Putnam's Social Capital and Government Performance: Empirical evidence from rural communities in Poland

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Pertaining to Putnam's famous contribution "Making Democracy Work" (Putnam et al., 1993) this paper presents empirical evidence that social capital is a determinant of local government performance. Understanding local politics basically as the provision of public services the Data Envelopment Analysis (DEA) is applied to estimate local government performance in rural communities in Poland for the years 2002-2005. Further, the Malmquist index is calculated, to measure the temporal change in government performance. Beside socio-economic, political and institutional characteristics, social capital indicators, e.g. the number of tertiary organizations and the voter turnout are recognized as explanatory variables in the investigations. To take care of endogeneity and identification problems, instrumental variables estimations are used; a Hausman-Taylor model is applied to take care for the time-invariant variable voter turnout. Estimation of cross-sectional as well as of panel data models show that social capital has a positive significant impact on the government performance as well as on its temporal change.

1 Introduction

The concept of social capital has attracted great academic and journalistic attention during the last years. Particularly since Robert Putnam's contribution "Making Democracy Work" (Putnam et al., 1993) the notion gained in publicity. Using indicators of civic behavior at neighborhood level to obtain a social capital index, Putnam points out that social capital positively affects the performance of local governments in Italy. But the use of social capital as an explanatory variable of performance is a controversial issue in the respective literature. All the more, this paper aims to give an empirical evidence of Putnam's social capital approach and its impact on the local government performance.

The concept of social capital developed in sociology and political economy. Contributions of Bourdieu (1986), Coleman (1988) and Putnam et al. (1993) yielded that the issue attracts worldwide attention. Although there is evidence that social capital can enhance the development program participation at different levels (Cohen and Uphoff, 1980), policies that purpose to strengthen economic development and social well-being still neglect the possibility of positive spillovers occurring from the regional social capital endowment. The participation in decision making, in implementation, in benefits, and in evaluation can be supported by social involvement of the citizens (Cohen and Uphoff, 1980). Furthermore, structural policy programs of the EU aim among others to establish and develop governmental structures in new member states in order to guarantee a successful implementation of EU policy programs after joining the EU. But the importance of social capital to yield a better performing government is not recognized in the program formulations so far. Therefore, this paper investigates the determinants of government performance as well as of its temporal change. Poland is chosen as object of investigation, representative for the ten member-states that joined the EU in 2004. The motivation to choose a new member-state as object of investigation are the new governmental structures established only recently. The determinants of a positive or negative development are therefore presumed to be more apparent as in case of long established democracies.

Our contribution is threefold. First, we estimate a government performance measure as well as a measurement of its temporal change. Understanding local politics basically as the provision of public services government performance can be interpreted as the technical efficiency of local public good production. Following this idea the paper applies the data envelopment analysis (DEA) to estimate local government performance in rural communities in Poland. Using the Malmquist index we receive the temporal change in efficiency. In a second step we estimate the determinants of the local government performance using cross-section data. The impact of various socio-economic, political and institutional characteristics of rural communities are chosen as explanatory variables. In particular, following Putnam's seminal contribution, social capital indicators, e.g. the number of tertiary organizations and the voter turnout, are tested for explaining performance differences observed across communities. Third, we investigate the development of local government performance over time. The efficiency changes of communities calculated with the Malmquist index are used as dependent variable. The explanatory variables remain the same as in the second step. Our econometric estimations are based on 314 rural communities in Poland. The period of investigation are the years 2002-2005. So we are able to explain the development of government performance over time as well as differences in the occurring regional performance.

Because in policy settings endogeneity and identification problems often point out as particularly important (Koopmans, 1949; Hsiao, 1983), we give special attention to these problems to occur. Regarding the determinants of local government performance intuition suggests that the average income should have a positive impact on the local government performance whereas the unemployment rate has a negative impact. But a higher government performance might lead to a higher average income and might cause a decrease of unemployment as well. Because endogeneity problems occur due to a correlation of the independent variable(s) with the error term, we deal with the problem by generating an independent local government performance measure. However, due to the identification problem we also use an instrumental variables estimation, instrumenting the right hand sight (RHS)

variables that concern endogeneity with values from the previous year. Therewith we try to solve the identification problem by using time-lags, yielding a forecast of the received temporal changes. Indeed, identification problems might still be apparent but less probable. Because the voter turnout is a time-invariant variable for the investigated time period we use a Hausman-Taylor model in addition to standard instrumental variable regressions allowing for the time-invariant.

In the following section we give an overview of the social capital theory. Especially, social capital components are deduced with respect to Putnam's social capital approach (Putnam et al., 1993). Further the measurement of local government performance is discussed. In addition we introduce the data base and econometric specification before the estimation results are presented and discussed. A conclusion will be presented at the end of the paper.

2 Social Capital and Government Performance

There is a diversified literature on social capital in all branches of social sciences, i.e. in economics (e.g. Alesina and La Ferrara (2000); Knack and Keefer (1997)), political science (e.g. Putnam et al. (1993); Putnam (2000); Hardin (1999)) and sociology (e.g. Granovetter (1988); Coleman (1988); Fukuyama (1995); Portes (1998)). It is therefore not astonishing that the terminology 'social capital' is widely-used and the impact on performance has been investigated on various occasions. Furthermore, the importance to recognize social capital in economic models is emphasized due to the fact that ignoring the impact of changes in physical capital on a form of social capital can lead to the unintended consequences of physical capital being less productive than desired (Ostrom, 1994). However, social capital is probably one of the most successfully introduced 'new' concepts in economics since the end of the last century (Beugelsdijk and van Schaik, 2005).

