern times on dealings with its ethnic questions, while not condonable, is not surprising given the young age of the Republic. It took hundreds of years and much strife before most of the industrialized nations of Europe managed to define themselves as cohesive nation states. Rather than holding Turkey hostage for its poor record of addressing its ethnic questions, the EU could cease the opportunity represented by the accession negotiations to promote and institutionalize economic progress, equity, and democracy in the Turkish political economy to create the economic and political foundations of a liberal democracy. By embracing Turkey as a member state the EU can help the young Republic in efforts to build the formal institutions that will serve as the pillars of liberal democracy in Turkey. Carefully designed and culturally sensitive formal institutions that reconcile the cultural and political differences between Turkey and industrially advanced European countries can, in time, nurture the emergence of deeply rooted political democracy, and a flourishing civil society. Turkey has made a series of first steps in reforming existing institutions and establishing new ones. To bear fruit these institutions need to be seen as an extension of the liberal democratic traditions that define most of the EU member states, and as such supported by further engagement of Turkey in the EU affairs through institutional ties as soon as possible. A positive and timely response to Turkey's wish to join the EU would pre-empt the likely popular backlash against joining the EU on the account of being rejected by the rest of the Community despite demonstrated goodwill on Turkey's part.

Chapter 7 Concluding remarks

Social capital has a wide range of applications in social sciences. Researchers have used the concept to explain various associations with socio-economic outcomes. However two important aspects have largely been ignored: (i) what forms social capital, and (ii) how social capital affects outcomes. This study has provided advancements on these relatively shallow aspects. The three main arguments of the thesis can be summarized as follows. First, by reducing transaction costs, creating new forms of information exchange and influencing behaviour through norms, higher social capital induces innovation. The empirical findings suggest that innovation works as a transmission mechanism that translates social capital to economic growth. Second, we have provided a relatively original approach to the measurement of social capital and used these new indicators to explain differences in crime rates across geographical space. Social capital reduces crime via network externalities, social support and by increasing the opportunity cost of crime. Third, institutions are important in shaping social capital. We do not focus on the complementary relation between informal and formal institutions, but rather suggest that history and formal institutional settings affect social capital in the long run. The main findings of this study are summarized below followed by suggestions and possible extensions for future research.

7.1 Summary of the main findings

The research trajectory of this study is introduced in chapter 2 by briefly referring to four different sources that previously have used the concept of social capital but have not referred to it as "social capital". These, together with the examples from British history given in the introduction, show that social capital is a multidisciplinary phenomenon. This fact has shaped this research to a great extent. Although social capital is analysed in an economics framework, our approach uses aspects of sociology including crime as a social outcome and even history showing that past institutions are conducive to current social capital. The main findings of the thesis could be summarized as follows.

Chapter 2 is an extended introduction addressing some of the issues that have kept social capital researchers busy for a long time and that are key to this study. Section 2.3 has provided comparisons between physical, human and social capital on nine dimensions. These have also helped to answer whether social capital is a form of *capital*. Trust, for example, is an interesting concept as it is one of the main components of social capital (e.g., Portes, 1998) and because it could be regarded as an output as well as an input. It fulfills the conditions to be treated as capital. One can *invest* in relationships to build trust which needs *maintenance*. Both investment and maintenance are costly (time lost) so there is an *opportunity cost*. If not invested in, trust is not maintained and it eventually *decays*. Trust facilitates economic transactions and thereby can transform resources to outcomes.

Another interesting finding of chapter 2 is the observation that cross disciplinary co-authorship among social capital researchers is rare. A simple network analysis showed that there is little communication between disciplines. These findings have implications for future research. Social capital is understood and utilized differently in different disciplines which makes the concept hard to define and to comprehend. It would be beneficial for researchers working on social capital to share information across disciplines. This information is difficult and costly to obtain if disciplines are not connected to each other.¹

Having addressed the issue that social capital is a multi-faceted concept, the following chapters have focused on three economic and social outcomes: innovation, income growth and crime. There are numerous studies relating social capital to economic outcomes, most of which have ignored the fundamental problem of how social capital affects outcomes. Both empirically and theoretically the literature offered little insight on this issue, which has created room for further research and improvement. Chapter 3 showed that innovation is one of the mechanisms that transforms social capital to income growth. Social capital induces more innovation by (i) reducing transaction costs such as monitoring costs, (ii) creating new forms of information exchange, and *(iii)* regulating selfish behaviour by instilling group norms. Chapter 3 demonstrates that trust is a robust estimator of both innovation and income growth. The second important contribution of this chapter is testing the assertion that the state of formal institutions in the past is, to an extent, important in shaping current social capital. A 2SLS strategy was employed to show that political institutions, literacy rates and the presence of universities in the 1880s have very strong positive correlations with current levels of trust after controlling for other exogenous variables. But the most important contribution of this study is merging the trust-innovation link with the existing trust-growth link. This was accomplished by estimating a simultaneous system where trust,

¹ The analysis in chapter 2 only includes prominent (star) researchers. In order to fully understand the situation, these preliminary findings should be extended to include all social capital researchers. See for instance Goyal, van der Leij, and Moraga-Gonzalez (2006) for an application to all researchers in economics. A further analysis of citations among disciplines could also reveal interesting patterns.

innovation and growth are treated as endogenous. Social capital directly affects income growth and also has an indirect effect through innovation. The empirical findings reveal that this indirect effect is much stronger than the direct effect. Three studies that have been published recently support our findings that social capital is conducive to innovation. By using structural equation modelling Kaasa (2008) show that social capital induces innovation in 162 EU regions and that different forms of social capital have different effects on innovation. Using EU regional level data and knowledge production functions de Dominicis, Florax, and de Groot (2007) show that both social capital and geographical proximity influence production of innovative output after controlling for spatial correlation. A similar exercise has been conducted by Miguelez, Moreno, and Artis (2008) for Spanish regions in the period 1989 to 2001 which returned analogous findings.

The empirical strategy to assess the robustness of the results has strengthened the findings and resulted in novel interpretations. Using a robustness methodology similar to Beugelsdijk, de Groot, and van Schaik (2004) to identify other indicators that might be conducive to innovation and income growth, we have found that perceptions in favour of the free movement of skilled labour and towards the importance of forming individual opinion are significantly associated with innovation. The latter have also been found to be a significant estimator of income growth. In the appendix to chapter 3, these results has undergone a further new robustness check. An analysis has been conducted on the estimation results of the robustness analysis (similar to meta-analysis). In this way one could see whether the presence of certain variables has impact on the probability of obtaining a significant trust coefficient. To our knowledge this type of analysis has not been done before, which makes it an interesting contribution to the existing literature. The results show that almost all cases in which the trust coefficient is not significant, another social capital indicator is present.

Chapter 4 extended the above findings in two ways. First, social capital not only increases the level of innovation, but also stimulates the growth of innovation. By modifying an empirical innovation capabilities model by Furman, Porter, and Stern (2002), we showed that social capital, measured as a multi-indicator social capital index as well as generalized trust, is positively associated with the growth of patent applications. Second, by treating EU structural funds as a form of financial capital, we have investigated the impact of objective 1,2 and 5b regional support programmes on innovation and growth. Given the level of economic development, higher levels of education and social capital imply stronger networks where communication and production are more effective. Norms that constrain selfish behaviour and values that support creativity result in an environment more inclined towards innovation (e.g., Rodriguez-Pose and Fratesi, 2004). In this environment, implementing policies is also much simpler and more effective which would in turn foster economic development. The findings imply that regions that are rich in human and social capital are better able to able to manage the innovation process.

The empirical findings in chapters 3 and 4 have important implications. First, the presence of social capital creates an innovation-prone environment that induces more innovation. However social capital is a stock concept and may take decades to form. This may partially explain why it is so hard to induce innovation in some EU regions as these regions might be lacking social capital that establishes a transient environment for venture capitalists and entrepreneurs to undertake risky R&D projects. In this case, it may not be the best strategy to blindly finance innovation, through public R&D funding and EU support. Referring to the complementarities between human and social capital in chapters 3 and 4 (e.g., Coleman, 1988), it might be a better strategy to complement these efforts by investing in human capital. Investment in education especially in the backward EU regions will enhance connectivity in the form of networks and form a receptive atmosphere, which in turn will increase the level of social capital. Given the fact that there is a large dispersion in educational levels between EU regions (8 years of difference in schooling between northern and southern Europe) it is puzzling to observe why education has not been among the primary targets of EU policy makers. The findings suggest that addressing education policy would be an effective means of improving innovation and social capital concurrently.

So far the investigation in this study have focused on economic outcomes. Having showed that social capital is conducive to innovation and income growth, it is interesting to see whether social capital affects social outcomes. As such it is natural to extend our investigation to include crime. The reason for this is two-fold: (i) crime is both a social and economic phenomenon. It has social (e.g., divorce, loss of social network, weak family relationships etc.) and economic costs (e.g., unemployment and various opportunity costs), (ii) social and economic factors affect crime. Chapter 5 utilizes these preliminary observations. We collected novel data on crime, social capital and historical indicators from 1859 household survey for municipalities in the Netherlands. Several different social capital indicators have been employed, such as blood donations, voluntary contributions to charity, electoral turnout and trust. We suppose that these indicators reflect different dimensions of social capital. The measurement of social capital is also new in the sense that, by using principal component analysis, social capital is treated as a latent construct that is composed of different dimensions. The main argument behind this measurement methodology is that it is hard to measure social capital and, as such, using a single indicator as a proxy might render wrong conclusions. Therefore, it is better to benefit from different indicators.

Chapter 5 offers a framework by which social capital reduces crime. First, if an individual is involved in criminal activity he/she risks to lose utility generating capital. In the case of financial capital this might be job loss and future unemployment. In the case of social capital it might be damage to reputation and weak family ties that might lead to divorce. In this sense the utility function here is modified to include utility generating social capital as suggested by Williams and Sickles (2002). Second, informal social control mechanisms are important in crime prevention. It has been shown that in communities where civic engagement is high people feel more responsible to act in the case of a crime (e.g., Sampson and Groves, 1989: Bursik and Grasmick, 1993; Messner, Baumer, and Rosenfeld, 2004). Third, social network externalities may play important role in reducing crime. For instance, crime could be prevented by exchanging information on malignant behaviour that may induce future crime. In a similar way, in communities where ties are strong and people care for each other conflicts are resolved in peaceful ways (e.g., Hirschi, 1969). This chapter has provided a thorough empirical investigation on these grounds. It is found that social capital, measured both in terms of individual indicators and as a latent construct, is negatively associated to crime. The empirical results are robust, (i) to inclusion of other indicators, (ii) across different subsamples and regional definitions, (iii) across different types of crime, (iv) to exclusion of influential observations and, (v) to alternative specifications. Yet the results could still be improved by taking geography and spatial correlation in to account. This seems easy to handle at first sight however it needs a thorough approach. It might be easier to argue that crime levels in a municipality are affected from unemployment and income levels of the neighbour municipalities. However it is not straight forward to assume that this holds for social capital as well. In line with the previous chapters, we also showed that the state of a municipality in the mid 19th century in terms of education, population heterogeneity and religion has a significant impact on current social capital. This last point together with the similar findings in chapters 3 and 4, needs further clarification.

We have already referred to the role of education in shaping social capital. However education is not the only formal institution that is conducive to social and economic outcomes. For instance, political institutions, universities, the intellectual property rights and justice system play vital role in commercialization of R&D efforts. Where formal institutions are not binding, social capital and norms could be a last resort to increase efficiency in economic transactions. Given the complementarity between formal and informal institutions, this study provides suggestive evidence that formal institutions and history affect the formation of informal institutions in the long run. Chapters 3, 4 and 5 provide strong evidence for this claim in different settings, for different samples and regional units. Good "social capital" forms in geographical areas where the power of the chief executive is constrained, where the level of education is high, where universities existed as repositories of culture and where the population was less heterogeneous. Using novel data collected for EU regions and for municipalities in the Netherlands, we showed that political institutions, education, universities and religion in the 1850s affected economic and social outcomes through their impact on social capital. This finding has important policy implications which are illustrated in chapter 6 by analyzing the EU-Turkey membership issue in an institutional framework.

Chapter 6 shows that Turkey's economy is well-integrated to the EU and argues that economic deficiencies that were among the most important reasons against Turkey's membership have become obsolete after the decision to welcome Bulgaria and Romania as member states. The second important argument against Turkey's membership has been the differences between Turkey and the EU member states regarding fundamental values, such as religion and democracy. However as it is shown in chapter 6, this is not supported by empirical evidence. Many of these worries have largely been exaggerated and have been governed by historical misperceptions. After providing evidence on these grounds, the main argument in chapter 6 is that differences between Turkey and the EU are rather related to the differences in institutional landscape and as such can only be addressed by investing in formal institutions. This is a more sustainable strategy, that would most probably result in Turkey's membership, if deliberately supported by the European Commission. The bottom line is that well-functioning institutions may accomplish dual objectives: (i) short run economic gains, and (ii) inducing longrun changes in informal institutions such as values and social capital. Comparisons between EU countries on an institutional basis in chapter 6 showed that there are quite significant differences regarding the effectiveness of formal institutions among EU member countries that supposedly have a similar institutional environment. Therefore, there is also room for improvement in designing and establishing correct and well-functioning formal institutions.

7.2 Suggestions for future research

The findings of this study have several implications for future research. Four of these are highlighted below.

First, this study has depicted that in order for social capital research to have policy implications we should know how social capital forms and how social capital affects outcomes. Regarding the latter we showed that innovation is a channel. However, our results are limited to developed EU regions and focus on macro outcomes such as economic growth. Future research should focus on extending the implications of this research to developing countries and other developed countries. Further research on developing countries could result in interesting conclusions especially if the findings contrast to the findings in this study. Moreover, future research should try to identify more channels that transform social capital to socio-economic outcomes. Guiso, Sapienza, and Zingales (2004) showed that financial intermediation is a channel. This study has provided evidence that innovation is another channel. It is likely that there are more. One possible way to proceed along these lines is to conduct research at the firm level. There have been numerous studies in management science on added value of social capital for firms and innovation (e.g., Nahapiet and Ghoshal, 1997; Tsai, 1998; Bouty, 2000) many of which are not acknowledged by similar literature in economics.

