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'Bridging Social Capital' and Tax Effort in Developing Countries

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Abstract

Taxation is a collective action problem that requires a willingness to cooperate among, and a preference to redistribute between social groups, including communities. Crossing social categorisation, stronger social ties and decreased social distance resulting from higher levels of bridging social capital are hypothesised to increase tax effort. Using an exogenous measure of bridging social capital based on the social lessons, views and norms transferred from past generations to current economically active generations, the evidence suggests that bridging social capital has a causal influence on tax effort in a cross-section of 49 developing countries. The findings are robust to the inclusion of 30 additional variables that control for tax revenue reliance, the current economic environment, human capital, government performance and institutions, the physical environment, the social environment and the economic environment from when bridging social capital was measured. Issues of spatial correlation and sample selection bias are also addressed. The estimated additional tax revenue of a one standard deviation increase in bridging social capital is substantial, exceeding for instance the total tax contribution of the property tax in any African country.

Keywords: Social capital; taxation; tax effort; development

JEL Codes: H30; H20; O23

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1. Introduction

Social capital has evolved from a concept to a field in the social sciences (Kwon and Adler 2014). The literature has linked social capital with tax morale, economic growth and development, human capital, intellectual capital and product innovation, knowledge transfer, climate change and even death.[2] The concept has however suffered from vague or overly encompassing definitions in empirical economic work (Fedderke et al. 1999; Manski 2000; Hayami 2009). The theoretical work on social capital, predominantly by sociologists building on the work of Coleman (1988) and Putnam (1993), provides some useful insights. Social capital is "the norms and networks that enable people to act collectively" (Woolcock and Narayan 2000: 225). Two types of motivation – innate (also called consummatory) and instrumental – underlie social capital (Adler and Kwon 2002). Social capital is not always productive; it can be perverse (Rubio 1997). And, there are two types of social capital, being "bonding" and "bridging" social capital (Gittell and Vidal 1998).

Innate motivations underlying social capital "are based on deeply internalized norms, engendered through socialization in childhood or through experience later in life by the experience of a shared destiny with others". Instrumental motivations are found in purely functional social exchange where "enforced trust" – obligations enforced on both parties by the broader community – is dominant (Adler and Kwon 2002: 25). Formal and informal institutions as described in the new institutional economics literature apply to the instrumental motivations underlying social capital, but to a lesser extent to innate motivations.[3] The economics literature on social capital also emphasise instrumental motivations when measuring social capital in terms of general trust. It has therefore been argued that this measure represents and outcome of institutions, rather than social capital (Beugelsdijk, 2006), although in my view a term such as "instrumental social capital" may also be satisfactory.[4]

Putnam's (1995) emphasis is on social capital arising from innate motivations. Putnam argues that social capital has decreased in American communities due to generational change. When discussing generational change, Putnam points out that this type of social change is slow and

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[2] See Coleman 1988; Kawachi et al. 1997; Knack and Keefer 1997; Nahapiet and Ghoshal 1998; Tsai and Ghoshal 1998; Woolcock 1998; Fukuyama 2001; Yli-Renko, Autio and Sapienza 2001; Guiso, Sapienza and Zingales 2004; Inkpen and Tsang 2005; Alm and Gomez 2008; Adger 2010, and Agénor and Dinh 2015.

[3] North (1990) for instance define institutions as humanly devised constraints, akin to enforced trust as discussed by Adler and Kwon (2002).

[4] This may also be the underlying reason that the general trust measure (as for instance found in the World Values Survey) is not significantly related to trusting behaviour (Glaeser et al. 2000), but is associated with cooperative behaviour in public good experiments that examine strategies of players (Thöni, Tyran and Wengström 2012).

near impossible to prevent since the observed behaviour of different generations are based on deeply internalised norms.

Bonding social capital refers to intracommunity ties and bridging social capital refers to intercommunity ties.[5] Intracommunity ties provide a sense of identity and common purpose, but without intercommunity ties, bonding social capital can be perverse and provide the basis for actions that go against public interest (Woolcock and Narayan 2000). Examples are drug cartels, gangs, organised crime, certain rent-seeking activities and some tax evasion schemes. For social capital to be productive, it is required that both bonding and bridging social capital exists in a society (Gittell and Vidal 1998). Bridging ties between communities often mean that social divides such as race, ethnicity, religion, politics, class, and gender need to be overcome.

Besides definitional issues, the econometric literature on the aggregate effect of social capital has been criticized for the instruments used to address the endogeneity of social capital (Paldman and Svendsen 2000; Durlauf 2002; Durlauf and Fafchamps 2005). The endogeneity of social capital poses a problem since identification must rely on exclusion restrictions that require variables that affect social capital formation, but not the behaviour choice under study. Since social capital tends to be broadly defined, valid instruments are difficult to find. The exclusion restriction is arguably not met in many studies on the aggregate effect of social capital.

In my view, most of the concerns regarding causal inference of the effects of social capital do not apply to the research reported in this paper. The focus of the paper is on bridging social capital arising from innate motivations, in other words social ties between communities motivated by deeply internalised norms. This type of social capital may be referred to as "innate bridging social capital",[6] but I only refer to bridging social capital.[7] I do not rely on general trust as the measure of social capital – in fact general trust is used to test the robustness of bridging social capital– but use a measure based on a project on developing countries carried out by Adelman and Morris (1967). This measure represents the social lessons, views and norms relating to bridging social capital, transferred from past generations

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[5] I use the terms community and social group interchangeably and community can be viewed as a large social group (Hiller, 1941).

[6] As opposed to "innate bonding social capital", "instrumental bridging social capital" and "instrumental bonding social capital".

[7] When using instruments to isolate the exogenous variance in a variable, the convention is to not attach a different label to the exogenous variance. I follow this convention and therefore refer to bridging social capital as opposed to innate bridging social capital, although the exogenous variance is directly measured and not obtained by using instruments.

to current economically active generations. Although bridging social capital is most likely endogenous to tax effort, it is argued that this measure represents the exogenous variance in bridging social capital. The presence of omitted variable bias is tested by including an additional 30 variables, together with the 11 independent variables in the baseline model. Other potential issues regarding heterogeneity bias, sample selection bias and spatial correlation are also considered. The evidence suggests that bridging social capital has a causal influence on tax effort (measured as tax revenues as a proportion of gross domestic product (GDP))[8] in the cross-section of 49 developing countries.