Generally, the idea of social capital corresponds to the effect of social relations and networks of such relations on social behavior and institutions. This is in line with Putnam et al. (1993) who argued that differences in the effectiveness of regional governments and economic performance can be explained by regional differences as to how society is organized, by the regional social capital endowment, respectively. Individual factors facilitate cooperation at the collective level, i.e. performance of political institutions and of the economy (Putnam et al., 1993; Knack and Keefer, 1997). The definition of social capital as "...features of social organization, such as trust, norms, and networks, that can improve efficiency of society by facilitating coordinated actions" (Putnam et al., 1993, 167) seems to be generally acceptable and universally valid because it only stresses the possibility of efficiency improvement, but controversary discussions and critical acknowledgments of the postulated relationship weaken the explanatory power. Furthermore, the postulated proven finding of Putnam et al. (1993) that more social capital in Italian regions has a positive effect on the governance and economic performance is criticized regarding the approach taken and the lack of a theoretical mechanism between social capital and the other 'dependent' variables (Jackman and Miller, 1996; Tarrow, 1996; Harriss and De Renzio, 1997; Paxton, 1999; Goldberg, 1996). Moreover, it is generally accepted that the effect of social capital can be positive as well as negative. Therefore Putnam (2000) distinguishes between bonding and bridging social

capital[1]. The first type causes a lack in flexibility and may result in negative outcomes whereas bridging social capital, e.g. voluntary organizations, active political participation and civic awareness, is supposed to have positive effects (Paxton, 1999; Woolcock, 1998; Fedderke et al., 1999; Sabatini, 2009).

Irrespective of the interesting issue which kind of performance impact social capital components have, in this study the criticism regarding the chosen approach by Putnam attracts our primary interest. Therefore we intend to conduct estimations, following the idea of Putnam but keeping the critique regarding his chosen approach in mind. Besides general criticism of the data-structure regarding the administrative unit level and the related low number of data points (Goldberg, 1996), two fundamental points of criticisms occur. First, the measurement of government performance and the composition of explanatory variables (Jackman and Miller, 1996). This means high inter-correlations of the explanatory variables and endogeneity problems as the explanatory variables are reasonably associated with the indicators Putnam developed to measure institutional performance. Second, the use of cross-sectional information instead of the initially time-series design (Tarrow, 1996). We will go into these criticism in more detail in our study. Regarding the first point our response is twofold. On one hand it is essential to deduce a meaningful government performance measure. On the other hand it seems useful to construct a government performance measure which is independent from the explanatory variables to avoid endogeneity problems. In respect of the second point we will apply a panel-data approach as well as a cross-sectional estimation setting. We will choose the explanatory components in regard to Putnam's investigation to ensure comparability. The database are 314 LAU 1 regions in Poland, the investigated time period the years 2002-2005. Therewith we avoid any objections regarding an insufficient number of investigated regions by Putnam[2].

2.1 Measurement of government performance

The general conception of local governments is one of a locally elected democratic statutory organization below the level of the state, providing public sector services to the populace within the area of its jurisdiction (Bailey, 1999). Following contributions of the economic theory the instrumental role of local governments is emphasized regarding the provision of public services and seeking to determine the conditions for maximization of economic welfare. The main economic role of governments are allocative, distributive, regulatory and stabilization issues whereas resource allocation is primarily the concern of local governments (Oates, 1972; King, 1984; Musgrave and Musgrave, 1989). As government interventions can generally only be justified by the existence of market failure, in case of local governments their intervention relates to market failures regarding natural monopolies, public goods and externalities (Bailey, 1999). Natural monopolies are e.g. the water and sewerage management, the public good provision means the social infrastructure, or the environmental quality. But although the public goods provision of a local government can be used as a performance indicator, the devolvement in a regional and temporal comparably measurement stays open.

In literature three problems in measurement of performance are therefore discussed: identification of outputs, the absence of prices, and the problem of attribu-

[1]Bridging social capital means bonds of connectedness that are formed across actors. Bonding social capital, e.g. strong family ties, reinforces homogeneous groups and means a lock-in effect.

[2]In Putnam et al. (1993) 20 regions are investigated.

tion (Stevens, 2005). We introduced the outputs in case of local governments are provided public goods. The attribution problem means that provided public goods are also influenced by other factors. Because the aim is to reduce a regional comparable performance measure it can be assumed that this effect applies to all regions and can therefore be ignored. The lack of prices for produced public goods and the resulting difficulty to aggregate the outputs as a measurement of performance can be overcome by transferring the provided public goods into another comparable and summable measure. Using the provided public goods implicitly to calculate shadow prices of each output to determine levels of provision, performance means the efficiency of local governments in the provision of public goods. Efficiency describes how well an organization uses resources in producing services, the relationship between the combination of inputs used to produce a bundle of outputs, respectively (Worthington et al., 2001)[3]. However, understanding local government performance as efficiency in public good provision it becomes measurable.

Three techniques for efficiency analysis are mainly applied in literature: the Data Envelopment Analysis (DEA), the Stochastic Frontier Analysis (SFA) and the Free Disposal Hull (FDH) techniques. All three have advantages and disadvantages. We decided to use a DEA because of various reasons which will be discussed in detail in section 3.1. The most important one is that it offers the possibility to deal with multiple in- and outputs. Understanding the government performance as efficient production of public goods it should be comprehensible that more than one public good is produced and more than one production input is available (Balaguer-Coll et al., 2007; Worthington et al., 2001; Stevens, 2005).

2.2 Social capital components

Two main problems are well discussed in the literature on social capital: the definition of social capital is elusive, there is a lack of suitable data and neither a single and commonly accepted indicator of social capital nor a universal measurement method is given. Further, assuming that social capital is a multidimensional concept, it is not clear which dimension has a positive effect on performance (Sabatini, 2009). Generally, it has to be differentiated in micro- and macro components and in aggregated micro-level components. This means that social capital refers at the individual level to the individual network embedding. At aggregate level traditions of civic engagement and the structure of civic networks are components of the regional social capital. In Putnam et al. (1993) macro level components are used as explanatory variables[4].

