sciendo Economics and Business Review https://www.ebr.edu.pl Vol. 9 (3), 2023: 152–179 https://doi.org/10.18559/ebr.2023.3.799

The relationship between social capital and economic growth on a provincial and regional basis

Abdulmuttalip Pilatin[1] Tunahan Hacıimamoğlu[2]

Abstract

The aim of this study is to examine the relationship between the level of GDP per capita and social capital provinces and regions in Türkiye in the period of 2007–2018. The social capital index was used as a comprehensive variable to represent social capital. The relationships between the variables were analysed with the use of the panel Granger causality test. It was determined that there is a unilateral causality from GDP per capita to social capital in sixteen provinces, from social capital to GDP per capita in nine provinces and bilateral causality in 45 provinces. On the other hand, no significant relationship was found in eleven provinces. The results reveal that the level of social capital in terms of GDP per capita in 45 provinces in Türkiye and the level of GDP per capita in terms of social capital is a factor that should be considered. Regional causality results for Türkiye support the provincial causality results. These results provide key insights regarding the nexus between social capital and economic growth for policymakers and researchers.

Keywords

- social capital
- GDP per capita
- economic growth
- panel causality analysis

JEL codes: A13, C23, E22, O4

Article received 22 February 2023, accepted 30 July 2023.

Suggested citation: Pilatin, A., & Hacıimamoğlu, T. (2023). The relationship between social capital and economic growth on a provincial and regional basis. *Economics and Business Review*, *9*(3). https://doi.org/10.18559/ebr.2023.3.799

[1] Department of Finance and Banking, Recep Tayyip Erdogan University, Fener Street 53100 Rize, Türkiye, corresponding author: apilatin@erdogan.edu.tr, http://orcid.org/0000-0002-2293-2808.

[2] Department of Economics, Recep Tayyip Erdogan University, Fener Street 53100 Rize, Türkiye, tunahan.haciimamoglu@erdogan.edu.tr, http://orcid.org/0000-0003-1474-8506.

Introduction

Economic growth is one of the vital issues that attracts the attention of economists and policy-makers. Studies examining the factors affecting economic growth and the causes of current growth differences have an important place in the literature. Economic growth theories focus on the causes of per capita income differences between countries and the sources of economic growth in the long run. Traditional factors of production encompass labor, capital, natural resources, and entrepreneurship. Traditional factors are insufficient to explain economic growth. The new economic growth theories have advanced in the form of the internationalization of technological development, the increasing importance of financial markets, the wider and more detailed treatment of the concept of capital and the institutional and non-institutional determinants of economic growth. Within this context, new variables such as human capital (Becker, 2009; Benabou, 1994; Lucas, 2015; Romer, 1990) structural capital (Bourdieu, 1986), physical capital, economic capital, intellectual capital (Edvinsson & Stenfelt, 1999; Stewart, 1997; Sveiby, 2000) and especially social capital have been used to explain the areas where traditional production factors such as labor, capital and natural resources are insufficient (Postelnicu & Hermes, 2018).

Social capital means all relationhips based on horizontal or vertical trust, norms and networks that facilitate coordination activities between individuals and institutions. Social capital can affect financial markets and economic growth through individual behavior and norm patterns (Pennar, 1997, p. 154). Social capital which is a multi-dimensional concept is also the subject of research from different disciplines. This situation brings about different definitions of social capital and its representation with various indicators (Coleman, 1994, p. 91; Putnam, 1993, p. 304; World Bank, 2011). Social capital is mostly represented by indicators such as generalized trust level, association participation, social networks and social norms. On the other side, some of these indicators are also criticized for explaining a limited dimension of social capital which is a multi-dimensional concept (Fukuyama, 1995). For this reason, in recent studies, it is seen that the social capital index which is a more inclusive and alternative indicator that takes into account all aspects of social capital has begun to be used instead of narrow-scoped indicators (Jin et al., 2019; Muringani et al., 2021; Pilatin & Ayaydın, 2022b).

Neoclassical growth theories aim to explain economic growth in terms of macroeconomic factors (Romer, 1986; Solow, 1956; Swan, 1956). Coleman's "social capital" theory, however, scrutinizes the effect of social capital on economic growth through people's trust, norms and commitment to each other (Coleman, 1990). It leads to better economic performance and this can result in higher GDP per capita. Therefore, investment in human and social va-

lues will bring success in global competition by supporting stability in financial and real markets.

Social capital contributes to economic growth through factors such as increased cooperation, trust, connectivity and coordination, knowledge sharing and innovation. The effect of social capital on economic development generally occurs in two ways at micro and macro levels. The same is true for economic growth. There is evidence that economic growth also affects social capital (Andini & Andibi, 2019). The aim of the study is to test the bi-directional causality between economic growth and social capital on a provincial and regional basis in Türkiye between 2007 and 2018. In the recent period, there are studies showing that social capital positively affects economic growth by improving the trust, social networks and social norms of societies. The original aspects of the study and its contributions to the literature are as follows. First, this study is one of the first research projects in which the causality relationship between economic growth and social capital in Türkiye, which is a developing country, is analyzed empirically on a provincial and regional basis. This is important as both the level of social capital and per capita income show changes at the provincial and regional levels. Second, current panel test techniques that allow cross-section dependency were applied instead of traditional estimation methods in empirical analysis. Test results that do not regard the cross-sectional dependence can lead to biased and misleading results (Phillips & Sul, 2003). Third, a current, original and comprehensive social capital index data produced by Pilatin and Ayaydın (2022a) is used to represent social capital in the study. Fourth, the differences between regions and provinces in Türkiye in terms of both economic and social capital levels and the effects of these differences on each other are discussed. Fifth, in addition to examining causality from social capital to economic growth, potential causality from economic growth to social capital is also investigated.

The remainder of the study is structured as follows: in Section 1, the concept of social capital is mentioned and related literature is discussed. After that, data and variables in Section 2 and methods in Section 3 are explained. The study is completed by explaining the results of the analysis in Section 4, the sensitivity results in Section 5 and finally the conclusions and policy recommendations are presented.

1. Literature review

1.1. Social capital concept

Informal institutional factors are those that affect the activities of a community or organization but have no legal or legal basis. These factors include

characteristics such as the organization's culture, values, reputation, social network, connections and collaborative capacity. Social capital is one of the informal institutional factors (Jin et al., 2019). Social capital is also expressed as the restrictions or modes of action imposed by society on people, institutions and businesses that affect the way they do business by being influenced by the rules, norms and procedures of the societies in which they live (North, 1990, p. 5). In addition, social capital which is in the class of intangible assets has a significant impact on the economic development of countries as well as investors and businesses (Tomer, 2011, p. 3).

The theoretical foundations of social capital are based on the research of Hanifan (1916) who used the concept of 'social capital' to indicate its importance for people, especially in social structure in terms of business and economy (Routledge & Amsberg, 2003). Bourdieu (1986) stated that social capital consists of the sum of the actual or potential resources associated with the membership of a group that has a permanent network of more or less institutionalized mutual acquaintance and recognition and provides some opportunities to each of its members. Coleman (1990) considered social capital as a concept that includes some institutions, organizations and structures and contributes to the formation of common qualities that facilitate certain activities of people or institutions within these structures (Coleman, 1990, p. 302). Putnam (1993) concluded that different levels of social capital between regions of Italy result in different institutional and economic performance. Likewise, Fukuyama (1995) states that countries with a higher level of general confidence, namely, with a higher level of social capital are more successful in international competition. Societies with a high level of trust spend less energy in this direction because they need less legal regulation and enforcement mechanisms. This reduces transaction costs and offers an alternative to the legal system. For this reason, social capital is closely related to performance in economic, social and political fields.

There are different definitions of social capital (Bourdieu, 1986; Coleman, 1990; Fukuyama, 1995; Guiso et al., 2004) as well as different measurement methods (Putnam, 2007; Rupasingha & Goetz, 2008; Wang et al., 2014; Woolcock, 1998). This diversity should not be interpreted as a lack of consensus on the importance and effects of social capital. There are also studies that measure social capital only with the trust question. The generalized trust question which is used to represent trust is measured by the question "In general do you think that most people can be trusted?" in the World Values Survey conducted in 87 countries (Casey & Christ, 2005).

