



Social capital and regional development in Turkey^{*}

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Abstract

This paper aims to improve the shortcomings of the empirical literature on regional social capital. The following three research questions are addressed: (i) do regional social capital and economic growth have an endogenous (circular) relationship as opposed to the exogenous one-way relationship assumed in the literature; (ii) What are the socio-economic and demographic determinants of cross-regional variation in social capital? And (iii) Are spatial spillovers relevant in the analysis of these questions? Empirically, we pursue the analysis for 81 Turkish provinces in 2015. Indeed, regional social capital in Turkey is far less studied than country-level social capital. The methodology adopted includes kernel density estimates, ordinary least squares, three stage least squares, and spatial error models. In terms of the obtained results, First, regional social capital is heterogeneously distributed across regions. Second, social capital has no significant impact on economic growth but the growth induces the generation of social capital (in social norms). This represents a first result of reverse causality in the literature. Third, a typical province that has high social capital is the one with relatively high income, more even income distribution, low unemployment, big households and older age profile. Fourth, there is the evidence of spatial dependence that should be incorporated in empirical analyses.

KEYWORDS

3SLS, economic growth, norms, participation, social capital, trust

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JEL CLASSIFICATION

R11; E24; O1; O35; A13

1 | INTRODUCTION

An increasing number of studies address social capital and its economic consequences. This new research subject still lacks a clear definition of social capital.¹ Thus far, scholars tend to conceptualize this phenomenon in three ways: by referring to concepts of social participation (Putnam, 1993), social trust (Fukuyama, 1998, 2000) and norms (Coleman, 1988). Therefore, it can be inferred that societies that exhibit greater participation in formal and informal networks, construct more trust ties, and commit more to the social norms are likely to have higher levels of social capital.

Existing studies on social capital have predominantly analyzed its impact on economic growth and productivity. In theoretical terms, the vast majority of the views indicate a positive impact. The main argument is that presence of well-structured social capital is likely to induce co-ordination among individuals, institutional quality, the flow of knowledge, labour mobility, participation in education, savings, innovative investments, adoption of new technologies, and entrepreneurship while it decreases transaction costs, bureaucratic difficulties, and information asymmetries. Therefore, social capital is expected to contribute to an increase in productivity and economic growth (Akcomak & Well, 2009; Bjørnskov, 2005, 2009; Coleman, 1988; Dasgupta, 2005; Forte, Palomino, & Tortosa-Ausina, 2015; Iyer, Kitson, & Toh, 2005; Peiró-Palomino, 2016; Putnam, 1993; Whiteley, 2000).

The negative impact of social capital is, in contrast, is not emphasized to the same extent. Nevertheless, scholars in this field identify the inefficiencies that social capital might create. For example, if informal networks are well developed in a country, firms will often use these networks (such as friendship/family ties) during the procurement and recruitment processes (such as hiring a friend in a company rather than a more qualified person), which will lead to inefficient economic outcomes (Callois & Aubert, 2007; Fukuyama, 1998, 2000; Sabatini, 2005).

On empirical grounds, many studies demonstrate positive effects. Studies by Peiró-Palomino and Tortosa-Ausina (2015) analysed these effects in Spanish provinces, Forte et al. (2015) examined 85 EU NUTS 1 regions, and Akcomak and Well (2009) investigated the effects in 102 EU regions. The negative impact of social capital is reported less frequently. Some exceptions are Helliwell (1996), Schneider, Plumper, and Baumann (2000), and Roth and Shuler (2006).

Nevertheless, the empirical literature in this field has several shortcomings. First, perhaps most importantly, most studies regard social capital as exogenous to economic growth. However, it is unlikely to be inherently exogenous. While the rationale behind this claim is that increasing social capital in a society might bring economic growth through the channels discussed above, a reverse causality might also be present. Hence, economic growth might induce social capital since a higher level of income allows individuals to live in better conditions and participate more easily in social networks and norms, as well as to generate trustworthy relationships. Thus, an endogenously occurring circular association might exist between social capital and economic growth. This has, however, never been tested in the existing literature. We test this premise by using simultaneous equations and a three-stage least squares (3SLS) algorithm that is known to be a useful method to explore such endogenous and simultaneous relationships with possible reverse causality (Zellner & Theil, 1992) While several studies have extensively analysed the main determinants underlying social capital (Lee, Lee, & Hahn, 2011; Neira, Vázquez, & Portela, 2009), many studies examine determinants at the national or international level. We also address regional determinants and cross-regional variation of social capital, which have received limited attention. Third, the spatial spillover of social capital among neighbouring regions has not yet been considered in the existing econometric models, which might generate significant bias in the estimations. Therefore, we aim to also bridge this gap by adopting a spatial error model (SEM). Fourth, to the best of our knowledge, other scholars are studying at the regional level in Turkey, but the

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number of studies is more limited than the studies on the national scale. Moreover, our study differs from other studies on Turkey since it adopts three different methodologies (OLS, 3SLS, SEM) that simultaneously account for endogeneity, reverse causality, and spatial dependence. Some of the studies in the literature on Turkey analyse social capital at the regional/provincial and its contribution to economic developments (Keskin (2008), Erselcan (2009) and Kartal, Acaroğlu, and Dura (2018)). However, more studies and recent analyses are needed on this topic.

Hence, this paper addresses the following three research questions for 81 Turkish provinces in 2015:(i) Do regional social capital and economic growth have an endogenous circular relationship? (ii) What determinants underlie cross-regional variation in social capital? and (iii) Are there any significant spatial spillovers of social capital across neighbouring regions?

We believe that Turkey is a relevant setting for study since the context of regional imbalances and social capital are suited to the study area. It is a developing country that includes sizable economic and social imbalances across regions. The regional studies focus on income disparities and related determinants (Gezici & Hewings, 2007; Yildirim & Ocal, 2006; Yildirim, Ocal, & Ozyildirim, 2009). Typically, important income differences have been noted between developed Western regions and less-developed Eastern regions. Nonetheless, the problem of social capital differences across regions is also crucial since similar East/West difference patterns might be observed. Large cross-regional disparities may be present in social capital as the commitment to norms, trust, and participation in networks differ significantly across regions.

In terms of methodology, OLS and simultaneous equation (3SLS) models have been used to investigate the first and second research questions and the spatial error model (SEM) is used to address the third one. Furthermore, we use summary statistics, illustrative maps, and Kernel density estimations for descriptive and exploratory analysis. The remaining part of the paper is structured in a following way; Section 2 provides a summary of the existing empirical and theoretical studies. In Section 3, we implement the empirical analysis, which is devoted to, first, exploratory and descriptive analysis and, second, to econometric model estimations. Finally, we conclude our study in Section 4.

2 | LITERATURE REVIEW

2.1 | Definition of social capital

In history, the concept of social capital was first introduced by Hanifan (a reformist in the US) in 2016. He defined this phenomenon by departing from the conventional definition of capital (such as physical equipment or money) and by referring to the strength of social ties and co-ordination among individuals, such as friendship and good willingness. The concept gained popularity in the 1990s. It has been used in the current form by Coleman (1988), Putnam (1993), and Fukuyama (1998, 2000).

As anticipated in the introduction, the literature relates the concept of social capital to social trust, norms, and participation in networks. For instance, Coleman (1988) defined social capital as a set of common norms that promotes collaboration among individuals. Putnam (1993), however, has emphasized the role played by networks, norms, and trust, which foster co-ordinated activities and develop social capital and effectiveness.

It is informative to expound on the three concepts of social capital, and it is useful to provide a discussion on their advantages/disadvantages. To begin with, their definitions, first, networks refer to the participation of individuals in formal/informal relationships, including involvement in non-governmental organizations (NGOs), membership of political parties, associations, and clubs. These networks often induce collaborative activities within society. Second, trust represents the level of confidence among individuals in a society (Coleman, 1988; Putnam, 1993), leading to increased co-ordination among people and their socio-economic linkages, which strengthens within a trustworthy environment. Third, commitment (participation) to formal and informal norms identifies social capital as obeying and complying with the regulations and laws develops a well-co-ordinated and effective socio-economic system (Coleman, 1988; Putnam, 1993).



From a critical perspective, these three approaches have several advantages and drawbacks. First, trust is a useful and appropriate variable as it indicates the general level of confidence within the society. Nonetheless, it also has some drawbacks. For instance, it does not reflect all the components of social capital. It demonstrates the degree to which individuals develop a confident economic and social environment. However, this is only partially representative of social capital. Other complementary variables are needed that indicate the level of co-ordination, collaboration, and commitment to norms in a society. Moreover, while trust is a phenomenon that is difficult to measure empirically where only proxies can be used, it is needed for concrete and measurable concepts in empirical social sciences. Hence, although trust is an important indicator, other variables of social capital are needed (Coleman (1988), Putnam (1993), and Fukuyama (1998, 2000)).

Similarly, commitment to norms can be used to understand the degree to which individuals respect the institutions. In other words, high commitment to norms may increase the efficiency of institutions as individuals commit more to the norms. As it represents a general indicator of social capital, it has an advantage over the trust variable. High commitment to norms in a society will lead to the proper functioning of institutions and the law. However, it is again difficult to quantify this variable empirically, thus other types of variables must be adopted (Coleman (1988), Putnam (1993), and Fukuyama (1998, 2000)).

Finally, as the third variable, participation in networks, can easily be measured empirically, it has certain advantages over the trust and norms variables. It is easy to calculate the percentage of individuals who are members of political parties, non-governmental organizations, associations, and their participation in general and local elections. However, as in the case of the trust variable, it only partially signals the level of social capital, and while it demonstrates how well-co-ordinated and collaborative individuals are in a society, other perspectives that reflect the social capital level are missing. Thus, the three measures of social capital have various advantages and drawbacks. As these indicators complement each other, we use them together (Coleman, 1988; Fukuyama, 1998, 2000; Putnam, 1993).