The paper relates to the work by Bergh and Bjørnskov (2011) who show empirically that historical trust levels influence the size of the welfare state. The size of the welfare state is measured in terms of public expenditures to GDP and also government revenues to GDP. This paper differs from Bergh and Bjørnskov (2011) in four respects. First, the aim of the paper is not to explain the variance in government revenues or the size of the welfare state, but rather in tax revenues. Second, the variable of interest is not generalised trust. Third, the estimation strategy is different to that of Bergh and Bjørnskov (2011) who use instruments in an attempt to capture the exogenous variance in their trust variable. Last, the focus of the paper is on developing countries while Bergh and Bjørnskov (2011) include countries that have been surveyed in the World Values Survey (i.e. both developed and developing countries).

2. How Can Bridging Social Capital Influence Tax Effort?

Bridging social capital potentially influences tax effort indirectly in many ways, for instance through economic development, sectoral composition, openness to trade, rent-seeking behaviour, corruption and government effectiveness.[9] Since the objective is to test whether the influence on tax effort is causal, I limit the discussion to how bridging social capital can directly influence tax effort. Taxation is a collective action problem that requires citizens to have a willingness to cooperate towards non-local public goods (as described below) and a preference to redistribute. I consider these two requirements separately.

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[8] Seminal contributions to this literature include Lotz and Morss (1967), Bahl (1971) and Bird, Martinez-Vazquez and Torgler (2008).

[9] Beugelsdijk and Smulders (2003) show that bridging social capital influences economic growth and hypothesize that this is through increased rent-seeking behaviour and corruption. Woolcock (2001) suggests that bridging social capital influences economic development through the sharing of ideas and resources. Putnam (1993) argues that social capital influences government effectiveness and empirical evidence supports this (Knack 2002).

2.1. A Willingness to Cooperate Towards Non-local Public Goods

In presenting a hypothesis on how bridging social capital can influence cooperation towards non-local public goods, I rely on the social psychology literature relating to intergroup relations and the social dilemma literature on cooperation, which includes public goods experiments.[10] Predominantly, the public goods experiments considers cooperation towards local public goods, where the public good will provide utility to all subjects, whether they cooperate or not. In this context individuals are all in one group and the benefits of the public good is to all the members of that group. This context differs from non-local public goods (and services) as provided for by taxation, where cooperation does not necessarily mean that the cooperator or that cooperators' social group will obtain utility from the public good. The investment of the public good may be targeted towards a social group that does not include the cooperator and there is not necessarily a direct compensatory quid-pro-quo to the taxpayer. This likely creates a cooperation challenge between different social groups.

Within the social psychology literature, the minimal group paradigm of intergroup relations as developed by Tajfel et al. (1971) provides interesting experimental results regarding group identity. For these experiments, subjects are anonymously assigned to one of two groups based on a neutral condition (known to the subjects), for instance a preference for one painting over another. Subjects, who are informed only whether another subject is in their group or not, are then required to allocate funds or penalties to other subjects. The results of the experiments based on this paradigm consistently show that subjects favour in-group members to out-group subjects, even in the case where subjects are informed that they are randomly divided into groups (without a neutral condition) as in Billig and Tajfel (1973).

This research show that social categorisation, together with the interdependency that such categorisation implies (Karp et al., 1993), is a sufficient condition for individuals to favour a social group. The more salient the social categorisation, the greater is the differentiation between in-group and out-group payments (Doise and Sinclair, 1973). Notable for the present paper is that in minimal group paradigm experiments, the effect of social categorisation can be weakened and in some instances eliminated when social categorisation is crossed (i.e. each group can for instance include 10 males and 10 females of which 5 males are white and 5

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[10] The existing literature on social capital and cooperation only considers bonding social capital, or bonding and bridging social capital together. Since the focus of this paper is on bridging social capital, I do not rely on this literature in this section.

males are black and the same for the females).[11] Categorising with one's own and another group therefore reduces between-group differentiation in payments. For collective action requiring larger groups as in the case of taxation, social categorisation with the group is often considered a precondition for collective action (Abrams and Hogg, 2006).

The social dilemma literature (including public goods experiments) has shown that "the impact of group identity is manifold and profound" and can be an effective solution to social dilemma problems within a group (Kollock, 1998a: 194). Kollock (1998b) shows how cooperation is influenced by social groups. When cooperation would benefit a participating student's own fraternity, another fraternity on campus or a student from the same university, mutual cooperation was the dominant strategy. However, when cooperation would benefit a student from a competing university or a police officer, exploitation was the dominant strategy. A more formal treatment by Goette, Huffman and Meier (2006) with random assignment of platoons in the Swiss Army shows that members of the same platoon show favour and a much greater willingness to cooperate with members of their own platoon, than with members of another platoon. Similar findings in a laboratory setting are reported by Chen and Li (2009:431); "participants are significantly more likely to choose social-welfare-maximizing actions when matched with an in group member." Goette, Huffman and Meier (2012) show that observed in-group favouritism is to a greater extent the result of social ties than of social categorisation, although both these aspects increase cooperation. This literature closely relates to the literature showing that decreasing social distance increases cooperative behaviour (see Apicella et al. (2012) for field evidence and Bohnet and Frey (1999a) for experimental evidence).

A greater amount of bridging social capital should allow for crossing of social categorisation as individuals discover less salient similarities to individuals in another social group. This should reduce the effect of in-group favouritism as a result of social categorisation as observed in the minimal group paradigm literature. Stronger social ties and decreased social distance between different social groups should also reduce in-group favouritism (Goette, Huffman and Meier, 2012). Reduced in-group favouritism should raise the willingness of individuals to cooperate towards non-local public goods, especially in instances when the provision of the public good is not to the benefit of an individual's own social group. It is therefore hypothesised that greater levels of bridging social capital should increase the willingness to cooperate towards public goods provided by taxes.

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[11] This is initially shown by Deschamps and Doise (1978).

2.2. A Preference to Redistribute

Taxes do not only allow for the provision of public goods; they also allow for the redistribution of wealth within the economy. Individuals may therefore be willing to cooperate towards public goods, but they should also have a preference to share with others through government redistribution. The likelihood that taxes for redistribution are for the benefit of a social group of which the contributor does not form part is likely greater than in the case of public goods as discussed in section 2.1. This will particularly be the case where social groups are primarily formed based on socio-economic status, as is often the case. In a progressive tax and transfer system, the payer of the tax and the recipient of benefits of redistribution will likely belong to different social groups.[12]

Klor and Shayo (2009) show in a laboratory setting that social categorisation significantly influences individual preferences over redistribution. Individuals prefer high levels of redistribution if their social group is poor, even if they themselves are relatively rich and low levels of redistribution if their group is rich, even if they themselves are relatively poor. With the use of field experiments, Leider, Möbius and Rosenblat (2009) show individuals have more altruistic preferences and significantly increase prosocial giving when this behaviour benefits individuals with whom they have closer social ties. Decreased social distance has also been shown to increase other-regarding behaviour in dictator games (Hoffman, McCabe and Smith, 1996; Bohnet and Frey, 1999a, 1999b).

