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– Is there a single underlying explanation?

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Abstract:
Social capital has not been measured in any general way yet as previous surveys have used their own ad hoc methodologies. This fact is due to the heterogeneity of the very definition of social capital. Therefore, consensus concerning measurement has not yet been reached. Based on ten existing empirical approaches at the macro, meso and micro level, we inductively identify the four main variables observed this far. By applying principal components analysis, we show that four indicators measuring elements of social capital at the micro, meso and macro levels all powerfully load onto one single underlying component. However, the results from the analyses also show that Putnam's Instrument is the variable that has the weakest association with the unitary measure of social capital and may constitute a second component.

1. Introduction

The concept of social capital has in recent years been associated with a number of features central to public policy making. Referring to relatively elusive features such as "trust, norms and networks" (Putnam, 1993), it has been shown to be a causal factor of e.g. corruption (Uslaner, 2001; Bjørnskov, 2003b), economic growth (Whiteley, 2000; Zak and Knack, 2001) and good government (la Porta, Lopez-de-Silanes, Schleifer and Vishny, 1998; Knack, 2002). Social capital can alternatively also be defined as the ability of people to work together for common purposes in groups and organizations (Coleman, 1988, 95). As such, the presence of social capital determines how easily transaction costs are lowered because informal self-enforcement of contracts is now possible without third party enforcement. Having social capital can thus help alleviate Prisoner's Dilemma-like situations and in this way, social capital becomes "the glue that holds societies together", lubricating voluntary collective action, increasing income and accordingly serving as an additional production factor. Nevertheless, it has not been measured in any satisfactory way yet, but has been addressed in various ad hoc ways (see Paldam (2000), Paldam and Svendsen (2000) and Hjøllund and Svendsen (2000) for literature surveys). This shortcoming thus poses a serious problem when conceiving and evaluating public policy that takes the social capital dimension into account.

Dasgupta (1999) describes the sociological and economical background for the use and interpretation of social capital while Paldam (2000) introduces "the social capital dream": the wish that there exists an underlying rock upon which all the various definitions of the concept rest. If this is the case, the concept of social capital will be robust to variation in definition and thereby be a very useful tool for explaining a number of problems in the social sciences. Our ambition in this paper is therefore to trace whether there can be said to be one underlying factor for social capital when dealing with a number of proxies. If a standardized methodology for measuring social capital can be developed, it will open the door to a whole range of new research approaches. For example, it will be a most useful tool for such tasks recently addressed such as performing comparative studies, measuring the effect on economic growth (Knack and Keefer, 1997; Whiteley, 2000; Zak and Knack, 2001), and measuring welfare such as happiness (Helliwell, 2001; Frey and Stutzer, 2002; Bjørnskov, 2003a). Moreover, it will be a most useful concept in facilitating communication between all social sciences which, one way or another, have addressed the same underlying rock where "everything might be shades of and approaches to the very same basic phenomenon" (Paldam, 2000, 641).

Studies of social capital have been conducted mainly in developing countries at the micro level, and in the United States. The studies that have included other developed countries are mainly cross-national studies using a single measure, for instance that of generalized trust, that examine the correlation with growth rates, i.e. at the macro level. However, as noted by Brehm and Rahn (1997), "social capital is an aggregate concept that has its basis in individual behavior, attitudes, and predisposition." Thus, there is a gap between purely micro level and case studies of social capital on one side, and the (too) simple macro economic studies on the other since its features are not directly observable (Hjøllund and Svendsen, 2000). As a consequence, a substantial part of the research effort has gone into examining how to conceptualise and measure features of social capital. Grootaert (1998) summarizes some of the early efforts and lists a large number of potential indicators, which can be divided into two strands: horizontal and vertical social capital. Other authors such as Narayan and Pritchett (1999) argue that the literature on social capital can be separated into three streams: the first one that is concerned with country level politics (including the growth aspect), whereas the second focuses on the meso-level (efficacy of institutions). Finally the third part of the literature considers social capital as a solution to market failures at the micro level. Regarding the question of measurement, this distinction does not tend to cause any major problems, as various

authors seem to agree upon this three level distinction. At the micro level, social capital consists of networks and norms that govern the interactions among individuals, households and communities. At the meso level and the macro level, the functioning of institutions, rule of law and government, makes up social capital. All three levels are subject to the influence of public policy.