Empirically, measuring such a phenomenon is a difficult task. A wide range of researchers has attempted to measure the degree of social participation by using the percentage of individuals that participate in elections, non-governmental organizations, social, cultural, and voluntary activities, as well as the strength of friendship and family ties (Oliver, 1999; Peiró-Palomino, 2016; Sabatini, 2008; World Bank, 1998). Other scholars have attempted to incorporate the measures of social trust by referring to the crime rate, institutional trust, independence of courts, and the percentage of individuals who receive bank loans (Parts, 2013; Putnam, 2000; World Bank, 1998). Lastly, the commitment of societies to norms has been quantified by using the rates of corruption, crime rate, and the level of individual freedom (World Bank, 1998).

All three measures are needed in Turkey since there is no single data/variable reflecting the level of social capital. Moreover, trust and norms overlap and some sub-variables in measurement may coincide. For instance, the satisfaction gained from the social- and work-life of individuals can be used to measure trust and commitment to norms. Similarly, the rate of paybacks and debt collection is common to both variables. Therefore, it is reasonable to adopt such overlapping variables. Moreover, not enough data is available, and, to some extent, we are restricted to using these variables. Participation in networks has a vastly different nature and it can be measured differently than the first two variables (trust and norms). Variables such as the rate of individual memberships of non-governmental organizations, trade unions, and political parties are used. Under these circumstances, we require all three variables and many sub-variables (as explained in empirical analysis) to quantify the concept of social capital.

2.2 | Relationship between social capital and economic growth

In many theoretical and empirical studies suggest that social capital promotes economic growth and productivity. In theoretical terms, the positive effect occurs through several channels. First, it is argued that social capital increases institutional quality, co-ordination, and collaboration among individuals, while it reduces transaction costs and bureaucratic procedures, which contributes to economic growth (Forte et al., 2015; Glaeser, 2001;



Peiró-Palomino, 2016; Putnam, 1993; Whiteley, 2000). Second, studies propose that norms and institutions that promote the demand for education encourage schooling and higher education, which leads to the accumulation of human capital and spillover of intellectual knowledge (Adam & Rončević, 2003; Bjørnskov, 2005, 2009). Third, collaboration within the country and norms could increase innovative entrepreneurship and adoption of new technologies (Akcomak & Well, 2009; Iyer, Kitson, & Toh, 2005). Fourth, social capital induces the savings and free flow of capital, labour, and knowledge, which, in turn, promotes economic growth (Dasgupta, 2005; Dearmon & Grier, 2009; Peiró-Palomino & Tortosa-Ausina, 2015).

Although infrequently mentioned in the literature, the negative effect of social capital is also possible (Callois & Aubert, 2007; Fukuyama, 1998, 2000; Sabatini, 2005). Once companies intensively use the informal relationships in their recruitment and procurement processes (such as hiring family members or buying expensive raw material from a friend's company rather than cheaper material from another company), economic decisions, and outcomes will be relatively less efficient and more costly.

Empirically, on the one hand, the vast majority of the findings confirm the positive effect. For example, Peiró-Palomino and Tortosa-Ausina (2015) report a positive impact of social capital on the provincial economic growth in Spain for the period 1985–2005, Beugelsdijk and van Schaik (2005) determined that social capital disparities across 54 EU regions are substantial and the level of social capital is positively related to growth and development. Furthermore, Dinda (2008) reports a positive relationship between social trust and school enrolment rates. Forte et al. (2015) identify a positive effect of social trust and participation in NGOs on the economic growth in their study on 85 NUTS 1 EU regions over the period 1995–2008 and, finally, Akcomak and Well (2009) conclude that social trust in 102 EU regions exhibits a positive effect on innovativeness for the period 1990–2002.

On the other hand, the detrimental influence of social capital on economic growth is reported in several studies (Schneider et al., 2000). For instance, Roth and Shuler (2006) found a negative correlation between social trust and economic growth. In a similar vein, Helliwell (1996) reported a negative effect of social trust on growth in his study on 17 OECD countries.

2.3 | Determinants of social capital

The existing literature also addresses why some societies/countries have superior social capital, and many empirical and theoretical studies have been conducted in this area. The most mentioned determinants are the level of income and development. Lee et al. (2011), for instance, emphasized the importance of high personal income and education level for the emergence of social capital in a society. Similarly, Neira et al. (2009) and Cote and Healy (2001) point to the role of development, quality of social and education policies, and education level in the determination of social capital level. Dinda (2008) argues that education brings human capital that, in turn, promotes the society's commitment to norms. Parts (2013) argues that the level of personal income, attitudes, experiences, institutional quality, and justice determines the degree of social capital. Uslaner (1999) states that trust is a product of optimism created by high income. The second important determinant is urbanization. Fidrmuc and Gërkhani (2005) argue that living in a relatively small city enhances participation in formal/informal networks. Supporting this view, Alesina and La Ferrara (2000) claim that metropolitan cities experience less informal social interaction. Third, it is argued that poverty and unequal distribution of income reduces the collective activities and thus impairs the social capital (Knack, 2000).

Empirically, various studies have tested the determinants. For instance, Parts (2013) has used the EVS (European Values Survey) and analysed the determinants for the period 1990–2008. As a result, social capital is found to be related to democracy, education level, age, income, and the number of children. Christoforou (2003) conducted another study on the EU. He found that higher education (obtaining a higher degree), greater income, and less unemployment induces social participation. Finally, Fukuyama (1998, 2000) determined that social capital tends to increase with the age of individuals.



2.4 | Studies on Turkey

The literature on social capital in Turkey is particularly limited, especially on the regional or national scale, there are some exceptional studies. Esmer (1999), for example, utilized the World Values Survey in 1990 and 1997. It is observed that, in terms of trust, Turkey has a tendency to fall in the rankings. Öksüzler (2006) found that trust has a positive effect on income for Turkey and European countries, and the most important determinant of social capital is education level. The empirical studies that focus on the regional dimension are, particularly, Keskin (2008), Erselcan (2009), and Kartal et al. (2018), which emphasize the contribution of social capital to economic growth. The departure of our study from these studies arises from the methodological improvements as explained in the introduction. Various valuable studies also analyse the social capital in Turkey from many different perspectives, and they include Özdemir (2007); Meçik (2010); Çalışkan and Meçik (2011); Özcan (2011), Çekiç and Ökten (2009); Çekiç (2012); San and Akyigit (2015); Karatas and Seki (2017); Arslan (2018); Üçdoğruk-Gürel (2018); İzmen and Üçdoğruk-Gürel (2020); Tabak (2019).

Referring to the common findings of these studies, social capital was emphasized as a determinant of economic development (Keskin, 2008). However, an emerging/developing economy might not use its resources effectively. Hence, it is not plausible to expect the achievement of development only through social capital. Moreover, it can be seen as one of the most important sources of innovative and technological activities. The extent of the relationship between social capital and knowledge creation may vary depending on the sector and the degree of co-ordination and collaboration within society (Özdemir, 2007). With high social capital, transaction costs may decrease, economic activities may accelerate and become simpler, and corporations might operate more efficiently. Furthermore, the generation of trust and elimination of social negativities are possible with high social capital (Erselcan, 2009; Meçik, 2010; Özcan, 2011), which contribute to the creation of an efficient economic process.

According to the empirical results, participation in social networks, norms, and confidence-related features, which are accepted as the elements of social capital, are among the factors affecting personal earnings (Çalışkan & Meçik, 2011). In countries with high social capital, gross value added is also high and positively affects regional development (Tabak, 2019). Therefore, social capital is crucial to promote the balanced and fair distribution of social capital to achieve a long-term and egalitarian economic development (İzmen & Üçdoğruk-Gürel, 2020).

3 | EMPIRICAL ANALYSIS

The first step in our empirical analysis is to measure social capital. To do so, we used a range of variables to construct social capital indexes for 81 provinces. Social capital is measured in three different variables, which are SC_trust, SC_norms, and SC_participation.

First, SC_trust is designed to capture the confidence level of individuals in a region. Trust is regarded as one of the important components of social capital. When individuals feel confident about each other, economic and social outcomes are positively affected, hence, social capital will be enhanced. Trade, business, and other social linkages can be more easily developed within a trustworthy environment. Therefore, it is important to adopt this variable. It is calculated by using an index number constructed with five different variables: job satisfaction rate of individuals in a region (%), the satisfaction rate of social relations (%), returned check ratios (%), debt collection ratios, and satisfaction rate of social life (%). Returned checks and debt collection ratios indicate the degree of trustworthy business relations. The satisfaction level of social and individual relationships signals the general social confidence level. These variables are first converted into relative values by dividing each region's value into the cross-regional average value. Thus, the average region takes the value of 1. Hence, the SC_trust variable represents the relative level of trust in regions. Thus, those regions that have the value above (below) 1 are referred to as having relatively more (less) trust ties. SC_norms and SC_participation variables are calculated with the same procedure but by using a different set of variables, which are listed in Table 1. (Most of the indicators used in Table 1 are obtained from life satisfaction survey of the Turkish Statistical Institute, TURKSTAT, 2015).