In this study the definition and derivation of suitable social capital components is hardly challenging as we aim to test Putnam's social capital approach and follow Putnam et al. (1993) by choosing our explanatory variables. In Putnam's study three components are substantial for the social capital of a region: trust, norms and networks. It is emphasized that trust and civic involvement are linked to better performance of government institutions. Therewith, the three components of social capital are not independent as social networks allow trust to become transitive and

[3]Regarding the public goods provision, in this study efficient means to use a given set of inputs to produce a maximum level of outcome.

[4]Regarding the dividing lines in social capital research the focus of investigation can be assigned by Bourdieu to the micro-, by Coleman to the meso- and by Putnam to the macro-level. An overview of micro and macro level studies of the effect of social capital can be found in Shideler and Kraybill (2009).

spread: "I trust you, because I trust her and she assures me that she trusts you." (Putnam et al., 1993, 169). That means that trust supports cooperation. In other words, the greater the level of trust, the greater the likelihood of cooperation in a society. Moreover, people who trust others are generally more engaged in civic life and build more social capital than people who do not[5]. In respect of measuring social capital the components creating trust have to be captured, i.e. social networks, social associations, respectively support reciprocity, facilitate coordination and communication and develop mutual trust.

Putnam focuses on voluntary organizations as a proxy for measuring social capital. In areas with strong, dense, horizontal, and more cross-cutting networks, there is a spillover from membership in organizations to the cooperative values and norms that citizens develop (Putnam et al., 1993). Therefore Putnam uses the density of organizations, i.e. the number of memberships in associations per capita in a region. Associations are e.g. soccer clubs, choirs, bird-watching groups or literary circles (Putnam et al., 1993, 91). Participation in this type of voluntary organizations is not limited by the level of membership fees.

In addition the political participation is a main factor, explaining the performance of local governments in Putnam et al. (1993). Putnam uses the voter turnout as a measure of political participation and gives the preference voting as a reason for the adequacy of this measurement. A low voter turnout represents a low political participation and is therefore negatively linked to government performance.

Since Putnam's publication many studies investigated determinants of social capital, using various approaches and indicators. Five main sources of social capital are mostly validated: strong family ties, i.e. bonding social capital, weak informal ties, i.e. bridging social capital as well as voluntary organizations, active political participation, and civic awareness (Sabatini, 2009). Some of them are not outlined in Putnam et al. (1993) but regarding their multiple validation we also recognize them in our study.

3 Econometric Specification and Data

3.1 Data Envelopment Analysis

The Data Envelopment Analysis (DEA) is a non-parametric frontier analysis and is allowing to rank communities and to analyze the distribution of different factors to local government performance. In comparison to the SFA, the DEA is advantageous as it does not impose a particular functional form on the data, i.e. it is flexible as it does not require the specification of an underlying production relationship between inputs and outputs. A further advantage of the DEA is that inputs and outputs can be recognized that are measured in different units and at different scales. Regarding the government performance measurement, the possibility to deal with multiple in- and outputs is conspicuous.

DEA models have been applied differently in literature (Cook et al., 1990; Rouse et al., 1995; Worthington, 1999); among other purposes for analyzing the efficiency terms of economic development and livability of cities (Charnes et al., 1989, 1994; Hashimoto and Kodama, 1997; Somarriba and Pena, 2009; Zhu, 2001)

[5]The conclusion that cooperation itself breeds trust, i.e. the steady accumulation of social capital has been a crucial part of the story behind the virtuous circles of civic Italy according to Putnam (Beugelsdijk and van Schaik, 2005).

and the efficiency of local governments (Balaguer-Coll et al., 2007; De Borger and Kerstens, 1996; Stevens, 2005). Further applications of the DEA can be found in Dollery and Wallis (2001). Emrouznejad et al. (2008) present a list of DEA research covering theoretical developments as well as applications.

In the DEA, an efficient region has comparable production inputs to other regions but utilizes those resources more efficiently to produce greater outcomes. Conversely, an efficient local government may similarly be viewed as having comparable public goods as outputs, but generally produces those levels of outputs with fewer resources. These two perspectives mean the input versus output orientation of the DEA estimation. We are convinced that the local governments are able to influence the setting of production inputs, aiming at producing a given level of outputs with fewer ressources, i.e. we use an input-orientated model. In this study production inputs are factors, local governments are able to influence as well as the given local conditions; outputs are thereby produced public goods and related amenities. Attention has been paid to non-negativity as well as to change the direction of undesirable outcomes; i.e. in case we want to include e.g. the environmental quality as a produced public good in our estimations but the only available environment indicator is the pollution of a region, the inverse of pollution yields a measure of the environmental quality. However, it is ensured that produced outcomes are public goods and not bads.

The choice of inputs and outputs is not predetermined by a standard approach. The number of inputs and outputs is chosen according to Dyson et al. (2001). Therefore the number of (Decision Making Units) DMUs has to be: $2 * m * n$, with m being the number of inputs and n the number of outputs. The DMUs of this study are the local governments of 314 (LAU 1) regions in Poland. The following production inputs were used: the habitable surface per km^2, the water- and forest area per km^2, the regional budget in Zloty per population, the employment rate and the number of enterprises per population. In order to receive a more complex description of the production outcomes, the principal component analysis is applied to reduce the great number of outcome variables and to classify them to significant public good variables by detecting structure in their relationships. The following outputs were received: the eductional, the social and the technical infrastructure, the environmental quality, and the spare time facilities.