Rose (1999) provides an interesting alternative approach. He considers the theoretical approaches to analysing social capital, and separates them, and their empirical treatment of the concept, into three alternative categories. The first category he labels "situational theories", in which social capital is defined in situational and instrumental terms, i.e. it varies from person to person and from situation to situation. This, again, implies that social capital cannot be reduced to a single unit of account and then aggregated into a summary statistic characterizing the whole of society. This category was introduced by Coleman (1990). The second category is named "social psychological approaches" and maintains that social capital is a set of cultural beliefs and norms. Supporters of this approach argue that voluntary organizations emerge as a consequence of trust, rather than the reverse, i.e. social capital is in essence equal to trust. Social capital varies from person to person but is situationally consistent (or invariable); among others, this approach is represented by Inglehart (1997) and Uslaner (2002).

Finally, in the third category, "culture theories", culture is considered to be the source of trust and cooperation. Social capital is homogeneous among individuals belonging to the same culture (society), as well as consistent from situation to situation. This implies that it should be very simple to identify social capital for a specific culture, for instance a country (Fukuyama, 1995).

Thus, economists, sociologists and political scientists differ in their approach to the theoretical explanation (and therefore empirical treatment) of social capital, which is the typical case when dealing with the new and multifaceted concept of social capital. It also inevitably means that it will form a big challenge to not only operationalise but also to standardize the concept and test the "social capital dream" in Paldam's terminology. Our contribution is therefore to identify a general way of measuring social capital based on existing theoretical and empirical studies. After surveying a number of already existing methodological approaches in Section 2, Section 3 turns to measurement and principal component analysis. Finally, Section 4 summarizes the results and briefly relates them to issues in public policy.

2. Previous studies

A single underlying factor for social capital has not yet been identified to our knowledge. This gap in literature and ideas for

developing an appropriate social capital model based on the empirical patterns observed in reality this far may be identified by overlooking ten empirical approaches undertaken so far. We categorise these approaches according to micro, meso and macro level.

Firstly, Narayan and Pritchett (1999) have done pioneering work in a study measuring social capital at the micro and meso level in rural Tanzania. They conduct a household survey (of 1376 households in 87 clusters) to examine the link between social capital and village-level economic outcome. They ask questions about the households' memberships in groups, the characteristics of these groups, and individuals' values and attitudes (particularly their definition of and expressed level of trust). Thus, they use both of the two most commonly used indicators, namely membership of voluntary organizations and trust, in a combined quantitative measure of social capital.

Secondly, Krishna and Uphoff (1999) similarly focus on generalised trust and the density of voluntary organizations as the main indicators of social capital. They demonstrate, in a watershed development programme in India, that such measurement is positively related with economic performance. They start out with constructing an index of development orientated collective action,

and test this against alternative hypotheses that might explain the collective actions, thus testing the validity of this measure. Following this, they construct a social capital index from six variables (interview questions) - three structural and three cognitive - using factor analysis. And this index is positively and significantly related with the index of development orientated collective action (ibid; Hjøllund and Svendsen, 2000). It should be noted that Narayan and Cassidy (2001) uses a similar methodology in Western Africa with comparable results. Moreover, Krishna and Uphoff (1999) defend an ad hoc approach to measuring social capital, as they state that indicators of social capital need to correspond with the pattern of life in this largely agrarian setting. The data for the study are based on household surveys of 2397 individuals and included questions related to a large number of what they considered as locally relevant activities. Afterwards, the questions for which more than 80 percent of the respondents indicated that this was considered an individualistic activity were excluded. Finally, Krishna and Uphoff approach their estimations and inferences critically by testing their specifications against alternative explanations in order to be able to eliminate irrelevant (though initially included) variables. This ensures validity of the measures and invokes a high degree of confidence in the results (Hjøllund and Svendsen, 2000).