Social capital addresses the questioned level of trust without being too closely related. The level of trust between individuals in the society is an important factor in being able to act jointly. Collective actions are possible through trust developed in society (Putnam, 1993, p. 167). However, Fukuyama (1995) who thinks that it would not be right to measure social capital with

only one trust question, thinks that people who state that most people can be trusted may have different perceptions about "most people" depending on the environment they are in (Delhey et al., 2011). In other words, while the term 'most people' is narrowly trustworthy trust may decrease in broad terms. If the community of people that those who say "most people can be trusted" actually associate differs greatly, this may mean that assessments of trust are incorrect (Fukuyama, 1995). For this reason, there are also studies in which the social capital index is created based on the norm, network and trust variables. The most widely used method in producing the social capital index is the method put forward by Rupasingha and Goetz (2008). In this study, the provincial-based social capital index data (Pilatin & Ayaydın, 2022a) created through this method was used.

Economies with higher economic performance are generally seen in countries that host institutions and organizations with higher social networks and norms. For this reason, there are studies and opinions that a higher level of economic performance emerges in countries and regions with higher social capital (Li et al., 2015, p. 135). Social capital is seen as an important variable in explaining the effective factors in the development of the economy. Fukuyama (1995) states that societies with higher generalized trust which is a determinant of social capital are more successful in international economic competition. Generalized trust is formed by ethics, norms, habits and moral obligations internalized by community members (Beugelsdijk & Schaik, 2005, p. 310). Fukuyama (1995) states that in societies with high levels of trust less legal regulation and enforcement mechanisms are used. In this respect, social capital is an alternative factor in economic structure and social relationships compared to official contracts and agreements. When the corporate system functions properly trust should only be seen as a factor that facilitates complex transactions. This situation reduces transaction costs and contributes to economic development. The generalized confidence factor is important in terms of showing a superior economic performance for developed economies. Social capital provides cooperation without the direct influence of power and market mechanism. Therefore, social capital not only serves as an alternative in legal systems but should also be seen as a facilitator of complex transactions in the issuance of contracts even in a well-functioning institutional system (Fukuyama, 1995).

1.2. Studies on economic growth—social capital nexus

The relationship between economic growth and social capital which has been the subject of many studies from different disciplines, has been extensively researched in the literature for selected countries and country groups.

In these studies, variables such as GDP per capita, economic growth, income, GDP growth and the industrialization rate which are indicators of economic growth, are used. Here GDP per capita was used as an indicator of economic growth. Most of these studies contain evidence of the positive effect of social capital on economic growth (Hjerppe, 1998; Iyer et al., 2005; Knack & Keefer, 1997; Neira et al., 2009; Perez et al., 2006; Pilatin, 2022; Postelnicu & Hermes, 2018; Westlund & Adam, 2010).

In relatively few studies, no significant relationship was found between social capital and economic growth. Furthermore, some studies have shown that social capital has a negative effect on economic growth (Fukuyama, 1995; Gambetta, 1996; Portes, 1998). Helliwell (1996) in his study of Asian countries covering the years 1987–1994 reached the conclusion that social capital and institutional quality do not have a significant effect on economic growth. Roth and Schüler (2006) in their study in which they applied panel data analysis for 49 countries, in the study conducted by Casey and Christ (2005) in the US states and in the study of 69 developing countries by Hall and Ahmad (2013) concluded that social capital negatively affects economic growth.

There are also studies examining the relationship between economic growth and social capital on a regional basis. Putnam (1993) investigated the effect of social capital on economic growth for different regions of Italy between 1970 and 1989 and concluded that social capital had a positive effect on economic growth. This study has a significant impact on the social capital literature. In a similar study by Helliwell (2007) and Putnam (1995); three different variables including civil society, institutional performance and civic satisfaction were used as social capital indicators. In the research which analyzed the effect of social capital on the development difference between the Northern and Southern regions of Italy in the 1950–1990 period, it was determined that the public participation rate had a significant effect on economic growth. Rupasingha et al. (2000) analysed 3,040 counties of the USA for the years 1990–1996 with panel OLS. Accordingly, findings have been obtained that social capital has a positive effect on income and GDP per capita variables. Iyer et al. (2005) using panel data analysis for nine regions in the USA concluded that social capital is an important variable in terms of GDP per capita. Beugelsdijk and Van Schaik (2005), in their study of the 54 EU regions between 1950 and 1998 concluded that social capital positively affects national GDP per capita. Similarly, Roth (2006) found results on the positive effect of social capital on economic growth. Akçomak and Bas ter Weel (2008) examine the interaction between social capital, innovation and GDP per capita growth in the European Union. In empirical research of 102 European regions over the period 1990–2002, it has been shown that higher innovation performance helps GDP per capita growth and that social capital indirectly influences this growth by stimulating innovation. The study also shows that social capital has no direct role in promoting GDP per capita growth in

European Union countries. Dearmon and Grier (2009) in their study of 51 selected countries determined that the factor of trust indirectly affects economic growth. Likewise, Feki and Chtouro (2014) in their study of developed and developing countries obtained strong evidence that social capital positively affects GDP per capita. Özcan and Zeren (2013) and Koç and Ata (2012) reached similar results in their studies.

Peiró-Palomino and Tortosa-Ausina (2015) in their study on the Spanish regions scrutinized the effect of social capital on regional economic growth in Spain for the period 1985–2005 using the social capital index variable, with a panel data approach. The results show that social capital has a positive effect on GDP per capita growth in the context of the Spanish provinces.

There are also studies examining the relationship between economic growth and social capital on a provincial basis. In their study, Pan and He (2010) used several different indicators of social capital and the effect of social capital on China's economic growth for the years 1978–2004 is discussed. The results reveal that social capital has a significant and positive effect on the economic growth of a province measured by GDP per capita growth in the long run.

In the study of Botzen (2016), exploratory spatial data analysis of social capital and its effect on German NUTS-3 regions and provinces is discussed. According to the results of these analyses, in Germany, the geographical scope of social capital is concentrated locally while the area of economic welfare covers a wider area. Second, in many German provinces social capital is positively correlated with GDP per capita which is used as an indicator of economic welfare. Calcagnini and Perugini (2019) used an empirical model to evaluate the role of social capital on welfare in his study for Italian NUTS-3 provinces covering the years 2003–2011. The results show that capital has a positive effect on well-being in social Italy. Juhro et al. (2022) using a modified endogenous growth model found that social capital increased growth through research and development (R&D) expenditures in 33 Indonesian provinces covering the period 2010–2018.

There is also debate in the literature regarding the determinants of social capital. In these studies, GDP per capita level is seen as an important determinant (Fischer & Torgler, 2006; Parts, 2013; Wong, 2013). For this reason, the per capita income variable was used here to analyse the reverse causality from GDP per capita to social capital.

In the literature, the relationships between economic growth and social capital are mostly examined in selected countries, country groups and regions, but there are very few studies on the basis of provinces. In this framework, the relationship between social capital and GDP per capita has been analysed empirically both on a provincial and regional basis in this paper. Therefore, the paper is expected to contribute to the existing literature as it is one of the first studies to examine the causal relationship between social capital and GDP per capita on a provincial basis.

2. Data and variables

The causality relationship between social capital and GDP per capita the was investigated both on a provincial and regional basis in Türkiye during the 2007–2018 period. In the literature mostly the relationship between economic growth and social capital has been examined nationally or regionally only in terms of the relationship between them. It has seldom been investigated whether social capital influences economic growth or whether economic growth influences social capital, or both. For this reason, the causality method was applied on regional and provincial basis. The regional classification determined by the Turkish Statistical Institute (TUIK) according to Level-2 was used. At Level-2 Türkiye consists of twelve regions as Istanbul, Western Marmara, Aegean, Eastern Marmara, Western Anatolia, Mediterranean, Central Anatolia, Western Black Sea, Eastern Black Sea, Northeastern Anatolia, Middle East Anatolia and Southeastern Anatolia. In the analysis, Istanbul was included in the Western Marmara and results were obtained for eleven regions. Since Türkiye's provincial social capital index data is only available for the years 2007–2018, the research is limited to these years. GDP per capita is symbolized by GDP p.c. and the data are obtained from the TUIK database (TUIK, 2022).