As discussed in chapter 3, social capital is linked to innovation via three mechanisms in a micro to macro framework. On the theoretical side, there is much to be done. The framework in chapter 3 can be fully extended by having recourse to recent research on the role of institutions in determining allocative efficiency in financial markets (e.g., Castro, Clementi, and MacDonald, 2004; Erosa and Hidalgo Cabrillana, 2008). For instance, in explaining economic development with production of investment Castro, Clementi, and MacDonald (2007) argue that entrepreneurs who cheat (or misreport) face a deadweight loss which is proportional to the quality of the institutions. Hence, the effectiveness of all institutional features that protect investors explains investment decisions and thus economic growth. However, this strand of research does not pay attention to informal institutional features such as social capital. On the empirical side, we conducted research at the macro level. Therefore, the exact transformation of social capital to innovation still remains unclear. Given the findings at the macro level, research at the firm level is promising as it has the potential to fill the gaps in this framework. Especially research on the dynamic relation between trust, social capital and the venture capital markets may render interesting findings. Social capital may be complementary to formal institutions. In such cases, it may affect the functioning of venture capital markets. On the other hand, social capital might be a substitute to formal institutions in the absence of such institutionalized seed funding. For example, Bottazzi, Da Rin, and Hellman (2007) show that, in a set of European countries, trust has a significant impact on venture capital investment decisions (see also Campo-Rembado, 2005). They further argue that trust and sophisticated contracts are complements, not substitutes. Given this finding what can we say about the optimal mix of formal and informal institutions? Do the findings above also hold for developing countries? These questions may lead to a research trajectory which is, as yet untouched.

Second, one of the main contributions of the thesis is regarding the relation between formal and informal institutions. This study has put forward the argument that past formal institutions are crucial in shaping current social capital. Having said that, this study does not cover the complex interplay between formal and informal institutions. Are formal and informal institutions complementary in character or are they substitutes? What factors affect complementarity? Considering the fact that contemporary formal institutions are very long run reflections of past values and norms, how do we disentangle the cause and effect in an evolutionary perspective? Currently, there is a lively debate on this issue which invites further research (e.g., Beugelsdijk, 2006, 2008b; Uslaner, 2008). We made an attempt in this study to highlight the importance of institutional landscape in forming social capital. Given the arguments of Williamson (2000) that norms, values and beliefs constrain formal institutions it is worthwhile investigating whether the causality between formal and informal institutions runs both ways. Future research should focus on a more encompassing approach, such as Zucker (1986). Social capital incorporates repeated interactions, general knowledge about the population (values, norms), and the effect of formal institutions. Unravelling these different dimensions to show which dimensions have become important and which have lost significance through time is another major research trajectory.

Given the argument in this study that reveals the role of past formal institutions

in shaping current values, one could easily the this study to recent research on institutions (e.g., Djankov, Glaeser, La Porta, Lopez-de-Silanes, and Shleifer, 2003; Dixit, 2004; Acemoglu, Aghion, and Zilibotti, 2006). For instance, Rodrik (2008) argues that appropriate institutions for developing countries could well be secondbest institutions that do not resemble institutions in developed countries. These could even be a mix of formal or informal institutions, if such an environment is conducive to investment, entrepreneurship, innovation and economic development. Previous works of Fafchamps (2004) in Ghana and McMillan and Woodruff (1999) in Vietnam constitute good examples of such situations. They both show that what sustains economic transaction is relational contracting (trust, reputation, personal contacts) not formal legal institutions. In such cases where formal institutions are not binding, the appropriate policy may well be strengthening these informal environment rather than setting up formal institutions which may be costly to establish and maintain (Rodrik, 2008). This suggestion does not undermine the role of formal institutions as a first-best solution (e.g., Bowles and Gintis, 2002). It rather means that they may not be appropriate solution for certain situations. Getting the right institutions that maintain an optimal informal-formal institution mix is challenging. Therefore, research along these lines is interesting, especially in an environment where most developing countries are forced to create formal institutions similar to the ones in developed countries.

A fourth possible extension is conducting similar research at the individual level. There has been a recent revival in research linking institutions and social capital to socio-economic performance (e.g., Acemoglu, Johnson, and Robinson, 2005; Tabellini, 2005; Beugelsdijk and van Schaik, 2005a; Beugelsdijk, 2006). Differences in economic growth among geographical units could be explained by the differences in political and educational institutions in the 18th and 19th centuries among them. This study has shown that institutions affect social capital (or culture) and through this channel determine the regional performance. Despite these recent advances at the macro level, there has been no substantial work at micro level. Do institutions affect social capital formation at the individual level? How do institutions affect/constrain individual behaviour? Are individual values and norms affected by institutional design and if so, how? These questions still need to be thoroughly investigated. In other words, formal institutions, such as the education system, universities, and political and governmental systems, shape individual values and norms in the long run not only by enforcing constraints on the individual behaviour, but also by creating a clash between existing informal institutions (culture, values, social capital) and rapidly evolving formal institutions.

Research on social capital is extending with very little cross-disciplinary work (Chapter 2). Given the multidisciplinary character of social capital, this observation is interesting and a cause for concern. In this regards, further research could benefit considerably by collaborating across disciplines.

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Appendix A Appendix to Chapter 3

A.1 Variable definitions

Variable	Definition
growth	Growth of per capita GDP 1990-2002, defined as the log difference of GDP per capita in the period 1990-2002. Source: Eurostat.
gdppc90	log GDP per capita in 1990. Source: Eurostat.
educ	Education defined as the share of tertiary level students (levels 5, 6 and 7) in the total number of all students in 1993, according to the International Standard Classification of Education 1976 (ISCED76) definitions. ISCED 5 covers programs that generally do not lead to a university degree but usually require successful completion of a program at the upper secondary level. ISCED 6 covers programs that lead to an award of a first university degree and ISCED 7 covers programs that lead to an award of a second or further university degree. Source: Eurostat.
pat91	Patent applications per million inhabitants centered around 1991 (average of 1990, 1991, 1992). The number of patent application is measured as "total number of patent applications to the European Patent Office(EPO) by year of filing, excluding patent applications to the national patent offices in Europe". Source: Eurostat.
pat00	Patent applications per million inhabitants centered around 2000 (average of 1999, 2000 and 2001). Source: Eurostat.
R&Dintns	R&D intensity defined as R&D personnel employment as a percentage of total employment in the business enterprize sector in 1995. Source: Eurostat.
trust	Generalized trust using the answer to the following question; "Most people can be trusted or you cannot be too careful". The answer category ranges from (0) "you can't be too careful" to (10) "most people can be trusted", with nine levels in between. The mean (std. dev.) of this measure for EU-14 countries is 4.945 (2.395) N=25,268. Source: European Social Surveys (ESS) first round in 2002.
$trust^*educ$	Interaction variable of <i>trust</i> and <i>educ</i> .
literacy	Literacy rates around 1880. See Appendix 2.1 for details.

Table A.1: Definitions of the variables and data sources

Variable	Definition
trust0	Generalized trust from EVS 1990. The respondents are asked "generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people". The interviewees were given two choices: (i) most people can be trusted or (ii) you can't be too careful. The mean value of this measure for 11 European countries is 0.369 (0.482), N=17,322. Source European Values Survey (EVS) in 1990.
instXXXX	Proxy for past political institutions as measured by "constraints on the ex- ecutive" as defined in the POLITY IV data set. This variable captures "institutionalized constraints on the decision making powers of chief exec- utives" coded on a scale 1 to 7, 1 representing "unlimited authority" and 7 "accountable executive constrained by checks and balances". Information is available separately for five dates: 1600, 1700, 1750, 1800, 1850. See Appendix 2.3 for details.
instAVR	Average of <i>inst1600</i> , <i>inst1700</i> , <i>inst1750</i> , <i>inst1800</i> and <i>inst1850</i> . See Appendix 2.3 for details.
instPC	First principal component of <i>inst1600</i> , <i>inst1700</i> , <i>inst1750</i> , <i>inst1800</i> and <i>inst1850</i> . See Appendix 2.3 for details.
univF	Measures the period of existence of a university in a region defined as "univ F = 2000 minus the foundation date of the university". Higher values reflect the existence of universities in a region for longer periods. See Appendix 2.4 for details.
univN	The density of universities defined as the number of universities per 100,000 population around 1850. See Appendix 2.4 for details.
univAVR	Average of the standardized values of $univF$ and $univN$. See Appendix 2.4 for details.
univPC	First principal component of standardized values of $univF$ and $univN$. See Appendix 2.4 for details.
urban	Urbanization rates defined as the share of population living in towns greater than 30,000 in total population in 1850. See Appendix 2.2 for details.

Variable	Definition
polactiv	Could take an active role in a group involved in political issues.
trustlgl	Trust in legal system.
trustep	Trust in European Parliament
ginveco	The less government intervenes in economy the better it is.
lawobey	The law should always be obeyed.
ecohenv	Economic advances harm the environment.
immig	Immigration good or bad for country's economy.
skill	All countries benefit if people can move where their skills are needed.
minority	People of minority/ethnic group in ideal living area.
shrtrad	Better for a county if almost everyone share the same customs and traditions.
shrreli	Better for a country if almost everyone share the same religion.
help	How often help others not counting voluntary work.
impsupport	To be a good citizen: How important to support people worse off.
implaw	To be a good citizen: How important to always obey in laws.
opinion	To be good citizen: How important to form independent opinion.
social	Take part in social activities compared to others in the same age.
cath	Percentage of Catholic.
prot	Percentage of Protestant.
orth	Percentage of Orthodox.
othc	Percentage of other Christian.
jewi	Percentage of Jewish.
isla	Percentage of Islam.
east	Percentage of eastern religions.
olson	Active member of Olson groups such as, trade unions, political groups or
	parties and professional associations. These groups are believed to hamper
	economic growth because of lobbying cost for instance. See Olson (1982)
	for details.
putnam	Active member of Putnam groups such as religious organizations, education
	and cultural groups, and youth work associations. Putham, Leonardi, and
	Nanetti (1993) suggests that these groups enhances trust and civic life hence
J	are conducive to growth.
aomgr	Dominant religious group, snare in total population.
irscale	Pontical opinion: Left-right scale.
suragremp	share of agricultural employment in total employment 1990. Source: Euro-
shrindomp	Stat. Share of industrial employment in total employment 1000 Source: Eurostat
smindemp	Share of industrial employment in total employment 1350. Source. Eurostat.

Table A.2: Definition of the variables employed in the stability analysis

Data source for all the variables, except *shragremp* and *shrindemp*, is ESS.

A.2 Further details on historical data

A.2.1 Historical data on literacy rates

Data on literacy come from different sources. Below we present in detail the variable definition and the data source for each country. For most of the cases the information available is the percentage of the population that can read and write - including the people who can read only - in 1870s and 1880s.

Table A.3: Detailed information on literacy rates data

Country	Variable definition and data source
Austria	The literacy rate is defined as the percentage of the population that is able to read and write including people who can read only in 1880. The data for West-Osterreich is the average of Salzburg, Tyrol and Voralberg. Data source: Flora (1983).
Belgium	Percentage of the population that is able to read and write in 1880. The percentage of the population who can read only is higher than the percentage of people who can read and write by about 15 percent. We therefore inflated each regional figure by 15 percent. Data source: Flora (1983).
Denmark	Percentage of the population that is not literate $(100 - \text{illiteracy})$. Information available only for males in 1860. Data source: Cipolla (1969).
Finland	Percentage of the population, 10 years or older, that is able to read and write and read only in 1880. Data source: Flora (1983).
France	We have used the average of three source of information available: (i) percent- age of the population able to read (69.2%) in $1871/72$, (ii) army recruits able to read (83%) , (iii) percentage of bridegrooms and brides able to write their names $(84\%$ and $74\%)$, respectively. No regional information available around 1880s. Data source: Flora (1983).
Greece	Approximate figure: Greece was occupied by the Ottoman empire till the 1830s and then ruled by the Bavarian Prince Otto (later changed name to Othon). In several sources it is mentioned that, in the rural areas of Greece the education level was very low in the second half of the 19th century. Given that urbaniza- tion rates were well below the average and the similarity of the Greek regions with other Mediterranean regions, (such as Southern Italy 20.4%, Southern Spain around 20%, Serbo-Croation estimated as 22-29% in 1870s and 80s) we suppose the literacy rate in Greece was about 20 percent in 1880s. No regional information available. Data source: Cipolla (1969) and Flora (1983).
Germany	Literacy defined as (100 – illiteracy in population aged 10 years or older) in 1871. For Baden-Wuttemberg, Bayern, and Thuringen we took the aver- age of the neighboring regions Hessen-Nassau, Westfalia, Saxony. The figure for Bremen and Hamburg is the average of Hannover and Schleswig-Holstein. Since there is not an exact correspondence to Saarland in the source data, we replace it with the available information on Rheinland-Pfalz. The cor- respondence of the remaining current regions and regions in Cipolla (1969) is as follows : Berlin (Berlin), Brandenburg (Brandenburg), Hessen (Hessen- Nasau), Mecklenburg-Vorpommern (Pomerania), Niedersachsen (Hannover), Nordrhein-Westfalen (Westfalia), Rheinland-Pfalz (Rheinland), Sachsen (Sax- ony), Sachsen-Anhalt (Saxony) and Schleswig-Holstein (Schleswig-Holstein). Data source: Cipolla (1969).
Ireland	The data represent the average of percentage of people, +5 and +10 years old, respectively who are able to read in 1880. Data source: Flora (1983).
Italy	Literacy defined as (100 – illiteracy in population aged 5 years or older) in 1881. For cases in which there are no explicit regional matches between the current Italian regions and the source(s), we employed the following correspon- dence: Valle D'Aosta (Piemonte), Friuli-Venezia-Giulia (Veneto). For Umbria there are important differences between two data sources, so we have used the average (in Cipolla (1969) 26%; in Flora (1983) 33%). Data source: Cipolla (1969) and Flora (1983).
Netherlands	Percentage of army recruits able to read in 1880. No regional data are available. Data source: Flora (1983).
Portugal	Literacy rate as defined by Tortella (1994). No regional information is available.
Spain	Literacy rates for the population aged 10 and older. Data source: Nunez (1990).