As discussed in the previous section, bridging social capital should influence social categorisation, social ties and social distance. Social categorisation of richer individuals with poorer individuals, and closer social ties and decreased social distance between richer individuals and poorer individuals, should increase the preference for redistribution of richer individuals and decrease the preference for redistribution of poorer individuals. In a progressive tax system with an income tax that excludes the poor through a minimum threshold and a value-added tax that exempts or zero rates goods and services often consumed by the poor, taxpayers vote (due to for instance the salience of tax payments) may be influenced to a greater extent by the level of redistribution than non-taxpayers. If this is the case, then the preference for higher levels of redistribution of richer individuals may dominate the preference for lower levels of redistribution of poorer individuals. The conclusion is more tentative than for cooperation towards public goods, but it is expected that

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[12] This position is similar to the position of Lind (2007) who model redistribution when voters has a group-based social conscience.

greater levels of bridging social capital in a society should result in a preference for higher levels of redistribution.

2.3. Bridging Social Capital, Cooperation and Redistribution

The previous two sections set out the hypothesis that increased bridging social capital should increase the willingness to cooperate towards public goods provided for by taxes and result in a preference for higher levels of redistribution by governments. The social norms of cooperation and redistribution (Elster 1989) can be expected to be different in societies with different levels of bridging social capital. In my view, it is not that bridging social capital influences the preference of individuals to share or not, but rather the preference with whom to share (a common pool resource constraint also identified by Ostrom (1990)). In societies with high levels of bonding social capital, but low levels of bridging social capital, one would expect a preference to share with and only with one's own social group. This could result in a tax constraint, since the benefits provided for by taxes will not be only to one's own social group and sharing avoided taxes would provide a greater benefit to individuals own social group. In such societies it can be expected that tax compliance will be lower and tax policy will reflect a preference for lower tax rates.

However, increased levels of bridging social capital can dissolve this constraint. In societies with greater levels of bridging social capital, there may be a preference to share not only with one's own social group, but also with other social groups. This preference should increase tax compliance and tax policy should reflect a preference for higher tax rates.

Tax effort can be viewed as a function of tax compliance, tax policy and their interaction. Based on the above, increased levels of bridging social capital are expected to increase tax effort.

3. Data and Estimation Strategy

3.1 Data

To estimate the influence of bridging social capital on tax effort, I use data from various sources. Table A1 in the Appendix provides a source and meaning for all variables. The data is primarily for the year 2014. For a few observations I use data from 2013 and the variable of interest is from the 1960s. The discussion in this section is limited to tax effort (the dependent variable) and bridging social capital (the variable of interest).

Tax effort can be defined as the amount of tax revenue collected, taking into account a country's capacity to do so. Tax revenues are defined – for purposes of this paper - as compulsory transfers to the central government for public purposes and excludes fines, penalties and most social security transfers. Tax refunds and corrections resulting in lower revenues are treated as negative revenue. Tax capacity can be measured by either predicting tax capacity based on a regression analysis of tax constraints, or taking GDP to represent tax capacity. Since the aim of this paper is not to calculate a tax effort index and to avoid the econometric issues that will arise when using predicted tax effort in the analysis, GDP is taken to represent tax capacity.[13] The tax effort variable has a mean of 14.78 and a standard deviation of 5.36.

The measure of bridging social capital is based on a project carried out in the 1960s on developing countries by Adelman and Morris and an index of socioeconomic development (as referred to originally), first published in Adelman and Morris (1967). Subsequently, this index has been used by Temple and Johnson (1998) as a measure of 'social capability', passing what can be termed a Quarterly Journal of Economics test. Various concerns regarding the use of this measure to represent social capability are addressed by Temple and Johnson (1998) and the authors suggest that the index can be used as a proxy for social capital in developing countries. The index is used by Temple (1998) as a measure of social capital in African countries.

The socioeconomic index of Adelman and Morris (1967) is based on a factor analysis of 22 variables that are deemed to not be purely economic. The first factor was interpreted to reflect socioeconomic development by Adelman and Morris (1967). Temple and Johnson (1998) reduced the number of variables to four, being the character of basic social organisation, the modernisation of outlook, the extent of mass communication and the extent of social mobility. The correlation between a first principal component of these four variables by Temple and Johnson (1998) and the first factor of Adelman and Morris (1967) exceeds 0.97. Table 1 presents the socioeconomic components of the Adelman-Morris Index, together with their factor loadings, although I limit the discussion to the four variables used for the first principal component of Temple and Johnson (1998).

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[13] Tax revenues as a proportion of GDP is also called tax performance, although the term tax effort is used more often. The tax effort measure is obtained from the World Bank. The World Bank's measure of tax revenues are obtained from the International Monetary Funds' Government Finance Statistics dataset and the measure of GDP is obtained from the World Bank's own dataset, together with the Organisation for Economic Co-operation and Development's GDP dataset.

The first variable, the character of basic social organisation, measures the extent to which social ties over larger social groups, such as the extended family, clan or tribe of individuals are stronger than within individual's immediate family. This closely relates to the differentiation between bridging social capital and bonding social capital. The second variable, modernisation of outlook, relates to political and social participation of individuals through for instance membership in formal and informal associations. Much of the focus of Putnam (1993) is on such membership to associations and it is argued in the social psychology literature that social categorisation between smaller social groups are required for such community action. The third variable, the extent of mass communication, is a measure of communication over larger communities and is based on newspaper circulation and radio ownership. Underlying the demand for these services is likely some other-regarding preferences for individuals in other social groups and this can be associated with bridging social capital. The fourth variable, social mobility, is measured based on school enrolment data, the importance of the middle class and cultural or ethnic barriers to social mobility. It seems reasonable to expect countries with greater levels of bridging social capital to have greater social mobility. Social categorisation and social ties with another social group most likely increase the willingness of an individual to move to within that social group and the acceptance of social group of the individual. Relying on Temple and Johnson (1998) and Temple (1998), together with the discussion in this paragraph, it appears that a convincing case can be made that the measure represents social capital, and specifically bridging social capital measured in the 1960s.