Social capital index data is utilised to represent social capital and is symbolized by SOCAP. The most up-to-date and original social capital index data produced by Pilatin and Ayaydın (2022a) for Türkiye on a provincial basis was used as the social capital index. The two network and two norm variables chosen by Platin and Ayaydın which constitute the social capital index on a provincial basis in Türkiye, are shown in Table 1.

Table 1. Variables constituting the social capital index

	Variables	Identification/Calculation	Source
Social networks	**Number of foundations**	The number of foundations per 100 thousand people on a provincial basis.	General Directorate of Foundations
	Number of associations	Number of associations per 100 thousand people on a provincial basis.	Associations Directorate
Social norms	**Participation rate in elections**	Participation rates in the general parliamentary elections held in 2007, 2011 and 2018 on a provincial basis are taken as a basis.	Supreme Election Board
	Rate of participation in surveys	Response rate to surveys conducted in World Value Survey. Wave 5 data for 2007, Wave 6 for 2011 and Wave 7 for 2018 were used. This rate is calculated over the regions at TURKSTAT Level 1 and the rate of the region it is in is taken as a basis for each province.	World Walue Survey

Source: (Pilatin & Ayaydın, 2022a).

This social capital index was derived for the first time in Türkiye to cover a period of twelve years for 81 provinces. Likewise, Rupasingha et al. (2006) derived the social capital index on a provincial basis for the years 2007, 2011, and 2018 by subjecting two networks and two norm measures to principal component analysis. Subsequently, the linear interpolation method was applied to the remaining years. This index generation method is the most comprehensive method used in many other studies (Alesina & La Ferrara, 2000; Davaadorj, 2019; Hasan et al., 2017; Jha & Chen, 2015; Jin et al., 2019; Knack, 2003; Rupasingha & Goetz, 2008). A positive and large value of the social capital index represents higher social capital and *vice versa*. The respective data for Turkish provinces in 2018 are displayed in Figure 1.

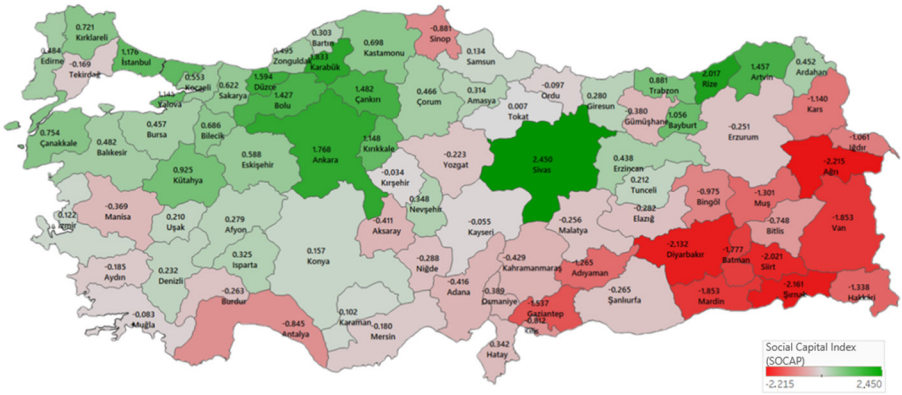

Figure 1. Social capital index in Türkiye in the year 2018

Source: (Pilatin & Ayaydın, 2022a).

As can be seen in Figure 1, Sivas (2.375) Rize (1.962) Karabuk (1.821) Ankara (1.720) Düzce (1.556) Çankırı (1.470) Bolu (1.419) and Artvin (1.418) are cities with the highest capital index. On the other hand, Şırnak (–2.269); Diyarbakır (–2.170) Ağrı (–2.123) Siirt (–2.056) Mardin (–1.917) Batman (–1.835) Gaziantep (–1.529) Hakkari (–1.453) and Adıyaman (–1.243) are the cities with the lowest social capital index. The provinces with high social capital are mostly concentrated in the Eastern Black Sea, Eastern Marmara and Western Black Sea regions while the cities with low social capital are mostly concentrated in the Southeast and Eastern Anatolia regions.

GDP per capita (GDP p.c.) is a widely employed measure to evaluate the economic growth performance. Figure 2 shows the level of GDP p.c. on a provincial basis in Türkiye in 2018.

According to Figure 2, the provinces of Istanbul, Kocaeli, Tekirdağ, Bursa, Ankara, Eskişehir, Bolu and Artvin are the ones with the highest GDP p.c. On the other side, Şırnak, Diyarbakır, Ağrı, Siirt, Mardin, Batman, Hakkari, Muş, Bingöl, Van, Bayburt, Yozgat and Çorum are the cities with the lowest GDP

Figure 2. GDP per capita in Türkiye in the year 2018

Note: As of 7.08.2023, 1 US dollar = 27 Turkish lira.

Source: own elaboration.

p.c. in Türkiye. The provinces with high GDP p.c. are mostly concentrated in the Marmara, Aegean and Mediterranean regions while the provinces with low GDP p.c. are mostly concentrated in the regions of Northeastern Anatolia, Middle East Anatolia, and Southeastern Anatolia.

3. Methods

While the GDP p.c. variable was used in logarithmic form, the SOCAP variable was used without logarithmic conversion as it expressed as the index value. The estimation models of the study are as in equations (1) and (2):

$$\ln GDP\,p.c._{it} = \alpha_0 + \beta_1 SOCAP + u_{it} \tag{1}$$

$$SOCAP_{it} = \sigma_0 + \delta_1\, ln\, GDP\,p.c. + \mu_{it} \tag{2}$$

In equations (1) and (2), α_0 and σ_0 stand for the constant term. β_1 and δ_1 represent the parameters of $SOCAP$ and $GDP\,p.c.$, respectively. $GDP\,p.c._{it}$ denotes the gross domestic product per capita of province i at time t, and $SOCAP_{it}$ shows the social capital index value of province i at time t. u_{it} and μ_{it} are the error terms of province i at time t. The i and t indices represent the section size and time dimension, respectively. t spans the period between 2007 and 2018 years. i represents 81 provinces of Türkiye.

The empirical analysis consists of three stages. In the first stage, cross-sectional dependence and slope homogeneity tests are performed to determine the appropriate unit root and causality tests. In the second stage, the stationarity properties of the variables are investigated with the CIPS panel unit root test. In the third stage, causality relationships between the variables are estimated by the Emirmahmutoglu and Kose (2011) panel causality test.

The hypotheses of the study are as follows:

HA: SOCAP Granger causes GDP p.c.
HB: GDP p.c. Granger causes SOCAP.

3.1. Cross-sectional dependence and slope homogeneity tests

Interaction and dependency between countries continue to increase due to globalization, trade openness and financial integration every passing day. Accordingly, other countries (provinces or regions) are also affected by external shocks. Ignoring this situation damages the reliability of the estimation findings (Menyah et al., 2014). For this reason, the existence of cross-sectional dependence (CSD) is investigated with the Lagrange Multiplier (LM) and CD_{LM} tests proposed by Breusch and Pagan (1980) and developed by Pesaran (2004), respectively.

Breusch and Pagan's (1980) LM test yields strong results in panels where the cross-section size (N) is relatively small and the time dimension (T) is large enough. The LM test statistic is expressed as:

$$LM = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{p}_{ij}^2 \tag{3}$$

where $\hat{p}_{ij}$ represents the sample estimate of the bidirectional correlation of the error term for each i. The power of the LM test weakens in large panels with $T \to \infty$ and $N \to \infty$. For large panels, Pesaran (2004) proposes an alternative LM test (CD_{LM}):

$$CD_{LM} = \left(\frac{1}{N(N-1)}\right)^{\frac{1}{2}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}(T\hat{p}_{ij}^2 - 1) \tag{4}$$

The CD_{LM} test is normally distributed with $N(N-1)/2$ degrees of freedom and asymptotic chi-square feature. The set of test hypotheses is:

H_0: Cov $(u_{it}, u_{ij}) = 0$; Cross-sectional dependence does not exist
H_A: Cov $(u_{it}, u_{ij}) \neq 0$; Cross-sectional dependence exists

The presence of slope homogeneity is checked by the Delta ($\tilde{\Delta}$) and Adjusted Delta ($\tilde{\Delta}_{adj}$) tests proposed by Pesaran and Yamagata (2008). $\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$ tests are an extended version of the Swamy (1970) test. $\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$ test statistics are respectively:

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right) \tag{5}$$

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{iT})}{\sqrt{Var(\tilde{z}_{iT})}}\right) \tag{6}$$

where $\tilde{S}$ is the modified Swamy test statistic; k represents the independent variable. The hypotheses of the slope homogeneity tests are as follows:

H_0: $\beta_i = \beta$; Slope homogeneity does not exist
H_A: $\beta_i \neq \beta$; Slope heterogeneity does exist

3.2. Panel unit root test

Traditional panel unit root analyses referred to as first-generation unit root tests assume cross-section independence and the homogeneity of panel. First-generation unit root tests lose their reliability under the presence of cross--section depdendence (CSD) and slope heterogeneity (Hasanov et al., 2021). Pesaran (2007) developed the Cross-sectionally Augmented Dickey-Fuller (CADF) test by incorporating lagged cross-sectional means into ADF regression. The CADF test is a second-generation test that can be applied under the presence of CSD and slope heterogeneity. It also provides reliable results in both $N > T$ and $T > N$ panels (Pesaran, 2007).