Country	Variable definition and data source
Sweden	Percentage of army recruits able to read and write and percentage of recruits able to read in 1880. Data source: Flora (1983).
UK	Literacy figures are derived from the percentages of brides and grooms sign- ing the marriage registers with marks in 1870. The numbers were aggre- gated using the population statistics in Mitchell (1988). The correspondence of current UK NUTS1 definitions and regions in Stephens (1973) are as fol- lows: North East (Durham, Northumberland); North West (Cheshire, Cum- berland, Lancashire, Westmorland); Yorkshire-Humber (Yorkshire); East Mid- lands (Derbyshire, Leicestershire, Lincolnshire, Northamptonshire, Notting- hamshire, Rutland); West Midlands (Herefordshire, Shropshire, Staffordshire, Warwickshire, Worcestershire); East of England (Bedforshire, Cambrisdge- hire, Essex, Hertfordshire, Huntingdonshire, Norfolk, Sufflok); Greater Lon- don (London, Middlesex); South East (Berkshire, Buckinghamshire, Hamp- shire, Kent, Oxfordshire, Surrey, Sussex); South West (Cornwall, Devonshire, Dorset, Gloucestershire). Data for Scotland are for 1871 and from Cipolla (1969). Data for Northern Ireland are from Flora (1983) and represent the per- centage of people able to read in 1880. Data source: Cipolla (1969), Stephens (1973) and Flora (1983).

A.2.2 Historical data on urbanization and population

The population of each region is calculated from the available data at http://www.library.uu.nl/wesp/populstat/populhome.html. The original data sources can be found at http://www.library.uu.nl/wesp/populstat/sources.html.

In general, the regional population data belong to years ranging from 1849 to 1861. Specifically: Belgium (1849); Austria, Denmark, Germany, Finland and Portugal (1850); Netherlands and Spain (1849/50); Greece and Sweden (1850/51); France and UK (1851); Italy (1861). For Greece we manage to find regional information only for region Attiki. The scores for other three regions are simply the country average.

The urbanization rate is defined as the percentage of population living in towns with more than 30,000 residents about 1850. The city population data are mainly from Bairoch, Batou, and Chèvre (1988). We also calculated urbanization rate considering cities with more than 20,000 residents. The difference between the two variables is less then 5% for most of the regions, excluding Mecklenburg-Vorpommern (DE8), Cantabria (ES13), Navarra (ES22), Valenciana (ES52), Illes Balears (ES53), Andalucia (ES61), Murcia (ES62), Nord-Pas-De-Calais (FR3), Puglia (ITF4), Sicilia (ITG1), Sardegna (ITG2), Oost Nederland (NL2), Zuid-Nederland (NL4) and North East (UKC).

A.2.3 Historical data on institutions

To capture the impact of past political institutions on current social capital we employed the data on "constraints on the executive" as a proxy as defined in the POLITY IV, Political Regime Characteristics and Transitions, 1800-2002. This variable captures "institutionalised constraints on the decision making powers of chief executives, whether individuals or collectivities". It is coded on a scale 1 to 7, (1) representing "unlimited authority" and (7) "accountable executive constrained by checks and balances", categories (2), (4) and (6) referring to intermediate situations. Below we summarize each category according to the POLITY IV Project, Dataset Users Manual (pages 23-24) accessible also via the POLITY IV web page available at http://www.cidcm.umd.edu/inscr/polity/. (1) Unlimited authority: Refers to cases in which there are no regular limitations on the executive's actions. For instance, situations in which constitutional restrictions on executive action are ignored; constitution is frequently revised/suspended; there is no legislative assembly or even if there is one it is dismissed at the executive's initiative.

(3) Slight to moderate limitation on executive authority: Existence of some real but limited constraints on the executive. Example evidences: Legislature can initiate some categories of legislation independently of the executive and is able to block implementation of executive acts and decrees or cases in which independent judiciary is present.

(5) Substantial limitations on executive authority: The accountability group has substantial constraints on the executive. For instance cases in which a legislature or a party council can modify or defeat executive's proposals or in which the accountability group makes important appointments to administrative posts.

(7) Executive parity or subordination: In most areas of activity the legislature or the parliament has effective authority equal to or greater than the executive. Examples of evidence: The accountability group initiates most important legislation; the executive is dependent on the legislature's continued support to remain in office.

We manage to compile information for most of the data points in our data set following Acemoglu, Johnson, and Robinson (2005) and in particular Tabellini (2005). In case of missing observations for some regions and countries the POLITY IV data set available from the web page of the POLITY IV project has been consulted. Above data sources enabled us to gather information on more than 70 EU regions in our data set. For regions for which no data are available, we coded the variable "constraints on the executive" in the same way as the POLITY IV dataset considering the political institutions in a 40year window around each date. Information is available for five dates: 1600, 1700, 1750, 1800 and 1850. Below we present detailed information on how we coded some regions as well as the data sources for each country.

Country	Variable information and data source
Austria	At the end of 17th century most of the current Austrian lands were under the control of Habsburgs, accept the ecclesiastical states Salzburg and Voralberg. This situation did not change till the beginning of 18th century; the Habsburgs gain more power and control over the territories. After the Habsburgs, the area was dominated by the Austrain Empire. The states did not have individual power and the political environment in this period can be identified as an absolutist monarchy. Polity IV data set codes Austria as (3) only after 1860 and before that it is coded as (1). Acemoglu, Johnson, and Robinson (2005) code 1850 as (2) and all remaining years as (1). Since we are interested in a 40-year window around 1850, we coded 1850 as (2) suggesting a transitory period.
Belgium	Data source: Tabellini (2005)
Denmark	Data source: Acemoglu, Johnson, and Robinson (2005)
Finland	Finland was an integral part of Sweden till 1803 and then mainly dominated by Russia. As the executives of both countries were mainly absolutist, Acemoglu, Johnson, and Robinson (2005) codes Finland as (1) for all periods. We also coded Finland as (1) for all of the 5 data points.
France	Data source: Tabellini (2005)

Table A.4: Detailed information on political institutions data

Country	Variable information and data source
Germany	For Baden-Wurttemberg, Bayern, Bremen, Hamburg, Hessen, Niedersachsen, Nordrhein-Westfalen, Rheinland-Pfalz, Saarland and Schleswig-Holstein we use Tabellini (2005). Berlin and Brandenburg: Berlin was under the domi- nance of Brandenburg (and later Prussia) in most of the period that we are interested in. The period 1648-1790 is described as the period of absolutism for Brandenburg and Prussia (Holborn, 1982). Therefore, 1600, 1700, 1750 and 1800 are coded as (1). The POLITY IV data set codes Prussia as (1) between 1800-1839; (2) between 1840-58; and (3) between 1859-1889. Therefore, we coded 1850 as (2) suggesting a transitory state. Mecklenburg-Vorpommern: Even after the separation in 1815, Mecklenburg-Vorpommern was mostly af- fected by absolutism. Therefore, in line with the other German states we code 1850 as (2) and all four dates before 1850 as (1). <u>Sachsen</u> : Under domina- tion of Saxony. POLITY IV codes Saxony as (1) between 1806-30 and (3) between 1831-1871, except a period of 8 years between 1840-47. All dates were coded as (1) before 1850 and 1850 is coded as (3). <u>Sachsen-Anhalt</u> : Sachsen-Anhalt was part of Saxony. POLITY IV codes Saxony as (1) between 1806-30 and (3) between 1831-1871, except a period of 8 years between 1840- 47. However northern part of Saxony, which is roughly the current Sachsen- Anhalt region, was lost to Prussia with the Congress of Viennan in 1814-1815. Since POLITY IV codes Prussia as (2) between 1840-1858, we therefore coded Sachsen-Anhalt as (2) in 1850. All other dates are coded as (1). <u>Thuringen:</u> Coded as (1) for 1600-1800 and (2) in 1850 in line with the other German states. For Germany we benefited from Tabellini (2005), POLITY IV dataset and Holborn (1982), as well as various historical maps in Holborn (1982) and at http://www.zum.de/whkmla/index.html.
Greece	Greece was under the domination of the Ottoman Empire during most of the period and only after 1830s emerged as a separate country (by the Convention of May 11, 1832), but still under the dominance of the Bavarian prince Otto of Wittelsbach. The administration and the army of the country was mainly ruled by the Bavarian officials, until 1843 when a revolt broke out in Athens due to accumulated Greek discontent. King Othon (Otto adopted the name Othon) had to convene the National Assembly and granted a constitution in 1843. The POLITY IV data set codes Greece as (3) after this date. However the Greek territory in the 1840s and 1850s does not match with the current Greek territory. According to the historical maps, Voreia Ellada and Nisia were still under the control of the Ottoman Empire for about another 30-40 years. Considering this we coded as (3) in 1850 and as (1) for the remaining years.
Ireland	Both regions, Border-Midland-Western and Southern and Eastern are coded the same. Data source Acemoglu, Johnson, and Robinson (2005).
Italy	Data source: Tabellini (2005)
Netherlands	Data source: Tabellini (2005)
Portugal	Data source: Tabellini (2005)
Spain	Data source: Tabellini (2005)
Sweden	Regions of Sweden did not have political autonomy. For this reason, the re- gional scores represent the country score. The POLITY IV data set codes Sweden as (3) between 1812-1854 and (4) between 1855-1869. We coded Swe- den as (3) for 1850 and as (1) for all the other periods. Data source: Acemoglu, Johnson, and Robinson (2005).
UK	Data source: Tabellini (2005)

A.2.4 Historical data on universities

We employed two different variables to capture the possible impact of universities (as historical institutions blending educational, cultural and social aspects) on current social capital. First, to measure the period of existence of universities in a particular region we formed the *univF* variable defined as "*univF* = 2000 – the foundation date of the university", the latter part referring to the date of foundation of the first university established in a region. In forming this variable we carefully examined the foundation dates (and re-foundation dates if applicable) of all the universities in a region to make sure that for the whole period at least one university was operational. Higher values reflect the existence of universities in a region for longer periods.

The second variable, univN measures the density of the universities in a particular region defined as the number of universities per 100,000 inhabitants around 1850. We started from the 13th century and matched each university to a corresponding region. The original data sources present information on the city and we matched cities to corresponding regions. Details on the population data can be found in Appendix 2.2. We had to pay special attention on three points to avoid double counting: (i) whether the university ceases to exist at a later time, (ii) whether the university was re-founded at a later date under the same name (or under a different name), (iii) whether the university is merged with another university. We formed two other variables, one is simply the arithmetic average of the standardized values of univF and univN and the other is the first principal component of the standardized values of the two variables. The major sources for these variables are Ridder-Symoens (1996), and Jilek (1984).

A.3 Further analysis on the stability

In this appendix we discuss in more detail the robustness analysis conducted in Section 5.3. We investigate whether the significance level of *trust* in the growth regressions is affected by the presence of particular switch variables. We conducted an analysis (similar to meta-analysis) of the 4,090 regressions estimated in the robustness analysis in which every coefficient constitutes one observation.

Meta-analysis is a quantitative literature review aiming at harmonizing and evaluating empirical results of an existing literature (e.g., Stanley, 2001; Florax, de Groot, and de Mooij, 2002). In meta-analysis the dependent variable is usually an estimated coefficient reported in earlier studies and the independent variables are moderator variables measuring different features in the original studies (for instance, existence of certain variables, research design, sample etc.). Despite its disadvantages and limitations metaanalysis has been widely used in economics in recent years. We stress that the analysis in this section is not a meta-analysis in the usual sense because all observations originate from the same source. This means that the research design, variable definitions and sample are exactly the same for all observations in the analysis. We are only interested whether the presence of certain switch variables have an impact on the likelihood of obtaining a significant *trust* coefficient.

We defined a dummy variable for *trust* taking a value of 1 whenever *trust* is significant in a regression and 0 otherwise. For all the other switch variables we defined dummy variables in the same manner. The analysis then constitutes of estimating a probit model, regressing the trust dummy on all other dummy variables created for each switch variable. This type of analysis is common in other meta-analyses (e.g., Waldorf and Pillsung, 2005; Koetse, de Groot, and Florax, 2006). We put special emphasis on the switch variables that returned a high fraction of significant estimates as it is not worthwhile to assess the effect of switch variables that are significant in only few regressions.

	(coefficient	ma	arginal effect
polactiv	2.159	$(0.180)^{***}$	0.716	$(0.035)^{***}$
immig	2.563	$(0.336)^{***}$	0.772	$(0.036)^{***}$
skill	-1.522	$(0.257)^{***}$	-0.181	$(0.010)^{***}$
opinion	1.187	$(0.075)^{***}$	0.410	$(0.028)^{***}$
cath	-0.789	$(0.148)^{***}$	-0.147	$(0.017)^{***}$
orth	-1.184	$(0.347)^{***}$	-0.166	$(0.018)^{***}$
jewi	-1.002	$(0.278)^{***}$	-0.159	$(0.020)^{***}$
isla	-1.783	$(0.227)^{***}$	-0.219	$(0.009)^{***}$
east	-0.915	$(0.335)^{***}$	-0.150	$(0.027)^{***}$
shragremp	0.823	$(0.077)^{***}$	0.273	$(0.029)^{***}$
shrindemp	-0.627	$(0.197)^{***}$	-0.124	$(0.026)^{***}$
constant	-0.897	$(0.032)^{***}$		
Psuedo R square	0.205		0.205	
LR $\chi^2(15)$ / Wald $\chi^2(15)$	844.4		605.3	

Table A.5: Results of the probit analysis on the stability regressions

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

The results of the probit analysis is presented in Table A3.¹ The variables are defined in Appendix 1.2. The results suggest the following. First, few variables were dropped from the analysis automatically as the presence of these variables predicts a failure (i.e. a non-significant *trust* coefficient) perfectly (not shown in the table below). Among them the most important is *help*. All 250 regressions in which *help* is significant, *trust* is insignificant. This suggests that the presence of *help* reduces the likelihood of obtaining a significant *trust* coefficient. On the other hand, results of the probit analysis show that including two other cultural factors, *polactiv* and *opinion* increases the chance of obtaining a significant *trust* coefficient. What is more interesting is that the simple correlation between these three variables and *trust* is lower than 0.20 but the correlation among them is higher than 0.50. Moreover all three variables in all growth estimations return a positive coefficient.² This suggests that these variables might be capturing another element of social capital other than *trust*. However given the complex nature of social capital it is not straightforward to test this claim.