Thirdly, Whiteley (2000) incorporates a micro measure of social capital as an explanatory variable into an endogenous growth model. The measure is constructed by a principal components analysis of three trust variables from the third wave of the World Value Survey. Along with several other explanatory variables (e.g. investments, education etc.) Whiteley regresses GDP per capita in a sample of 34 countries (for the period 1970-92). Because economic variables (including the explained variable) precede the social capital measure (one of the explanatory variables) in time, this could give rise to a discussion of the causality between social capital and economic performance. Whiteley is aware of this and therefore performs a test for it. By including older (less extensive) indicators for the measure of trust from 1981 in a regression using economic time series from 1981-92, he obtains similar results.

Fourthly, Brehm and Rahn (1997) specify a structural model of social capital, consisting of the interaction between three concepts, namely civic engagement (Putnam's Instrument), interpersonal trust, and confidence in the government, whereby they emphasize the existence of an endogenous (and dynamic) property of the concept of social capital. Using data from the General Social Survey from 1972 to 1994, they estimate their model in a pooled cross-sectional analysis combining latent variables (civic engagement, interpersonal trust, and confidence in government) for

the key concepts and exogenous variables, all measured at an individual level. More specifically they estimate the model using a covariance structure analysis, which means using the correlation matrix as input. One of the implications (and advantages) of this approach is that missing data are deleted pair-wise rather than list-wise which reduces the possibility of biases.[i] First, they estimate measurement models for each of the three endogenous (or latent) variables, using factor analysis on exogenous explanatory variables. Second, they estimate the structural model using the three latent variables and some structural components. Brehm and Rahn obtain results that show that civic engagement and interpersonal trust are in a tight reciprocal relationship, where the connection is stronger from participation to interpersonal trust, rather than the reverse.[ii]

Fifthly, Rose (1999) defines social capital as the stock of formal or informal social networks that individuals use to produce or allocate goods and services at the micro level. Accordingly, his purpose is to identify the extent of formal and informal networks as well as the interaction between these two network categories. Finally, he emphasizes the lack of valid empirical indicators of social capital, even in the data-rich OECD countries. Rose does not undertake any econometric analysis of the data he has collected on Russian social relations. He simply reports the marginal distribution of the

answers for the various questions, and from there he draws his conclusions. However, he does present a rather thorough and very important discussion of his considerations on formulating and selecting the appropriate questions. Rose claims that the investigated situations should be relevant to a majority of households regardless of economic status etc. and it should be situations in which formal organizations would be expected to deliver the goods or services. Finally, in every question focus should be on a particular good or service, and it should be left open whether the respondent relies on a formal organization or an informal organization to produce the good/service. With regards to the choice of method, this study has an interesting point (particularly relevant to our studies) of the existence of informal networks – working against (or instead of) the constituted formal networks in "anti-modern" (Rose's concept) societies, such as Russia. Ideally, one should correct any measure of social capital for these societies with an indicator of this "negative" social capital that happens to be detrimental to economic growth (Hjøllund and Svendsen, 2000).

Sixthly, as argued by Uslaner (2001), the level of corruption in a society may affect the level of social capital at the meso level. In the absence of corruption, we may expect a higher level of social capital and hence more economic growth because a low level of

corruption implies strong enforcement of contracts thereby encouraging the voluntary building of trust among trading parties (Paldam and Svendsen, 2001). To paraphrase Søren Kierkegaard, the 'leap of faith' involved in any transaction becomes shorter and hence more likely when strong and credible institutions are able to punish those who abuse one's confidence. However, causality may run both ways. Uslaner (2001) and Bjørnskov (2003b), both using generalized trust as proxy for social capital, find that the influence of trust on corruption is substantially stronger than the reverse causal link. For example, trust makes people more willing to engage in transactions with more diverse people that in turn create increased competition for any corrupt practices. Generalized trust is also used as the proxy for social capital in research that establishes the causal effect of social capital on economic growth (Zak and Knack, 2001; Beugelsdijk, de Groot and van Schaik, 2002).