In the introduction we stated that we decided to use a cross-sectional as well as a panel data approach to investigate the determinants of government performance as well as the determinants of its temporal change. The dependent variable in the cross-sectional setting is therefore a relative efficiency measure, i.e. the government performance measure of a region is received in comparison to all other regions which have a similar production structure. The efficiency values are scaled so that they range between [0,1], with a value of 1 meaning an efficient public good production and values < 1 meaning an inefficient production, a lower level of government performance, respectively. The formulation of the DEA is given in equation (eq) 1 and eq:2. Each Decision Making Unit (DMU) j has multiple inputs $x_{i,j}$ and multiple outputs $y_{k,j}$; u and v are weights . By this each DMU j_0 is allowed to set its own weights. The optimization problem (eq:2) is given as the efficiency of DMU j_0 is maximized subject to the condition that all efficiencies of other DMU's remain less than or equal to 1. By this the denominator is fixed to a constant value, e.g. 1.0, which can be interpreted as setting a constraint on the weights v_i (Coelli et al., 1998):

$$Efficiency = \frac{\sum_k u_k y_{k,j}}{\sum_i v_i x_{i,j}} \tag{1}$$

$$\begin{aligned} \max u, v \sum_k u_k y_{k,j_0} \\ s.t. \sum_i v_i x_{i,j_0} = 1 \\ \sum_k u_k y_{k,j} \leq \sum_i v_i x_{i,j} \forall j \\ u_k, v_i \geq 0 \end{aligned} \tag{2}$$

To investigate the change of government performance the Malmquist index has to be calculated (Caves et al., 1982). The advantage of this approach is that it allows decomposing the change in total factor productivity into technical progress and technical efficiency change; i.e. the Malmquist index measures the total factor productivity change between two time periods by calculating the distances of each data point relative to a common technology (Halkos and Tzeremes, 2007; Chen and Huffman, 2004). Following Färe et al. (1994) it can be divided into a change in technical efficiency and a shift of the production frontier from time period t to time period $t+1$ (eq:3). In other words, a shift in the best practice production frontier is an indication of technical change, and technical efficiency change is associated with learning by doing, improved managerial practices, and change in efficiency when using an existing technology (Felipe, 1999).

$$M_0 = \frac{D_0^{t+1}(x_0^{t+1}, y_0^{t+1})}{D_0^t(x_0^t, y_0^t)} \left[\frac{D_0^t(x_0^{t+1}, y_0^{t+1})}{D_0^{t+1}(x_0^{t+1}, y_0^{t+1})} \frac{D_0^t(x_0^t, y_0^t)}{D_0^{t+1}(x_0^t, y_0^t)} \right]^{1/2} \tag{3}$$

The first component $TEC_0 = \frac{D_0^{t+1}(x_0^{t+1}, y_0^{t+1})}{D_0^t(x_0^t, y_0^t)}$ measures the change in technical efficiency, which will be greater than unity if there has been an increase in efficiency. The second component $FS_0 = \left[\frac{D_0^t(x_0^{t+1}, y_0^{t+1})}{D_0^{t+1}(x_0^{t+1}, y_0^{t+1})} \frac{D_0^t(x_0^t, y_0^t)}{D_0^{t+1}(x_0^t, y_0^t)} \right]^{1/2}$ measures the frontier shift, occurring from t to $t+1$.
In case $FS_0 > 1$, this signifies a positive shift of the frontier, respectively technical progress. $FS_0 < 1$ represents a negative shift and, $FS_0 = 1$ implies that the frontier has not changed over time (Färe et al., 1992).

3.2 Regression Models

3.2.1 Cross-Sectional Approach

From the DEA we received for each region and each year a measurement for the technical efficiency, i.e. the technical efficiency of each DMU measured in relation to DMUs with the most similar production technology (Coelli et al., 1998). Calculation of the Malmquist index generates a measurement for the frontier shift as well as for the change in technical efficiency. Whereas the investigation of the temporal change in the government performance of a region yields a panel data approach, in case of the relative technical efficiency measure of several years a cross sectional setting is appropriate.

Therefore, first we estimate a pooled regression model, using the technical efficiency values of several years as the independent variable. Because the efficient units have an efficiency value of one, a tobit model censoring these observations is

estimated, explaining the inefficiencies. A higher value of the dependent variable indicates a lower inefficiency, i.e. the region is more efficient in the public good provision than regions with a lower value[6].

In ordinary least squares as well as in tobit models it is assumed that the errors are uncorrelated with the dependent variables. Because of measurement errors and omitted variables this assumption may not apply and endogeneity problems may occur. The estimation results will then be biased and the parameter estimates inconsistent (Greene, 2003).

Endogeneity bias cannot easily be avoided because there is no equivalent to the robust estimators used to conduct inference in the presence of general patterns of heteroskedasticity. A well approved solution is the instrumental variables estimation. This means to estimate linear regression models of the form $Y = \theta X + \epsilon$, where Y is the dependent variable, θ is the parameter of interest, and the error term ϵ is potentially correlated with the explanatory variable X. If the observed regressor X and the unobserved true regressor X^* are related through $X = X^* + \Delta X$, with ΔX being a zero mean measurement error that is uncorrelated with X^*, the true model $Y = \theta X^* + \Delta Y$ is related to the observed model $Y = \theta X + \epsilon$ by

$$Y = \theta X^* + \Delta Y = \theta X - \theta \Delta X + \Delta Y = \theta X + \epsilon, \tag{4}$$

with $\epsilon = -\theta \Delta X^* \Delta Y$ being correlated with X, which prompts the need for instrumental variables regression (Schennach, 2007).