Second, the presence of variables on religion reduces the probability of obtaining a significant *trust* coefficient although most of these variables do not survive in the stability analysis. Similarly, there are only a few cases in which *immig* and *skill* return significant coefficients in the main regressions, however the former seems to augment and the latter seems to reduce the probability of obtaining a significant *trust* coefficient. Finally, the share of agricultural employment affects the significance level of *trust* positively whereas the share of industrial employment decreases it.

In sum, the detailed analysis reveals that certain switch variables have an impact on the significance level of the coefficient of *trust*. There are 530 (13% of all estimated regressions in the stability analysis) cases in which *trust* is not significant but social capital might be captured by the presence of *opinion*, *help* and *polactiv*. This supports our findings in the sense that at least one proxy for social capital has a positive and significant impact on growth in about 95% of all 4,090 regressions estimated in the stability analysis.

 $^{^1}$ To save space, we present only the results for the variables that returned significant coefficients. The detailed results are available upon request.

 $^{^{2}}$ In almost all regressions *opinion* has a significant positive impact on growth. When only these regressions are considered, the coefficient of *trust* is significant in 223 cases and insignificant in 183 cases.

	z																																		
	univ	0.06	0.11	0.25	0.30	0.09	0.06	0.13	0.13	0.24	0.05	0	0	0.14	0.32	0.09	0.20	0.05	0	0.12	0.05	0.11	0.21	0.07	0.06	0.20	0	0	1.43	0	0.24	0.49	0.28	0.31	0
ersities	univF	635	415	380	166	575	185	615	598	190	502	30	81	473	581	425	612	546	52	591	498	348	621	525	474	426	0	0	460	0	646	413	782	511	27
and unive	literacy	91.5	91.5	91.5	71.6	63.8	71.6	95	95	98	94.5	95	95	96.5	88.5	94	94.5	92.5	92.5	96.5	96.5	96	95	97	27.5	40.5	40.5	48.5	45.5	45.5	29	62	53	29	29
tey rates a	inst1850	2	2	2	5	5	5	4	33	2	2	4	4	1	2	1	1	1	3	3	2	1	2	5	4	4	4	4	4	4	4	4	4	4	4
ons, litera	inst1800	1	1	1	4	4	4	2	1	1	1	с С	33	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2
l instituti	inst1750	1	1	1	2	2	2	2	1	1	1	33	33	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1
n politica	inst1700	1	1	1	2	2	2	2	1	1	1	°	с С	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	2	1	1	1	1
al data o	inst1600	1	1	1	2	2	2	2	1	1	1	33	33	33	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1
Table A.6: Historic	Region	Ost-Osterreich	Sud-Osterreich	West-Osterreich	Brussels	Vlaams Gewest	Region Wallone	Baden Wurttemberg	Bayern	Berlin	$\operatorname{Brandenburg}$	Bremen	Hamburg	Hessen	Mecklenburg-Vorpommern	Niedersachsen	Nordrhein-Westfalen	Rheinland-Pfalz	Saarland	Sachsen	Sachsen-Anhalt	Schleswig-Holstein	Thuringen	Denmark	Galicia	Asturias	Cantabria	Pais Vasco	Navarra	La Rioja	Aragon	Madrid	Castilla Y Leon	Castilla La Mancha	Extramadura
	NUTS	AT1	AT2	AT3	BE1	BE2	BE3	DE1	DE2	DE3	DE4	DE5	DE6	DE7	DE8	DE9	DEA	DEB	DEC	DED	DEE	DEF	DEG	DK0	ES11	ES12	ES13	ES21	ES22	ES23	ES24	ES3	ES41	ES42	ES43

	Table A.5 Historical of	data on pol	itical instit	utions, lit	eracy rate	s and univ	ersities (co	ontinued)	
STUN	Region	inst1600	inst1700	inst1750	inst1800	inst1850	literacy	univF	univN
ES51	Cataluna	3	2	1	2	4	32	200	0.08
ES52	Valenciana	3	2	1	2	4	21	501	0.36
ES53	Illes Balears	1	1	1	2	4	21	517	0.40
ES61	Andalucia	1	1	1	2	4	31.2	495	0.18
ES62	Murcia	1	1	1	2	4	21	217	0.25
FI1	Manner Suomi	1	1	1	1	1	97.5	360	0.06
FR1	Île De France	1	1	1	4	5	75.6	800	0.04
FR2	Bassin Parisien	1	1	1	4	5	75.6	694	0.07
FR3	Nord-Pas-De-Calais	1	1	1	4	5	75.6	441	0.11
FR4	Est	1	1	1	4	5	75.6	578	0.13
FR5	Ouest	1	1	1	4	5	75.6	663	0.10
FR6	Sud-Ouest	1	1	1	4	5	75.6	771	0.07
FR7	Centre-Est	1	1	1	4	5	75.6	661	0.09
FR8	Mediterranee	1	1	1	4	5	75.6	711	0.30
GR1	Voreia Ellada	1	1	1	1	1	20	52	0
GR2	Kentriki Ellada	1	1	1	1	°C	20	36	0
GR3	Attiki	1	1	1	1	°	20	163	1.08
GR4	Nisia	1	1	1	1	1	20	27	0
IE01	Border-Midland-Western	2	4	5	9	9	76.5	0	0
IE02	Southern-Eastern	2	4	5	9	9	76.5	408	0.03
ITC1	Piemonte	2	2	1	1	°,	67.8	596	0.06
ITC2	Valle D Aosta	2	2	1	1	°°	67.8	0	0
ITC3	Liguria	5	5	5	2	e c	55.5	529	0.25
ITC4	Lombardia	3	33	2	2	1	63	639	0.09
ITD3	Veneto	5	5	5	1	1	45.9	778	0.09
ITD4	Friuli-Venezia-Giulia	5	5	5	1	1	46	62	0
ITD5	Emilia-Romagna	2	2	2	2	1	36.5	800	0.19
ITE1	Toscana	2	2	1	1	1	38.1	754	0.22
ITE2	Umbria	1	1	1	1	1	29.6	692	0.19
ITE3	Marche	1	1	1	1	1	26	460	0.56
ITE4	Lazio	1	1	1	1	1	41.8	697	0.39
ITF1	Abruzzo	1	1	1	1	1	19.4	139	0.08
ITF2	Molise	1	1	1	1	1	19.4	18	0
ITF3	Campania	1	1	1	1	1	24.6	776	0.08
ITF4	Puglia	1	1	1	1	1	20	252	0.08

	Table A.5 Historical	data on pol	itical insti	tutions, li	teracy rate	s and unive	ersities (co	ontinued)	
STUN	Region	inst1600	inst1700	inst1750	inst1800	inst1850	literacy	univF	univN
ITF5	Basilicata	1	1	1	-	1	14.7	19	0
ITF6	Calabria	1	1	1	1	1	14.6	32	0
ITG1	Sicilia	1	1	1	1	1	18.8	556	0.17
ITG2	Sardegna	1	1	1	1	1	20.1	394	0.34
NL1	Noord-Nederland	5	5	5	4	9	89	415	0.39
NL2	Oost-Nederland	5	5	5	4	9	89	400	0.34
NL3	West-Nederland	5	5	5	4	9	89	425	0.22
NL4	Zuid-Nederland	5	5	5	4	9	89	82	0
PT11	Norte	2	2	2	2	co Co	18	89	0
PT15	Algarve	2	2	2	2	33	18	21	0
PT16	Centro	2	2	2	2	3	18	710	0.08
PT17	Lisboa	2	2	2	2	റ	18	710	0.13
PT18	Alentejo	2	2	2	2	с С	18	442	0.33
SE01	Stockholm	2	3	3	3	3	66	123	0.48
SE02	Ostra Mellansverige	2	3	3	3	3	66	523	0.15
SE03	Sydsverige	2	3	3	3	3	66	334	0.18
SE04	Norra Mellansverige	2	3	3	3	3	66	0	0
SE05	Mellersta A Norrland	2	3	с С	33	с С	66	0	0
SE06	Ovre Norrland	2	3	3	3	3	66	35	0
SE07	Smaland Med Oarna	2	3	с С	3	റ	66	0	0
SE08	Vastsverige	2	3	3	3	co Co	66	46	0
UKC	North East	ç	5	9	7	7	74.4	343	0.29
UKD	North West	e.	5	9	7	7	71.8	120	0.03
UKE	Yorkshire-Humber	°C	5	9	7	7	74.1	96	0
UKF	East Midlands	°C	5	9	7	7	78	119	0.10
UKG	West Midlands	°°	5	9	7	7	68.4	120	0.09
UKH	East of England	3	5	9	7	7	74	200	0.05
UKI	Greater London	°C	5	9	7	7	88.2	174	0.05
UKJ	South East	°C	5	9	7	7	83.8	800	0.04
UKK	South West	°,	5	9	7	7	79.4	91	0
UKL	Wales	e C	5	9	7	7	63.1	107	0.09
UKM	Scotland	ი	5	9	7	7	80	589	0.10
UKN	Northern Ireland	2	4	5	6	6	76.5	418	0.14
instXXXX are uninF is define	to provies for past political institutions a ad as " $wnivF = 2000 - $ the foundation	is measured by "co date of the univers	ntraints on execut itv" univN is de	tives" available f	or 1600, 1700, 170 nber of universiti	50, 1800 and 1850 es per 100-000 poi	<i>literacy</i> is the	literacy rate arou 1850s"	nd 1880s.

							morrooda				
						fract.	fract. of				
		base	type of	mean	std .	of $(+)$	signf. $(+)$				
equation	method	equation	s.e.	trust	dev.	values	values	Test 1	Test 2	Test 3	Test 4
growth	OLS	Table 4, col 1	normal	0.029	0.004	1.00	0.79	YES	YES	NO	NO
growth	OLS	Table 4 , col 1	clustered	0.029	0.004	1.00	0.95	YES	\mathbf{YES}	\mathbf{YES}	\mathbf{YES}
growth	2SLS	Table $4, \text{ col } 4$	normal	0.152	0.012	1.00	1.00	YES	\mathbf{YES}	\mathbf{YES}	\mathbf{YES}
growth	2SLS	Table $4, \text{ col } 4$	clustered	0.152	0.012	1.00	0.83	YES	\mathbf{YES}	NO	NO
patent	OLS	Table $6, col 1$	normal	0.205	0.021	1.00	1.00	YES	\mathbf{YES}	YES	\mathbf{YES}
patent	OLS	Table $6, col 1$	clustered	0.205	0.021	1.00	1.00	YES	\mathbf{YES}	\mathbf{YES}	\mathbf{YES}
patent	2SLS	Table $6, \text{ col } 4$	normal	0.565	0.067	1.00	1.00	YES	\mathbf{YES}	\mathbf{YES}	\mathbf{YES}
patent	2SLS	Table 6, col 4	clustered	0.565	0.067	1.00	1.00	YES	YES	\mathbf{YES}	YES
For each s	pecification	we ran 4090 regree	ssions. Mean	trust is t	the average	ge value o	f the coefficien	it of trust	in each sp	ecification	
Test 1: St_0	rong sign te	st (all equal sign p	assed?)								
Test 2: We	eak sign tes	t (90% equal sign l	passed?)								
Test 3: Sti	rong extrem	ie bounds test (all	significant an	d equal s	iign passe	ed?)					

Test 4: Weak extreme bounds test (90% significant and equal sign passed?)

A.4 Further analysis on the stability of TRUST

A.5 Estimation results with internet use as an indicator to innovativeness

In this appendix we show the results of applying internet use as a measure of innovativeness. It is impossible to find an independent source of regional data on ICT diffusion at the regional level. The new version of the Eurostat database, the previous version of Eurostat CRONOS database and the regional innovation scoreboard do not provide such data at the regional level. Hence, we apply a measure from the ESS 2002 database that could serve as a proxy for ICT diffusion. The variable *netuse* is obtained from the question "How often do you use the internet, the World Wide Web or e-mail - whether at home or at work - for your personal use?". The answer categories are given as (0) No access at home or work, (1) Never use, (2) Less than once a month, (3) Once a month, (4) Several times a month, (5) Once a week, (6) Several times a week, (7) Every day. The answers are aggregated for individuals to the level of the 102 EU regions. The variable *netuse* thus represents the average Internet use within regions.

Table A.8: Pairwise correlations between innovation indicators

	netuse	pat91p	pat91lf	pat00p	pat00lf	
netuse	1.00					
pat91p	0.79^{***}	1.00				
pat91lf	0.78^{***}	0.99^{***}	1.00			
pat00p	0.83^{***}	0.95^{***}	0.95^{***}	1.00		
pat00lf	0.81^{***}	0.95^{***}	0.95^{***}	0.99^{***}	1.00	

* significant at 10%; ** significant at 1%; *** significant at 1%. Pat91p and pat00p stands for patent applications per million inhabitants in 1991 and 2000 respectively. Pat91lf and pat00lf stands for patent applications per million labor force in 1991 and 2000, respectively.

Table A.8 presents the pairwise correlation coefficients between patent measures and *netuse*. The correlation coefficients are large and significant at the one percent level. The mean *netuse* for each country is presented in Table A.9. The numbers show a clear distinction between Northern and Southern European countries, the former displaying figures of more than two times larger than the latter.

Next, we use *netuse* as an indicator for regional innovativeness in our regression model. Table A.10 is similar to Table 3.6 in the main text and Table A.11 is comparable to Table 3.10. Table A.10 shows that the estimates do not diverge from the results in the body text: *trust* is still an important determinant of innovativeness. One important difference from the original results is that the explanatory power of the model diminishes by about 10 percent. Table A.11 presents the 3SLS estimation results. The *netuse* and the *trust* equation display qualitatively similar results. The major difference between these results and the ones in the main text is that now there is a small direct effect of *trust* on income growth on top of the indirect effect through the innovation channel.

The results in this appendix should be taken with caution for two reasons. First, measurement error in *netuse*. Individuals do not necessarily depend on Internet usage because other channels of information and communication could be more efficient. It could also be the case that in some countries or regions there is a government policy (or services) to facilitate use of ICT (for instance, e-government applications). It could simply be the case that the cost of these services are high hence consumers may avoid using these technologies. Second, the indicator is only for available for 2002. The use of it in a regression trying to explain per capital income growth between 1990 to 2002 is not optimal.