Seventhly, Putnam (1993) introduced a simple measure of social capital at the meso level in an analysis of the differences in institutional efficiency and its influence on economic development between North and South Italy. Putnam found that to a large extent this could be explained by historically determined differences in the density of voluntary organizations. This basic and easily accessible measure has been a point of departure for many of the social capital analyses since then, and is almost always included as

one of the explanatory factors (see Paldam (2000) who categorizes the measure as a member of the "trust family" and Hjøllund and Svendsen, 2000 concerning identification of different social capital measurement approaches).

Eighthly, in the context of theories of household economics in developing countries, it is becoming common to consider social capital as a production factor, similar to human or physical capital.[iii] A representative of this group of studies is Grootaert (1999) who analyses the link between social capital and household welfare and poverty in Indonesia by undertaking a multivariate analysis of the role of voluntary organisations at the meso level in affecting household welfare and poverty outcomes and in determining access to services. The data are generated by 1200 household interviews mapping the different levels of society (household, community, and district), and interviewing respondents from identified focus groups.[iv] Grootaert investigates six dimensions of social capital all dealing with voluntary organizations as represented by local associations, namely the density of associations, the internal heterogeneity, frequency of meeting attendance, members' effective participation in decision making, payment of dues, and the community orientation of associations. From the values of these six variables, he constructs a social capital index, which turns out to be positively related to

household welfare – measured by indicators of expenditure per capita, assets, access to credit, savings, school attendance, etc.[v] Using instrument variables, Grootaert (1999) tests that the causality goes from social capital to income, and not the other way round. This result is robust to several sets of instruments. Finally, he compares the impact of household memberships in local associations with the impact of human capital on household welfare. He finds that at low incomes, the returns to social capital are higher than returns to human capital. At higher incomes, the reverse is true. In a similar study in Bolivia, however, Grootaert (2001) finds that the two types of capital contribute with equal amounts to income.

Ninthly, measures of economic freedom can be used as macro proxies for social capital. An economic freedom index addresses the economic policies implemented by the government and the more centralised power is in the hands of bureaucrats, the more they can exert monopoly power when granting permissions for different activities. Such power centralisation will therefore distort economic freedom and beneficial macroeconomic policies thus lowering the general trust towards any macro economic institutions in that society (see Svendsen, 2003). Consequently, the annual World Bank report (WDR, 1996, 94) states that government credibility is low in Russia and Eastern Europe in general.

Similarly, Rose and Mishler's (1998) battery of questions about trust in macro institutions of Russian society indicated that most Russians distrust every major institution, especially representative institutions of governance.

Tenthly, the level of decentralisation could influence the level of social capital by creating more corruption and influencing institutional quality negatively. Paldam and Svendsen (2001; 2004) compare former communist societies in Eastern Europe with capitalist democracies in Western Europe. They argue that heavy power centralisation during communism may explain why the general level of social capital here is roughly half of the level found in Western Europe when using trust proxies in a detailed questionnaire. Heavy state intervention in such centrally planned economies meant that the state made almost all decisions and coerced people into doing certain things, thereby presumably eliminating entrepreneurship, experiments and voluntary organisation into social groups. As a consequence, during the purges people learned to trust nobody, and to restrict all activities to the (relatively) safe task of obeying orders (Paldam and Svendsen, 2001), an argument elaborated empirically by Bjørnskov and Svendsen (2003).

3. Data and measurement

The review of empirical studies in Section 2, summarized in Table 1, suggests that social capital measures at three levels can be compressed into four dominant operational features.

INSERT TABLE 1 ABOUT HERE

First, the micro-level factor of generalised trust may be used as a proxy for social capital as it is the percentage of a population answering confirmatory to the question "do you think that most people can be trusted, or can't you be too careful?" i.e. it can be said to measure the normal trust radius of a population. As such, it is an inclusive, horizontal measure of social capital. We do not attempt to incorporate networks in this factor due to the risk of incorporating negative social capital as argued by Rose (1999) above. Furthermore, networks are not easy to measure in practice (Putnam, 2001) while trust has documented beneficial consequences (Whiteley, 2000; Bjørnskov, 2003b).