Individual stationarity can be examined by calculating the CADF test statistic (Wald test statistic) for each cross-section unit in the panel. At the same time, the stationarity of the whole panel can be investigated with the cross-sectionally augmented IPS (CIPS) test statistics (Fisher test statistic which expresses the average of the CADF test statistics). The CADF regression is as follows:

$$\Delta y_{it} = \alpha_i + b_i y_{i,t-1} + c_i \underline{y}_{t-1} + d_i \Delta \underline{y}_t + e_{it} \tag{7}$$

In equation (7), $\underline{y}_t$ shows the cross-section mean of $y_{i,t}$ and $\underline{y}_{t-1}$ refers to the lagged value of $\underline{y}_t$.

The $CIPS$ test statistic is expressed as:

$$CIPS = N^{-1}\sum_{i=1}^{n} CADF \tag{8}$$

In equation (8) $CADF_i$ shows the $CADF$ t-test statistic for each cross-section in the $CADF$ regression (Pesaran, 2007). The null hypothesis supposes that the panel has a unit root.

3.3. Panel causality test

Granger causality assumes that past events influence future events. If the the capacity to estimate variable X by making use of its own past values improves by adding the past values of variable Y, it means that variable Y is the Granger cause of variable X. Here the causality relationship between the variables is examined with the Emirmahmutoglu-Kose (E-K) panel Granger causality test (2011).

The reasons for choosing the E-K panel Granger causality approach can be explained as follows. First, in the E-K panel Granger causality test, the variables are not estimated by making them stationary as in Dumitrescu and Hurlin's (2012) panel causality test because in the E-K panel Granger causality test, the critical condition is instead the maximal order of integration of the variables (i.e. at which maximal degree the variables are stationary). Therefore, the E-K panel Granger causality test can be reliably applied in stationary, non--stationary and cointegrated or non-cointegrated panel conditions. Second, it considers CSD with its bootstrap feature and can be used reliably under the presence of slope heterogeneity. Third, test results are available for each cross-section and the whole panel. The weakness of the E-K panel Granger causality test is that it neglects asymmetric and nonlinear relationships. The E-K panel Granger causality test estimates the $k_i + d\max_i$ lagged VAR model in heterogeneous mixed panels (Emirmahmutoglu & Kose, 2011):

$$x_{i,t} = \mu_i^x + \sum_{j=1}^{k_i+d\max_i} A_{11,ij} x_{i,t-j} + \sum_{j=1}^{k_i+d\max_i} A_{12,ij} y_{i,t-j} + u_{i,t}^x \tag{9}$$

$$y_{i,t} = \mu_i^y + \sum_{j=1}^{k_i+d\max_i} A_{21,ij} x_{i,t-j} + \sum_{j=1}^{k_i+d\max_i} A_{22,ij} y_{i,t-j} + u_{i,t}^y \tag{10}$$

In equations (9) and (10) x_i and y_i represent GDP p.c. while $y_{i,t}$ stands for SOCAP respectively. A refers to the fixed matrix of parameters allowed to change between cross-sections. u_i refers to the error term. k_i and $d\max_i$ denote the lag length and the maximal order of integration. Since the study covers a limited period (2007–2018), the appropriate lag length is one.

4. Empirical results

LM and CD_{LM} tests were applied to determine CSD. The cross-section dependence test results are given in Table 2. The null hypothesis which assumes the absence of cross-sectional dependence was rejected for SOCAP at a significance level of 1% in all regions. For GDP p.c., it was rejected at a significance level of 10% in Eastern Marmara, 5% in Aegean and Northeastern Anatolia, and 1% in the remaining regions.

Table 2. Cross-sectional dependence test results

CSD tests	GDP p.c.		SOCAP		GDP p.c. = f (SOCAP)	
	LM test	CD_{LM} test	LM test	CD_{LM} test	LM test	CD_{LM} test
Regions	**Test statistics**					
Western Marmara	23.034***	2.914***	100.000***	20.125***	69.164***	13.230***
Aegean	43.666**	2.093**	280.000***	33.675***	170.498***	19.042***
Eastern Marmara	39.006*	1.471*	280.000***	33.675***	222.619***	26.007***
Western Anatolia	23.007***	8.168***	30.000***	11.023***	23.803***	8.493***
Mediterranean	45.162***	2.293***	279.870***	33.658***	176.204***	19.805***
Central Anatolia	333.339***	40.810***	280.000***	33.675***	305.666***	37.105***
Western Black Sea	90.254***	4.770***	450.000***	42.691***	251.437***	21.760***
Eastern Black Sea	53.921***	7.106***	150.000***	24.648***	95.929***	14.776***
Northeastern Anatolia	33.091**	1.866**	210.000***	29.163***	82.412***	9.476***
Middle East Anatolia	55.392***	3.660***	280.000***	33.675***	152.240***	16.602***
Southeastern Anatolia	64.698***	3.382***	360.000***	38.184***	229.677***	22.825***

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Source: own work.

However, the null hypothesis for the model was rejected at a 1% significance level in all regions. Thus, it has been determined that there is a cross-section dependence in all regions for the variables and the model. In other words, it has been determined that a shock that occurs in any part of Türkiye affects other parts of Türkiye.

Slope homogeneity was examined by $\tilde{\Delta}$ ve $\tilde{\Delta}_{adj}$ tests. $\tilde{\Delta}$ ve $\tilde{\Delta}_{adj}$ test results were presented in Table 3.

According to the $\tilde{\Delta}$ test and $\tilde{\Delta}_{adj}$ test statistics in Table 3, the null hypothesis that the panel is homogeneous was rejected at a 1% significance level in all regions. Thus, it was determined that the slope coefficient differs between

Table 3. Slope homogeneity test results

GDP p.c. = f (SOCAP)	$\tilde{\Delta}$ test	$\tilde{\Delta}_{adj}$ test
Western Marmara	5.891***	6.717***
Aegean	11.685***	13.323***
Eastern Marmara	4.692***	5.349***
Western Anatolia	3.851***	4.391***
Mediterranean	5.529***	6.304***
Central Anatolia	10.269***	11.708***
Western Black Sea	6.847***	7.807***
Eastern Black Sea	10.798***	12.312***
Northeastern Anatolia	8.213***	9.364***
Middle East Anatolia	4.374***	4.987***
Southeastern Anatolia	4.801***	5.474***

Note: *** indicates significance at the 1% level.

Source: own work.

the sections and that the panel was heterogeneous. Afterward, the stationary properties of the variables were examined with the CIPS panel unit root test. CIPS panel unit root test results were shown in Table 4.

Table 4. CIPS panel unit root test results

Level	GDP p.c.	SOCAP
Regions	**Test statistics**	**Test statistics**
Western Marmara	–1.637	–1.240
Aegean	–2.604**	–1.468
Eastern Marmara	–1.535	–2.528**
Western Anatolia	–1.088	–1.580
Mediterranean	–2.800**	–1.160
Central Anatolia	–2.790**	–0.636
Western Black Sea	–1.687	–1.166
Eastern Black Sea	–1.912	–1.370
Northeastern Anatolia	–1.779	–1.173
Middle East Anatolia	–1.431	–1.725
Southeastern Anatolia	–2.445*	–0.908

Note: ** and * indicate significance at the 5% and 10% levels, respectively. Critical values are –2.97 (1%), –2.52 (5%) and –2.31 (10%).