**TABLE 1** List of variables used to construct social capital variables

SC_trust	It is constructed from the following variables:	Number of Provinces	Year	Source
	The rate of job satisfaction (%)	81	2015	TURKSTAT
	The rate of satisfaction regarding social relationships (%)	81	2015	TURKSTAT
	Checks which are returned (%)	81	2015	CBRT
	The ratio for debt collection (%)	81	2015	CBRT
	The rate of satisfaction regarding social life (%)	81	2015	TURKSTAT
SC_norms	<i>It is constructed from the following variables:</i>			
	The rate of job satisfaction (%)	81	2015	TURKSTAT
	The rate of satisfaction regarding social relationships (%)	81	2015	TURKSTAT
	Checks which are returned (%)	81	2015	TURKSTAT
	Number of households experiencing loud noise problems from the streets/Total number of households (%)	81	2015	TURKSTAT
	The rate of murders (per million people)	81	2015	TURKSTAT
	(‰) Number of traffic accidents with serious injury or death/total number of accidents	81	2015	TURKSTAT
	Percentage of individuals considering themselves confident when walking at night alone (%)	81	2015	TURKSTAT
SC_participation	<i>It is constructed from the following variables:</i>			
	Percentage of people voting in local administrations (%)	81	2015	TURKSTAT
	Percentage of membership to political parties (%)	81	2015	TURKSTAT
	Share of people interested in union/association collective activities (%)	81	2015	TURKSTAT
	Rate of participation to general elections (%)	81	2015	TURKSTAT

Source: CBRT (2015) and TURKSTAT (2015).

The norms variable is an important component of social capital. It shows the degree to which individuals obey the formal/informal rules. High commitment to norms in society enables the institution and power of law to function properly. Thus, the institutional quality will be higher in those places, which can create justice, fairness, and efficiency in economic and social life. Thus, the regions that commit more to norms are likely to have a higher level of social capital.

It is used the following indicators are used to measure the level of commitment to norms: returned checks (inverse of the indicator)(%), number of households experiencing loud noise from the streets/total number of households (%) (inverse or (1-) of the indicator) (%), the murder rate (per million people) (inverse of the indicator), number of traffic accidents with a serious injury or mortality/total number of accidents (inverse of the indicator)(%), percentage of individuals considering themselves confident when walking at night alone (%), the rate of job satisfaction (%), and the rate of satisfaction regarding social relationships (%) (Özdemir & Gül, 2019). The first five indicators represent the level of security within society. They, thus, signal the degree to which individuals follow the norms, law, and institutions. The last two indicators represent the level of satisfaction within social and job relationships, which signals partially the commitment to norms as people are expected to be more satisfied with the relationships under the environment in which norms are widely adhered to.



Some of the indicators used to measure norms and trust variables are the same. Particularly, returned checks, job satisfaction, and social relationships are used commonly in both norms and trust variable measurements. This happens because trust and norms variables are conceptually close to each other and their contents partially overlap. For instance, trust can be developed in a city when individuals commit to the norms. Thus, satisfaction occurs when norms are followed and trust is present in a society. Therefore, satisfaction indicators are likely to show both the level of confidence among individuals and the degree to which individuals obey the norms.

Finally, the participation variable contributes to social capital from a different perspective. Unlike trust and norms, it is used to measure the level of co-ordination and collaboration among individuals. In a society with intensive participation in networks, the efficiency of economic and social systems increases as individuals are more collaborative and cooperative. Therefore, we also adopt this variable. The participation variable is calculated by using the following indicators: percentage of people voting in elections for local administration, percentage of membership to political parties, percentage of individuals that belong to collective trade union/associations, and the rate of participation in general elections. These variables represent the active participation of individuals in formal/informal networks. In our empirical analyses, we use all three indicators since each of them represents a different component of social capital. Hence, they can be seen as complementary.

3.1 | Descriptive and exploratory analysis

Having calculated the values for each social capital variable, their basic statistical properties are summarized in Table 2. Since the variables are defined in relative values, the mean values are 1 as expected. The maximum-minimum (range) and SD (standard deviation) values, however, provide more information on the disparities in social capital. The values range between 0.88 and 1.11 for norms, 0.75 and 1.54 for participation, and 1.14 and 0.83 for social trust. Hence, the greatest disparity is observed in social participation across provinces. The SD values support this observation as Participation's SD value (0.1) is twice that of trust (0.06) and norm (0.05) values.

To further investigate in detail, the distributional properties of these variables, we have calculated the skewness and kurtosis values. In terms of skewness, while social norms and trust display a negative and milder skewness (-0.07 and -0.28 respectively), participation has a positive and a much greater value (1.4), which shows once more the extent of the heterogeneity of distribution. To address this issue more formally, we apply a Jarque Bera test to understand whether the types of social capital exhibit a normal distribution across provinces (Jarque & Bera, 1980). It was observed that Jarque Bera test statistics are significant only for the SC_Participation variable. Therefore, the

TABLE 2 Descriptive statistics of social capital variables

Indicators	SC_Norms	SC_Participation	SC_Trust
Mean	1,000	1,000	1,000
Median	0,997	1,010	0,995
Max	1,111	1,544	1,138
Min	0,881	0,755	0,828
SD	0,054	0,109	0,064
Skewness	-0,069	1,376	-0,278
Kurtosis	2,226	9,561	3,150
Jarque-Bera	2,086	170,857	1,122
Probability	0,352	0,000	0,571
Observations	81	81	81

Source: Own Computation.

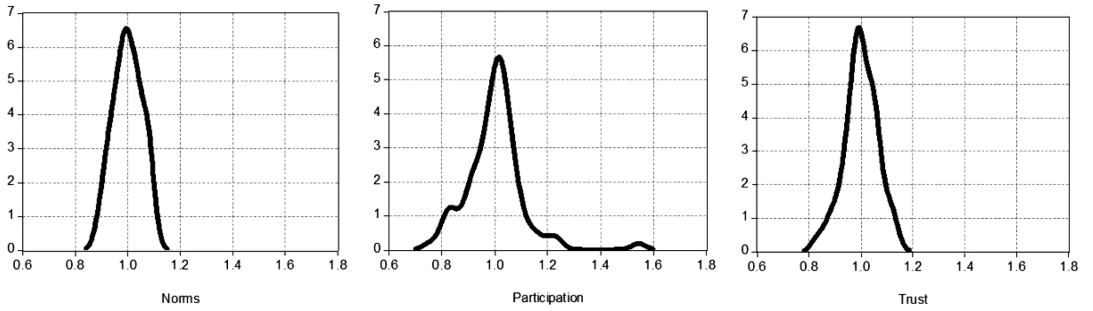


FIGURE 1 Kernel probability density estimations
Source: Own estimation

SC_Trust and SC_Norms variables are normally distributed while SC_Participation is not. Moreover, we estimate and depict the kernel density distributions of the variables in Figure 1. Similar to what we find in the Jarque Bera test, social trust and norms appear to follow a clear normal distribution while social participation has a relatively more dispersed distribution.

The maps that illustrate the values for each social capital variable are presented in Figure 2. Trust and norms exhibit a similar picture, but social participation appears to have quite different dynamics. In terms of trust and norms, the Midwestern Anatolian provinces and those in the Black Sea region have the highest level of social capital whereas the provinces that lie along the southern Aegean and Mediterranean region and the South Eastern provinces have the lowest scores of social trust and norms.

However, in terms of participation, the industrialized provinces in Central and East Marmara, the Northeastern coastal provinces, Mid-Eastern Anatolian provinces (such as Sivas, Kayseri) exhibit the highest scores. Similar to what has been observed for trust and norms, provinces along the Southern Aegean and Mediterranean region and Southeastern provinces have the lowest scores of social participation. Overall, the main message conveyed in this section is that social capital differs considerably across regions, particularly in social participation. Explanation of the observed patterns is problematic and requires deeper empirical investigation. It is pursued in the next subsection.

3.2 | Econometric model

To investigate the determinants of cross-sectional variation in social capital and a possible two-way relationship between economic growth and social capital, we use the following simultaneous equations:

$$\begin{aligned}
 SC_i = & \gamma_0 + \gamma_1 growth_i + \gamma_2 unemployment_i + \gamma_3 educationquality_i + \gamma_4 bachelor_i + \gamma_5 householdsize_i + \gamma_6 income_i \\
 & + \gamma_7 incomedistr_i + \gamma_8 life + \gamma_9 nmr_i + \gamma_{10} pop_i + \gamma_{11} popdensity_i + \gamma_{12} poverty_i \\
 & + \gamma_{13} healthservices + \gamma_{14} green_i + \gamma_{15} electricity_i + \varepsilon_i
 \end{aligned} \quad (1)$$

$$Growth_i = \gamma_0 + \gamma_1 SC_i + \gamma_2 pop_i + \gamma_3 educationquality_i + \gamma_3 employment_i + \gamma_3 electricity_i + u_i. \quad (2)$$

Table 3 details the definition of the variables used in the above regression equation. These variables were selected because of the underlying theoretical hypotheses. First, growth represents the economic progress, and it may affect social capital, as the rapidly growing and income-generating places are likely to be situated in a trustworthy environment, are committing to the norms, and have more resources to participate in the social networks. The *Electricity* variable, which indicates electricity consumption in industry, proxies the level of