Second, including Putnam's Instrument as another proxy for social capital at the meso level in the analyses below provides a more exclusive and less horizontal measure also addressing civic participation. The Instrument measures the density of voluntary organizations in a given country as the number of organizations in which an average citizen participates; i.e. it provides a measure of

individual network density. The 16 different organizations to choose from in the questionnaire upon which the measure is based have various degrees of inclusiveness and formality. Some of these organisations can hardly even be said to constitute a horizontal and informal element of social capital, as e.g. labour unions and religious associations tend to be strictly hierarchically organised in many societies while others may have exclusive member requirements. These data on trust and Putnam's Instrument are both drawn from the third wave of the World Values Survey (Inglehart, Basañez and Moreno, 1998) combined with more recent data from the European Values Study (van Schaik, 2002).

Third, corruption has been used as an indirect measure of social capital at the meso and the macro level too. Corruption cannot be said to be wholly horizontal, but not whole vertical either, as it captures illegal asymmetric, horizontal social relations that enable people to extract gains from vertical relations with formal institutions. Also, a non-corrupt institutional set-up will increase citizens' trust in institutions thus capturing a macro aspect of trust in government. Furthermore, it should be noted that Uslaner (2001) and Bjørnskov (2003) document that generalised trust is a strong causal factor of corruption. We use the Corruption Perceptions Index, which is measured as the level of corruption at national level in 2000 (Transparency International, 2001). The data are generated

on the basis of interviews with business people, risk analysts and the general public in 89 different countries concerning their perceptions of the degree of corruption. The index is thus based on subjective perceptions (how people think it is), which do not necessarily show how the situation really is. The score ranges between 10 (highly clean) and 0 (highly corrupt), i.e. high scores mean low corruption and low scores mean high corruption; as such the index is really an index of perceived honesty, as low values show corruption and high values show honesty.

Fourthly, at the macro level, Freedom House publishes an annual assessment of economic freedom in the world by assigning each country and territory a status of *free*, *partly free*, or *not free* by averaging overall ratings on political rights and civil liberties obtained from raw scores on a wide range of issues and represented in a discrete index between one and seven. The Freedom House (2002) measure of civil liberties is included as a vertical element of social capital, as it provides a much-used measure of the quality of formal national institutions, i.e. a potential vertical element of social capital as proposed by Grootaert (1998). Norris (2001) reports that the civil liberties index is significantly associated with other social capital measures. The measure contains information on e.g. the extent of freedom of speech and organization, and may as such be a necessary precondition for forming the type of

organization measured in Putnam's Instrument. In addition, bad institutions, i.e. those with discretionary power to arbitrary punishment, have been argued to play a central role in the decline of interpersonal trust during the communist era in Eastern Europe (Paldam and Svendsen, 2001; Rothstein and Stolle, 2002).

By relying on these four indicators, the paper thus attempts to capture a broad element of national social capital more precisely by including proxies with various degrees of horizontality / verticality and formality / informality. We thereby aim at constructing a social capital measure that is more or less free from imposing structural constraints on the way social capital works in different countries. The choice of these indicators is motivated by the fact that numerous studies have shown them to be significantly related to e.g. economic growth, although not all under the heading of social capital. Whiteley (2000) and Zak and Knack (2001) show the effect of trust, Beugelsdijk, et al. (2002) find a causal effect of Putnam's Instrument; Mauro (1995) show the connection between corruption and economic growth, and Kormendi and Meguire (1985) and Farr, Lord and Wolfenbarger (1998) show how civil liberties is conducive to growth. Other cases include Culpepper (2000) who analyses a French case where institutional cooperation between state and employer's organisations is crucial when implementing public policy, and Frey and Stutzer (2002) and Bjørnskov (2003)

who shows a positive association between social capital and happiness. As all are included in parsimonious definitions of the social capital concept and seem to have comparable effects on growth, it thus seems natural to hypothesize that they are all indicators of the same feature.

By employing factor analysis, we aim to reduce these explanatory variables into one or a few variables. This could be an obvious way of obtaining a simpler measure of social capital and test whether the measures are indeed shades of the same basic phenomenon. We therefore move on to discuss the methodology of factor analysis, more specifically principal component analysis (PCA), which can be used to analyse the data. Factor analysis is a commonly used tool for constructing measurement indices, and although it is a rather disputed method, we find that for this purpose it is very well suited.