Moreover, identification problems might occur if more than one theory is consistent with the same data. Theories are then said to be observationally equivalent and the structure is said to be unidentified (Greene, 2003; Hsiao, 1983). We deal with the problems of endogeneity and identification by generating an independent local government performance measure. Further, due to the identification problem we use an instrumental variables estimation instrumenting the explanatory variables that concern a problem with values from the previous year. Therewith we try to solve the identification problem by using time-lags, yielding a forecast of the received temporally changes.

Apart from the presumed independent local government performance measure we use a general Durbin-Wu-Hausman test to test for endogeneity[7]. Because there is still evidence for endogeneity problems to occur for two of the explanatory variables we estimate an instrumented variable regression model, instrumenting the relevant variables with values from the previous year.

3.2.2 Panel-Data Approach

The original specification of the linear model for panel data is given in eq:5, with y the dependent variable, X the explanatory variables, Z the unobserved person specific effects, β and α the related parameters and ϵ the error term.

$$y_{it} = X_{it}\beta + Z_i\alpha + \epsilon_{it} \tag{5}$$

[6]The estimation results of an ordinary least squares regression are listed in the appendix.

[7] This means a test for endogeneity in a regression estimated via instrumental variables. The null hypothesis for this states that an ordinary least squares (OLS) estimator of the same equation would yield consistent estimates, i.e. any endogeneity among the regressors would not have deleterious effects on OLS estimates. A rejection of the null hypothesis indicates that endogenous regressors' effects on the estimates are meaningful, and instrumental variables techniques are required (Baum et al., 2007).

Panel data models generally differentiate between fixed and random effects models. Random effects models assume exogeneity of all regressors and the random individual effects. Fixed effects models allow for endogeneity of all regressors and the individual effects (Greene, 2003). Following Hausman (1978) it is possible to test if the fixed effects or random effects model is more appropriate. The null hypothesis that the conditional mean of the disturbances given the regressors is zero is tested. In case it is rejected, a fixed effect estimator should be used. In case fixed effects methodologies are applied, these models do not use the cross-sectional information in the data; i.e. in case the panel consists of individual information at different moments, the differences between two different individuals are not recognized, but only the variation within individuals. Therefore, the variables are transformed into deviations of individual means. In case of a time invariant variable there is no within variation and the variable will be dropped in the fixed effect model.

Hausman and Taylor (1981) criticize the "all or nothing" choice of correlation between the individual effects and the regressors of fixed and random effects models and propose a differing model, allowing some of the regressors to be correlated with the individuals effects (eq:6).

$$y_{it} = X_{it}\beta + Z_i\gamma + \mu_i + \nu_{it} \tag{6}$$

In eq:6 Z_i are cross-sectional time-invariant variables. X and Z are splitted into two sets of variables, with $X = [X_1; X_2]$ and $Z = [Z_1; Z_2]$. X_1 is $n \times k_1$, X_2 is $n \times k_2$, Z_1 is $n \times g_1$, Z_2 is $n \times g_2$ and $n = NT$. X_1 and Z_1 are assumed exogenous in that they are not correlated with μ_i and ν_i, and are time-varying. X_2 and Z_2 are endogenous because they are correlated with μ_i, but not with ν_i and are time-invariant (Baltagi, 2005).

With respect to the estimation setting in this study the voter turnout is a time-invariant variable. This means that for the years 2002-2005 each region has a constant value. Therefore we consider the Hausman-Taylor estimator (eq:6) to be more appropriate (Hausman and Taylor, 1981). Comparing the fixed effects, random effects and Hausman-Taylor estimator with a pretest developed by Baltagi et al. (2003), we gain evidence that the Hausman-Taylor model is adequate.

3.3 Data

The data used for empirical analysis is cross-sectional data for the years 2002-2005; regarding the panel-data structure a balanced panel is available. As dependent variable we use the government performance measures described in section 3.1. The explanatory variables are selected in accordance to Putnam et al. (1993). Because we were convinced that an omission would cause an endogeneity bias of omitted variables we recognized some socio-economic components: the average income (Inc), the unemployment rate (Unempl), the education level (Educ), the share of population in working age (Workage), the number of married couples per population (Married), the club memberships per population (Member), the voter turnout of the year 2002 (Voter), the administrative units per population (Adm) and the outmigration-rate (Outmig).

The variables 'Inc', 'Unempl' and 'Educ' are recognized as socio-economic characteristics of a region. The variables 'Married', 'Member', 'Voter', 'Adm' and 'Outmig' are chosen as social capital indicators. The variable 'Workage' can be assigned to both groups of variables, i.e. besides the obvious socio-economic character it is also

conceivable that the civic-awareness and network-embedding is represented by a high share of working-age population.

In PUTNAM et al. (1993) the participation in voluntary organizations is used as proxy for measuring social capital. We therefore include the club memberships per population (Member) in our estimations. Besides the social involvement, the political participation of the citizens is outlined by Putnam. Following PUTNAM et al. (1993) a low voter turnout (Voter) represents a low political participation and is therefore negatively linked with the government performance. The recognition of the density of councilors per population (Adm) is also in accordance with a probably higher political participation; a higher density of authorities might imply a higher access to authorities and therewith a higher political participation. The variable 'Married' is taken as a proxy of family. In PUTNAM et al. (1993) the family is not explicitly recognized in the estimations. But the general importance of family-ties as a form of bonding-social capital is well established in literature. In later studies (PUTNAM, 2000) Putnam also discusses the importance of family and classifies this form (i.e. bonding social capital) as the downside of social capital. The outmigration-rate (Outmig) represents the connectivity to the home region. A low outmigration-rate is presumed to have a positive effect on the civic awareness and consequently on the social capital endowment of a region.

In table 1 and 2 the descriptive statistics of different dependent and explanatory variables are given in accordance with the panel data structure.