Variable	Mean	Std. Dev.	Min	Max
Austria	3.19	0.24	2.92	3.35
Belgium	3.08	0.81	2.47	4.00
Denmark	3.97		3.97	3.97
Finland	3.26		3.26	3.26
France	2.32	0.49	1.90	3.45
Germany	3.06	0.58	1.81	3.96
Greece	0.86	0.29	0.56	1.18
Ireland	2.30	0.60	1.87	2.72
Italy	1.96	0.84	1.13	4.39
Netherlands	3.35	0.36	2.89	3.66
Portugal	1.51	0.81	0.31	2.47
Spain	1.46	0.67	0.61	3.10
Sweden	3.79	0.43	3.28	4.63
UK	2.72	0.48	2.19	3.86
Overall	2.41	1.00	0.31	4.63

Table A.9: Summary statistics for internet use

Table A.10: Social capital and innovation

	1 1 1		() (
	(1)(OLS)	(2)(1st stage)	(3)(2SLS)
	netuse	trust	netuse
R&Dints	0.322	0.035	0.27
	$(0.077)^{***}$	(0.099)	$(0.091)^{***}$
	(0.074)***	[0.047]	[0.078]***
educ	0.106	-0.028	0.071
	$(0.064)^*$	(0.085)	(0.074)
	0.111	0.096	0.130
trust	0.189	[]	0.589
	(0.079)**		$(0.205)^{***}$
	[0.036]***		[0.084]***
instPC	[0.000]	0.495	[0.00-]
moor C		(0.186)***	
		[0 101]**	
univPC		0.104	
ullivi C		(0.001)**	
		$(0.091)^{*}$	
1.		[0.095]	
interacy		0.479	
		$(0.232)^{**}$	
		[0.188]**	
Ν	102	102	102
R-squared	0.77	0.66	0.7
Adj R sqr	0.73	0.58	0.65

Standard errors in parentheses and clustered standard errors in brackets. Clustered standard errors are clustered at the country level to allow arbitrary correlations within a country.

* significant at 10%; ** significant at 5%; *** significant at 1%.

All the regressions include country dummies and a constant

$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		(1)OLS	(2)3SLS	(3) 1st	(4) 1st	(5) 1st	(9)	(2)	(8)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		growth	growth	growth	netuse	trust	growth	netuse	trust
the 0.066 0.111 0.098 0.031)* 0.098 0.031)* 0.022 0.116 0.021)** 0.0198 0.631 0.022 0.116 0.023 0.026 0.002 0.188 0.038 0.631 0.0039)** 0.011 0.013) 0.023 0.026 0.0028 0.071 0.0291 0.016)* 0.0011 0.016)* 0.0011 0.016)* 0.0011 0.0039)** 0.0117 0.021 0.016)* 0.0011 0.0039)** 0.0117 0.021 0.016)* 0.0011 0.015)* 0.0114 0.0021 0.0115 0.0231 0.0039)** 0.0117 0.021 0.0131** 0.0114 0.0223* 0.023 0.0021 0.0133** 0.0021 0.0115) 0.0115 0.0231 0.0039)** 0.0117 0.021 0.0131** 0.0114 0.0231 0.0031* 0.0231 0.0031* 0.0114 0.0123* 0.0031* 0.0121 0.0131** 0.0231 0.0031** 0.0231 0.0031** 0.0231 0.0031** 0.0031 0.0135* 0.0031*** 0.0031*	ppc90	-0.224 $(0.023)^{***}$	-0.291 (0.029)***	-0.212 (0.196)***	0.490 $(0.100)^{***}$	0.336 $(0.151)^{**}$	-0.278 (0.031)***		0.445 $(0.109)^{***}$
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	tuse	0.066 $(0.021)^{***}$	0.111 $(0.049)^{**}$				0.098 (0.051)*		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ust	0.022 (0.015)	0.116 $(0.043)^{***}$				0.098 (0.046)**	0.631 (0.166)***	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	uc	0.023	0.026	0.002	-0.188	-0.099	0.028	0.071	-0.204
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		(0.014)	$(0.015)^{*}$	(0.014)	$(0.072)^{***}$	(0.109)	$(0.016)^{*}$	(0.069)	$(0.089)^{**}$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ban	0.017	0.028	0.019	0.118	-0.117	0.021		-0.014
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		(0.011)	$(0.015)^{*}$	$(0.010)^{*}$	$(0.052)^{**}$	(0.079)	(0.015)		(0.058)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	¢Dints			0.037	0.168	-0.024		0.253	0.006
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				$(0.013)^{***}$	$(0.066)^{**}$	(0.101)		$(0.084)^{***}$	(0.080)
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	ivPC			0.021	0.143	0.224			0.184
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				$(0.012)^{*}$	$(0.062)^{**}$	$(0.093)^{**}$			$(0.061)^{***}$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	eracy			0.082	0.598	0.397			0.548
stPC 0.62 -0.091 0.458 0.319 nstant 0.568 0.612 0.024)*** (0.122) (0.185) *** (0.135) ** (0.135) ** (0.135) ** (0.135) ** (0.099) *** (0.098) *** (0.098) *** (0.499) (0.755) ** (0.130) *** (0.711) (0.447) not 102				$(0.029)^{***}$	$(0.151)^{***}$	$(0.228)^{*}$			$(0.150)^{***}$
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	stPC			0.062	-0.091	0.458			0.319
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				$(0.024)^{***}$	(0.122)	$(0.185)^{***}$			$(0.135)^{**}$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	nstant	0.568	0.612	0.368	-0.433	1.783	0.352	-0.521	0.398
$\begin{array}{cccccccccccccccccccccccccccccccccccc$		***(660.0)	$(0.062)^{***}$	$(0.098)^{***}$	(0.499)	$(0.755)^{**}$	$(0.130)^{***}$	(0.711)	(0.447)
squared 0.85 0.73 0.87 0.86 0.68 0.78 0.69 0.67		102	102	102	102	102	102	102	102
	squared	0.85	0.73	0.87	0.86	0.68	0.78	0.69	0.67

* significant at 10%; ** significant at 5%; *** significant at 1% All the regressions include country dummics. Column (2) presents only the 3SLS results for the growth equation when *trust* equation do not include

Appendix B Appendix to Chapter 5

B.1 Details on variable definitions and data sources

Variable	Definition
young	Percentage of people aged 15-24 in 2001. Source: Centraal Bureau voor de Statistiek (CBS).
density	Log of population density in 2001. Source: CBS.
unemp	Young unemployment defined as percentage of people who are under 30 years old and unemployed in 2001. Source: CBS
education	Percentage of people with medium and high level of education in 2001. Source: CBS.
inequality	Income inequality defined as the proportion of the percentage of people in the highest %20 income percentile to percentage of people with lowest income in 2001. Source: CBS.
recrat	Percentage of total area devoted to recreation in 2001. Source: CBS.
shop	Percentage of total area devoted to shopping in 2001. Source: CBS.
cofshop	Number of coffeeshops per 10,000 inhabitants in 2002. Source for the absolute figures: (Bieleman and Nayer, 2005).
charity	Voluntary contributions per household in euros. Average of six years from 2000-2005. Source: Central Bureau on Fundraising. See Appendix B.1.1 for details.
blood	Blood donations per 100 inhabitants in 2005. Source: See Appendix B.1.1 for details.
vote	Voter turnout in the election of the lower house (tweede kamer) in 2003. Source: CBS.
trust	Trust indicator calculated as the average of three indicators: <i>ppltrst</i> , <i>help</i> and <i>fair</i> . See Appendix B.1.1 for details. Source: European Social Survey (ESS) 2002 and 2004 rounds.
ppltrust	Generalized trust indicator constructed from the answers to the ques- tion "Most people can be trusted or you cannot be too careful". See Appendix B.1.1 for details. Source: ESS 2002 and 2004 rounds.

Table B.1: Definitions of variables and data sources

Note: If otherwise indicated all variables are averages of years 2000, 2001 and 2002.

Variable	Definition
help	Social capital indicator obtained from the question "Most of the time people are helpful or mostly looking out for themselves". See Appendix
	B.1.1 for details. Source: ESS 2002 and 2004 rounds.
fair	Social capital indicator obtained form the question "Most people try to take advantage of you, or try to be fair". See Appendix B.1.1 for details. Source: ESS 2002 and 2004 round
trustplc	Confidence in police. See Appendix B.1.1 for details. Source: ESS 2002 and 2004 rounds.
SC1	First principal component of six social capital indicators: <i>charity</i> , <i>blood</i> , <i>vote</i> , <i>trust</i> , <i>foreign</i> and <i>divorce</i> . See Appendix B.1.1 for details.
SC2	First principal component of four social capital indicators: $charity$, $blood$, $vote$ and $trust$. See Appendix B.1.1 for details.
SC3	First principal component of three social capital indicators: $charity$, $blood$ and $vote$. See Appendix B.1.1 for details.
divorce	Percentage of divorces in total population. Source: CBS.
immig	Immigration as a percentage of total population. Source: CBS.
emmig	Emigration as a percentage of total population. Source: CBS.
movers	Sum of immigration and emigration as a percentage of total population. Source: CBS.
foreign	Percentage of foreigners in total population. Source: CBS.
foreign1859	Percentage of foreigners in total population in 1859. See Appendix B.1.3 for details. Source: Volkstellingen Archive.
protestant1859	Percentage of Protestants in total population in 1859. See Appendix B.1.3 for details. Source: Volkstellingen Archive.
#school1859	Number of schools per 100 inhabitants in 1859. See Appendix B.1.3 for details. Source: Volkstellingen Archive.
crime	Crime rates including all recorded crimes in 2002. See Appendix B.1.2 for detailed information on crime data and how crime categories below are formed.
homicide	Homicide per 100 inhabitants in 2002.
assault	Assault per 100 inhabitants in 2002.
rape	Rape per 100 inhabitants in 2002.
robbery	Robbery per 100 inhabitants in 2002.
theft	Theft per 100 inhabitants in 2002.
autotheft	Motor vehicle theft per 100 inhabitants in 2002.
burglary	Burglary per 100 inhabitants in 2002.
domestic burglary	Domestic burglary per 100 inhabitants in 2002.
drug	Crimes related to hard drugs per 100 inhabitants in 2002.

Note: If otherwise indicated all variables are averages of years 2000, 2001 and 2002.

B.1.1 Social capital indicators

Four social capital indicators is used in this chapter. First, as an indicator of altruism voluntary contributions per household is used. The data is available from Central Bureau on Fundraising at the municipality level from 2000 to 2005.¹ However in order to minimize the risk of high variability from year to year and because of missing values for some municipalities for different years, the average value of the available data is calculated

 $[\]label{eq:linear} {}^1 \ http://www.cbf.nl//Database_goede_doelen/2_Collectegegevens_Gemeenten.php$

for each municipality. Second, as a measure of civic participation the voter turnout of the elections for the Lower House (Tweede Kamer) in 2003 is employed. This data is available at the municipality level via Centraal Bureau voor de Statistiek (CBS) website.² and is calculated as the number of votes divided by the number of inhabitants eligible to vote multiplied by 100.

The next indicator, blood donations, could also be viewed as an indicator of altruism (number of blood donations at the municipality level). The data is recorded under two different headings: blood donations to blood centers and hospitals, and blood donations to the mobile centers. Not every municipality in the Netherlands have a blood bank and/or a hospital and some of these municipalities are frequently visited by mobile services. However there are some municipalities rather smaller in size that do not have blood centers and have not been visited by mobile blood centers. Therefore the following correction has been made. If there is no record for a municipality it is assumed that the inhabitants of the municipality donate blood in the closest municipality in the neighborhood. However in all cases there are more than one neighbor municipality that the inhabitants can possibly donate blood. In such cases we divided the population of that municipality by the number of neighbours and recorded the inhabitants of that municipality to other neighbour municipalities as if they reside there. Once this has been replicated for all the municipalities that there is no record for, we end up with base population for all the municipalities in the data set. Then the number of blood donations is divided by the base population constructed, as explained above, to calculate the blood donations per 100 inhabitants for each municipality. Finally, for all the municipalities that there is no record the average of the neighbour municipalities is calculated and used as a proxy. Among 63 municipalities with a population over 50,000 only 5 are subject to such a correction and among 142 municipalities that has a population over 30,000, 31 are subject to this correction. For NUTS 3 aggregation there is no significant difference between the corrected and non-corrected blood donation data suggested by the simple correlation coefficient of 0.89 (significant at %1). However for reasons of symmetry with the analysis at the municipality level the corrected blood donations data is aggregated to 40 NUTS3 regions. The analyses for 40 NUTS 3 regions employ this measure.

Fourth, a set of indicators from the European Social Surveys (ESS) rounds 2002 and 2004 is employed. In order to maximize the number of individual data the first and the second rounds of the data set for Netherlands are merged. The data is available for 40 NUTS 3 regions. The raw data is aggregated on individuals (2364 individuals in the first round and 1881 individuals in the second round, a total of 4245 data points) to 40 regions. The raw data is adjusted by population weights to reduce the problems that may arise due to oversampling. The questions and the answer categories to these questions are exactly the same in both rounds. From the answers to three question below an equal weighted average trust index is constructed (trust): (i) people trust (ppltrst)is a generalized trust indicator obtained from the answers to the question "Most people can be trusted or you cannot be too careful". The answer category ranges from (0) "you can't be too careful" to (10) "most people can be trusted", with nine levels in between. The mean (s.e.) for this indicator is 5.75 (2.09) for n=4243, (ii) people help (help) is constructed from the question "Most of the time people are helpful or mostly looking out for themselves". The answer category ranges from (0) "people mostly look out for themselves" to (10) "people mostly try to be helpful", with nine levels in between. The mean (s.e.) for this indicator is 5.30 (1.97) for n=4242. (*iii*) people fair (fair) is an indicator obtained from the question "Most people try to take advantage of you, or try to be fair". The answer category ranges from (0) "most people would try to take advantage of me" to (10) "most people would try to be fair", with nine levels in between.

² http://www.cbs.nl/nl-NL/menu/cijfers/statline/toegang/default.htm

The mean (s.e.) for this indicator is 6.20 (1.85) for n=4233. The mean (s.e.) for the trust index is 5.75 (1.58) for n=4229. The question on confidence to police (trustplc) is also used for robustness reasons. The question is "How much you personally trust in police". The answer category ranges from (0) "no trust at all" to (10) "complete trust". The mean (s.e.) for this indicator is 5.89 (1.94) for n=4213. One particular weakness of these measures is that they are observed at the regional level and when conducting the analysis at the municipality level these indicators have the same number for all the municipalities belonging to the same NUTS3 definition.