The notion of factor analysis is a common description of several different methods, of which principal components analysis (PCA) is a specific method for simplifying data by means of an approximate description. This approach is considered explorative as opposed to common factor analysis, which constitutes a confirmatory approach. This point is relevant to our considerations of methodological choice, since we intend to investigate data in

order to determine whether any underlying explanations / relations exist. The PCA is the relevant choice for this and we will therefore focus on this specific method here.

All the various theories of factor analysis including PCA rest on the explanation of correlation between two (or more) variables to be that of "measuring the same thing" – as opposed to explaining each other, for example. More specifically, the principal component theory is based on the multiple correlation principle and seeks to explain the variance of the independent variables. This is done by the identification of one or a limited number of indices (denoted scores) constructed from weighted combinations of the independent variables. The simple correlations between our four variables are shown in Table 2, which also reports partial correlations when controlling for economic development.

INSERT TABLE 2 ABOUT HERE

The table shows the relatively high correlations between the chosen variables, but also reveals a potential problem, as Putnam's instrument is uncorrelated with any of the other variables once economic development has been controlled for. This could be interpreted as being in line with Whiteley (2000) who claims that the popular definition by Putnam (1993) confuses two features of

the concept. He views the concept as consisting of both psychological phenomena such as norms and trust, and behavioural traits such as networking. As Putnam's Instrument is conceived as a measure of the latter, the problems in Table 2 may be unsurprising. However, laying these problems aside for a moment, we first perform a PCA with all four variables to test the hypothesis that social capital is a unitary concept, i.e. that all proxies can be said to rest on a common bedrock of meaning. If this is so, the measurement problem can be reduced to simply using one of the above variables or a combination of two or more of them. If not, the results from using different proxies imply different interpretations and thus also different prescriptions for public policy that depends on social capital.

Table 3 lends considerable support for the hypothesis that social capital at the national level can be treated as a one-dimensional concept by documenting (in column 1) that all four proxies of social capital load very powerfully onto one underlying principal component extracted from the data. Furthermore, the table also suggests that excluding one of the four variables from the PCA should be considered acceptable, as the components extracted in columns 2-5 exhibit very similar factor loadings. This can also be seen in Table 4, which shows that the correlations between the components in columns 1-5 using different combinations of three

variables are extremely high.[vi] In these cases, the Kaiser-Meyer Olkin (KMO) measure of sampling adequacy is sufficient whereas it is somewhat lower when only including two variables. The percentage of the variation in the data explained by the common component is between 67 and 75 percent, which is also satisfactory. Including only two variables in general exhibits substantially lower cross-measure correlations (in columns 6-11 and in some cases also creates some problems of sampling adequacy.

INSERT TABLE 3 ABOUT HERE

INSERT TABLE 4 ABOUT HERE

The tables thus lends considerable support for the one-dimensionality hypothesis and as such, the measurement problem and policy recommendations only boils down to having adequate data on at least one of the many potential social capital proxies. We nevertheless perform an intuitive test to be sure that the common underlying component is not an effect of omitting a variable, since the simple correlations in Table 2 suggests that economic development measured as income per capita could induce an omitted variable bias in our PCA. We therefore run simple regressions with per capita income in a linear and a squared term on the right hand side and any of the four variables on the left hand

side. Doing this, we take out most of the variation in the scores attributable to economic development. We thereafter run the PCA with the residuals from these regressions, which can be seen as the variation capturing a core of the variables free from any effects of economic development, i.e. the residuals are measures of an entirely *social* capital. This is an extreme test of the one-dimensionality hypothesis, as income also proxies for a plethora of other features, but it addresses any potential omitted variable bias arising from e.g. the fact that the variables in principle could have nothing else in common but their association to income. The results are shown in Table 5.