Table 1

Socioeconomic Components of the Adelman-Morris Index

	Factor loading
Size of the traditional agriculture sector	-0.89
Extent of dualism	0.84
Extent of urbanisation	0.84
Character of basic social organization	0.83
Importance of indigenous middle class	0.82
Extent of social mobility	0.86
Extent of literacy	0.86
Extent of mass communications	0.88
Crude fertility rate	-0.63
Degree of modernisation of outlook	0.75

Source: Temple (1998)

Next, I argue that this measure of bridging social capital from the 1960s is an exogenous measure of current levels of bridging social capital. In arguing this, I borrow from Tabellini's

(2010) discussion regarding culture. To establish a theory of how culture is determined, Tabellini (2010: 692) argues that "culture can be viewed to be shaped by two forces: contemporaneous social interactions and the cultural traditions inherited from earlier generations." Based on this theory, Tabellini (2010) argues that the cultural traits of earlier generations represents the variance in culture that is exogenous to current culture and follows an instrumental variable approach to isolate this variance.

Fukuyama (2001: 16) is critical of a pure economist view of how norms are established through iterated Prisoner's Dilemma games:

> The economists' approach to understanding how social capital is generated is ultimately very limited, however. The problem is that social capital more often than not is produced by hierarchical sources of authority, which lay down norms and expect obedience to them for totally arational reasons… (Such norms) are transmitted from one generation to the next through a process of socialization that involves much more habit than reason.

Following this statement from Fukuyama, some Prisoner's Dilemma games have adopted an inter-generational framework. This line of research acknowledges that social norms are created and passed on from one generation to the next and that this could influence human cooperation. Schotter and Sopher (2003) show that inter-generational advice is a strong force in creating social conventions, and Chaudhuri, Graziano and Maitra (2006) find that allowing for advice to be transferred between 'generations' in the game, increases cooperation. Empirical evidence also provide support that preferences and attitudes are transferred between generations (Wilhelm et al. 2008; Dohmen et al. 2012).

I propose that similarly to culture, social capital is shaped by two forces: contemporaneous social ties and norms, and the norms, views and social lessons transferred from past to current generations. The second force relates to the deeply internalised norms formed during socialisation in childhood that, together with norms established later in life, underlie innate motivations towards social capital (Adler and Kwon 2002).

These norms transferred from past generations, as measured by the Adelman-Morris Index, are exogenous to current economic and political influences and other factors that may influence current levels of tax effort. A person who was actively involved in economic activities (older than 18 years) at the time that Adelman and Morris started their data collection (1961) would be at least be 70 years old at the time tax effort is measured in this

paper (2014). The average life expectancy for a person born in 1945 in a developing country is about 40 years (Zijdeman and Ribeira da Silva 2015). Assuming a maximum age of 100 years and a normal distribution, the probability that an individual who was 18 years old at the time of data collection was still alive at the time tax effort is measured, is about 0.035. If alive, such an individual is unlikely to be very economically active. The Adelman-Morris Index should therefore represent the social lessons, views and norms transferred from the past generations to the current, economically active generations that are exogenous to current tax effort.

3.2   Estimation Strategy

The estimation strategy does not directly follow the tax effort tradition in only relying on tax capacity factors as control variables, but rather a strategy that aims to test causality of one variable of interest. The aim is to obtain estimates of the causal influence of bridging social capital on tax effort in a linear regression:

$$TE = \alpha + \beta BSC + \gamma X + e \qquad (1)$$

where TE denotes tax effort, BSC denotes the exogenous variance in bridging social capital as argued in Section 3.1, X denotes control variables, including tax capacity variables, potentially correlated with BSC and included to address omitted variable bias, e is the unobserved error term and β is the coefficient of interest. Although BSC is likely exogenous, β in equation (1) will be biased if the causation runs from tax effort to bridging social capital (called reverse causality). Since the bridging social capital variable was measured long before tax effort, reverse causality cannot be an issue.

The control variables included in the estimation of equation (1), excluding variables used in the robustness tests, are the level of development, trade openness, population density, rule of law, religion, and binary variables representing colonization. From these controls, the level of development is arguably the most important. Knack and Keefer (1997) show that social capital – measured in terms of general trust – has a significant influence on the level of development and the positive relationship between tax effort and development is well documented in the tax effort literature. Including the level of development eliminates the possibility that the channel of causation runs bridging social capital → development → tax effort. In a first attempt to ensure that bridging social capital does not indirectly influence tax effort through the economic environment, I also include trade openness and population

density, both variables that have been fairly consistently found to have an effect on tax effort in the literature.

Rule of law is included to represent the political environment and in an attempt to ensure that the measurement of bridging social capital does not reflect enforced trust or instrumental motivations towards bridging social capital. Rule of law represents the perceptions of individuals of the extent that agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. This measure is highly collinear with the other measures of government performance from the World Governance Indicators, being government effectiveness, control of corruption, regulatory quality, political stability and voice and accountability. It may be that the channel of causation runs political environment → bridging social capital → tax effort or bridging social capital → political environment → tax effort and including rule of law is the first attempt to eliminate this possibility.

It seems reasonable to expect that bridging social capital is correlated with religion. Protestantism closely relates to principles of reciprocity and treating others as you want to be treated. *Zakah*, which leads to redistribution of wealth, is a core religious practice of Islam. Religion also represents general societal features and culture, particularly whether a society has traditional values or secular-rational values (Inglehart and Welzel 2005). To exclude the possibility that religion or traditional cultural values, rather than bridging social capital has a causal influence on tax effort, I include the percentage of people who identify as Protestant and the percentage of people who identify as Muslim in the analysis as control variables.

Feger and Asafu-Adjaye (2014: 172) suggest that "the different institutional and economic structures that various countries inherited from their colonial masters have influenced their tax revenue performance to date." Since colonisers often settled in the colonised country, it is possible that the bridging social capital measure partly represents the institutions of a colonising country. To exclude this possibility from the analysis, I control for the country that colonised the developing country; a binary variable indicating colonisation by Spain, France, Great Britain, Other (the dropped binary variable), or not colonized.

Since the variable of interest is likely exogenous and reverse causality cannot be an issue, all estimations are performed using ordinary least squares as the estimator with robust standard errors and standardised variables. The variables discussed in this section provides partial control of the economic, political, social and historic institutional environments of countries

and represent the baseline model. Following estimation of the baseline model, a thorough robustness check for omitted variable bias is performed by including a further 30 variables interchangeably, as discussed in Section 5. Issues regarding spatial correlation and sample selection bias are also discussed in Section 5.

4. Results

Figure 1 shows the positive relationship between bridging social capital and tax effort in the sample of developing countries.[14] Besides Nigeria and Iraq, both of which rely primarily on revenues from sources other than taxes, tax effort appears to increase as bridging social capital increases. To estimate the influence of bridging social capital on tax effort, I regress bridging social capital on tax effort, controlling for the level of development, openness, population density, rule of law, the percentage individuals identifying as Protestant or Muslim, and the country by which the developing country was colonised.