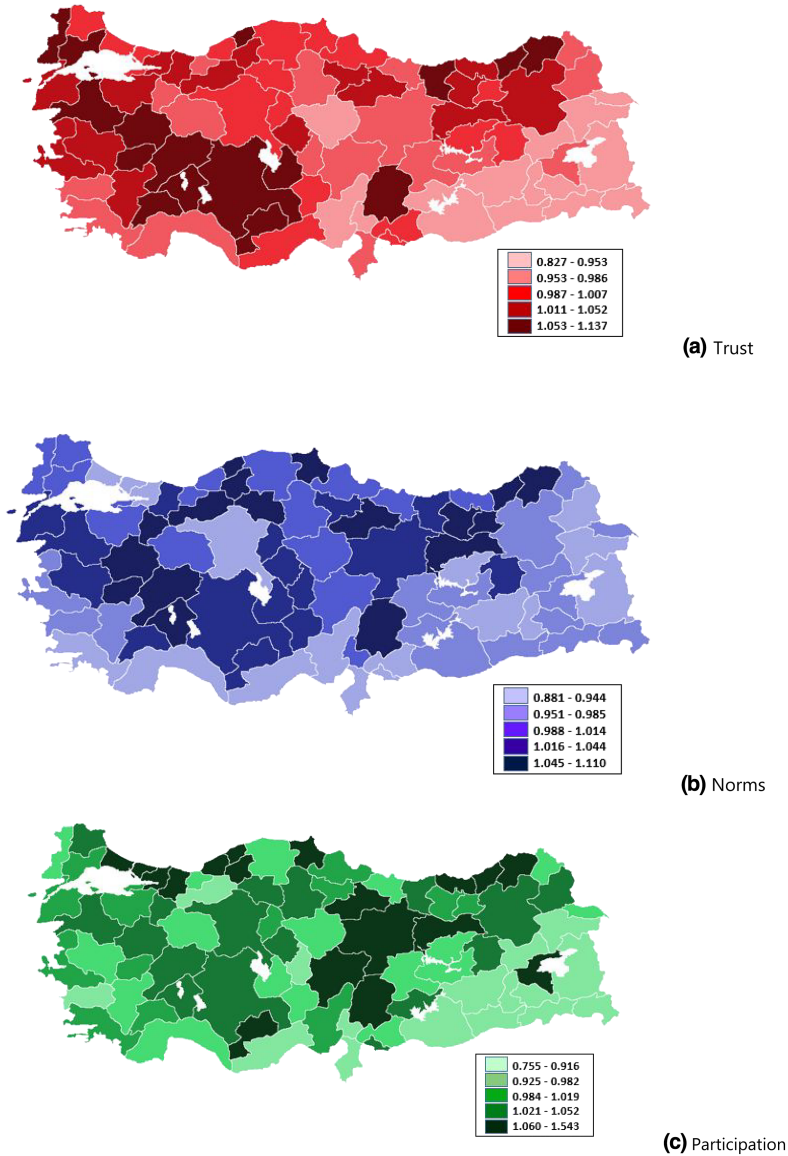


FIGURE 2 Geographical distribution of social capital values

Source: Own estimation

investments in an economy. Hence, a high level of investment is likely to signal an economically dynamic society and contributes to social capital creation.

income, life expectancy, and health services variables might be used to signal the development level that might induce social capital generation. Prosperous and developed regions are likely to have an environment that makes it easier to obey rules, which encourages trust ties and participation in social organizations.

Controversially in contrast, the *unemployment and poverty* variable might negatively affect such a social capital environment. In the regions with high unemployment and poverty, individuals are likely to abandon social capital components, because their priority is to find a job and to obtain minimum necessities. These regions may have a high level of crime, a large informal economy, and widespread illegality. Similarly, an uneven distribution of income across

**TABLE 3** Definition of variables used in regression analysis

Variable name	Definition/formula	Spatial units	Year	Source
SC	Social Capital as defined in three forms in Table 1	81	2015	TURKSTAT
growth	[GDP (2014–2004)/2004/10]	81	2004–2014	TURKSTAT
young	Young population/Province population	81	2015	TURKSTAT
pop	Population	81	2015	TURKSTAT
householdsize	Large family household/Province population	81	2015	TURKSTAT
popdens	Population by km ²	81	2015	TURKSTAT
bachelor	Percentage of higher education graduates (%)	81	2015	TURKSTAT
nmr	Net migration rate (‰)	81	2015	TURKSTAT
employmentrate	Working population/Total Population	81	2015	TURKSTAT
unemployment	The ratio of the unemployed population to the workforce (%)	81	2015	TURKSTAT
incomedistr	Percentage of households living in middle/higher income class (%)	81	2015	TURKSTAT
poverty	Percentage of households living under poverty line (%)	81	2015	TURKSTAT
life	Life expectancy at birth (Year)	81	2015	TURKSTAT
green	Forest are per km ²	81	2015	TURKSTAT
educationquality	Average performance (points) in higher education entrance exam	81	2015	TURKSTAT
healthservices	Number of applications per doctor	81	2015	TURKSTAT
income	GDP distribution by provinces	81	2014	TURKSTAT
electricity	Electricity consumption <i>per capita</i> in the industry (kWh)	81	2015	TURKSTAT

Source: TURKSTAT.

individuals might hinder the creation of social capital. High inequality will push a fraction of the society (i.e., the low-income group) to remain motivated only for economic purposes while reluctantly adhering to social capital components. *Education quality and bachelor rate* is used to measure the level of human capital and their impact on social capital. A well-educated and productive society is expected to have a higher level of social capital as the awareness of norms and trust is higher. *Household size* is another variable of interest. It is expected that the size of the families might affect attitudes, customs, and traditions. Hence, all these values might determine the level of social capital. Net migration rate (*nmr*) is likely to influence social capital as a migrating population is likely to bring new attitudes and norms from one region to another. Similarly, the age profile of regions may be significant as old and young generations might have quite different habits concerning networks, norms, and trust.

In the case of variables related to urbanization, *pop*, and *popdens* variables measure the population size and its density. The norms and trust attitudes in large cities and small cities might be quite different. While urban areas are characterized by a highly competitive economy, consumption culture, open economic and social relationships with the rest of the world, easy adoption of novelties, and technology, rural areas are characterized by agricultural activities and a more closed society. Hence, urban and rural areas might have different outcomes for social capital. Finally, the *green* variable indicates the share of green areas that represent the importance given to the environment, which might, therefore, indicate the awareness of such concerns.

The variables are those that are most commonly used in the existing literature. Neira et al. (2009) and Cote and Healy (2001) relate social capital to the role of development, quality of social and education policies, education level on the determination of social capital level, Dinda (2008) relates it to education and human capital. Parts (2013)



considers the level of personal income, attitudes, experiences, institutional quality, and justice as important factors determining the degree of social capital. Uslaner (1999) relates it to income level, while Fidrmuc and Gërkhani (2005) and Alesina and La Ferrara (2000) emphasize the population and urban size. Christoforou (2003) suggests that higher education (obtaining a higher degree), higher income, and less unemployment encourage social participation. Finally, Fukuyama (1998, 2000) determined that social capital tends to rise with the age of individuals. We intend to incorporate most of the hypotheses into one unique analysis. Some variables may lack measuring and are not incorporated into our analyses. For instance, policies on regional developments, social policies, social security systems, benefits, security policies, and other social and economic policies may affect the social capital degree. However, since we apply a cross-sectional analysis, these country-level policies cannot be adopted as a variable.

In terms of empirical strategy, we follow a three-step approach. First, we estimate the two models separately by using an OLS technique. Second, because the two equations should be simultaneously estimated, we employ a 3SLS model and, finally, we test the robustness of the results by allowing for spatial dependence in error terms. Since OLS estimates might suffer from reverse causality (simultaneity), a 3SLS technique is helpful to estimate two equations simultaneously and incorporate the reverse causality and simultaneity. Moreover, OLS estimations might be problematic if spatial autocorrelation is present. Therefore, a spatial error model (SEM) is also applied by using a generalized moments technique (Anselin, 1988; Anselin, Gallo, & Jayet, 2008; Anselin & Moreno, 2003; Bell & Bockstael, 2000; Bivand et al., 2019). The empirical analysis in this paper is performed in Eviews, 4, Stata, and R-Spdep software packages. The spatial weight matrix is an inverse distance and is raw standardized type. We obtained the distance matrix from the General Directorate of Highways in Turkey (2017). We estimate all our models for three types of social capital variables (dependent variables: SC_Trust, SC_Norms, SC_Participation).

Before moving to the results, we discuss the weak points and limitations of our methodology and dataset. First, one limitation is the restricted time dimension. We had to analyse the year 2015 only, since the official data on the relevant variables for social capital is available only for that year. This restricts us to applying a cross-sectional analysis only, rather than a panel data analysis. Hence, we are bound to implement our models with 81 observations (provinces) instead of a far larger panel dataset. In this case, we lose many degrees of freedom in the cross-sectional analysis since many independent variables are needed.

Another limitation comes from the complex measurement of the social capital phenomenon is another limitation. We have used some proxies (survey variables) to measure the level of components of social capital (norms, trust, and participation). However, these variables obtained from a survey may not fully reflect the level of social capital. This represents another methodological drawback. A possible solution to this problem is to implement a benchmark study that measures social capital by using another class of variables. However, the only dataset available at the provincial scale is the one we use. Nevertheless, we believe that our analyses represent accurate estimations with the available data.

In regression estimations (summarized in Tables 4–6), we determine a base model (which is always model 1 in the first column), then add our test variables one at a time. If one of our test variables has a high covariance with a variable in the base model, we discard that variable in the base model to avoid a multicollinearity problem.

Multicollinearity is one of the important concerns in regression estimates. For instance, income distribution and poverty variables may be collinear and represent similar concepts. We include them alternatively to our regression to provide cross-validation across variables. To address the multi-collinearity, we, first provide bi-variate correlations among independent variables in Appendix Table A1. In our regressions, we select the base model by adopting growth, unemployment, and education quality, which do not have a high correlation between each other. We then add the variables, one at a time, to the regression. If one of the added variables exhibits a high correlation with one of the variables in the base model, we discard that base model in that regression. In this way, we remove multi-collinearity.