INSERT TABLE 5 ABOUT HERE

As the table shows, the one-dimensionality hypothesis fails the test. Although the PCA only exhibits one eigenvalue above unity, the second component has an eigenvalue so close to one that we cannot discard of it. Furthermore, it also explains an additional 25 percent of the variation in the data. The test thus reveals much the same feature that the partial correlations in Table 2 do: Putnam's Instrument may only be spuriously related to the remaining indicators, as the simple correlations and results of the analyses in Table 3 may simply be effects of omitting economic development.[vii] The conclusion deriving from a PCA with the raw

proxies that the social capital concept refers to one and only one underlying feature of society need not be final.

As a consequence, the many studies connecting social capital to the efficiency and constraints to public policy must be viewed more sceptically, as it need not be trivial which proxy is used. We therefore may need to divide the social capital concept into two dimensions where one dimension (component 1 in Table 5) refers to honesty and trust in both fellow citizens and institutions, and another dimension (component 2) refers to civic participation. The former thus includes generalised trust, civil liberties and corruption while the latter consists of Putnam's Instrument. Another appealing way to view this division congruent with Whiteley's and Uslaner's critique of Putnam's definition could be to view the first dimension as a manifestation of psychological and moral phenomena (trust and honesty) and the second dimension as a "behavioural relationship between individuals, moulded by the institutions in which they live" Whiteley (2000, 447). Both dimensions can obviously be influenced by public policy making the conceptual division the more relevant.

4. Conclusion

A number of recent studies have connected public policy problems and social capital. Social capital is becoming a buzzword in the

policy debates around the world, but this should not discourage the development of a more precise and detailed understanding of it; hence this paper. Our main question concerns how to measure the level of social capital within a country, which may not be trivial. Generally speaking, each survey has used its own ad hoc method of measurement, which again could be partly explained by the heterogeneity of the very definition of the concept of social capital. Thus, a gap in the literature exists as no general method of measurement has been established yet. It is nevertheless necessary to know whether one measure is as good as another, or if they in reality measure disparate phenomena.

We have in this paper taken a tentative step towards filling this gap. By applying principal components analysis, we show that four popular indicators measuring elements of social capital at the micro, meso and macro levels all load powerfully onto a single underlying component. We hence show that at the national level, it may make sense to talk about 'social capital' as a unitary concept. This could be a useful insight for future research efforts on the effects of social capital and in particular the role of public policy in building social capital. However, the results from the PCA also show that Putnam's Instrument is the variable that has the weakest association with the unitary measure of social capital. We therefore test whether this is due to omitted variable bias by purging the

proxies for effects of economic development. Our test shows that this may indeed be so, but this result should be interpreted tentatively, as the test is admittedly very strong. It may nevertheless show some support for Whiteley's (2000) claim that the concept covers two different phenomena.

Overall, our results thus indicate that it makes sense to treat social capital as a one-dimensional concept. However, one should be extremely careful when interpreting empirical results from using different measures. This insight has special consequences for public policy, namely that specific policies could influence an attitudinal dimension of social capital, but not a behavioural dimension, and vice versa. For example, the behavioural dimension probably influences cooperation between formal institutions and stakeholders while combating corruption has been shown to depend on proxies relating to the attitudinal dimension. In other words, one should be careful to design public policy manipulating national social capital such that it influences trust and honesty or civic participation in the desired direction, and not just includes the buzzword 'social capital'.

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Table 1. Social capital measures at the micro, meso and macro level.

Authors	Micro	Meso	Macro
1. Narayan and Pritchett (1999)	Generalised trust	Voluntary organisations	
2. Krishna and Uphoff (1999)	Generalised trust	Voluntary organisations	
3. Whiteley (2000)	Trust factor		
4. Brehm and Rahn (1997)	Generalised trust	Civic participation	Trust in government
5. Rose (1999)	Network		Trust in government
6. Uslaner (2001)		Corruption	Corruption
7. Putnam (1993)		Voluntary organisations	
8. Grootaert (1999)		Voluntary organisations	
9. World Bank (1996)			Economic freedom
10. Paldam and Svendsen (2002)			Decentralisation

Table 2. Simple and partial correlations

	Generalized trust	Putnam's Instrument	Corruption	Civil liberties	Income
Generalized trust	1.00	0.480** (0.135)	0.685** (0.522**)	-0.462** (-0.224)	0.542**
Putnam's Instrument		1.00	0.494** (0.135)	-0.372* (-0.068)	0.509**
Corruption			1.00	-0.690** (-0.478**)	0.870**
Civil liberties				1.00	-0.687**

Note: figures in parentheses are partial correlations with GNI per capita as control variable; ** denotes significance at the 5 % level (* at 10 %).