Figure 1

Bridging Social Capital and Tax Effort

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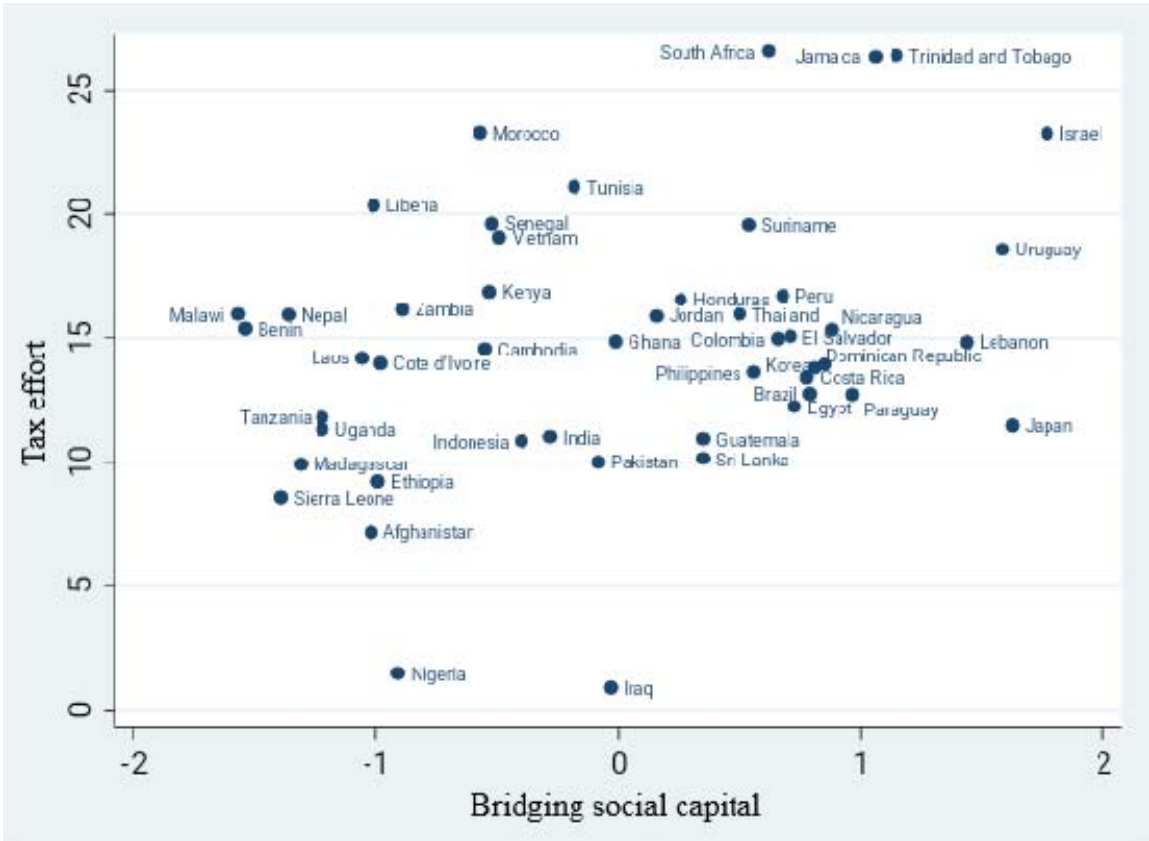
[14] Japan is included since it was regarded as a developing country at the time the bridging social capital variable was measured.

The results in Table 2 show that bridging social capital has a positive and significant effect on tax effort. The coefficient of bridging social capital indicates that a one standard deviation increase in bridging social capital is associated with an increase in tax effort of more than one-third (0.356) of a standard deviation.[15] This means a standard deviation increase in bridging social capital is estimated to raise tax effort by 1.90 percent of GDP, an economically significant influence. To put this in perspective, this increment in tax effort exceeds the total property tax revenue contribution for any African country for which data is available (see Table 2.2 in McCluskey, Franzsen and Bahl, 2017).

Table 2

Regression of Tax Effort and Bridging Social Capital

VARIABLES	Tax effort
Bridging social capital	0.356**
	(0.144)
Development	-0.124
	(0.173)
Openness	0.266**
	(0.100)
Population density	-0.283**
	(0.114)
Rule of law	0.360**
	(0.167)
Protestant	0.175*
	(0.0950)
Muslim	-0.0470
	(0.107)
Spain colonised	0.194
	(0.332)
France colonised	0.819**
	(0.340)
Great Britain colonised	0.581*
	(0.318)
Not colonized	0.375
	(0.414)
Constant	-0.645**
	(0.252)
Observations	49
R-squared	0.556

All variables are standardised. Robust standard errors in parenthesis, *** p<0.01, ** p<0.05, * p<0.1

[15] The relationship between bridging social capital and tax effort appeared linear from investigating scatter plots and tests for alternative functional forms of social capital suggested that an alternative functional form should not be preferred. A potential interaction effect between bridging social capital and the level of development (as suggested by Knack and Keefer 1997) was also considered, but this effect was not statistically or economically significant.

5. Robustness Tests

5.1 Omitted Variable Bias

Without further robustness tests, there exists insufficient evidence to confirm that the influence of bridging social capital on tax effort reported in Table 2 is causal. The effect may be due to the selection of control variables or omitted variable bias and the general requirement of exchangeability, although not a requirement for causal inference, may not be met. To address these concerns, I test the robustness of the influence of bridging social capital on tax effort reported in Table 2 by including additional variables. These variables can be categorised as relating to the reliance on tax revenues, economic environment, human capital, government performance and institutions, physical environment, social environment and historic environment of the period that the bridging social capital variable was measured. In total 30 additional variables are included. The variables are included interchangeably, meaning each regression contains a total of 12 independent variables. The results in Table 3 show the coefficient and robust standard error of bridging social capital when each variable is added to the baseline model in Table 2.

First, the reliance of governments on tax revenues is controlled for. Bridging social capital, as it relates to tax effort, will not be important in countries that are not reliant on revenues from taxes, but receive sufficient foreign aid and rents from natural resources. In this sense, heterogeneity bias may be influencing the results. The discovery and extraction of natural resources could also give rise to conflict or new social ties and thereby be correlated with bridging social capital. The results in Table 3 show that the bridging social capital coefficient is robust to the inclusion of natural resource rents (as a percentage of GDP) and foreign aid received.