Source: own work.

When the CIPS panel unit root statistics are examined in Table 4, the null hypothesis that the panel has a unit root for the GDP p.c. variable was rejected at the significance level of 5% in Aegean, Mediterranean and Central Anatolia, and 10% in Southeastern Anatolia. It has been determined that other regions have unit roots at the level. In other respects, the null hypothesis which supposes that the panel has a unit root for the SOCAP variable was rejected at a 5% significance level only in Eastern Marmara. It was determined that in the other regions, SOCAP has unit roots at the level. In the next step, the causality relationships between the variables were examined with the E-K panel Granger causality test. For the cross-section unit (provinces), E-K panel Granger causality test results were reported in Table 5.

Table 5. Results from the E-K panel Granger causality test by provinces

Direction	GDP p.c. ⇏ SOCAP Wald stat.	SOCAP ⇏ GDP p.c. Wald stat.	Decision
Western Marmara			
Istanbul	7.123**	0.182	Unidirectional
Tekirdağ	0.120	0.086	No causality
Edirne	46.229***	6.614***	Bidirectional
Kırklareli	122.637***	3.821**	Bidirectional
Balıkesir	6.458**	10.134***	Bidirectional
Çanakkale	4.275**	3.632*	Bidirectional
Aegean			
İzmir	0.304	0.093	No causality
Aydin	76.928***	8.966***	Bidirectional
Denizli	9.505***	15.012***	Bidirectional
Muğla	10.136***	8.212***	Bidirectional
Manisa	3.538*	0.206	Unidirectional
Afyonkarahisar	18.948***	5.425**	Bidirectional
Kütahya	3.827**	12.405*	Bidirectional
Uşak	3.698*	10.754*	Bidirectional
Eastern Marmara			
Bursa	16.818***	8.284***	Bidirectional
Eskişehir	14.43***	6.597***	Bidirectional
Bilecik	14.656***	3.725*	Bidirectional
Kocaeli	2.198	1.928*	Unidirectional
Sakarya	16.679***	7.623	Unidirectional
Düzce	16.368***	5.978	Unidirectional
Bolu	8.684***	5.866	Unidirectional
Yalova	1.508	23.347***	Unidirectional

Direction	GDP p.c. ⇏ SOCAP Wald stat.	SOCAP ⇏ GDP p.c. Wald stat.	Decision
Western Anatolia			
Ankara	6.361**	15.143***	Bidirectional
Konya	1.844	4.396**	Unidirectional
Karaman	0.733	0.055	No causality
Mediterranean			
Antalya	3.390*	3.374*	Bidirectional
Isparta	1.642	11.457***	Unidirectional
Burdur	20.373***	11.925***	Bidirectional
Adana	20.750***	11.291***	Bidirectional
Mersin	1.327	6.399**	Unidirectional
Hatay	9.340***	50.881***	Bidirectional
K. Maraş	9.123***	11.318***	Bidirectional
Osmaniye	11.887***	27.599***	Bidirectional
Central Anatolia			
Kırıkkale	1.167	7.487***	Unidirectional
Aksaray	4.479**	1.707	Unidirectional
Niğde	3.28*	5.268**	Bidirectional
Nevşehir	8.323***	10.441***	Bidirectional
Kırşehir	1.855	4.794**	Unidirectional
Kayseri	4.983**	14.577***	Bidirectional
Sivas	3.098*	13.987***	Bidirectional
Yozgat	6.591***	20.564***	Bidirectional
Western Black Sea			
Zonguldak	3.967**	23.385***	Bidirectional
Karabük	3.129*	7.146***	Bidirectional
Bartın	15.015***	14.219***	Bidirectional
Kastamonu	3.347*	21.089***	Bidirectional
Çankırı	14.425***	10.819***	Bidirectional
Sinop	6.022**	7.496***	Bidirectional
Samsun	23.931***	8.57***	Bidirectional
Tokat	10.335***	1.093	Unidirectional
Çorum	37.449***	71.261***	Bidirectional
Amasya	4.849**	0.748	Unidirectional
Eastern Black Sea			
Trabzon	4.913**	11.917***	Bidirectional

Direction	GDP p.c. ⇏ SOCAP Wald stat.	SOCAP ⇏ GDP p.c. Wald stat.	Decision
Ordu	5.933**	0.281	Unidirectional
Giresun	6.461**	0.298	Unidirectional
Rize	2.946*	3.758*	Bidirectional
Artvin	0.529	1.527	No causality
Gümüşhane	4.601**	1.434	Unidirectional
Northeastern Anatolia			
Erzurum	28.888***	23.263***	Bidirectional
Erzincan	2.147	5.774**	Unidirectional
Bayburt	0.406	2.193	No causality
Ağrı	13.587***	2.066	Unidirectional
Kars	4.726**	0.126	Unidirectional
Iğdır	1.534	0.477	No causality
Ardahan	0.614	0.000	No causality
Middle East Anatolia			
Malatya	3.021*	15.611***	Bidirectional
Elâzığ	16.310***	10.261***	Bidirectional
Bingöl	20.813***	18.517***	Bidirectional
Tunceli	6.645***	12.514***	Bidirectional
Van	3.340*	1.184	Unidirectional
Muş	18.131***	2.449	Unidirectional
Bitlis	15.750***	2.499	Unidirectional
Hakkâri	2.473	3.710*	Unidirectional
Southeastern Anatolia			
Gaziantep	8.511***	6.148**	Bidirectional
Adıyaman	12.528***	2.833*	Bidirectional
Kilis	0.203	0.661	No causality
Şanlıurfa	25.049***	50.932***	Bidirectional
Diyarbakır	8.765***	30.065***	Bidirectional
Mardin	1.862	0.055	No causality
Batman	4.769**	13.559***	Bidirectional
Şırnak	0.732	1.448	No causality
Siirt	0.836	1.529	No causality

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. ⇏ indicates "does not cause".

Source: own work.

According to the E-K panel causality test results shown in Table 5, bilateral causality was found in Edirne, Kırklareli, Balıkesir and Çanakkale in Western Marmara and unilateral causality from GDP p.c. to SOCAP in Istanbul while no significant relationship was found in Tekirdağ. In Aegean, no meaningful relationship was found in İzmir while unilateral causality from GDP p.c. to SOCAP was found in Manisa and bilateral causality was found in Aydın, Denizli, Muğla, Afyonkarahisar, Kütahya and Uşak. Unilateral causality was determined from GDP p.c. to SOCAP in Sakarya, Düzce and Bolu in Eastern Marmara and from SOCAP to GDP p.c. in Kocaeli and Yalova. It was determined that there is bilateral causality in Bursa, Eskişehir and Bilecik. While it is seen that there is unilateral causality from SOCAP to GDP p.c. in Konya in Western Anatolia and bilateral causality in Ankara no significant relationship was detected in Karaman.

While unilateral causality from SOCAP to GDP p.c. was identified in Isparta and Mersin in Mediterranean, bilateral causality was found in Antalya, Burdur, Adana, Hatay, K. Maraş and Osmaniye. Unilateral causality was determined from SOCAP to GDP p.c. in Kırıkkale and Kırşehir in Central Anatolia and from GDP p.c. to SOCAP in Aksaray. It was found that there is bilateral causality in Niğde, Nevşehir, Kayseri, Sivas and Yozgat. While there is unilateral causality from GDP p.c. to SOCAP in Tokat and Amasya in the Western Black Sea, there is bilateral causality in Zonguldak, Karabük, Bartın, Kastamonu, Çankırı, Sinop, Samsun and Çorum.

It has been observed that there is unilateral causality from GDP p.c. to SOCAP in Ordu, Giresun, Gümüşhane in the Eastern Black Sea and bilateral causality in Trabzon and Rize. No significant relationship was found in Artvin. While causality was determined from GDP p.c. to SOCAP in Ağrı and Kars in Northeastern Anatolia and from SOCAP to GDP p.c. in Erzincan, bilateral causality was detected in Erzurum. No significant findings were found in Bayburt, Iğdır and Ardahan. There is a unilateral causality from GDP p.c. to SOCAP in Van, Muş and Bitlis in Middle East Anatolia and from SOCAP to GDP p.c. in Hakkari. In Malatya, Elazığ, Bingöl and Tunceli, it was found that there is a bilateral causality relationship. In Southeastern Anatolia, there was a bilateral causality relationship in Gaziantep, Adıyaman, Şanlıurfa, Diyarbakır and Batman while no significant relationship could be determined in Kilis, Mardin, Şırnak and Siirt.