Table 3. Principal components

	1	2	3	4	5	6	7	8	9	10	11
Generalised trust	0.870	0.823		0.899	0.859	0.860	0.918	0.855			
Putnam's Instrument	0.693		0.722	0.750	0.759	0.860			0.828	0.864	
Civil liberties	-0.838	-0.837	-0.850		-0.831			-0.855	-0.828		-0.919
Corruption	0.930	0.931	0.900	0.913			0.918			0.864	0.919
Observations	32	46	34	32	32	32	46	46	34	34	105
Percent explained	70.1	74.9	68.5	73.5	66.8	74.0	84.3	73.1	68.6	74.7	84.5

Table 4. Correlations between components

	1	2	3	4	5	6	7	8	9	10	11
1	1.00	0.977	0.978	0.976	0.983	0.909	0.949	0.954	0.893	0.929	0.953
2		1.00	0.924	0.943	0.936	0.834	0.955	0.971	0.782	0.845	0.961
3			1.00	0.945	0.962	0.881	0.875	0.879	0.949	0.938	0.952
4				1.00	0.959	0.959	0.957	0.912	0.861	0.953	0.888
5					1.00	0.940	0.901	0.943	0.933	0.921	0.894
6						1.00	0.859	0.838	0.881	0.932	0.744
7							1.00	0.911	0.714	0.837	0.861
8								1.00	0.771	0.784	0.899
9									1.00	0.895	0.828
10										1.00	0.824
11											1.00
Generalised trust	0.870	0.823	0.751	0.899	0.859	0.860	0.918	0.855	0.628	0.727	0.636
Putnam's Instrument	0.693	0.529	0.722	0.750	0.759	0.860	0.526	0.508	0.828	0.864	0.479
Civil liberties	-0.838	-0.837	-0.850	-0.699	-0.831	-0.593	-0.639	-0.855	-0.828	-0.619	-0.919
Corruption	0.930	0.931	0.900	0.913	0.848	0.761	0.918	0.817	0.719	0.864	0.919
Income	0.829	0.792	0.809	0.816	0.800	0.743	0.754	0.700	0.702	0.769	0.842

Note: all correlations are significant at the 1 % level.

Table 5. Principal components without income effects

Residual of:	Component 1	Component 2
Corruption	0.875	0.148
Civil liberties	-0.672	0.176
Putnam's Instrument	0.064	0.954
Generalised trust	0.699	0.252
Eigenvalue	1.79	0.95
Percentage explained	68.2	

Note: components have been Varimax rotated.

Footnotes

[i] A list-wise deletion of missing data would favour the respondents who answer all questions, and therefore are most likely to be the most involved citizens.

[ii] This view has since been challenged by Claibourn and Martin (2000) who find evidence that the apparent reciprocal relationship between social capital and civic engagement is a symptom of a selection mechanism at work, and hence not in any sense real.

[iii] Interpreting the concept as "capital" basically means that it is a stock that yields a flow.

[iv] This method of categorizing is similar to the one recommended by Krishna and Shrader (1999).

[v] Grootaert claims, that using the additive index of the number of memberships and the index of active participation in decision-making (with equal weights) explains just as much as using all the variables. So, this is what he does.

[vi] Performing a PCA with the 11 components can further corroborate this notion. All load powerfully (load coefficients above 0.9) onto one common component, which preserves 91 percent of the variation in the data.

[vii] It should be noted that if we substitute civil liberties with either Kaufman, Kraay and Ziodo-Lobaton's (1999) rule of law index or the Fraser Institute index of legal structure and security of property rights (Gwartney and Lawson, 2002), which are arguably more precise although less well known measures, the effect is exactly the same.