Second, although the baseline model controls for the economic environment, the level of development, which is the work-horse variable in tax effort studies, has a low correlation (r=0.131) with tax effort and could therefore provide insufficient control. Also, Gordon and Li (2009) argue that small financial services sectors have limited governments' ability to increase tax effort. I therefore control for the size of different economic sectors in addition to the level of development. Controlling for the size of the services and manufacturing sectors has little influence on the coefficient and t-statistic of bridging social capital. However, when controlling for the size of the agricultural sector, the coefficient of bridging social capital decreases by 0.089 and statistical significance is outside of the ten percent level (14 percent).

The coefficient remains positive with large economic significance. Bridging social capital and the size of the agricultural sector is highly correlated (r=-0.768) and the size of the agricultural sector is also included in the Adelman-Morris Index. This means that including the size of the agricultural sector results in a multicollinearity problem undermining the statistical significance of bridging social capital.

Third, the possibility that the bridging social capital variable is a proxy for human capital is explored. This is possible since the extent of literacy is a variable used to compile the Adelman-Morris Index (Table 1) and past levels of social capital could influence current levels of human capital. Including controls for human capital, being schooling and the number of scientific articles published, has little influence on the coefficient of bridging social capital. Including schooling does increase the standard error of bridging social capital, but since the sample size is decreased to 41, this is as expected.

Fourth, I ensure that government performance and institutions not captured by the rule of law variable are not resulting in omitted variable bias. Bird, Martinez-Vazquez and Torgler (2008) show the importance of control of corruption and voice and accountability in relation to tax effort and these factors may be correlated with bridging social capital. None of the government performance variables, being control of corruption, government effectiveness, regulatory quality, political stability and voice and accountability, results in the coefficient of bridging social capital being less significant.

The variables included to represent institutions are whether a country is a *de jure* democracy, whether a country has a parliamentary system, whether a country has an independent judiciary, whether a country is federal and the legal tradition of a country, being civil law or common law. Besides for the theoretical models of the size of government that depends on the extent of suffrage (Meltzer and Richard 1981; 1983), a large body of empirical literature explores the relationship between democracy (and related concepts) and the size of government. The measure of tax revenues used in this paper may result in measurement error for federal countries since the revenues collected by federal states are not included in the definition of tax revenues used in this paper. Tax competition between federal states may also influence central government tax revenues (Keen and Kotsogiannis, 2002). The legal tradition of a country could also be an important omitted variable. A civil law tradition "can be taken as a proxy for an intent to build institutions to further the power of the state" and a common law tradition "can be taken as a proxy for the intent to limit rather than strengthen the State"

(La Porta et al. 1999: 231-232). As evident in Table 3, bridging social capital is robust to the inclusion of all the variables representing institutions.

Fifth, it may be possible that omitted variables representing the physical environment are resulting in bias. Alesina and Wacziarg (1998) argue, supported by empirical evidence, that there are economies of scale in supplying public goods and that larger countries – based on population or area – require lower tax effort than smaller countries. The size of a country could influence the potential for social ties between communities. There is evidence from the economic development literature that the location of a country and the disease environment at the time of colonisation have a causal influence on development (Acemoglu, Johnson, and Robinson 2001); this may also influence tax effort and bridging social capital. To address concerns regarding omitted variable bias relating to the physical environment, I control for population size, area, malaria risk in 1965 as a proxy for the disease environment faced by settlers, latitude and the percentage of land in geographical tropics where diseases are more common. Bridging social capital is robust to the inclusion of these variables, although malaria risk in 1965 reduces the coefficient of bridging social capital by 0.149. [16]

Sixth, I control for social variables not previously controlled for, being the importance of religion, ethnic fractionalisation, religious fractionalisation and generalised trust.[17] Importance of religion is controlled for since religious behaviour and the traditional values represented by religion should be influenced by the type of religion (already controlled for) and the importance of the principles of that religion to an individual. Ethnic fractionalisation and religious fractionalisation are included since fractionalised societies have been shown to exhibit more rent-seeking behaviour, less collective action, less consensus on public goods and lower levels of tax morale (Easterly and Levine 2003; Miguel and Gugerty 2005; Lago-Peñas and Lago-Peñas 2010). Generalised trust is the predominant measure of social capital in the economics literature, but as argued in the introduction this measure can be viewed as an outcome of formal and informal institutions or instrumental social capital. None of these variables drastically reduces the significance of bridging social capital.

Last, to ensure that the bridging social capital is not simply a measure of past economic development or tax effort - through the correlation between population and tax effort as

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[16] The correlation between social capital and malaria risk is -0.61. It may be possible that the variable is not only a proxy for the past disease environment, but - through its influence on life expectancy – a proxy for social relationships. The survivalist values often encountered in countries with more diseases may provide a challenge in fostering bridging social capital.

[17] Including the importance of religion and generalized trust variables nearly halves the sample size.

shown by Alesina and Wacziarg (1998) – I include three historic variables: population size in 1960, the level of urbanisation in 1960 and the level of development in 1973. The bridging social capital variable is also robust to the inclusion of these variables.

Table 3

Robustness Test for Bridging Social Capital

Regressor	Bridging social capital	R-squared	Observations
Tax revenue reliance			
Natural resource rents	0.333**	0.571	49
	(0.134)		
Foreign Aid	0.346**	0.566	49
	(0.142)		
Economic environment			
Agriculture to GDP	0.267	0.542	47
	(0.178)		
Services to GDP	0.360*	0.525	47
	(0.180)		
Manufacturing to GDP	0.378**	0.544	46
	(0.147)		
Human capital			
Schooling	0.390*	0.532	41
	(0.232)		
Scientific articles	0.341**	0.585	49
	(0.143)		
Government performance and institutions			
Control of corruption	0.358**	0.557	49
	(0.150)		
Government effectiveness	0.249**	0.608	49
	(0.107)		
Regulatory quality	0.287**	0.580	49
	(0.133)		
Political stability	0.366**	0.561	49
	(0.148)		
Voice and accountability	0.316**	0.598	49
	(0.138)		
Democracy	0.349**	0.633	49
	(0.144)		
Parliamentary	0.328**	0.575	49
	(0.133)		
Federalism	0.351**	0.557	49
	(0.146)		
Independent judiciary	0.328**	0.559	49
	(0.151)		
Civil law	0.360**	0.547	48
	(0.162)		
Common law	0.390**	0.580	48
	(0.149)		
Physical environment			
Population size	0.353**	0.558	49
	(0.145)		
Area	0.350**	0.556	49
	(0.152)		
Malaria risk 1965	0.207*	0.608	49
	(0.118)		

Latitude	0.357** (0.144)	0.557	49
Tropical area	0.311* (0.163)	0.566	47
Social environment			
Importance of religion	0.446* (0.226)	0.770	27
Ethnic fractionalisation	0.402** (0.157)	0.569	49
Religious fractionalisation	0.352** (0.143)	0.566	49
Generalised trust	0.463* (0.256)	0.733	27
Historic environment			
Population size 1960	0.362** (0.145)	0.559	49
Urbanisation 1960	0.406* (0.237)	0.557	49
Development 1973	0.250* (0.145)	0.579	48

All variables are standardised. Robust standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5.2   Spatial Correlation

The evidence thus far suggests that bridging social capital has a causal influence on tax effort. One potentially important statistical issue that may not be addressed in the results reported is spatial correlation. Countries often base their tax codes on neighbouring countries and other factors that could influence tax effort are often similar between neighbouring countries. If there are omitted variables that have similar values between neighbouring countries, the residuals of nearby countries will be correlated and the reported standard errors will be inaccurate.