In the OLS estimations for social trust, there are no significant relationships between social trust and economic growth, regardless of the direction of the relationship. Hence, one may argue that the most emphasized hypothesis

**TABLE 4** OLS, 3SLS and SEM estimation results for social trust variable,

SC - Trust (OLS)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
constant	0.677931***	1.01929***	0.932976***	1.044257***	1.049262***	-0.001241***	1.07736***
growth	--0.1727193	-0.0720518	-0.2208892	-0.055434	-0.1057667	-0.1546242	-0.3505786
unemp	-0.0088890***	-0.0093434***		-0.0089867***	-0.0092173***	-0.0092849***	
educationquality	0.0022221**					0.0019292*	
bachelor		0.0064589***					
householdsize			0.4214235***				
income				2.35E-06***			
incomedistr					0.0016149**		
life						0.0094231*	
nmr							0.0008835**
pop							
popdens							
poverty							
healthservices							
green							
youngpop							
electricity							
R ²	0.4069	0.4286	0.2419	0.4319	0.4164	0.4295	0.1099
F-Stat	17.61***	19.25***	12.45***	19.51***	18.31***	14.30***	4.81***
P-Value	0	0	0	0	0	0	0.0094
N	81	81	81	81	81	81	81

**TABLE 4** Continued

SC - Trust (OLS)	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
constant	0.682685***	0.6907656***	1.244311***	0.653861***	1.086966***	1.197193***	0.799355***
growth	-0.15513	-0.1628288	-0.16004	-0.18163	-0.155223	0.032557	-0.18083
unemp	-0.00901***	-0.0090132***		-0.00829***	-0.0093787**		-0.00891***
educationquality	0.002177**	0.0021452**		0.002289**			0.001565
bachelor							
householdsize							
income							
incomedistr							
life							
nmr							
pop	1.09E-09						
popdens		8.03E-06					
poverty			-0.00409***				
healthservices				2.08E-06			
green					0.0009889***		
youngpop						-0.01182***	
electricity							0.010211**
R ²	0.4077	0.4084	0.4545	0.4085	0.4612	0.2590	0.4360
F-Stat	13.08***	13.12***	32.49***	13.12***	21.97***	13.63***	14.69***
P-Value	0	0	0	0	0	0	0
N	81	81	81	81	81	81	81

**TABLE 4** (Continued)

Growth	Model 1
constant	0.4105277***
SC	-0.0493555
pop	-4.28E-09**
educationquality	-0.0004862
employmentrate	-0.0008262
electricity	0.4105277
R ²	0.1397
F-Stat	2.44**
P-Value	0.0371
N	81



TABLE 4 (Continued)

SC - Trust (3SLS)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
constant	0.707113	0.857358***	1.168265***	0.7834951***	0.9540063***	0.010522	1.391907***
growth	-0.2510685	0.593929	-1.163222	1.063609	0.2926281	-0.19123	-1.754883**
unemp	-0.0088126***	-0.01021***		-0.0102967***	-0.0096663***	-0.00924***	
educationquality	0.0021585*					0.0019	
bach		0.008143*					
householdsize			0.3328042***				
income				3.44E-06*			
incomedistr					0.0019082*		
life						0.009445*	
nmr							0.0005536
pop							
popdens							
poverty							
healthservices							
green							
youngpop							
electricity							
R ²	0.4056	0.3417	0.0569	0.1897	0.3849	0.4292	-0.3119
Chi Square	54.77***	50.14***	22.35***	42.70***	53.94***	60.34***	9.99***
P-Value	0	0	0	0	0	0	0.0068
N	81	81	81	81	81	81	81



TABLE 4 (Continued)

SC - Trust (3SLS)	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
constant	0.484161	0.697651***	1.311641***	0.7202528**	1.133004***	1.101622***	0.860762***
growth	0.456556	-0.19029	-0.50632	-0.3769929	-0.36865	0.6926491	-0.34271
unemp	-0.00988***	-0.00896**		-0.0086243***	-0.0091***		-0.00875***
educationquality	0.002514*	0.00214**		0.0021507*			0.00143
bach							
householdsize							
income							
incomedistr							
life							
nmr							
pop	3.91E-09						
popdens		6.57E-06***					
poverty			-0.00389***				
healthservices				2.56E-06			
green					0.000962***		
youngpop						-0.014831***	
electricity							0.010308**
R ²	0.3355	0.4082	0.4292	0.4006	0.4516	0.1808	0.4305
Chi Square	49.21***	55.21***	64.50***	54.61***	67.89***	26.07***	61.35***
P-Value	0	0	0	0	0	0	0
N	81	81	81	81	81	81	81



(Continues)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Growth							
constant	0.39668296***	0.406184***	0.4632794***	0.3748509***	0.4001773***	0.401242***	0.4411894*
SC	-0.0249554	-0.09496	-0.0258194	-0.1028728	-0.0692141	-0.03989	0.17221
pop	-4.30E-09**	-4.24E-09**	-2.39E-09	-4.34E-09**	-4.32E-09**	-4.32E-09**	-7.09E-10
educationquality	-0.0005133	-0.00027	-0.00006937	-0.0000639	-0.0003454	-0.00048	-0.001296
employmentrate	-0.0009262	-0.0007	-0.0015587*	-0.0007152	-7.868E-05	-0.00086	-0.002775
electricity	0.0002753	0.002464	-0.0022851	0.001616	0.0015615	0.000375	-0.0004625
Chi Square	12.46**	12.64**	23.56***	12.69**	12.56**	12.54**	66.30***
P-Value	0.029	0.027	0.0003	0.0264	0.0279	0.0281	0
R ²	0.1376	0.1306	0.0868	0.1275	0.1378	0.1391	-0.1354
N	81	81	81	81	81	81	81
Growth	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14

TABLE 4 (Continued)

constant	0.421287***	0.406811***	0.401194***	0.3932637***	0.436428***	0.5805313	0.860762
SC	-0.0238	-0.4828	0.026689	-0.0277022	-0.05706	-0.3828839	-0.02791
pop	-4.21E-09**	-4.29E-09**	-3.61E-09**	-4.34E-09**	-4.26E-09**	-3.95E-09	-4.30E-09***
educationquality	-0.00065	-0.00047	-0.00046	-0.0004832	-0.00061	0.0002041	-0.00054
employmentrate	-0.00092	-0.00083	-0.00121*	-0.0009103	-0.00069	-0.0003011	-0.0009
electricity	0.002375	0.000675	0.000244	-0.00000686	0.000279	0.0003476	0.000784
Chi Square	12.77**	12.50**	13.39**	12.53**	12.96**	12.57**	12.43**
P-Value	0.0256	0.0285	0.02	0.0282	0.0238	0.0277	0.0293
R ²	0.1342	0.1396	0.1325	0.1373	0.1375	-0.2508	0.1383
N	81	81	81	81	81	81	81
SC - Trust (SEM)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7

**TABLE 4** (Continued)

Intercept	1.02***	0.94***	0.1***	1.05***	0.02	1.01***
growth	-0.14	-0.15	-0.06	-0.08	-0.11	-0.01
unemp	-0.009***	-0.009***	-0.009***	-0.009***	-0.009***	
educationquality	0.002*				0.002	
bach	0.006***					
householdsize		0.33***				
income			0.002***			
incomedistr				0.001**		
life					0.011*	
nmr						0.0003
pop						
popdens						
poverty						
healthservices						
green						
youngpop						
electricity						
λ	0.37*	0.64	-0.27**	0.34**	0.45*	1.27
Residual Variance	0.0023498**	0.0029614*	0.0022683**	0.0023168**	0.0022493**	0.003074*
Sigma	0.048475	0.054418	0.047627	0.048133	0.047427	0.055444*
N	81	81	81	81	81	81



TABLE 4 (Continued)

SC - Trust (SEM)	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Intercept	0.72***	0.73***	1.25***	0.71***	0.73***	1.15***	0.81***
growth	-0.13	-0.14	-0.17	-0.15	-0.13	0.05	-0.18
unemp	-0.009***	-0.009***		-0.009***	-0.009***		-0.009***
educationquality	0.002*	0.002*		0.002*	0.002*		0.002
bach							
householdsize							
income							
incomedistr							
life							
nmr							
pop	0.007						
popdens		0.006					
poverty			-0.004***				
healthservices				0.002			
green					0.0009***		
youngpop						-0.009***	
electricity							0.01**
λ	0.34*	0.32*	-0.41**	0.37*	-0.59*	0.75	-0.06***
Residual Variance	0.002305**	0.0023485**	0.0021744**	0.0023431**	0.002073**	0.0028844*	0.0022554**
Sigma	0.048477	0.048467	0.046631	0.048405	0.04553	0.053707*	0.047491
N	81	81	81	81	81	81	81

**TABLE 4** (Continued)

	Model 1
Growth	
Intercept	0.04***
SC	-0.005
pop	-0.004**
educationquality	-0.004
employmentrate	0.008
electricity	0.001
λ	0.2**
N	81

Source: Own computation

**TABLE 5** OLS, 3SLS and SEM estimation results for Norms variable

SC - Norms (OLS)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
constant	1.103397***	1.049052***	0.8583384***	1.033049***	1.007008***	0.5430449	0.9523086***
growth	0.2295204	0.1848134	0.2508431	0.1924356	0.2422639	0.2444495	0.2068179
unemp	-0.0071187***	-0.0070573***		-0.0071398***	-0.0069746***	-0.0074448***	
educationquality	-0.0004659					-0.0007066	
bach		-0.0023105					
householdsize			0.30962***				
income				-6.59E-07			
incomedistr					5.29E-06		
life						0.0077744	
nmr							0.0011819***
pop							
popdens							
poverty							
healthservices							
green							
youngpop							
electricity							
R ²	0.2473	0.2551	0.1518	0.2516	0.2452	0.2685	0.1713
F-Stat	8.43***	8.79***	6.98***	8.63***	8.34***	6.97***	8.06***
P-Value	0	0	0	0	0	0	0
N	81	81	81	81	81	81	81