The causality test results reported in Table 4 were shown on the map in Figure 3 by province. When Figure 3 was examined, a bilateral relationship was found between GDP p.c. and SOCAP in 45 of 81 provinces. It was observed that there was a unilateral causality from GDP p.c. to SOCAP in sixteen provinces and from SOCAP to GDP p.c. in nine provinces. In eleven provinces, no significant relationship was found between GDP p.c. and SOCAP.

The provinces in the east of Türkiye are in a disadvantageous position in terms of economic and social aspects compared to the provinces in the west. This is because the provinces in the West are production and industrial zones

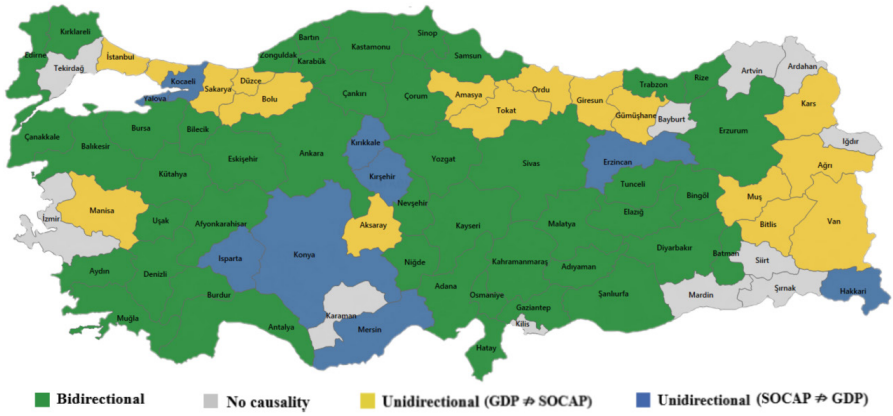

Figure 3. The E-K panel Granger causality test results by the provinces

Note: GDP = GDP p.c.

Source: own elaboration.

and are close to ports and transportation lines. In some provinces, the absence of a causal relationship can be explained by the fact that they are provinces in the east of Türkiye that are below Türkiye's average in terms of economic development, transportation and population. Table 6 demonstrates the results from the E-K panel Granger causality test by regions.

Table 6. Results from the E-K panel Granger causality test by regions

Direction	GDP p.c. ⇏ SOCAP	SOCAP ⇏ GDP p.c.	Decision
Regions	**Fisher stat.**	**Fisher stat.**	
Western Marmara	194.618***	34.484**	Bidirectional
Aegean	148.135***	79.543**	Bidirectional
Eastern Marmara	114.025***	83.818*	Bidirectional
Western Anatolia	14.267	25.485*	Unidirectional
Mediterranean	98.813***	159.260**	Bidirectional
Central Anatolia	50.781**	100.793***	Bidirectional
Western Black Sea	150.811***	194.648***	Bidirectional
Eastern Black Sea	37.996*	28.977	Unidirectional
Northeastern Anatolia	66.501***	45.013*	Bidirectional
Middle East Anatolia	108.614***	86.767**	Bidirectional
Southeastern Anatolia	82.669***	127.680**	Bidirectional

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. ⇏ indicates "does not cause".

Source: own work.

According to the Fisher test statistics in Table 6, a unilateral causality was found from GDP p.c. to SOCAP in Eastern Black Sea region and from SOCAP to GDP p.c. in Western Anatolia. Bilateral causality was found in Western Marmara, Aegean, Eastern Marmara, Mediterranean, Central Anatolia, Western Black Sea, Northeastern Anatolia, Middle East Anatolia and Southeastern Anatolia. Regional causality test results are displayed on the map in Figure 4.

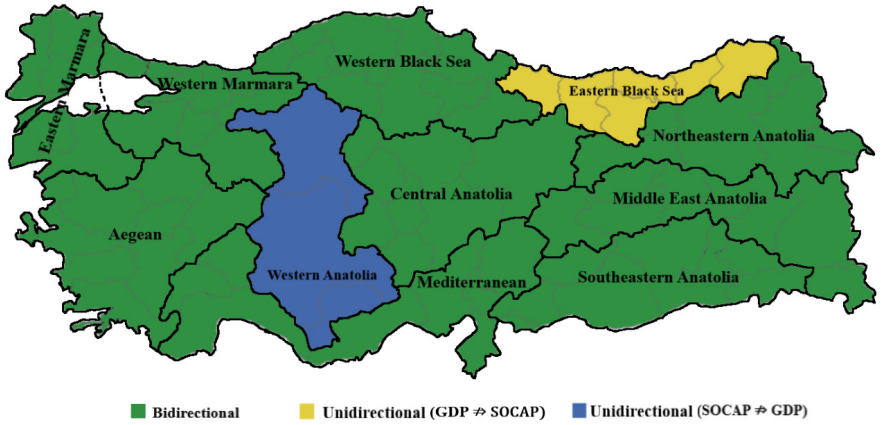

Figure 4. The E-K panel Granger causality test results by regions

Source: own elaboration.

It was determined that there was a bilateral relationship between GDP p.c. and SOCAP in all regions except Western Anatolia and Eastern Black Sea regions in Figure 4. There is a unilateral causality from GDP p.c. to SOCAP in Eastern Black Sea and from SOCAP to GDP p.c. in Western Anatolia. Regional results are more general than causality results on a provincial basis. While provinces in the east of Türkiye that are below average in terms of economic development, transportation and population may affect the results, regional outputs provide more clarity to the results and support the results on a provincial basis.

5. Sensitivity test

The robustness of the results of the causality relationship between the variables is checked for the whole panel in Türkiye. For this purpose, the E-K panel Granger causality test results for Türkiye are given in Table 7.

According to the E-K panel Granger causality test results for Türkiye in Table 7, a bilateral causality relationship was found between GDP p.c. and

SOCAP in 48 provinces of Türkiye. A unilateral causality was obtained from GDP p.c. to SOCAP in thirteen provinces and from SOCAP to GDP p.c. in eight provinces. No significant relationship was found in twelve provinces. Finally, it was determined that there is a bilateral relationship between the related variables in Türkiye. Accordingly, it is seen that the results obtained for the whole panel largely support the results obtained on the provincial and regional basis.

Table 7. The E-K panel causality test results for Türkiye

No relationship			
Ardahan	Artvin	Bayburt	Iğdır
İzmir	Karaman	Kilis	Kocaeli
Mardin	Siirt	Şırnak	Tekirdağ
Unidirectional relationship from GDP p.c. to SOCAP			
Ağrı	Aksaray	Amasya	Bitlis
Giresun	Gümüşhane	İstanbul	Kars
Manisa	Muş	Ordu	Tokat
Van	-	-	-
Unidirectional relationship from SOCAP to GDP p.c.			
Erzincan	Hakkari	Isparta	Kırıkkale
Kırşehir	Konya	Mersin	Yalova
Bidirectional relationship			
Adana	Adıyaman	Afyonkarahisar	Ankara
Antalya	Aydın	Balıkesir	Bartın
Batman	Bilecik	Bingöl	Bolu
Burdur	Bursa	Çanakkale	Çankırı
Çorum	Denizli	Diyarbakır	Düzce
Edirne	Elazığ	Erzurum	Eskişehir
Gaziantep	Hatay	Kahramanmaraş	Karabük
Kastamonu	Kayseri	Kırklareli	Kütahya
Malatya	Muğla	Nevşehir	Niğde
Osmaniye	Rize	Sakarya	Samsun
Sinop	Sivas	Şanlıurfa	Trabzon
Tunceli	Uşak	Yozgat	Zonguldak
Türkiye			

Source: own elaboration.

Conclusions

In this paper, the causality relationships between GDP p.c. and social capital in Türkiye during the period of 2007–2018 were examined both at provincial and regional level. Differing from the majority of previous studies, social capital was represented by the social capital index which is a proxy of more comprehensive. The relationships between variables were examined using the E-K (2011) panel Granger causality test. In the analysis for provinces, it was concluded that there is a bilateral causal relationship in 45 provinces, a unilateral causality from GDP p.c. to SOCAP in sixteen provinces and from SOCAP to GDP p.c. in nine provinces.