Table 1: Dependent variables: definitions and descriptive statistics (2002-2005)

Variable	Variable Description		Mean	Std. Dev.	Min	Max
MI	Malmquist Index	overall	0.889	0.156	0.344	2.130
		between		0.096	0.532	1.304
		within		0.123	0.286	1.715
Effch	Change in technical efficiency	overall	1.033	0.182	0.462	2.303
		between		0.083	0.816	1.418
		within		0.162	0.375	1.952
Techch	Shift of the production frontier	overall	0.867	0.115	0.333	1.308
		between		0.074	0.577	1.006
		within		0.088	0.421	1.243
Govperf	Technical efficiency in public good production	overall	0.636	0.175	0.312	1.000
		between		0.161	0.350	1.000
		within		0.069	0.410	1.031

4 Results

4.1 Cross-Sectional Approach

First we estimate a pooled regression model to investigate determinants of the local government performance. Some of the variables have to be instrumented because endogeneity problems occur. This applies for the variables income and unemployment. Therefore, we estimate a pooled instrumental variables regression, instrumenting the variables 'Unempl' and 'Inc' with values from the previous year.

Table 2: Explanatory variables: definitions and descriptive statistics (2002-2005)

Variable	Variable Description		Mean	Std. Dev.	Min	Max
Vote	Voter turnout 2002	overall	0.441	0.079	0.270	0.736
		between		0.079	0.270	0.736
		within		0.000	0.441	0.441
Married	Married couples per population	overall	0.529	0.057	0.345	0.707
		between		0.048	0.412	0.649
		within		0.031	0.431	0.643
Inc	Average yearly income in	overall	1.426	0.274	0.904	3.156
	1000 Euro	between		0.273	0.994	3.104
		within		0.032	1.306	1.572
Unempl	Unemployment rate	overall	0.902	0.283	0.354	1.690
		between		0.277	0.370	1.632
		within		0.057	0.657	1.102
Adm	Councillors per population	overall	0.281	0.084	0.101	0.693
		between		0.085	0.104	0.691
		within		0.002	0.263	0.302
Member	Club memberships per population	overall	0.040	0.024	0.001	0.328
		between		0.022	0.009	0.245
		within		0.010	-0.112	0.123
Outmig	Outmigration per 1000 population	overall	0.194	0.103	0.034	0.730
		between		0.102	0.036	0.676
		within		0.013	0.116	0.286
Educ	Tertiary per primary educated	overall	9.784	12.878	0.000	73.000
	population	between		12.687	0.000	73.000
		within		2.282	-17.883	27.784
Workage	Share of population in working age	overall	0.616	0.025	0.543	0.696
		between		0.024	0.551	0.690
		within		0.006	0.604	0.627

The estimation results (table 3)[8] show at the one percent level statistically significant results for the variables 'Inc', 'Unempl', 'Vote', 'Educ', 'Outmig' and 'Member'. Further 'Workage' points out as a significant government performance determinant. The directions of the average income and the unemployment are plausible as a higher average income causes a higher level of government performance whereas a high unemployment rate has a decreasing effect on the performance level. An on average higher educated region has a significantly higher level of performance, i.e. human capital has an efficiency increasing effect.

With respect to the social capital components the density of club memberships ('Member') is to emphasize. In line with Putnam et al. (1993) we also find a significant positive influence of the social involvement and the government performance. The negative significant impact of the variable 'Outmig' is plausible as a high outmigration rate might represent a low social embeddedness of the citizens, a lower social capital, respectively. Contrary to the results of Putnam the voter turnout has a significant negative impact. This might be due to a reversed causality as a low

[8]The estimation results of an uncensored model are given in the appendix (table 6).

Table 3: Pooled instrumental variable tobit regression - dependent variable: government performance

	Coef.	Std. Err.	z	$P > \|z\|$
Inc	0.230***	0.051	4.550	0.000
Unemp	-0.161***	0.040	-4.070	0.000
Vote	-0.086**	0.034	-2.510	0.012
Married	0.020	0.033	0.590	0.553
Educ	0.120***	0.035	3.400	0.001
Outmig	-0.156***	0.035	-4.510	0.000
Member	0.149***	0.033	4.500	0.000
Workage	-0.104**	0.049	-2.100	0.036
Const	0.028	0.031	0.900	0.367

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

level of government performance might induce a high voter turnout and not vice versa.

4.2 Panel-Data Approach

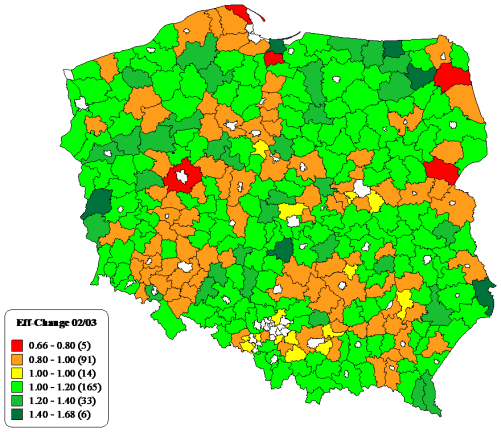
We calculated the Malmquist index, regarding the temporal change in efficiency from a year t to the following year $t+1$. In section 3.1 we mentioned that the Malmquist index can be divided in an effciency change and in a frontier shift whereas the shift in the best practice production frontier is an indication of technical change, and the technical efficiency change can be associated with learning by doing, improved managerial practices, and change in efficiency when using an existing technology. With respect to the government performance we will recognize the change in technical efficiency as well as the Malmquist index.

In figure 1 the change in the technical efficiency of local government performances is given. It is obvious, that the number of regions that improved their government performance is highest in case of the temporal change 2002/2003 and 2004/2005. In all years the average increase in government performance exceeds the change for the worse.