TABLE 5 Continued

SC - Norms (OLS)	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
constant	1.0624***	1.040121***	1.096319***	0.992018***	0.991646***	1.022881***	1.162392***
growth	0.0778244	0.1807582	0.312893*	0.188291	0.266083	0.298239	0.225582
unemp	-0.0060735***	-0.0065103***		-0.00684***	-0.00691***		-0.00713***
educationquality	-0.0000871	-0.0000927		-0.00015			
bach							
householdsize							
income							
incomedistr							
life							
nmr							
pop	-9.40E-09***						
popdens		-3.96E-05**					
poverty			-0.00326***				
healthservices				9.61E-06**			
green					0.000315		
youngpop						-0.00518**	
electricity							0.004961
R ²	0.3294	0.2967	0.3649	0.2943	0.2576	0.0602	0.2568
F-Stat	9.33***	8.02***	22.40***	7.92***	8.91***	2.50***	6.56***
P-Value	0	0	0	0	0	0	0
N	81	81	81	81	81	81	81
Growth							Model 1
constant							0.3854237***
SC							0.0109167
pop							-4.11E-09**
educationquality							-0.000607
employmentrate							-0.0010642*

(Continues)



TABLE 5 (Continued)

electricity												0.0005171
R ²												0.1324
F-Stat												2.29**
P-Value												0.0486
N												81
SC - Norms (3SLS)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7					
constant	0.3987559	0.6408328*	0.5168823***	0.4575425	0.4524526	-0.33173	0.7593064***					
growth	2.121389**	1.989184	1.618375**	2.683569	2.631149*	2.210709**	1.068482*					
unemp	-0.008982	-0.0093532***	-0.0099893***	-0.0099893***	-0.0100495***	-0.00954***						
educationquality	0.001041					0.000779						
bach		-0.0002861										
householdsize			0.438226***									
income			1.49E-06									
incomedistr					0.0013785							
life						0.009818*						
nmr							0.0013844***					
pop												
popdens												
poverty												
healthservices												
green												
youngpop												
electricity												
Chi Square	15.81**	13.75***	12.25***	14.52***	12.00***	16.56***	15.36***					
P-Value	0.012	0.0033	0.0022	0.0023	0.0074	0.0023	0.0005					
R ²	-0.7815	-0.6563	-0.3854	-1.4116	-1.3286	-0.8398	-0.0476					
N	81	81	81	81	81	81	81					



TABLE 5 (Continued)

SC - Norms (3SLS)	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
constant	0.385374	0.446061*	0.721468***	0.4307069	0.598719***	0.6730154***	0.456248
growth	2.163863	1.888702***	2.240762	1.850875**	2.09595**	2.714709*	2.0871**
unemp	-0.00905**	-0.00804***		-0.0086043***	-0.00935***		-0.00896***
educationquality	0.001062	0.001027		0.0010127			0.000768
bach							
householdsize							
income							
incomedistr							
life							
nmr							
pop	2.35E-10						
popdens		-6.36E-06					
poverty			-0.00437***				
healthservices				5.28E-06			
green					0.000478		
youngpop						-0.0162031**	
electricity							0.003857
Chi Square	15.40***	39.25***	22.81***	19.84***	17.24***	4.82*	16.46***
P-Value	0.0039	0	0	0.0005	0	0.0899	0.0025
R ²	-0.8281	-0.5387	-0.7131	-0.4921	-0.7156	-1.3832	-0.7388
N	81	81	81	81	81	81	81
Growth	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
constant	0.4288307***	0.3978032***	0.6330606***	0.420121***	0.4186704***	0.43129***	0.5330559***
SC	-0.0240124	-0.0428008	-0.2804228	-0.0672511	-0.0607381	-0.02154	-1.54E-01
pop	-4.47E-09**	-4.77E-09***	-8.34E-09***	-5.07E-09***	-4.96E-09***	-4.37E-09**	-7.05E-09***
educationquality	-0.0006733	-0.0004111	-0.0006058	-0.0004004	-0.0004197	-0.00069	-0.0006929
employmentrate	-0.0009839**	-0.0010201**	-0.0000642	-0.0009917**	-0.0010248**	-0.00102**	-0.000279



TABLE 5 (Continued)

electricity	0.0017739	0.0017294	0.0018634	0.00073	0.0009019	0.002117	0.0011587
Chi Square	12.70**	11.96**	12.73**	14.52**	12.64**	13.05**	13.47**
P-Value	0.0264	0.0354	0.026	0.0135	0.0269	0.0229	0.0194
R ²	0.1276	0.1217	-0.0949	-1.4116	0.1179	0.1269	0.0502
N	81	81	81	81	81	81	81
Growth	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
constant	0.430305**	0.327547**	0.491159***	0.4312174***	0.395784***	1.300115**	0.414957**
SC	-0.02593	0.097187	-0.05465	-0.0308625	-0.03411	-1.057002	-0.02344
pop	-4.51E-09**	-3.13E-09	-5.81E-09***	-4.58E-09**	-4.70E-09**	-1.65E-08**	-4.51E-09**
educationquality	-0.00067	-0.00074	-0.00097***	-0.0006533	-0.00043	-0.0002975	-0.0006
employmentrate	-0.00098	-0.00116**	-0.00032	-0.0009646**	-0.00108**	0.0011058	-0.00099**
electricity	0.001771	0.001676	-0.00067	0.0015061	0.00114	0.0042908	0.000641
Chi Square	12.70**	13.87**	19.10***	12.49**	12.49**	4.84	12.31**
P-Value	0.0263	0.0165	0.0018	0.0287	0.0287	0.4353	0.0307
R ²	0.1273	0.1102	0.0957	0.1270	0.1255	-2.7982	0.1294
N	81	81	81	81	81	81	81
SC - Norms (SEM)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	1.13***	1.05***	0.87***	0.1***	1.01***	0.59	0.93***
growth	0.26	0.21	0.26	0.02	0.24	0.26	0.32*
unemp	-0.007***	-0.006***	-0.006***	-0.006***	-0.009***	-0.007***	
educationquality	-0.0007					-0.0008	
bach		-0.004					
householdsize			0.24***				
income				-0.001			
incomedistr					-0.0003		
life						0.007	
nmr							0.0009***
pop							

TABLE 5 (Continued)

popdens													
poverty													
healthservices													
green													
youngpop													
electricity													
λ	0.51*	0.69	0.8	0.68	0.47*	0.31**	1.09						
Residual Variance	0.0021547**	0.0021079**	0.0023912**	0.0021168**	0.0021654**	0.0021094**	0.0022425**						
Sigma	0.046418	0.045912	0.04890	0.046008	0.046534	0.045928	0.047355						
N	81	81	81	81	81	81	81						
SC - Norms (SEM)	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14						
Intercept	0.11***	0.11***	1.1***	0.1***	1.15***	0.95***	1.18***						
growth	0.01	0.02	0.29*	0.23	0.26	0.33	0.25						
unemp	-0.005***	-0.006***		-0.006***	-0.007***		-0.007***						
educationquality	-0.0004	-0.0004		-0.0004	-0.0008		-0.0009						
bach													
householdsize													
income													
incomedistr													
life													
nmr													
pop	-0.0009***												
popdens		-0.0004**											
poverty			-0.003***										
healthservices				0.0001***									
green					0.0003								
youngpop													
electricity									-0.0009				0.005



TABLE 5 (Continued)

λ	0.64	0.61	0.32*	0.81	0.31**	1.35	0.58*
Residual Variance	0.0018985**	0.0019963**	0.0018301**	0.0019839**	0.0021286**	0.0024676**	0.002134**
Sigma	0.043572	0.044681	0.042779	0.044541	0.046137	0.049675	0.04608
N	81	81	81	81	81	81	81
Growth							Model 1
Intercept							0.03***
SC							0.002
pop							-0.0004**
educationquality							-0.0004
employmentrate							-0.0004*
electricity							-0.001
λ							0.3*
N							81

**TABLE 6** OLS, 3SLS and SEM estimation results for social participation variable

SC - Participation (OLS)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
constant	0.4652679	0.8121191***	0.7882972***	0.845448***	0.8157309***	-0.4608669	1.04153***
growth	0.2988977	0.5575068	0.2520939	0.6289325*	0.5726647	0.3235721	0.26267
unemp	-0.011220***	-0.0116228**		-0.010753***	-0.0111164***	-0.0117592***	-0.0114239***
educationquality	0.0028691					0.0024713	
bach		0.0135516***					
householdsize			0.563634***				
income				5.41E-06***			
incomedistr					0.004491***		
life						0.0128493	
nmr							0.0005627
pop							
popdens							
poverty							
healthservices							
green							
youngpop							
electricity							
R ²	0.2004	0.2649	0.1225	0.2883	0.2963	0.2147	0.1898
F-Stat	6.43***	9.25***	5.45***	10.39***	10.81***	5.20***	6.01***
P-Value	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004
N	81	81	81	81	81	81	81

**TABLE 6** (Continued)

electricity													4.98E-09
R ²													0.1472
F-Stat													2.59**
P-Value													0.0281
N													81
SC - Participation (3SLS)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7						
constant	1.115135*	0.8872347*	1.419661***	0.7458589*	0.8357409**	0.213818	1.445463***						
growth	-1.440591	0.1914248	-2.276517	1.004391	0.463052	-1.399098	-1.635389						
unemp	-0.009502***	-0.010702***		-0.010649***	-0.0107437***	-0.009791***	-0.00906**						
educationquality	0.001479					0.0011605							
bach		0.0134431*											
householdsize			0.325847										
income				6.14E-06**									
incomedistr					0.0045256**								
life						0.0122405							
nmr							0.00045						
pop													
popdens													
poverty													
healthservices													
green													
youngpop													
electricity													
Chi Square	16.52**	26.43***	9.43**	29.64***	31.58***	17.81***	16.04***						
P-Value	0.012	0.0033	0.0022	0.0023	0.0074	0.0023	0.0005						
R ²	-0.0164	0.2550	-0.3324	0.2787	0.2953	0.0036	-0.0704						
N	81	81	81	81	81	81	81						