In addition to these four indicators two others are employed- percentage of divorces and percentage of foreigners in total population -as they display high and significant correlations with the above four indicators. Out of these seemingly unrelated indicators several social capital indices are constructed by using principal component analysis (PCA). The first principal component of each PCA analysis is taken as an indicator of social capital. First index includes 6 indicators, *charity*, *blood*, *vote*, *trust*, *foreign* and *divorce*, which forms an all inclusive measure (SC1). Second index, SC2, includes only four social capital indicators, excluding *divorce* and *foreign*, to form SC2. Finally, a third index is constructed out of the three indicators, *charity*, *blood* and *vote*, which labeled as SC3. The reason for this is that *trust* is measured at the regional level as discussed above and especially in the analysis at the municipality level this might result in measurement error.

To check the robustness of the above indices, all possible combinations of these indices are experimented by interchanging between indicators. For instance, one can use *ppltrust*, *help*, *fair* separately instead of *trust* or one can use *immig* instead of *foreign*. All constructed indices behave in a similar way. Similar indicators in content (for instance, including *ppltrust*, *help* or *trustplc*) are not included at the same because PCA tends to give similar weights to these indicators and the resulting index becomes very powerful (i.e., the probability of obtaining a significant coefficient for the social capital index in regressions increases considerably).

Table B.2 below displays information on the principal component loadings of the first principal component and the explained variance for each social capital index for different samples. As visible from the table the indicators that are suggested as proxy to presence of social capital have positive loadings. On the contrary indicators that is associated with the absence of social capital have negative loadings as expected. The PCA tends to put more (and similar in terms of quantity) weight on *charity*, vote, foreign and divorce and less weight one blood and trust. The reason for this is that blood and trust involve data corrections and interpolations and this is picked up by the PCA so that these indicators have less weight in the overall index. This can be easily seen from the table. For instance loadings to blood decreases considerably in all three social capital index as we move to the right of the table (i.e. the number of corrected/interpolated data points increase as the sample size increases from 40 NUTS3 regions with no data corrections to 142 municipalities with some data corrections which reduces the robustness of the indicator). After all this can be viewed as a positive outcome and helps to produce a healthy social capital indicator by specifically placing less weight on the problematic indicators. All indices are expected to display a negative relationship with crime.

B.1.2 Crime data

Crime data reflects data on 27 different types of crime. It is available at the municipality level at *http://www.ad.nl/misdaadmeter/*. However due to under-reporting and reliability problems of the data for certain crime types, beside analyzing total crime rates different subgroups are formed according to European Sourcebook of Crime and Criminal Justice,

Statistics 2006. All crime numbers are calculated as per 100 inhabitants. Throughout chapter 5, the following subcategories are used in the analysis.

Table B.2: Principal component loadings for the first component and the explained variance

	NUTS	33 regio	ns	muncp	p. pop>	>50,000	munc	p. pop>	>40,000	munc	p. pop>	>30,000
	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3
charity	0.42	0.49	0.58	0.48	0.55	0.63	0.47	0.55	0.66	0.49	0.59	0.69
blood	0.32	0.46	0.50	0.25	0.40	0.46	0.17	0.34	0.36	0.10	0.25	0.22
vote	0.47	0.58	0.65	0.47	0.57	0.63	0.48	0.58	0.66	0.49	0.63	0.69
trust	0.28	0.46		0.30	0.47		0.31	0.50		0.21	0.44	
foreign	-0.48			-0.47			-0.48			-0.50		
divorce	-0.44			-0.41			-0.43			-0.47		
explained variance	0.56	0.57	0.65	0.55	0.56	0.63	0.55	0.55	0.60	0.54	0.49	0.58
N	40	40	40	63	63	63	95	95	95	142	142	142

Indicator	Definition
crime	Crime rates including all 27 categories.
homicide	Homicide.
rape	Rape.
assault	It is defined as activity causing bodily injury with intent on another person. We include sexual assault, threatening, armed-attack, mis-treat and act on person and mugging.
theft	Includes auto theft, motor/scooter theft, theft from any kind of business (office, shop etc.), school and sport complex, and pickpocketing.
autotheft	Theft of a motor vehicle excluding handling/receiving stolen vehicle. We include auto theft, motor/scooter theft, theft from a motor vehicle.
robbery	The general definition is stealing from a person with force or threat. We include robbery and mugging category from our data set.
burglary	Includes theft from any kind of business (office, shop etc.), school and sport complex.
domestic burglary	Domestic burglary defined as gaining access to private premises with intent to steal goods. This subcategory excludes theft from an office, shop, garage, factory etc. We only included break in to a house.
drug	Hard-drug trading. We did not include soft-drug trading as soft-drugs, such as marihuana, are legal in the Netherlands and we suspect that the records are highly affected by under-reporting.

Table B.3: Definitions of subgroups of crime

B.1.3 Historical data

The major source of the historical data is the Volkstellingen archives (Dutch census), which is an invaluable data source comprising basic population and household data starting from 1795. The first round that present information at the municipality level is 1859. This year has a particular municipality definition presenting data on about 1200 local area

	city	pop>50,000	pop>40,000	pop>30,000
crime	52.57	70.41	77.04	83.19
homicide	50.84	66.48	74.30	84.36
rape	49.44	67.89	75.09	81.35
assault	51.91	70.86	77.50	83.49
robbery	76.82	90.13	93.26	94.97
theft	54.30	71.37	77.93	83.98
autotheft	55.99	71.30	77.82	83.85
burglary	43.58	64.21	72.16	79.17
domestic burglary	45.13	64.13	71.49	78.49
drug	75.98	84.69	87.26	90.19
N	22	63	95	142

Table B.4: Distrib	oution of	criminal	activity	for	different	samples

units. Therefore a correspondence table is constructed matching the local area names in 1859 to current municipality definitions. In doing this three sources were used: (i) information on the historical evolution of the municipality definitions, (ii) correspondence table linking each current local area unit (about 6,000 places regardless of size that are even much smaller than a municipality) in the Netherlands to a municipality definition in 2002, (iii) historical maps as matching for about 10 local area units to a municipality was problematic. The main reason for this is that the statistics were recorded in historical names that do not exist in current correspondence tables. For these local area units historical maps are used to match the historical local area name to a current local area name and then to a corresponding municipality. Information on the first two is available at the CBS website.

First, data is collected on the percentage of foreigners in a local area unit in 1859. Foreign 1859 is defined as the number of foreigners per inhabitant multiplied by 100. Then information is gathered on the percentage of Protestants in a municipality in 1859. The names and the data availability for different Churches and Protestant groups (most of which are smaller denominations and constitute less than 0.01 percent of total population) differ in great extent from the current classifications therefore all inhabitants belonging to a Protestant denomination are summed up, divided by the number of total inhabitants living in the municipality and multiplied by 100 to arrive to our indicator protestant1859. The final, indicator is the formed from the data on the number of schools per local area unit in 1859. #school1859 is defined as the number of schools per 100 inhabitants, which is assumed to be a proxy to education in 1859. One particular problem with the historical data is that some current municipalities were gained from the Northern sea: Noordoostpolder in 1944, Oostelijk Flevoland in 1957 and Zuidelijk Flevoland in 1966. Obviously, there is no information for these regions before these dates, therefore figures from the 1971 census are used as a substitute for earlier years. Only four municipalities are subject to this correction: Almere (476), Dronten (381), Lelystad (439) and Noordoostpolder (411).

	859																														
tants	#school1	0.0371	0.0960	0.0555	0.0222	0.0650	0.0355	0.0484	0.0707	0.0374	0.1799	0.1572	0.0333	0.0877	0.0401	0.0302	0.0850	0.1354	0.1473	0.1024	0.0739	0.0667	0.0619	0.0404	0.0325	0.1057	0.0162	0.0501	0.0707	0.0281	0.1825
1 30,000 inhabi	protestant1859	80.79	84.12	43.79	82.67	94.25	76.81	99.77	81.99	88.74	83.07	88.11	96.06	92.18	78.53	71.71	67.78	85.75	69.14	52.51	80.46	43.79	14.17	32.01	85.65	89.00	93.27	72.34	85.60	54.32	88.47
vith more than	foreign1859	2.24	1.66	3.76	7.62	0.62	1.56	0.08	0.79	2.24	7.37	5.97	0.99	0.74	2.85	1.32	3.73	6.03	0.88	2.20	1.75	3.76	4.64	0.47	0.36	0.37	1.41	1.54	0.85	4.53	0.50
palities v	trust	5.90	5.90	5.66	5.83	6.03	5.93	6.03	5.83	5.46	5.51	5.51	6.09	6.09	5.64	6.11	5.64	5.98	5.64	5.64	5.98	5.66	5.64	6.11	5.64	5.98	5.64	5.98	5.94	6.09	5.94
or munici	vote	81.40	77.20	76.20	78.80	80.70	80.50	84.00	80.80	82.50	83.70	78.60	81.20	83.80	77.60	80.60	76.60	86.40	87.10	82.60	86.10	85.10	84.90	85.80	91.20	84.50	83.80	82.90	80.90	75.00	88.90
al data fc	blood	10.74	1.68	1.83	2.98	4.80	5.74	5.89	6.11	2.55	2.63	2.41	2.83	3.73	2.35	5.43	4.50	2.86	3.24	5.70	2.46	2.18	2.66	2.74	4.18	2.40	4.08	14.41	3.95	1.87	4.51
d historic	charity	1.82	4.05	2.76	7.98	9.45	5.87	8.58	7.89	5.58	8.12	5.81	8.92	8.20	6.53	5.43	4.62	10.24	12.77	4.74	12.62	13.43	7.11	14.60	13.12	8.70	19.06	12.98	4.47	2.21	13.09
le B.5: Social capital ar	municipality	Groningen	Hoogezand-Sappemeer	Almere	${ m Stadskanaal}$	Heerenveen	Leeuwarden	\mathbf{S} mallingerland	\mathbf{Sneek}	Assen	Coevorden	Emmen	Hoogeveen	Meppel	Almelo	Deventer	Enschede	Hardenberg	Hellendoorn	Hengelo (Overijssel)	Kampen	Noordoostpolder	Oldenzaal	\mathbf{R} aalte	$\operatorname{Rijssen}$	Steenwijk	Vriezenveen	Zwolle	Apeldoorn	Arnhem	Barneveld
Tabl	nuts3	113	113	230	111	123	121	123	122	131	132	132	133	133	213	212	213	211	213	213	211	230	213	212	213	211	213	211	221	223	221
	code	14	18	34	37	74	80	90	91	106	109	114	118	119	141	150	153	160	163	164	166	171	173	177	178	181	186	193	200	202	203

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alities
municipa
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data
historical
and
capital
Social
3.5:

nts (continued)	#school1859	0.0720	0.0945	0.0416	0.0567	0.0788	0.0611	0.1674	0.0364	0.0139	0.0726	0.0730	0.0481	0.0756	0.0706	0.0823	0.0511	0.0625	0.0200	0.0000	0.0000	0.0748	0.0000	0.0108	0.0000	0.0615	0.0646	0.0295	0.0506	0.0325	0.0089
30,000 inhabita	protestant1859	9.99	60.15	98.12	84.94	16.90	85.49	96.94	85.06	27.76	77.45	80.16	67.65	77.14	5.31	9.49	78.10	43.79	47.05	82.81	26.09	65.35	35.74	59.05	91.92	42.38	74.74	52.21	57.07	54.80	67.20
more than	foreign1855	2.18	2.13	0.31	0.26	3.19	5.50	0.62	0.29	4.60	1.55	1.57	1.56	1.93	0.90	4.44	2.36	3.76	1.32	0.44	0.45	1.07	0.77	1.92	0.56	0.83	5.34	0.68	1.24	1.66	3.14
es with	trust	6.09	6.20	5.94	5.94	6.20	5.94	6.20	5.94	6.09	6.09	6.09	5.64	5.94	6.09	6.09	6.20	5.66	5.84	5.84	5.84	5.84	5.84	5.84	5.84	5.84	5.84	5.84	6.01	5.75	5.75
unicipaliti	vote	82.50	80.80	85.50	83.60	82.70	83.40	86.40	85.60	77.30	84.80	83.70	77.80	84.20	83.10	81.10	81.70	84.10	81.70	88.30	86.00	81.80	84.40	77.60	85.20	81.30	82.50	79.40	78.60	84.20	71.80
a for m	blood	2.35	2.92	1.79	1.66	1.33	2.44	1.46	2.71	4.61	1.41	3.78	1.59	0.57	1.95	3.78	3.52	1.62	3.78	2.35	2.10	1.29	1.42	3.73	1.38	2.71	2.38	1.82	3.69	2.06	0.54
historical dat	charity	8.00	6.90	7.87	13.70	10.19	8.75	9.52	9.90	2.32	5.25	5.98	5.36	5.63	5.14	8.17	5.21	7.60	4.47	6.17	7.03	7.55	6.37	1.41	7.87	8.24	5.55	5.32	5.36	3.66	0.88
Social capital and	municipality	Bennel	Doetinchem	Ede	Epe	Groenlo	Harderwijk	Lochem	Nijkerk	Nijmegen	Renkum	Rheden	Tiel	Wageningen	Wijchen	Zevenaar	Zutphen	Dronten	Amersfoort	De Bilt	Houten	Maarssen	Soest	Utrecht	Veenendaal	IJsselstein	Zeist	Nieuwegein	Alkmaar	Amstelveen	Amsterdam
e B.5:	nuts3	223	222	221	221	222	221	222	221	223	223	223	224	221	223	223	222	230	310	310	310	310	310	310	310	310	310	310	322	326	326
Tabl	code	206	222	228	232	240	243	262	267	268	274	275	281	289	296	299	301	303	307	310	321	333	342	344	345	353	355	356	361	362	363

7 • .