Figure 1 provides a map of the residuals of the baseline model in Table 2. The residuals range from -1.02 to 1.2. The only neighbouring countries with similar residuals are Indonesia and Philippines (0.382 and 0.263 respectively) and El Salvador and Honduras (0.305 and 0.444 respectively). The residuals of the remaining countries are diverse. Based on this, it seems reasonable to conclude that the residuals do not suffer from spatial correlation.[18]

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[18] If spatial correlation were present, the robustness checks that included latitude and tropical areas would also have dealt in part with this issue.

Figure 2: Residual Map (red (lowest) to blue (highest))
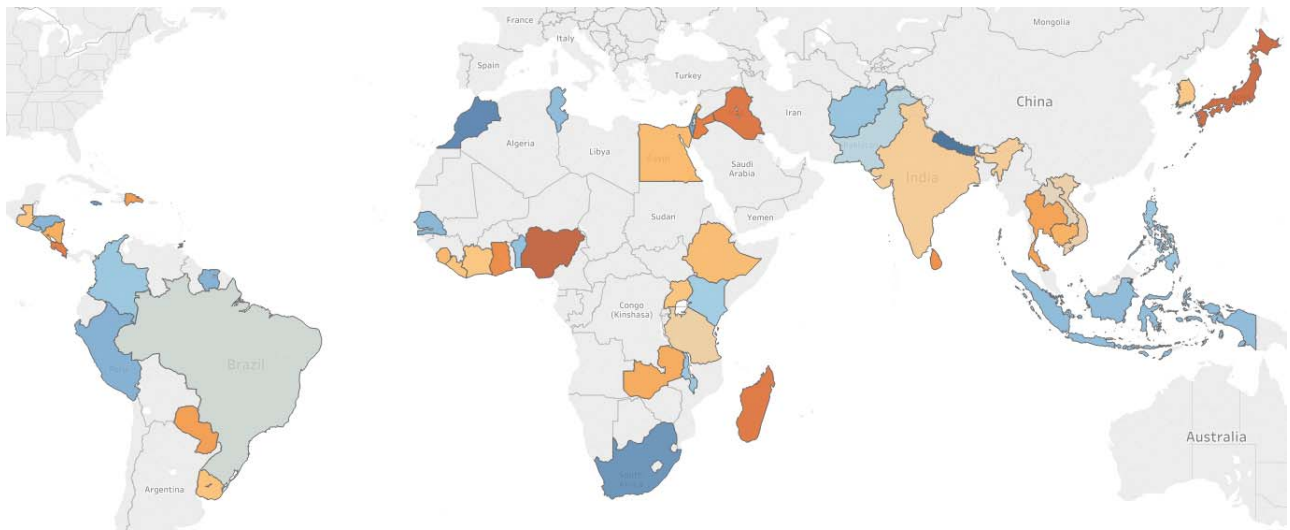
5.3 Sample Selection Bias

The sample initially included 50 countries (those included in the Adelman-Morris Index). Investigating the residual plots of the full sample revealed that Algeria was an outlier and caused significant upward bias in the coefficient of bridging social capital.[19] On further investigation it became apparent that the tax effort of Algeria (with a value of 62) most likely suffered from measurement error. The historic data of Algeria's tax effort showed large deviations and the maximum reported tax to GDP ratio for Algeria is 180, which is very unlikely. Algeria was therefore removed from the sample used in the results reported.

To assess the sensitivity of the results to sample selection bias, the baseline model was re-estimated after removing ten observations from the sample. This process was repeated five times with a different set of observations being removed for each iteration. As evident from Table 4, the coefficient of bridging social capital is sensitive to sample selection, although the positive effect of bridging social capital on tax effort remains economically significant in all sub-samples. Despite the smaller samples, statistical significance remains in all sub-samples except sub-sample (4). For this sub-sample statistical significance is just outside the 10 percent level. For sub-sample (3), the coefficient of bridging social capital is statistically significant at the one percent level.

In the final estimation (6) in Table 4, Iraq and Nigeria are removed from the sample. This is done since these two countries are not reliant on tax revenues to fund their governments and

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[19] The coefficient of bridging social capital is 0.120 higher with Algeria included in the sample.

therefore do not face the same challenges as other developing countries, meaning heterogeneity bias may be an issue. Removing these two countries results in a slightly lower coefficient for bridging social capital and the level of statistical significance does not change.

Table 4

Sample selection bias

VARIABLES	(1) Tax effort	(2) Tax effort	(3) Tax effort	(4) Tax effort	(5) Tax effort	(6)
Social capital	0.443**	0.282*	0.478***	0.254	0.324**	0.309**
	(0.183)	(0.149)	(0.147)	(0.159)	(0.169)	(0.151)
Observations	39	39	39	39	40	47
R-squared	0.585	0.534	0.686	0.589	0.542	0.506

All variables are standardized. Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

6. Conclusion and Policy Implications

The evidence presented in this paper suggests that bridging social capital has a causal influence on tax effort in the sample of 49 developing countries. The estimated influence is large; a one standard deviation increase in bridging social capital is estimated to increase tax revenues by about 2 percent of GDP.

Bridging social capital requires social categorisation and social ties that transcend traditional social divides such as race, ethnicity, religion, class, status and gender. This type of social capital is important for tax effort, irrespective of a country's reliance on revenues from taxes, economic environment, human capital, government performance and institutions, physical environment and social environment, which includes religion, ethnic fractionalisation and the level of generalised trust. Towards domestic revenue mobilisation required for sustainable economic development, the results suggest that developing countries should foster bridging social capital.

Without specific intervention, humans generally form social ties with others that exhibit salient similarities (Apicella et al. 2012). This means that bonding social capital should develop naturally. This poses a risk that social capital could become perverse and be a tax constraint. Individuals may be less willing to share with members outside their social group and as a result exhibit a lower willingness to cooperate towards public goods provided for by taxes and a preference for redistribution that will only benefit their own social group. This constraint can be dissolved if bridging social capital exists alongside bonding social capital.