TABLE 6 (Continued)

SC - Participation (3SLS)	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
constant	1.507397	0.1723228	1.548286***	1.109578	1.32071***	1.26454***	1.374647*
growth	-2.690904	1.340989*	-1.461922	-1.424181	-1.233673	0.0596344	-1.600684
unemp	-0.007619	-0.0117275***		-0.0095196***	-0.009729***		-0.009396***
educationquality	0.0008538	0.0031439		0.0014902			0.0002486
bach							
householdsize							
income							
incomedistr							
life							
nmir							
pop	-6.89E-09						
popdens		0.0000801**					
poverty			-0.004334***				
healthservices				-2.21E-07			
green					0.0013454**		
youngpop						-0.016038*	
electricity							0.0174093
Chi Square	11.90***	22.25***	20.49***	16.54***	22.97***	15.67*	18.60***
P-Value	0.0039	0	0	0.0005	0	0.0899	0.0025
R ²	-0.4242	0.1470	0.0125	-0.0110	0.0791	0.1663	-0.0276
N	81	81	81	81	81	81	81
Growth	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
constant	0.364758***	0.4019221***	0.409876***	0.4441346***	0.4259292***	0.3699882***	0.388499***
SC	0.008517	-0.080423	-0.03379	-0.1296728	-0.0776722	-0.026674	0.0025286
pop	-4.20E-09**	-3.97E-09**	-2.42E-09	-3.67E-09*	-3.94E-09**	-4.09E-09**	-4.08E-09**
educationquality	-0.000451	0.0003242	-0.00037	-0.0003973	-0.0004837	-0.000353	-0.000553
employmentrate	-0.001176	-0.000636	-0.00159	-0.0002392	-0.005647	-0.000951	-0.001121



TABLE 6 (Continued)

electricity	-0.002015	-0.000423	-0.00298	0.002445	0.0010009	-0.001949	-
Chi Square	13.08**	10.43**	32.85**	9.78**	10.98**	13.15**	13.65**
P-Value	0.0264	0.0354	0.026	0.0135	0.0269	0.0229	0.0194
R ²	-0.0164	-0.0070	0.0303	-0.1491	0.0056	0.0922	0.1236
N	81	81	81	81	81	81	81
Growth	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
constant	0.3682515***	0.3985069***	0.3626941***	0.365594***	0.4025466***	0.4454584**	0.3936974***
SC	-0.020349	0.0980172	-0.01574	0.0068132	-0.026605	-0.084401	0.0090945
pop	-4.28E-09**	-4.70E-09**	-3.47E-09**	-4.20E-09**	-4.08E-09**	-3.38E-09	-4.09E-09**
educationquality	-0.00038	-0.0010819	-0.000281	-0.0004494	-0.000538	-0.0000763	-0.000615
employmentrate	-0.000932	-0.001224	-0.001378*	-0.001165	-0.000889	-0.002538	-0.001168
electricity	-0.001931	0.0021066	-0.000726	-0.0019563	-0.000872	-0.001647	0.0174093
Chi Square	13.92**	9.52**	14.00***	16.54**	12.31**	24.71	12.08**
P-Value	0.0263	0.0165	0.0018	0.0287	0.0287	0.4353	0.0307
R ²	0.1016	0.0871	0.1023	-0.0110	0.0988	-0.2134	-0.0276
N	81	81	81	81	81	81	81
SC - Participation (SEM)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	0.53	0.83***	0.68	0.83***	0.81***	-0.45	0.93***
growth	0.32	0.52	0.31	0.68*	0.59*	0.35	0.37
unemp	-0.009***	-0.01***		-0.001***	-0.011***	-0.01***	
educationquality	0.002					0.002	
bach		0.01***					
householdsize			0.33*				
income				0.0006***			
incomedistr				0.005***			
life						0.014	
nmr							0.0002
pop							



TABLE 6 (Continued)

λ	0.75	0.59	0.45*	0.86	0.49*	0.79	0.53
Residual Variance	0.0088773*	0.0089274*	0.0087879	0.0088864*	0.0084959*	0.0091177	0.0089159*
Sigma	0.094219	0.094485	0.93744	0.094267	0.092173	0.95487	0.094424
N	81	81	81	81	81	81	81
Growth	Model 1						
Intercept	0.04***						
SC	0.004						
pop	-0.0004**						
educationquality	-0.00006						
employmentrate	-0.0001**						
electricity	0.0003						
λ	0.2**						
N	81						



that defends social capital, which is claimed to enhance growth, is invalid in the trust context. Furthermore, economic growth does not necessarily create trustworthy relationships.

It is found that social trust is related to the unemployment rate, poverty rate, and share of the young population of the provinces. Moreover, it is positively related to *per capita* income, *per capita* electricity consumption in industry, fair income distribution, education quality, the number of bachelor graduates, household size, net migration rate, life expectancy, and the intensity of green areas. In terms of economic growth determinants, only the population variable has a significant (and negative) coefficient.

When we run the same models using 3SLS, results remain the same except the coefficient of net migration rate, which is insignificant, and population density's coefficient, which is significant (with positive coefficient). Thereafter, when we add a spatial spillover component across the error terms, the results are similar, with few exceptions (population density). Spatial components are also significant, indicating the importance of geographical clustering of social capital. Thus, in other words, regions are geographically clearly distinguished from each other in terms of the level of trust among individuals.

By considering these findings in combination, various robust determinants are found. Therefore, provinces with low unemployment rates, low poverty rates, high income, high investment levels (electricity consumption in industry), older average ages, high education level and quality, equitable income distribution, large households, high life expectancy, and intensive green areas tend to have higher levels of social trust. To interpret these findings, we can initially state that regions with low unemployment and poverty are likely to have a more trustworthy environment. For similar economic reasons, development levels (as measured by *per capita* income, investments, equitable income distribution, and high life expectancy) enrich the trust relationships. This result is plausible as prosperous regions are likely to have more welfare and, therefore, trust among individuals is more easily created in such environments. Parallel to the development level, education level (as measured by bachelor rate and education quality) also affects positively the trust level within society. This appears to be logical as the higher education triggers the awareness of individuals regarding economic and social issues, which facilitates the generation of trustworthy relationships. Household size has a positive effect on trust. Thus, regions that have larger households and older average ages (which signals the extent of the role of customs and traditions) have higher levels of trust. Moreover, regions with well-protected green areas have better trust ties within the society.

As a next step, we estimate the models for social norms as a dependent variable (in 3SLS) and a very important result is observed: economic growth significantly improves the social capital and not the other way around. This contrasts with the literature. Therefore, it represents an interesting finding. Hence, we argue that the literature suggests that social capital influences economic growth exogenously. However, we demonstrate that economic growth affects social capital. Ignoring this reverse causality, indeed, brings the existing results into question. We explain this finding by the argument that economic growth induces social capital as a higher level of income allows individuals to live in better conditions. In such an environment, it is easier to comply with the norms as people have certain welfare and can satisfy more than their minimum needs.

Concerning other determinants of social norms, according to OLS estimations, it is negatively related to the unemployment rate, poverty rate, the share of the young population of the provinces, population, and density. Moreover, it is positively related to household size, health services, and the net migration rate. Concerning the determinants of economic growth, only population and employment rates have a significant (and negative) coefficient.

Then, when we run the same models by using 3SLS, results consistently remain the same, except the coefficient of population, its density, and health services which are insignificant, and life expectancy which is significant. Later, we add a spatial spillover component across the error terms. As a result, we find somewhat similar results (except changes in the significance of population and its density, health services, young population's share, and life expectancy variables). The spatial component is also significant and indicates the importance of the geographical clustering of social capital. By combining these findings, various robust determinants are found for social norms. Thus, provinces with low unemployment rates, low poverty rates, large households, high economic growth, and high immigration rates tend to exhibit a greater score for the commitment to the social norms.



These results can be interpreted in the following way. Similar to what we have seen in the trust variable case, places with high unemployment and poverty can barely maintain the commitment to norms. This is plausible as individuals in these places are motivated to satisfy minimum needs rather than commit to norms. It has been found that the younger generation does not adhere to the norms. Larger household sizes increase the commitment to norms, as the individuals are more familiar with informal rules (such as customs, traditions). Surprisingly, the net migration rate has a positive effect, which contrasts with the theoretical expectations.

Finally, the determinants of social participation in OLS estimations are negatively related to the unemployment rate, poverty rate, and the size of the young population, whereas it is positively related to bachelor rates, household size, income, equitable income distribution, and intensity of green areas in the province. When we run a 3SLS regression, many coefficients remain the same, but the coefficient of the household size becomes insignificant whereas the population density coefficient becomes significant. In the SEM, the spatial component is significant. All other determinants are consistent with the 3SLS model, except the household size and population density variables. Consequently, the results of the three models for social participation indicate that the robust determinants (verified across methods) are the unemployment rate, bachelor rate, income and its distribution, poverty, the intensity of green areas, and the share of the young population.

These results warrant further explanation. Individuals living in the regions that suffer high unemployment and poverty can barely participate in networks as they do not have resources. Moreover, they are far more motivated to satisfy basic needs, such as finding a job and moving above the poverty threshold. The younger generation has lower participation in networks as the competition among individuals is becoming more pronounced within the society and new generations may regard it as irrelevant to participate in these networks, as the networks do not contribute to their competitiveness. It is plausible that in high-income areas, individuals participate more in networks as they have greater resources. Human capital (as measured by the rate of bachelor degrees) enhances participation in networks due to the high awareness of educated individuals regarding social issues.