(continued)	#school1859	0.0000	0.0101	0.0000	0.0060	0.0000	0.0120	0.0231	0.0000	0.0209	0.0526	0.0215	0.0207	0.0246	0.0000	0.0286	0.0000	0.0098	0.0446	0.0402	0.0355	0.0372	0.0469	0.0301	0.0166	0.0147	0.0000	0.0811	0.0153	0.0543	0.0487	0.0609	0.0000
00 inhabitants	protestant1859	98.99	68.62	50.49	55.62	98.57	83.15	61.90	56.00	97.66	83.37	88.20	53.64	76.75	41.95	99.70	18.59	11.82	1.65	1.41	6.03	25.52	2.88	13.71	16.95	4.27	4.00	1.53	1.06	0.02	1.41	2.53	2.15
ore than 30,00	foreign1859	0.12	2.84	2.09	1.74	0.05	0.44	0.73	0.72	0.27	1.03	0.93	8.64	3.64	1.27	0.11	2.53	5.06	0.25	2.04	0.94	0.70	2.64	2.50	0.56	1.50	1.47	0.66	1.37	0.40	2.29	0.44	1.04
with m	trust	5.30	5.30	5.68	5.30	5.30	5.30	5.84	5.68	5.70	5.41	5.41	5.97	5.41	5.84	5.93	5.51	5.51	5.74	5.74	5.51	5.51	5.74	5.82	5.82	5.72	5.51	5.82	5.72	5.82	5.74	5.82	5.74
cipalities	vote	82.10	69.90	79.50	74.00	75.60	77.10	86.20	80.90	80.90	80.10	82.30	74.70	75.40	85.40	87.10	75.00	75.70	80.40	74.50	76.60	81.00	72.60	76.90	80.90	84.75	78.80	78.40	70.70	79.90	81.20	81.30	80.60
for muni	blood	1.40	1.40	2.38	2.29	2.91	3.17	2.78	2.44	2.00	1.55	1.55	2.41	1.55	2.77	1.17	2.97	2.00	1.95	2.53	2.00	2.32	2.26	2.36	1.94	2.45	2.21	2.25	2.45	1.96	3.85	4.34	2.53
ical data	charity	5.72	0.73	3.83	2.01	3.33	2.30	8.55	4.57	6.38	6.44	6.96	6.27	4.24	9.94	17.91	6.55	3.34	6.48	4.49	5.44	6.63	2.52	3.49	5.43	5.39	4.36	4.20	3.67	5.74	5.15	6.02	4.15
Social capital and histor	municipality	Ridderkerk	Rotterdam	Rijswijk (Zuid-Holland)	Schiedam	Spijkenisse	Vlaardingen	Woerden	Zoetermeer	\mathbf{Z} wijndrecht	Goes	Middelburg	Terneuzen	Vlissingen	De Ronde Venen	Tytsjerksteradiel	Bergen op Zoom	Breda	Deurne	Eindhoven	Etten-Leur	Geertruidenberg-Drimmelen	Helmond	's-Hertogenbosch	Heusden	Oisterwijk-Hilvarenbeek	Oosterhout	Oss	Tilburg-Goirle	Uden	Valkenswaard	Veghel	Veldhoven
e B.5:	nuts3	335	335	332	335	335	335	310	332	336	342	342	341	342	310	121	411	411	414	414	411	411	414	413	413	412	411	413	412	413	414	413	414
Tabl	code	597	599	603	606	612	622	632	637	642	664	687	715	718	736	737	748	758	762	772	777	779	794	796	797	824	826	828	855	856	858	860	861

able	B.5:	Social capital and his	storical dats	a for mu	nicipaliti	es with 1	more than 30	,000 inhabitants	s (continued)
е	nuts3	municipality	charity	$_{\rm blood}$	vote	trust	foreign1859	protestant1859	#school1859
2	412	Waalwijk	5.37	2.43	78.30	5.72	0.59	37.17	0.0083
22	423	Landgraaf	3.26	1.26	72.60	5.34	8.44	0.03	0.0531
02	422	Echt-Susteren	5.16	2.15	77.60	5.43	5.22	0.32	0.0133
17	423	Heerlen	2.75	1.26	68.60	5.34	4.47	1.06	0.0166
28	423	Kerkrade	3.73	1.26	67.70	5.34	12.94	0.11	0.0000
35	423	Maastricht	3.15	2.62	72.00	5.34	8.37	11.41	0.0153
57	422	Roermond	4.69	1.92	70.00	5.43	7.42	3.32	0.0379
83	421	Venlo	3.46	2.69	72.30	5.97	6.61	4.01	0.0318
984	421	Venray	5.68	1.65	77.90	5.97	2.59	0.06	0.1019
988	422	Weert	4.59	1.74	76.40	5.43	3.30	0.39	0.0502
9 95	230	Lelystad	3.02	1.92	74.40	5.66	3.76	43.79	0.0468
1674	411	Roosendaal	5.40	2.56	75.50	5.51	4.35	2.04	0.0000
1676	342	Schouwen-Duiveland	0.00	2.51	85.00	5.41	0.60	91.13	0.0427
1699	131	Noordenveld	7.30	2.16	85.70	5.46	1.37	83.83	0.1195
1709	411	Moerdijk	7.50	2.00	79.50	5.51	0.57	47.05	0.0283
1730	131	Tynaarlo	9.40	1.94	86.30	5.46	0.58	98.42	0.0751
[731	131	Midden-Drenthe	8.80	1.89	86.20	5.46	0.76	00.70	0.0588
1734	223	Overbetuwe	7.90	0.57	83.00	6.09	0.88	39.68	0.0851
1735	213	Hof van Twente	12.50	2.29	87.60	5.64	0.95	67.96	0.0899
1883	423	Sittard-Geleen	4.80	2.37	74.60	5.34	5.17	1.59	0.0608
The figur	tes for mur	nicipalities of Flevoland- Almere (3	4), Noordoostpold	sr (171), Dror	nten (303) and	Leystad (995)) are for 1971 as these	lands were gained from t	he
and and	did not e:	xist in 1859. charity: voluntary con	ntributions per hou	sehold in eur	os. blood: bloo	d donations p	er 100 inhabitants. vo	ote: voter turnout	
n lower	house (twe	eede kamer) elections 2003 in perce	ntages. trust: trus	t index source	ed from the inc	lividual level	data ESS. foreign1859	 percentage of foreigners 	
n total ₁	opulation	ι in 1859. protestant1859: percenta,	ge of protestants in	ı total popula	tion in 1859. j	#school1859:	number of school per	100 inhabitants in 1859.	

Appendix C Appendix to Chapter 6

C.1 Definition of institutional indicators

Definitions of the indicators employed in Chapter 6, Table 6.3 are presented below.¹

"Rule of Law" is a composite index that measures the extent confidence, effectiveness and predictability of the judiciary, and the enforceability of contracts. This indicator supposedly measures the success of a society in developing an environment in which fair and predictable rules form the basis for economic and social interactions, and importantly, the extent to which property rights are protected. Higher values indicate that societies are successful in setting up such an institutional environment.

"Impartial courts" is an indicator assessing the existence of a trusted legal framework for private businesses to challenge the legality of government actions or regulation. Higher values represent the existence of such an institutional framework.

"Judicial independence" is an index that measures whether the judiciary is independent and not subject to interference by the government or parties in disputes. Higher values indicate independence of the judiciary.

"Protection of property rights" measures the degree of intellectual property protection. Higher values indicate more effective protection.

"Government Effectiveness" combines small the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies in one index. The main focus of this index is on "inputs" required for the government to be able to produce and implement good policies and deliver public goods. Higher values indicate more effectiveness.

"Voice and accountability" represents the process by which those in authority are selected and replaced. It is a composite index composed of indicators measuring various aspects of the political process, civil liberties and political rights that measure the extent to which citizens of a country are able to participate in the selection of governments. We also include in this category indicators measuring the independence of the media, which serves an important role in holding monitoring those in authority and holding them accountable for their actions. Higher values indicate higher ability to participate in the selection of governments.

 $^{^1}$ http://www.cesifo-group.de/portal/page/portal/ifoHome/a-winfo/d3iiv. As appear in the DICE webpage

"Business regulation" is a composite index of several indicators, such as the extent of price controls, administrative procedures and obstacles for business and the ease of starting the business. Lower values associate with higher degree of business regulation.

"Economic freedom" is a composite index of more than 50 independent economic variables such as trade policy, fiscal burden of government and government intervention in the economy. Higher values represent more represses economies.

"Barriers to entrepreneurship measures the ease of establishing new firms. Higher values reflect obstacles for entrepreneurship and new firm creation.

Decision making at the lower secondary school represents the responsibility and decision making at various levels from central authority to school level. Source is OECD.

"Trust" is constructed from the answers to the following question "Generally speaking would you say that most people can be trusted or can't be too careful in dealing with people?".

Social capital is an index of generalized trust, importance of voluntary work and the extent of participation in to voluntary associations. It is akin to the social capital index in chapter 4. For both indicators higher values associate with higher trust or social capital.

"Corruption perception" index measures the overall extent of corruption (frequency and the amount of corruption) in the private and public sectors and in the political arena. Higher values represent lower corruption.

"Control of corruption" is another measure for corruption. Higher values represent better and more effective controls for corruption. These last two indicator are from CESifo DICE and the definitions above are taken from DICE webpage.

C.2 Detailed result of analysis of EVS

This section presents the detailed results of the analysis conducted in chapter 6, section 6.2.2. The first row in the following tables indicates the variable names as in the European Values Study (1999) Methodological Questionnaire. The yes-no questions are coded as [1: yes, 0: no] and the coding is reversed in some questions. Such cases are denoted with an asterisk and the coding of each variable is represented in the last row of the table. The values indicate the average score for different country groups and Turkey. The numbers in parentheses are the standard errors. The country codes are as follows:

France	\mathbf{FR}	Luxembourg	LU
United Kingdom	$\mathbf{U}\mathbf{K}$	Ireland	IE
Germany	DE	Estonia	EE
Austria	AT	Latvia	LV
Italy	\mathbf{IT}	Lithuania	LT
Spain	\mathbf{ES}	Poland	PL
Portugal	\mathbf{PT}	Czech Republic	CZ
Netherlands	\mathbf{NL}	Slovakia	SK
Belgium	BE	Hungary	HU
Denmark	DK	Malta	\mathbf{MT}
Sweden	SE	Slovenia	SI
Finland	\mathbf{FI}	Romania	RO
Greece	\mathbf{GR}	Bulgaria	BG

	*911	w1.01	*115	xr11.0*	*105*	w111	x119	w113	11/ T
	Uom immentent	Do rot holono	Do root boliono in	Var voir o vol	Home officer of	Chundh / Monano	Church / Moocaro	Churdy / Moody	Church / Mooch
	in vour life:	to a religious de-	God?	zious person?	tend religious	adequate answer	adequate answer	adequate answer	adequate answer
	religion	nomination			services (apart	to: moral prob-	to: family life	to: spiritual	to: social prob-
					from wedding	lems		needs	lems
					funerals etc.)				
EU15	2.46(1.03)	0.77(0.42)	0.78 (0.42)	2.37 (0.90)	3.85(2.48)	0.40(0.49)	0.33(0.47)	0.59(0.49)	0.29(0.45)
EU27	2.49(1.05)	0.74(0.44)	0.76(0.42)	2.38(0.89)	3.96(2.48)	0.46(0.50)	0.40(0.49)	0.66(0.47)	0.30(0.46)
EU12	2.53(1.08)	0.68(0.47)	0.74(0.44)	2.41(0.89)	4.14(2.47)	0.57(0.50)	0.53(0.50)	0.76(0.42)	0.32(0.47)
EUNORTH	2.23(0.95)	0.75(0.43)	0.66(0.47)	2.26(0.94)	2.92(2.07)	0.31(0.46)	0.26(0.44)	0.56(0.50)	0.24(0.43)
EUSOUTH	2.80(0.99)	0.86(0.34)	0.92(0.27)	2.62(0.76)	4.79(2.28)	0.52(0.50)	0.41(0.49)	0.67 (0.47)	0.36(0.48)
LATE COMERS	2.91(0.97)	0.86(0.35)	0.86(0.35)	2.52(0.83)	4.71(2.08)	0.63(0.48)	0.57(0.49)	0.78(0.41)	0.37 (0.48)
TURKEY	3.73(0.66)	0.98(0.15)	0.98(0.15)	2.61(0.78)	4.53(2.73)	0.76(0.43)	0.67(0.47)	0.83(0.37)	0.44 (0.50)
FORMERSOV	2.43(0.97)	0.53(0.50)	0.76(0.43)	2.26(0.94)	3.06(2.06)	0.70(0.46)	0.53(0.50)	0.76(0.43)	0.26(0.44)
Min [EII15]	2 04 [DE]	0.45 [NL]	0.53 [SF]	1 84 [SE]	9 38 [FR]	0 90 [DK]	0.15 [DK]	0.46 [LTI]	0.11 [DK]
Max [EU15]	3.01 [FE]	0.96 [GR]	0.96 [PT]	2.78 [PT]	5.92 [TE]	0.62 [TT]	0.48 [TT]	0.72 [PT]	0.43 IT1
Min [EU27]	1.82 [CZ]	0.25 [EE]	0.40 [CZ]	1.84 [SE]	2.38 [FR]	0.20 [DK]	0.15 [DK]	0.46 [LU]	0.11 [DK]
Max [EU27]	3.56 [MT]	0.99 [MT]	0.99 [MT]	2.90 [PL]	6.73 [MT]	0.82 [LT]	0.80 [LT]	0.89 [RO]	0.58 [LT]
Variable coding	1: Not at all im-	0: No	0: No	1: Convinced	1: Never / prac-	0: No	0: No	0: No	0: No
	portant			atheist	tice never				
	4: Very impor- tant	1: Yes	1: Yes	3: Religious	8: More than once a week	1: Yes	1: Yes	1: Yes	1: Yes