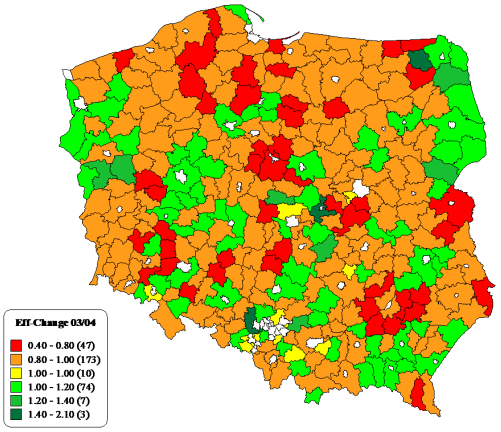
To choose between the random and fixed effects estimators we applied a Hausman test. It rejects the null hypothesis that the conditional mean of the disturbances given with the regressors is zero by probability of 0.019. Therefore, the fixed effects model seems to be more suitable than the random effects model. Because the voter turnout does not change over time, the voter turnout will be dropped in the estimation in case the fixed effects model is applied; i.e. the fixed effects model uses the average change of values of each region over time which becomes zero in case of the voter turnout. In the Hausman-Taylor model the voter turnout can be included as a time invariant version. Following the pretest for the Hausman-Taylor model by Baltagi et al. (2003) we come to the conclusion that the Hausman-Taylor estimator is more efficient than the fixed effect estimator. In the Hausman-Taylor regression we considered 'Vote' as time-invariant variable, 'Married', 'Membership', 'Educ', 'Workage', 'Outmig' and 'Adm' as time varying exogenous, 'Inc' and 'Unempl' as time varying endogenous. The exogenous time-varying regressors from other than the current periods are used as instruments.

The estimation of the Hausman-Taylor model provides mixed results (table 4). The socioeconomic components income and unemployment stand out as significant determinants of the change in local government performance. A high regional unemployment rate serves as impetus for local governments to perform more efficiently

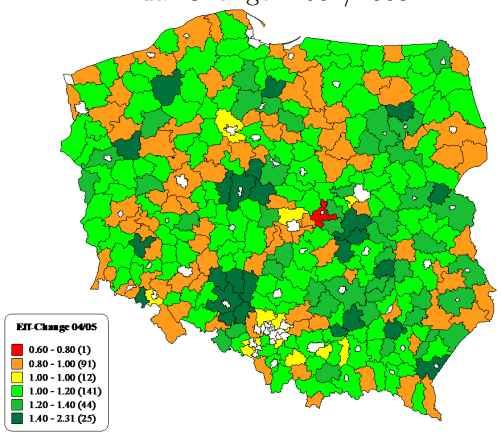
Figure 1: Government Performance: annual change



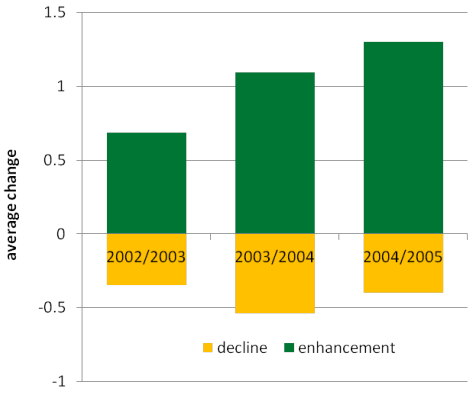
Annual Change: 2002/2003



Annual Change: 2003/2004



Annual Change: 2004/2005



Average Efficiency Change

over time. To the contrary, a high average income decreases the efficiency. The social capital variables 'Member' and 'Married' are statistically significant. Both have a government performance increasing effect. Because we used standardized variables in our estimation the relative impact of several variables can be directly deduced. The highest and negative impact results for the average income, whereas it can be nearly compensated by the positive impact of the unemployment rate. 'Workage' has a positive significant impact which is almost half of the unemployment effect.

One of the main criticisms with respect to Putnam was the use of cross-sectional information instead of the initial time-series design (Tarrow, 1996). We size this criticism and estimate a panel-data model. Two results are astonishing: First, the social capital component 'Member' stays positive and significant. Therefore Putnam would have drawn the same conclusions as he did without estimating a panel model. Second the directions of 'Inc' and 'Unempl' change in comparison to the cross-sectional setting. Various explanations are possible. It is feasible that the higher the average income, the lower the change in efficiency, which means diminishing marginal utility. Otherwise identification problems might occur, i.e. if more than one theory is consistent with the same data, then the theories are said to be observationally equivalent and the structure is said to be unidentified (Greene, 2003; Hsiao, 1983). This might also be an explanation for the changed direction of the voter turnout, even if it is insignificant. Because there is no way of distinguishing the theories in case they are observationally equivalent (Greene, 2003), we considered more intuitively and cannot declare to have found a solution of the problem. First, we are convinced that the time-lag structure in the estimation

Table 4: Hausman-Taylor panel-regression - dependent variable: efficiency change

	Coef.	Std. Err.	z	$P > \|z\|$
Married	0.242***	0.058	4.200	0.000
Adm	-0.274	0.218	-1.260	0.208
Outmig	-0.217	0.187	-1.160	0.246
Educ	0.151	0.094	1.600	0.109
Workage	0.391***	0.131	2.980	0.003
Member	0.186***	0.065	2.880	0.004
Inc	-0.981***	0.220	-4.450	0.000
Unempl	0.806***	0.218	3.690	0.000
Vote	0.059	0.103	0.580	0.564
cons	0.000	0.092	0.000	1.000

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

setting picks up something of the identification problem, i.e. the time-lags yield forecast of the received temporal changes. Second, we estimate a further Hausman-Taylor model, serving as a robustness check.