In regional results, it was determined that there was a bilateral relationship between the mentioned variables in all the regions except the Western Anatolia and Eastern Black Sea regions. On the one hand, it was observed that there was a one-sided relationship from GDP p.c. to SOCAP in the Eastern Black Sea and from SOCAP to GDP p.c. in Western Anatolia. These results supported the results obtained on a provincial basis. Except for İzmir and Tekirdağ provinces, any causal relationship was determined in the provinces of Bayburt, Karaman, Kilis, Artvin, Ardahan, Iğdır, Mardin, Siirt and Şırnak which are low-population and underdeveloped in terms of income and industry. It is thought that the presence of high immigration from the eastern regions to İzmir and Tekirdağ provinces might account for the absence of a substantial relationship between the variables. At least one unilateral causality relationship was found in all other 70 provinces and a bilateral causality relationship was found in 45 provinces. Furthermore, in order to test the sensitivity of the results, a causality test was performed for a single panel covering all provinces. It was determined that the sensitivity results largely supported the main results.

In 45 provinces (in 56% of provinces) with notable population and economic scale, there existed a causal relationship between GDP p.c. and social capital. In regional analysis, it was determined that there was a bilateral causality relationship in 10 regions (in 83% of provinces) of twelve regions. The results for Türkiye in general supported the previous literature. For the coherence and reliability of the study, it is crucial that the causality results obtained for the provinces, regions, and nationwide analysis are mutually affirmative.

The results revealed that the level of social capital in terms of GDP p.c. in 45 provinces in Türkiye and the level of GDP p.c. in terms of social capital were factors that should be considered. Additionally, it was established that GDP p.c. was determinant for SOCAP in 16 provinces while SOCAP was determinant for GDP p.c. in 9 provinces. The results of the study predominantly provided evidence that indicated the presence of reciprocal interaction between GDP p.c. and social capital in Turkey. These revealed that on the one hand,

practices that contribute to the level of social capital supported GDP p.c. in Türkiye and that, investments made for GDP p.c. encouraged social capital.

In provinces where unilateral causality is detected, appropriate policy recommendations should be put forward by considering the direction of the relationship. Accordingly, in 16 provinces where there is a unilateral causality from GDP p.c. to SOCAP, priority and weight should be given to measures to support the level of GDP. Within this scope, investment and employment opportunities in these 16 provinces should be reviewed and initiatives aimed at enhancing the current capacity should be undertaken.

On the other side, in 9 provinces where unilateral causality from SOCAP to GDP p.c. was detected, strategies supporting the level of social capital should be implemented to improve the level of GDP p.c. In this context, priority should be assigned to essential policy implementations that foster the advancement of social capital levels in these provinces. Although there is no precise formula for enhancing social capital level, policies can be implemented to improve and increase the level of trust by fostering connections and networks among individuals by working in this direction. Undoubtedly, the implementation of regulatory and supportive policies in both spheres will both improve the level of social capital and positively affect GDP p.c.

It is vital to focus on GDP p.c. by ensuring regionally and geographically balanced growth. It is noteworthy that the disadvantaged provinces and regions in the east of Türkiye suffer from low both per capita income and social capital. Hence, strategies that eliminate regional inequalities in income distribution and give priority to disadvantaged provinces and regions should be implemented.

This study has some limitations. First, in the investigation of the relationship between social capital and GDP p.c., the causality test is solely employed and coefficient estimation is ignored. Second, the observation range of the variables (2007–2018) in the study covers a limited period. Third, asymmetric and non-linear test methods are neglected in the analysis since the E-K causality test analyzes linear relationships between variables. Therefore, different variables and different social capital indicators can be used in future studies. The bidirectional relationship between social capital and GDP p.c. can be explored in different countries and regions and particularly on the basis of provinces in Türkiye through utilizing asymmetric or non-linear test techniques in future studies.

References

Akçomak, I. S., & Bas ter Weel. (2008). *Social capital, innovation and growth: Evidence from Europe*. IZA Discussion Papers, 3341.

Alesina, A., & La Ferrara, E. (2000). Participation in heterogeneous communities. *Quarterly Journal of Economics*, *115*, 847–904.

Andini, C., & Andini, M. (2019). Social capital and growth: Causal evidence from Italian municipalities. *Journal of Economic Geography*, *19*(3), 619–653.

Becker, G. S. (2009). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago Press.

Benabou, R. (1994). Human capital, inequality, and growth: A local perspective. *European Economic Review*, *38*(3–4), 817–826.

Beugelsdijk, S., & Van Schaik, T. (2005). Differences in social capital between 54 Western European regions. *Regional Studies*, *39*(8), 1053–1064.

Botzen, K. (2016). Social capital and economic well-being in Germany's regions: An exploratory spatial analysis. *Region*, *3*(1), 1–24.

Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood.

Breusch, T. S., & Pagan, A.R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies*, *47*(1), 239–253.

Calcagnini, G., & Perugini, F. (2019). Social capital and well-being in the Italian provinces. *Socio-Economic Planning Sciences*, *68*, 100668.

Casey, T., & Christ, K. (2005). Social capital and economic performance in the American states. *Social Science Quarterly*, *86*(4), 826–845.

Coleman, J. S. (1990). *Foundations of social theory*. Harvard University Press.

Coleman, J. S. (1994). Social capital, human capital, and investment in youth. In A. C. Petersen & J. T. Mortimer (Eds.), *Youth unemployment and society* (pp. 34–50). Cambridge University Press. https://doi.org/10.1017/CBO9780511664021.004

Davaadorj, Z. (2019). Does social capital affect dividend policy? *Journal of Behavioral and Experimental Finance*, *22*, 116–128.

Dearmon, J., & Grier, K. (2009). Trust and development. *Journal of Economic Behavior & Organization*, *71*(2), 210–220.

Delhey, J., Newton, K., & Welzel, C. (2011). How general is trust in ''Most People''? Solving the radius of trust problem. *American Sociological Review*, *76*(5), 786–807.

Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling*, *29*(4), 1450–1460.

Edvinsson, L., & Stenfelt, C. (1999). Intellectual capital of nations—for future wealth creation. *Journal of Human Resource Costing and Accounting*, *4*(1), 21–33.

Emirmahmutoglu, F., & Kose, N. (2011). Testing for Granger causality in heterogeneous mixed panels. *Economic Modelling*, *28*(3), 870–876.

Feki, C., & N. Chtourou (2014). Social capital & economic growth: Empirical analysis of panel data. *International Journal of Innovation and Scientific Research*, *2*(1), 164–176.

Fischer, J. A., & Torgler, B. (2006). The effect of relative income position on social capital. *Economics Bulleti*n, *26*(4), 1–20.

Fukuyama, F. (1995). *Trust: The social virtues and the creation of prosperity*. Free Press.

Gambetta, D. (1996). *The Sicilian mafia: The business of private protection*. Harvard University Press.

Guiso, L., Sapienza, P., & Zingales, L. (2004). The role of social capital in financial development. *The American Economic Review*, *94*(3), 526–556.

Hall, S. G., & Ahmad, M. (2013). Can trust explain social capital effect on property rights and growth? *Procedia Economics & Finance*, *7*, 55–64.

Hanifan, L. (1916). The rural school community center. *Annals of the American Academy of Political and Social Science*, *67*, 130–138.

Hasan, I., Hoi, C. K., Wu, Q., & Zhang, H. (2017). Social capital and debt contracting: Evidence from bank loans & public bonds. *Journal of Financial and Quantitative Ananysis*, *53*, 1017–1047.

Hasanov, F. J., Khan, Z., Hussain, M., & Tufail, M. (2021). Theoretical framework for the carbon emissions effects of technological progress and renewable energy consumption. *Sustainable Development*, *29*(5), 810–822.

Helliwell, J. F. (1996). *Economic growth and social capital in Asia*. NBER Working Paper, 5470. National Bureau of Economic Research.

Helliwell, J. F. (2007). Well-being and social capital: Does suicide pose a puzzle?. *Social Indicators Research*, *81*(3), 455–496.