Overall, some determinants are firmly robust across different regression methods and three different measures of social capital. These are, first, economic variables including unemployment, income, income distribution, and poverty rates of provinces and, second, some of the demographic variables such as household size and the average age in the province and one environmental variable, which is the intensity of green areas in the provinces. Therefore, a characteristic province with a high social capital is the Anatolian province, which has a relatively higher income, a relatively even income distribution, lower unemployment/poverty rate, more green areas, large households, and older age profiles.

This result seems reasonable, as regions that are more prosperous—where people can satisfy their economic needs and have fewer problems of unemployment and poverty—are inherently more likely to have a better environment in which to create social capital. These people can easily participate in networks, obey the norms, and generate trustworthy relationships. Moreover, these positive attitudes are more easily generated in the regions with large households and an older age profile. This is also reasonable because people in these societies are accustomed to norms and rules, such as strict customs and traditions. Finally, the protection of green areas might be seen as a signal of social capital as the level of awareness of environmental issues in these societies is higher.

4 | CONCLUSION

In this study, we empirically analysed the regional social capital in Turkey for 81 provinces in 2015. Specifically, we have analysed the magnitude and direction of the relationship between social capital and economic growth. Moreover, we analysed the socio-economic and demographic determinants that can influence the social capital in regions and searched for an answer to the question of whether social capital evolves in a spatially clustering way.

We used various measures of social capital, particularly in three modes: social trust, norms, and participation. In terms of methodology, we adopted descriptive statistics, illustrative maps, kernel density estimates, cross-sectional



simple OLS, 3SLS, and SEM estimations. As an outcome, our results can be summarized in four groups. First, regional social capital is heterogeneously distributed across regions, particularly in social participation. Second, having estimated our model by using OLS, 3SLS, and SEM, we understood that social capital has no significant impact on economic growth, but the growth induces significantly the generation of social capital (in social norms type). This represents a brand-new result that has not yet been considered by the literature. Third, cross-regional variation in social capital is best explained by robustly significant economic and demographic determinants. Hence, a typical province that has high social capital can be defined as an Anatolian province that has a relatively higher income, relatively even income distribution, less unemployment and poverty, more green areas, large households, and an older age profile. Fourth, social capital is shown to emerge in spatially correlated clusters.

Having these results in mind, this study provides intellectual and methodological contributions to the literature. First, reverse causality should always be considered as many variables in social sciences have circular (two-way) relationships. In our analysis, the assumption of a one-way relationship from social capital to economic growth is shown to be irrelevant.

Moreover, spatial autocorrelation should not be ignored and be often incorporated in the analysis. Since we found evidence of a spatial component, we understood that failing to incorporate such a component might produce misleading results. Third, concerning the cross-regional determinants of social capital, many social, economic, and demographic variables should be analysed from a broad perspective rather than only analysing economic variables. Rather than country-level studies, analysis of determinants at the regional level should be enriched since significant variation has been identified across regional social capital and its determinants.

These contributions are useful also to provide new perspectives for the future research agenda. Methods such as simultaneous equations and spatial regressions can be combined (i.e., spatial three-stage least squares) in future studies. As another example of a future research idea, a study can investigate the relationship between social capital and human development rather than economic growth. Similar extensions of the literature should be encouraged.

The policy lessons that can be learned from our results provide several perspectives. Initially, a commonly accepted hypothesis of "social capital is beneficial for growth" is not always true. However, it is somewhat correct, vice versa. Hence, economic growth should be further promoted as it helps the formation of social capital. Particularly, in the Turkish context, the economic growth of underdeveloped regions should be promoted. Eastern and Mediterranean cities should receive special care since it appears that they have relatively lower social capital, particularly in the context of social participation and commitment to norms. Primarily, investments, social and physical infrastructure, subsidies should be directed to these regions to stimulate economic growth. Public investments, export promotion, the foundation of free trade zones, incentives of financial credit, organized industrial zones, and tax exemptions are among the policies to achieve this target. Moreover, components of social capital (e.g., participation) should be encouraged by increasing the civil organizations, NGOs, and other formal/informal networks. Moreover, social infrastructures should be increased. Increasing the number of universities and formal and informal education centers is a good example of such a policy.

The cities along the Mediterranean coast can be viewed as a tourism belt, the growth performance of which is known to be low. Accordingly, the social capital level in our analysis is found to be low for these cities. Since tourism as a sector might bear less potential for growth compared to other highly productive sectors such as manufacturing, sectoral diversification should be maintained and other sectors besides tourism should be supported in these regions. The three large cities, Istanbul, Ankara, and Izmir and several other metropolitan cities lack trust values, which undermines the generation of social capital. Any social policy that may enhance the trust in these places should be applied, including increasing institutional quality and reducing unemployment and poverty.

Another policy implication relates to the association between social capital and unemployment/poverty variables. Since we have found that social capital is more easily generated within the regions with low unemployment and poverty, employment and poverty reduction programmes should be developed. Labour market organization of backward regions should be reconsidered to reduce the unemployment in these regions. Employment creating sectors (such as manufacturing) should be encouraged. Organized industrial zones should be planned and similar



relevant planning decisions should be taken. Any policy that can increase employment should be applied, including special employment programmes, agencies that match the employer and employee, and insurance subsidies. Moreover, the poverty issue should be addressed to increase the welfare of individuals and induce the improvement of social capital in poorly developed regions. Related aids and resources should be directed to these regions and individuals living below the poverty threshold.

A high level of social capital has a relatively older age profile. Therefore, young people should also be encouraged to participate in voluntary activities, social norms, and trust. Otherwise, over time, society may lose social capital values. Society should benefit more from the older generation's attitudes and even the efforts to make them pass these values to younger generations should be encouraged. Following these policies may be useful for regions to improve the creation of social capital.

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APPENDIX

TABLE A1 Correlation among independent variables.

	growth	young	pop	householdsize	popdensity	bachelor	nmr	emp	unemployment
growth	1.00	0.47	-0.24	-0.25	-0.12	-0.38	-0.16	-0.31	0.25
young	0.47	1.00	-0.19	-0.63	-0.15	-0.44	-0.33	-0.45	0.46
pop	-0.24	-0.19	1.00	0.00	0.93	0.44	-0.03	-0.03	0.12
householdsize	-0.25	-0.63	0.00	1.00	0.00	0.44	0.37	0.40	-0.48
popdensity	-0.12	-0.15	0.93	0.00	1.00	0.32	-0.02	-0.02	0.12
bachelor	-0.38	-0.44	0.44	0.44	0.32	1.00	0.25	0.22	-0.14
nmr	-0.16	-0.33	-0.03	0.37	-0.02	0.25	1.00	0.21	-0.29
emp	-0.31	-0.45	-0.03	0.40	-0.02	0.22	0.21	1.00	-0.82
unemployment	0.25	0.46	0.12	-0.48	0.12	-0.14	-0.29	-0.82	1.00
incomedistr	-0.22	-0.45	0.40	0.36	0.35	0.57	0.31	0.12	-0.10
poverty	0.28	0.62	-0.10	-0.60	-0.09	-0.52	-0.49	-0.41	0.52
life	-0.07	-0.18	0.08	0.16	0.05	0.45	0.17	-0.06	0.11
healthservices	0.13	0.00	-0.34	-0.15	-0.19	-0.44	0.03	-0.05	-0.05
educationquality	-0.23	-0.48	0.12	0.35	0.13	0.38	0.40	0.18	-0.27
green	-0.19	-0.50	0.11	0.32	0.14	0.34	0.12	0.10	-0.04
income	-0.39	-0.56	0.55	0.45	0.50	0.76	0.25	0.32	-0.22
electricity	-0.05	-0.32	-0.02	0.12	0.05	0.20	0.20	0.08	-0.08

Source: Own computation.



TABLE A1 Continued

	incomedistr	poverty	life	healthservices	educationquality	green	income	electricity
growth	-0.22	0.28	-0.07	0.13	-0.23	-0.19	-0.39	-0.05
young	-0.45	0.62	-0.18	0.00	-0.48	-0.50	-0.56	-0.32
pop	0.40	-0.10	0.08	-0.34	0.12	0.11	0.55	-0.02
householdsize	0.36	-0.60	0.16	-0.15	0.35	0.32	0.45	0.12
popdensity	0.35	-0.09	0.05	-0.19	0.13	0.14	0.50	0.05
batchelor	0.57	-0.52	0.45	-0.44	0.38	0.34	0.76	0.20
nmr	0.31	-0.49	0.17	0.03	0.40	0.12	0.25	0.20
emp	0.12	-0.41	-0.06	-0.05	0.18	0.10	0.32	0.08
unemployment	-0.10	0.52	0.11	-0.05	-0.27	-0.04	-0.22	-0.08
incomedistr	1.00	-0.53	0.11	-0.26	0.27	0.34	0.67	0.30
poverty	-0.53	1.00	-0.15	0.10	-0.49	-0.34	-0.60	-0.30
life	0.11	-0.15	1.00	0.01	0.14	0.30	0.18	-0.10
healthservices	-0.26	0.10	0.01	1.00	-0.13	0.16	-0.20	0.20
educationquality	0.27	-0.49	0.14	-0.13	1.00	0.18	0.36	0.27
green	0.34	-0.34	0.30	0.16	0.18	1.00	0.38	0.30
income	0.67	-0.60	0.18	-0.20	0.36	0.38	1.00	0.46
electricity	0.30	-0.30	-0.10	0.20	0.27	0.30	0.46	1.00

Source: Own computation.