Regarding tax policies, the results in this paper provide additional support that an excise on telecommunication and mass communication – as is becoming ever more popular in

developing countries – should be avoided. Besides taxing a positive externality, Ellison, Steinfield and Lampe (2007) as well as Valenzuela, Park and Kee (2009) provide robust results indicating that greater usage of social media increases bridging social capital. Online communities and the internet in general have also been shown to have a positive influence on bridging social capital (Kavanaugh et al. 2005; Kobayashi, Ikeda and Miyata 2006; Bauernschuster, Falck and Woessmann 2014). Developing countries should therefore rather invest and potentially subsidise technologies that allow for mass communication. If economic rents exist in the telecommunication sector, these can be taxed under a variable income tax, a spectrum license fee or another type of rent tax (Matheson and Petit, 2017).

Regarding other policies, bridging social capital can be fostered through education (Fukuyama 2001).Through education, social norms and rules are passed on and knowledge of and interest in other cultures and religions can be cultivated. Individuals with higher levels of education are more engaged with their societies and exhibit higher levels of bridging social capital (Dee 2004; Helliwell and Putnam 2007). Besides investing in increased access to education, governments can create policies to ensure that educational activities allow for social interaction between different social groups. Such horizon-expanding policies has been shown to foster more learning than policies emphasising norm retention (Morgan and Sørensen 1999).

Immigration policy can also influence bridging social capital. On the one hand, being open to immigrants will likely result in greater social diversity and potentially provide a challenge for fostering bridging social capital. On the other hand, policies and public rhetoric accompanying such policies that limit immigration may break down existing bridging social capital by alienating minority groups or immigrants already in a country. Kesler and Bloemraad (2010) show empirically in a panel setting that increased diversity in itself does not decrease collective-mindedness (referred to by the authors as social capital). Countries with an institutional or policy context promoting equality and accommodating immigrant minorities experience little or no decline in collective-mindedness. Non-exclusionary policies have been shown to increase bridging social capital by Kumlin and Rothstein (2005). Although further research is required, it appears that more open immigration policies and public rhetoric that does not take a stance against minorities could potentially be less costly to bridging social capital than the alternatives.

Research on how governments can foster bridging social capital is still in its infancy. The results of this paper add to the importance of future research in this area. This research is not

only important for increasing tax effort in developing countries, but – as other authors have shown – for economic welfare.

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A. APPENDIX

Table A1

Variables sources and meanings

Variable	Source	Meaning
Agriculture to GDP	World Bank	The size of the agriculture sector as a proportion of GDP.
Area	CEPII	Area of country in kilometers.
Civil law	Thuronyi (2003)	Binary. Countries in which a civil law system is applied.
Colonized	CEPII	Binary. Indicates the country by which a country was colonized, or alternatively that a country was not colonized.
Common law	Thuronyi (2003)	Binary. Countries in which a common law system is applied.
Control of corruption	World Bank	Perceptions of the extent that public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.
Democracy	(Boix, Miller and Rosato, 2014)	Binary. A country is classified as a democracy if there exists a rule that is enforced that gives citizens to right to vote in an election, freely and fairly.
Development	World Bank	GDP per capita.
Development1973	Maddison Project database	GDP per capita in 1973.
Ethnic Fractionalization	Alesina, Devleeschauwer, Easterly, Kurlat and Wacziarg (2002)	Reflects the probability that two randomly selected people from a given country will not belong to the same racial or linguistic group.
Foreign Aid	World Bank	Net official development assistance and official aid received. Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. Net official aid refers to aid flows (net of repayments) from official donors to countries and territories in part II of the DAC list of recipients.
Generalized trust	World Values Survey	Indicates whether respondent thinks that most people can be trusted, or that you need to be very careful in dealing with people.
Government effectiveness	World Bank	Perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and

		implementation, and the credibility of the government's commitment to such policies.
Importance of religion	World Values Survey	Indicates how important religion is in the life of the respondent.
Independent judiciary	Bertelsmann Transformation Index	The extent that the judiciary is independent from political influence.
Latitude	CEPII	Degrees in latitude from the North pole.
Malaria risk 1965	Conley, McCord and Sachs (2007)	Percentage of population at risk of malaria in 1965.
Manufacturing to GDP	World Bank	The size of the manufacturing sector as a proportion of GDP.
Muslim	World Factbook	Percentage of population who classify themselves as being Muslim.
Natural resource rents	World Bank	The sum of all oil rents, natural gas rents, coal rents, mineral rents and forest rents, as a percentage of GDP. The estimates of natural resources rents are calculated as the difference between the price of a commodity and the average cost of producing it, multiplied by the physical quantities extracted or harvested.
Openness	World Bank	Total exports plus total imports, over GDP.
Parliamentary	World Bank	A system is classified as parliamentary if 1) the system has elected executives, 2) the system has a prime minister, 3) the president cannot veto legislation without a supermajority support from parliament, 4) the president cannot appoint or dismiss prime ministers *and* dissolve parliament.
Political stability	World Bank	Perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.
Population size	World Bank	Number of citizens in a country.
Population 1960	World Bank	Number of citizens in a country in 1960.
Population density	World Bank	Number of citizens per squared kilometer.
Protestant	World Factbook	Percentage of population who classify themselves as being Protestant.
Regulatory quality	World Bank	Perceptions of the ability of the government to formulate and implement sound policies and regulations, which permit and promote private sector development.
Religion Fractionalization	Alesina, Devleeschauwer, Easterly, Kurlat and Wacziarg (2002)	Reflects the probability that two randomly selected people from a given country will not belong to the same religious group.
Rule of law	World Bank	Perceptions of the extent that agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.
Scientific articles	World Bank	Scientific and technical journal articles refer to the number of scientific and engineering articles published in the following fields: physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.
Schooling	World Bank	Tertiary school enrolment.
Services to GDP	World Bank	The size of the services sector as a proportion of GDP.
Bridging social capital	Adelman and Morris (1967)	Refer to Section II.
Tax effort	World Bank	Total tax revenues over GDP. Tax revenues are defined as compulsory transfers to the central government for public purposes and excludes fines, penalties and most social security transfers. Tax refunds and corrections resulting in lower revenues are treated as negative revenue. GDP is taken as a measure of tax capacity.

Tropical area	Portland State University	Percentage of land in geographical tropics.
Urbanization 1960	World Bank	The extent of urbanization in 1960.
Voice and accountability	World Bank	Perceptions of the extent that a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.