Hjerppe, R. (1998). *Social capital and economic growth*. VATT Discussion Papers183, 1–26. Government Institute for Economic Research. Helsinki.

Iyer, S., Kitson, M., & Toh, B. (2005). Social capital, economic growth and regional development. *Regional Studies*, *39*(8), 1015–1040.

Jha, A., & Chen, Y. (2015). Audit fees and social capital. *The Accounting Review*, *90*, 611–639.

Jin, J. Y., Kanagaretnam, K., Liu, Y., & Liu, N. (2019). Banks' loan growth, loan quality and social capital. *Journal of Behavioral and Experimental Finance*, *21*, 83–10.

Juhro, S. M., Narayan, P. K., Iyke, B. N., & Trisnanto, B. (2022). Social capital, R&D and provincial growth in Indonesia. *Regional Studies*, *56*(12), 2117–2132.

Knack, S. (2003). Groups, growth & trust: Cross-country evidence on the Olson and Putnam hypothesis. *Public Choice*, *117*(3–4), 341–355.

Knack, S., & Keefer, P. (1997). Does social capital have an economic payoff? A cross--country investigation. *The Quarterly Journal of Economics*, *112*(4), 1251–1288.

Koç, A., & Ata, Y. (2012). Sosyal sermaye ve ekonomik büyüme ilişkisi: AB ülkeleri ve Türkiye üzerine ampirik bir inceleme. *Süleyman Demirel* Üniversitesi İktisadi *ve* İdari *Bilimler Fakültesi Dergisi*, *17*(1), 199–218.

Li, Y., Wung, X., Westlund, H., & Liu, Y. (2015). Physical capital, human capital and social capital: The changing roles in China's economic growth. *Growth and Change*, *46*(1), 133–149.

Lucas, R. E., Jr. (2015). Human capital and growth. *American Economic Review*, *105*(5), 85–88.

Menyah, K., Nazlioglu, S., & Wolde-Rufael, Y. (2014). Financial development, trade openness and economic growth in African countries: New insights from a panel causality approach. *Economic Modelling*, *37*, 386–394.

Muringani, J., Fitjar, R. D., & Rodríguez-Pose, A. (2021). Social capital and economic growth in the regions of Europe. *Environment and Planning A: Economy and Space*, *53*(6), 1412–1434.

Neira, I., Vászquez, E., & Portela, M. (2009). An empirical analysis of social capital and economic growth in Europe (1980–2000). *Social Indicators Research*, *92*(1), 111–129.

North, D.C. (1990). *Institutions, institutional change and economic performance*. Cambridge University Press.

Özcan, B., & Zeren, F. (2013). Sosyal güven ve ekonomik kalkınma: Avrupa ülkeleri üzerine mekansal ekonometri analizi. *Eskişehir Osmangazi* Üniversitesi İktisadi İdari *Bilimler Fakültesi Dergisi*, *8*(1), 7–36.

Peiró-Palomino, J., & Tortosa-Ausina, E. (2015). Social capital, investment and economic growth: Some evidence for Spanish provinces. *Spatial Economic Analysis*, *10*(1), 102–126.

Pan, F., & He, C. (2010). Regional difference in social capital and its impact on regional economic growth in China. *Chinese Geographical Science*, *20*, 442–449.

Parts, E. (2013). *The dynamics and determinants of social capital in the European Union and neighbouring countries*. Discussions on Estonian economic policy: Theory and practice of economic policy in the European Union, 1. https://doi.org/10.2139/ssrn.2336016

Pennar, K. (1997, December 15). The tie that leads to prosperity: The economic value of social bonds is only beginning to be measured. *Business Weekly*, 153–155.

Perez, F., Fernandez de Guevara, J., Serrano, L., & Montesinos, V. (2006). Measurement of social capital & growth: An economic methodology. *Fundacion BBWA*, 1–57.

Pesaran, M. H. (2004, August). *General diagnostic tests for cross section dependence in panels*. IZA Discussion Paper, 1240, 1–39.

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, *22*(2), 265–312.

Pesaran, M. H., & Yamagata, T. (2008). Testing slope homogeneity in large panels. *Journal of Econometrics*, *142*(1), 50–93.

Phillips, P. C., & Sul, D. (2003). Dynamic panel estimation and homogeneity testing under cross section dependence. *The Econometrics Journal*, *6*(1), 217–259.

Pilatin, A. (2022). Impact of social capital on economic growth: A meta-analysis. *International Journal of Economics, Business & Politics*, *6*(2), 216–235. https://doi.org/10.29216/ueip.1132292

Pilatin, A., & Ayaydın, H. (2022a). Social capital measurement in Türkiye: Creating an index by province. *Journal of Economy Culture & Society*, *66*, 235–259. https://doi.org/10.26650/JECS2021-1033478

Pilatin, A., & Ayaydin, H. (2022b). The relationship between banks' credit quality, credit growth and social capital: Evidence from Turkish banking sector. *Middle East Development Journal*, *14*(1), 133–170. https://doi.org/10.1080/17938120.2022.2074673

Portes, A. (1998). Social capital: Its origins and the application in modern sociology. *Annual Review of Sociology*, *24*(1), 1–25.

Postelnicu, L., & Hermes, N. (2018). The economic value of social capital. *International Journal of Social Economics*, *45*(6), 870–887.

Putnam, R. D. (1993). *Making democracy work. Civic traditions in modern Italy*. Princeton University Press.

Putnam, R. D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, *6*(1), 65–78.

Putnam, R. D. (2007). E pluribus unum: Diversity and community in the twenty-first century the 2006 Johan Skytte Prize Lecture. *Scandinavian Political Studies*, *30*(2), 137–174.

Romer, P. M. (1986). Increasing returns and long-run growth. *The Journal of Political Economy*, *95*(5), 1002–1037.

Romer, P. M. (1990). Human capital and growth: Theory and evidence. *Carnegie-Rochester Conference Series on Public Policy*, *32*, 251–286.

Roth, F. (2007). *Trust & economic growth: Conflicting results between cross-sectional and panel analysis*. Ratio Working Paper, 102. https://www.ratio.se/pdf/wp/fr_trust.pdf

Roth, F. & Schüler, D. (2006). Trust and economic growth: A panel analysis. Manuscript Draft: University of Göttingen.

Routledge, B. R, & von Amsberg, J. (2003). Social capital and growth. *Journal of Monetary Economics*, *50*, 167–193.

Rupasingha, A., & Goetz, S. J. (2008). *US county-level social capital data, 1990–2005*. The Northeast Regional Center for Rural Development, Penn State University.

Rupasingha, A., Goetz, S. J., & Freshwater, D. (2000). Social capital and economic growth: A county-level analysis. *Journal of Agricultural and Applied Economics*, *32*(3), 565–572.

Rupasingha, A, Goetz, S. J., & Freshwater, D. (2006). The production of social capital in US counties. *Journal of Socio-Economics*, *35*, 83–101.

Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, *70*, 65–94.

Stewart, T. (1997). *Intellectual capital: The new wealth of organizations*. Currency Doubleday.

Sveiby, K. E. (2000). *Measuring intangibles and intellectual capital*. The MIT Press.

Swan, T. W. (1956, November). Economic growth and capital accumulation. *Economic Record*, *32*, 334–361.

Tomer, J. F. (2011, October 1). *Improving the standard of living through investments in intangible capital*. https://doi.org/10.2139/ssrn.1991256

TUIK. (2022). https://data.tuik.gov.tr/Bulten/Index?p=Donemsel-Gayrisafi-Yurt-Ici-Hasila-IV.-Ceyrek:-Ekim-Aralik-2021-45548

Wang, P., Chen, X., Gong, J., & Jacques-Tiura, A. J. (2014). Reliability & validity of the personal social capital scale 16 & personal social capital scale 8: Two short instruments for survey studies. *Social Indicators Research*, *119*(2), 1133–1148.

Westlund, H., & Adam, F. (2010). Social capital and economic performance: A meta-analysis of 65 Studies. *European Planning Studies*, *18*(6), 893–919.

Wong, S. (2013). From economic meltdown to social crunch: Lessons about social capital and economic crises. *Procedia-Social and Behavioral Sciences*, *72*, 107–119.

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

World Bank. (2011). *What is social capital?* www.worldbank.org