In table 5 the estimation results of a second Hausman-Taylor regression model are given, using the Malmquist index as explanatory variable instead of the efficiency change. This means that the technical progress, regress respectively, of the years is recognized as well. On the whole the results stay the same: the income is negative significant, the unemployment rate is positive significant and the membership variable remains positive significant. Conspicuous is the positive significant influence of the voter turnout. This means that if the frontier shift is recognized in addition to the change in efficiency the voter turnout has a government performance increasing effect over time, which is in line with the results given by Putnam et al. (1993).

Table 5: Hausman-Taylor panel-regression - dependent variable: Malmquist index

	Coef.	Std. Err.	z	$P > \|z\|$
Married	0.011	0.048	0.220	0.826
Adm	-0.238	0.156	-1.530	0.127
Outmig	0.031	0.147	0.210	0.835
Educ	0.094	0.065	1.440	0.151
Member	0.120**	0.049	2.440	0.015
Workage	0.355***	0.106	3.340	0.001
Inc	-0.568***	0.182	-3.130	0.002
Unempl	0.321*	0.192	1.670	0.095
Vote	0.109*	0.064	1.710	0.087
const	0.000	0.055	0.000	1.000

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

5 Conclusions

The purpose of this paper was to investigate the influence of social capital on local government performance. Moreover, in respect of Putnam et al. (1993) we investigated if social capital indicators derived by Putnam affect the performance of local governments positively. In the structural policy programs of the EU the importance of social capital to cause a better performing government has not been recognized so far. Therefore, we wanted to extend our knowledge as to whether social capital building activities should be more focused in a rural development perspective.

The approach and estimation setting chosen by PUTNAM et al. (1993) has been criticized frequently. The small number of investigated regions (20), the government performance measurement, inter-correlations of the explanatory variables, endogeneity problems and the use of cross-sectional information instead of the initial time-series design met with criticism. We took different approaches with respect to this criticism. First, we deduced a meaningful and independent government performance measure. Second, we applied a panel-data approach as well as a cross-sectional estimation setting. The explanatory components were chosen with regard to Putnam's investigation to ensure comparability. The database consists of 314 LAU 1 regions in Poland, the investigated time period are the years 2002-2005. Hence we took also into account the critical issue of an insufficient number of investigated regions.

Understanding local politics basically as the provision of public goods, we interpreted the government performance as the technical efficiency of local public good production. Using the DEA we estimated a government performance measure, calculating the Malmquist index we received a measurement of its temporal change as well. We considered endogeneity and identification problems to occur. Therefore we used an instrumental variables estimation, instrumenting the variables income and unemployment-rate that concern endogeneity with values from the previous year. Regarding the identification problem we tried to solve it by using time-lags, yielding a forecast of the received temporal changes. Regarding the panel-data structure we compared a fixed effects, a random effects and a Hausman-Taylor model. The last one proved most adequate. The voter turnout was included as a time-invariant variable.

The analysis proceeded in two steps. First we estimated a pooled cross-sectional instrumented variable regression model, using the technical efficiency values of several years as explanatory variables. Subsequently, the Hausman-Taylor regression was estimated, using first the change in technical efficiency and then the Malmquist index as dependent variables. The results can be summarized as follows. In line with PUTNAM et al. (1993) the membership variable is a positive significant determinant of the local government performance as well as of its temporal change. However, comparing the cross-sectional with the panel estimation contrary directions of the estimated parameters of the average income and the unemployment rate are conspicuous. A higher income affects the government performance level positively whereas the unemployment-rate has a decreasing effect. Over time it becomes obvious that the higher the income, the lower the change in efficiency (whereas for the unemployment rate it is the inverse case). On one hand this can be explained by diminishing marginal utility. On the other hand we discussed that identification problems occurred. The estimation of an additional Hausman-Taylor regression is therefore chosen as a robustness check and the time-lag structure as a forecast of the received temporal changes. Indeed, identification problems might still be apparent. Interestingly, by using the Malmquist index as independent variable the voter turnout becomes significant. In line with Putnam we found that the political participation has a positive effect on the change of local government performance, in case technical progress is recognized.

To sum up, this paper shows evidence of the importance of Putnam's social capital and the positive impact on local government performance. With respect to the significant impact of social capital on government performance as well as on its temporal change, we come to the conclusion that for future structural programs it might be profitable to focus on social capital building activities more than in the past.

Appendix

Robustness Checks

Table 6: Pooled instrumental variable regression - dependent variable: government performance

	Coef.	Std. Err.	z	$P > \|z\|$
Inc	0.211 ***	0.046	4.600	0.000
Unemp	-0.157***	0.037	-4.260	0.000
Vote	-0.083***	0.032	-2.590	0.009
Married	0.015	0.032	0.480	0.632
Educ	0.108***	0.032	3.340	0.001
Workage	-0.106**	0.044	-2.400	0.016
Outmig	-0.154***	0.033	-4.730	0.000
Member	0.139***	0.031	4.490	0.000
cons	0.000	0.029	0.000	1.000

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$*

Table 7: Hausman-Taylor panel-regression[a] - dependent variable: efficiency change

	Coef.	Std. Err.	z	$P > \|z\|$
Married	0.210***	0.060	3.510	0.000
Adm	-0.437*	0.242	-1.800	0.071
Outmig	-0.096	0.188	-0.510	0.611
Educ	0.269**	0.105	2.550	0.011
Member	0.258***	0.063	4.110	0.000
Inc	-1.195***	0.286	-4.180	0.000
Unempl	0.617***	0.192	3.220	0.001
Vote	-0.099	0.101	-0.980	0.326
cons	0.000	0.092	0.000	1.000

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$*

[a]: without 'Workage'

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