	v172	Learn children at	home: religious	faith		0.20(0.40)	0.22(0.41)	0.25(0.44)	0.09 (0.29)	0.29 (0.45)	0.52 (0.50)	0.54(0.50)	0.12(0.32)	0.05 [SE]	0.40 [IE]	0.05 [SE]	0.59 [RO]	0: Not men-	tioned 1: Mentioned	
	v132*	Religious leaders	should not influ-	ence government	decisions	3.90(1.11)	3.92(1.08)	3.95(1.03)	3.72(1.20)	3.83(0.98)	4.04(0.99)	3.76(1.11)	3.78(0.98)	3.41 [SE]	4.34 [DK]	3.41 [SE]	4.34 [DK]	1: Disagree	strongly 5: Agree	strongly
inued)	v131*	Better if people	with religious be-	liefs held public	office	2.42(1.16)	2.59(1.20)	2.87(1.20)	2.09(1.02)	2.73(1.08)	3.33(1.19)	3.42(1.24)	3.31(1.11)	1.66 [DK]	3.04 [GR]	1.66 [DK]	3.76 [RO]	1: Disagree	strongly 5: Agree	strongly
ication (cont	$v130^{*}$	Religious leaders	should not influ-	ence voting		4.04(1.06)	4.05(1.03)	4.08(0.99)	3.88(1.19)	3.99(0.93)	4.11(0.97)	3.88(1.09)	4.02(0.89)	3.69 [NL]	4.42 [FR]	3.69 [NL]	4.42 [FR]	1: Disagree	strongly 5: Agree	strongly
itics and edu	$v129^{*}$	Politicians not	believing in God	are unfit for	public office	2.09(1.11)	2.25(1.15)	2.52(1.17)	1.77(0.90)	2.49(1.11)	2.96(1.26)	3.52(1.36)	2.70(1.14)	1.53 [DK]	3.07 [GR]	1.53 [DK]	3.46 [RO]	1: Disagree	strongly 5: Agree	strongly
Religion, pol	$v106^{*}$	How often at-	tend religious	services when 12	years old	5.65(2.38)	5.36(2.54)	4.89(2.69)	3.99(2.47)	6.31 (1.87)	5.11(2.47)	4.44(2.92)	2.18(1.89)	3.29 [DK]	7.13 [EE]	2.51 [EE]	7.64 [MT]	1: Never / prac-	tice never 8: More than	once a week
tal values I:	v109	Religious ser-	vice important:	death		0.80(0.40)	0.81 (0.39)	0.83(0.38)	0.76(0.43)	0.87 (0.33)	0.94(0.24)	0.95(0.22)	0.83(0.38)	0.55 [NL]	0.96 [IE]	0.50 [CZ]	0.98 [RO]	0: No	1: Yes	
: Fundamen	v108	Religious service	important: mar-	riage		0.73(0.44)	0.75(0.44)	0.77(0.42)	0.63(0.48)	0.83(0.38)	0.93(0.26)	0.82(0.39)	0.60(0.49)	0.45 [NL]	0.93 [IE]	0.41 [CZ]	0.98 [RO]	0: No	1: Yes	
Table C1	v107	Religious service	important: birth			0.71(0.45)	0.73(0.44)	0.77 (0.42)	0.62(0.48)	0.82(0.39)	0.90(0.31)	0.42(0.49)	0.80(0.40)	0.40 [NL]	0.92 [IE]	0.40 [NL]	0.98 [RO]	0: No	1: Yes	
						EU15	EU27	EU12	EUNORTH	EUSOUTH	LATE COMERS	TURKEY	FORMERSOV	Min [EU15]	Max [EU15]	Min [EU27]	Max [EU27]	Variable coding		

	v224*	How much re-	spect for human	rights these	days?	2.87(0.75)	2.71(0.79)	2.46(0.80)	3.14(0.72)	2.71(0.72)	2.26(0.78)	1.69(0.86)	1.91 (0.77)	2.60 [FR]	3.33 [DK]	1.91 [LT]	3.33 [DK]	1: No respect at	all	4: Lot of respect	
	v223*	Democracy: can-	not maintain or-	der		2.10(0.78)	2.22(0.81)	2.43(0.81)	2.02(0.65)	2.15(0.71)	2.26(0.87)	2.21(0.87)	2.64 (0.79)	1.74 [AT]	2.60 [FR]	1.74 AT	2.86 [PL]	1: Disagree	strongly	4: Agree	strongly
cracy	$v222^*$	Democracy: is	indecisive			2.47 (0.81)	2.53(0.81)	2.64(0.79)	2.42(0.72)	2.52(0.72)	2.51(0.89)	2.57(0.88)	2.74(0.81)	2.16 [DE]	2.92 [FR]	2.10 [MT]	3.00 [PL]	1: Disagree	strongly	4: Agree	strongly
and demo	$v221^{*}$	Democracy: the	economic system	runs bad		2.11(0.73)	2.22(0.75)	2.39(0.75)	1.97 (0.58)	2.32(0.67)	2.39(0.86)	2.22(0.77)	2.48 (0.74)	1.83 [DE]	2.48 [FR]	1.83 [DE]	2.61 [RO]	1: Disagree	strongly	4: Agree	strongly
ical system	v220*	Democracy:	better than any	other political	system	3.45(0.66)	3.35(0.68)	3.18(0.69)	3.46(0.61)	3.41(0.62)	3.22(0.78)	3.27(0.74)	2.89 (0.76)	3.08 [UK]	3.70 [DK]	3.07 [HU]	3.70 [DK]	1: Disagree	strongly	4: Agree	strongly
es II: Politi	v219*	Political system:	having a demo-	cratic political	system	3.48(0.67)	3.38(0.70)	3.22(0.72)	3.54(0.61)	3.54(0.62)	3.35(0.71)	3.40(0.73)	2.85 (0.77)	3.27 [FI]	3.80 [GR]	3.01 [EE]	3.80 [GR]	1: Very bad		4: Very good	
nental valu	v218*	Political system:	having the army	rule		1.29(0.58)	1.34(0.63)	1.44(0.69)	1.27(0.54)	1.41(0.67)	1.68(0.85)	1.92(0.95)	1.84(0.80)	1.09 [DK]	1.65 [PT]	1.09 [DK]	1.96 [RO]	1: Very bad		4: Very good	
1.2: Fundar	$v217^{*}$	Political system:	experts making	decisions		2.36(0.95)	2.55(0.95)	2.85(0.87)	2.29(0.87)	2.26(0.95)	3.16(0.75)	2.95(0.87)	2.60(0.83)	1.56 [GR]	2.64 AT	1.56 [GR]	3.21 [AT]	1: Very bad		4: Very good	
Table (v216*	Political system:	having a strong	leader		1.81(0.95)	1.90(0.97)	2.06(1.00)	1.82(0.89)	1.72(0.86)	2.31(1.08)	2.85(1.00)	2.51 (0.96)	1.36 [GR]	2.28 [LU]	1.36 [GR]	2.86 [RO]	1: Very bad		4: Very good	
	v213*	Are you satisfied	how the democ-	racy works?		2.58(0.73)	2.45(0.75)	2.23(0.74)	2.67(0.65)	2.50(0.72)	1.99(0.73)	1.76(0.88)	1.73 (0.74)	2.26 [IT]	2.93 [LU]	2.00 [SK]	2.93 [LU]	1: Not at all sat-	isfied	4: Very satisfied	
						EU15	EU27	EU12	EUNORTH	EUSOUTH	LATE COMERS	TURKEY	FORMERSOV	Min [EU15]	Max [EU15]	Min [EU27]	Max [EU27]	Variable coding			

Samenvatting

Sociaal kapitaal is een concept dat breed wordt toegepast in verschillende sociale wetenschappen. Onderzoekers hebben het concept gebruikt om socio-economische resultaten te verklaren en te vergelijken. Twee belangrijke aspecten hebben echter weinig aandacht gekregen: (i) waardoor wordt sociaal kapitaal eigenlijk gevormd? en (ii) wat is het mechanisme waardoor sociaal kapitaal uitkomsten beïnvloedt? Deze studie gaat expliciet in op deze twee vragen vanuit een economische invalshoek.

De drie belangrijkste bevindingen kunnen als volgt worden samengevat:

(1) Sociaal kapitaal leidt tot lagere transactie kosten, efficiënte informatieuitwisseling en betrouwbaar gedrag wat een positieve impact heeft op innovatie. Empirische bevindingen laten zien dat innovatie een transmissiemechanisme is tussen sociaal kapitaal en economische groei.

(2) Het op verschillende manieren meten en definiëren van sociaal kapitaal heeft geleid tot nieuwe indicatoren waarmee het verschil in misdaadcijfers tussen geografische gebieden voor een groot deel kan worden verklaard. Sociaal kapitaal vermindert criminaliteit dankzij netwerkeffecten, sociale ondersteuning en de verhoging van de kosten van misdaad.

(3) Geschiedenis en instituties spelen een belangrijke rol bij de vorming van sociaal kapitaal. Regio's waarin instituties die zich richten op onderwijs, gemeenschapszin en cohesie langer bestaan, hebben een hoger niveau van sociaal kapitaal dan regio's waarvoor dit niet geldt.

Dit proefschrift bestaat uit vijf inhoudelijke hoofdstukken. In Hoofdstuk twee wordt een overzicht gegeven van het onderzoek over sociaal kapitaal in verschillende wetenschappelijke disciplines. Door het uitvoeren van een netwerkanalyse blijkt dat verschillende onderzoeksdisciplines een ander begrip van sociaal kapitaal hanteren en eigenlijk nauwelijks op de hoogte zijn van elkaars onderzoek. Het sociaal kapitaal van de sociaal-kapitaal-onderzoekers lijkt dus geconcentreerd en beperkt tot de eigen kring. Een duurzame toekomst van de sociaal kapitaal theorie is afhankelijk van de versterking van de banden tussen verschillende disciplines zoals economie, sociologie en politieke economie. De analyses in dit proefschrift maken gebruik van de ingrediënten uit de verschillende bloedgroepen om tot een meer evenwichtige definitie en analyse te komen binnen de economische wetenschap. Het is echter slechts een eerste stap.

Hoofdstuk 3 laat zien dat innovatie één van de mechanismen is vertrouwen om te zetten in economische groei. Een belangrijke bijdrage van deze studie is het koppelen van de "vertrouwen-innovatie" relatie met de bestaande "vertrouwen-groei" relatie. Sociaal kapitaal leidt tot meer innovatie door (i) de verlaging van transactie kosten zoals monitoringkosten, (ii) efficiënte informatie-uitwisseling, en (iii)het stimuleren van gedrag dat rekening houdt met groepsnormen. De bevindingen laten zien dat sociaal kapitaal een direct en indirect effect (d.m.v. innovatie) heeft op de economische groei in de regio's van de Europese Unie.

Hoofdstuk 4 voegt twee punten toe aan deze bevindingen. Ten eerste verhoogt sociaal kapitaal niet alleen het niveau maar ook de groei van innovaties. Ten tweede wordt de effectiviteit van EU-doelstellingen op het gebied van regionale ondersteuningsprogramma's onderzocht. De schattingen laten zien dat regio's die meer sociaal kapitaal hebben (gegeven inkomen) meer profiteren van iedere Euro aan fondsen dat zij ontvangen.

In de volgende hoofdstukken wordt de link van sociaal kapitaal naar inkomen verbreed door te kijken naar andere socio-economische uitkomsten. In Hoofdstuk 5 wordt de relatie tussen sociaal kapitaal en criminaliteit onderzocht voor Nederlandse gemeentes. De redenen hiervoor zijn dat (i) criminaliteit zowel een sociaal als een economisch verschijnsel is en (ii) sociale en economische factoren van invloed zijn op criminaliteit. De gegevens over sociaal kapitaal voor dit onderzoek zijn uniek en bestaan uit informatie over bloeddonaties, vrijwillige bijdragen aan liefdadigheid, opkomst bij verkiezingen en vertrouwen. Deze meting is nieuw in de zin dat het sociaal kapitaal wordt behandeld als een latente variabele die bestaat uit verschillende dimensies. De schattingen laten zien dat gemeentes met meer sociaal kapitaal een lagere criminaliteit kennen.

Al deze schattingen in Hoofdstukken 3-5 zijn uitgevoerd door historische informatie over instituties te gebruiken om causale verbanden te vinden. Door empirische analyse ontstaat het beeld dat er een sterke complementariteit bestaat tussen formele en informele instituties en dat er hysterese in deze relatie is. Sociaal kapitaal ontstaat in gebieden waar de invloed van de uitvoerende macht beperkt is, waarbij het niveau van het onderwijs hoog is, waar universiteiten bestaan als centra van cultuur en waar de bevolking minder heterogeen is. Door gebruik te maken van originele gegevens verzameld voor EU-regio's en gemeentes in Nederland blijkt dat de politieke instellingen, onderwijs, universiteiten en religie in de jaren 1850-1859 invloed hebben op de huidige economische en sociale uitkomsten van deze regio's en gemeentes via hun impact op sociaal kapitaal.

In Hoofdstuk 6 wordt ingegaan op de verschillen tussen Turkije en de Europese Unie om te kijken in welke mate Turkije en Europa van elkaar verschillen en waarom het zo moeilijk is voor Turkije om toe te treden tot de EU. Deze verschillen uiten zich op vele manieren; de focus hier is op verschillen in sociaal kapitaal
en formele instituties die kunnen worden teruggeleid naar de geschiedenis van beide gebieden. Dit is consistent met de aanpak in de eerdere hoofdstukken en toont een mooie, actuele en praktische beleidstoepassing van dit proefschrift. De analyse laat zien dat de verschillen tussen Europa en Turkije vooral van politieke en economische aard zijn. Deze verschillen kunnen slechts worden overwonnen door het versterken van de institutionele banden en niet door het isoleren van Turkije en het afdwingen van hervormingen die niet passen bij de cultuur van het land. Toekomstige pogingen tot toenadering zullen dan ook slechts vruchtbaar zijn wanneer Turkije instituties bouwt die passen bij een modern land en wanneer Europa de waarde erkent van het sociale kapitaal tussen de EU en Turkije dat zijn oorsprong vindt in de overeenkomsten en verschillen in cultuur en diversiteit.

Curriculum Vitae

Ibrahim Semih Akçomak studied economics at the Middle East Technical University (METU) in Ankara, Turkey. After graduating he worked as a research assistant in the Department of Economics at METU where he also obtained his MSc. degree. Semih joined the UNU-MERIT PhD programme in 2003 and was appointed as a research assistant (AiO) at the Department of Economics, Maastricht University. His work on social capital and socio-economic outcomes has resulted in several working papers, book chapters and articles. Semih's main research interests include social and human capital, institutions, innovation policy and regional economics. Additional information and a full CV can be obtained from his webpage at http://akcomak.unu-merit.nl/.