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Adelaide Baronchelli, Alessandra Foresta, Roberto Ricciuti

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Abstract

This paper empirically evaluates the impact of accountability on fiscal capacity. We maintain that if the average citizen speaks a language different from the central government and the elite, she will find it difficult/impossible to hold the government to account. As a result, this will negatively affect fiscal capacity. We adopt an instrumental variable approach using, as an instrument, the measure of how far the official language differs from ordinary language. The first stage results suggest that this instrument is strong and reliable and is negatively correlated with our measure of accountability in line with the hypothesis. The results in the second stage support our hypothesis. The results are robust to plausible exogeneity tests and different specifications.

JEL-Codes: H200, D020, D720, C260.

Keywords: language, accountability, fiscal capacity, insulation.

Adelaide Baronchelli
Department of Economics
University of Verona / Italy
adelaide.baronchelli@univr.it

Alessandra Foresta
Department of Economics
University of York / United Kingdom
alessandra.foresta@york.ac.uk

*Roberto Ricciuti**
Department of Economics
University of Verona / Italy
roberto.ricciuti@univr.it

*corresponding author

1 Introduction

Fiscal capacity, the ability of the government to raise revenues from a broad base, is crucial for the proper functioning of modern states because the collection of taxes enables the provision of fundamental services, such as education, healthcare and military defense. Accountability, the set of constraints on the government's use of political power, is also considered a cornerstone for modern states because it allows the citizen to better understand what are the priorities of the government and how their taxes are spent. This work explores the relationship between these two phenomena from a novel perspective. More specifically, we propose a new channel relating fiscal capacity and accountability that runs through the official language of a country.[1]

The previous literature underlines the importance of accountability for fiscal capacity (Besley & Persson, 2014 and Ricciuti et al., 2019). As proposed by Besley & Persson (2009), the existence of checks and balances forces the incumbent to promote common interests, rather than personal or group gains. Additionally, the presence of mechanisms of accountability facilitates the "fiscal contract" between citizens and the state, reducing taxation transaction costs (Levi, 1988) and generating a "tax morale" (e.g., Doerrenberg & Peichl, 2013 and Luttmer & Singhal, 2014). However, studying the relationship between fiscal capacity and accountability is not straightforward. Although according to the theoretical literature, the first depends on the latter, accountable institutions are also likely to be found in rich countries, which are able to raise higher taxes. This generates an endogeneity issue that makes us unable to understand the direction of the causal link.

To solve this endogeneity issue, we proposed an instrumental variable based on the distance between the languages spoken by the citizens and the official language of a country, as proposed by Laitin & Ramachandran (2016). Adopting this instrument, we argue that the elites may use a distant official language to avoid being accountable to the citizens since the absence of a common linguistic background prevents the latter from using the available constraints on the first's actions. Consequently, the accountability of the political elite is reduced, which in turn leads to lower fiscal capacity. Due to its construction, we can consider the proposed instrument as exogeneous and, given the importance of language in communication and bureaucracy, as strongly correlated with our main measure of accountability. The results are in line with our

[1] The *Concise Oxford Companion to the English Language* defines the official language, or state language, as a language given a special legal status in a particular country, state, or other jurisdiction. Typically, a country's official language refers to the language used in government dealings (by the judiciary, legislative bodies and administration).

main hypothesis. To reinforce our findings, we implement a series of sensitivity checks, based on Conley et al. (2012), and a series of robustness checks.

The novelty of the paper lies in the link between language and accountability. Economists have addressed language-related topics in a number of ways (Ginsburgh & Weber, 2020). First, in international trade, language similarity is considered a facilitating factor that, other things being equal, increases exchanges (Melitz, 2008). Second, for policy outcomes such as in healthcare, if government guidance is provided in the language normally used by laypeople, it is much more effective (Djité, 2008; Gomes, 2014). Third, assimilation policies, in which education is compulsory given in a language that is different from the one of the immigrant groups, may lead to more in-ward behavior by the member of the same groups (Bisin et al., 2011; Fouka, 2020). Fourth, ethnolinguistic fractionalization, dealing with the number, size, and geographical location of distinct cultural groups in a state, has been studied as a source of civil conflict, underprovision of public goods and low economic growth (Alesina et al., 2003; Easterly & Levine, 1997). Fifth, a strand of studies analyzing the effect of culture on economic outcomes uses linguistic variables as a proxy for cultural values and beliefs (Licht et al., 2007; Tabellini, 2008, 2010; Davis & Abdurazokzoda, 2016; Galor et al., 2018). Our work introduces a new strand by accounting for the role that the official language of a country has in shaping the relationship between the political elite and the citizenry.

The rest of the paper is structured as follows: section 2 highlights the mechanisms by which language impacts accountability and reviews the relevant literature. Section 3 provides a historical background. Section 4 describes the measure of linguistic distance and contrasts this index with fractionalization indicators. Section 5 presents the data. Section 6 sets out the results of our analysis, and section 7 deals with robustness checks. Section 8 concludes.

2. Official language and accountability

Relating accountability with fiscal capacity, the key novelty in this paper is the role played by the official language in allowing the political elite to avoid being accountable.[2] Previous literature shows that through history the elite resorted to several strategies to keep its power unchecked and, thus, pursue policies that are favorable to its interests. Acemoglu & Robinson

[2] Accountability refers to the constraints on the elite's use of political power requiring justification of their actions and potential sanctions by the citizens (Lührmann et al., 2020).

(2001) highlight that in countries where inequality is high, the richer minority favours autocratic regimes in fear of redistributive policies. Aghion et al. (2004) argue that the ruling class sets the *ex-ante* optimal level of leader insulation, defined as the share of votes required to block a leader trying to enact legislation, to protect its own interests. Acemoglu & Robinson (2006; 2008) claim that to prevent the establishment of institutions more costly for them, elites can increase their investments in *de facto* political power. Corvalan et al. (2020) show that the extension of suffrage is not sufficient for the implementation of more redistributive policies but the removal of eligibility requisites is also required. Carvalho & Dippel (2020) show that, after the emancipation of slaves in the British Caribbean islands, the new black elite, allied with the old elite to pass extractive policies, progressively weakening the electoral institutions and leading to their dismissal.

Our paper adds to this literature since it identifies the adoption of the colonisers' official language as a key mechanism in undermining accountable institutions after decolonisation (see section 3 for an overview of the historical background). Whether the constitutional structures chosen by the new states, the adoption of a foreign language made constraints on the elite less effective. In highlighting the role of the official language in the institutions, this paper also related to the existing literature on linguistic disenfranchisement (Ginsburgh et al., 2005; Ginsburgh & Weber, 2005). We agree with this strand that the adoption of the official language in multilingual countries is not inconsequential for the participation of the citizens.

To explain why the official language is instrumental in holding the elites accountable, we point out that the official language is a key factor in allowing people's ability to constrain the elite's power. To better understand this point, we refer to two different interpretations of the role of language in social interactions.[3] First, language shapes the cognitive patterns on which the interactions between people are based and, second, it is the mean which allows communication between them. In our opinion, the absence of common linguistic background severely affected accountability at both these two levels. On one level, it prevents the formation of shared cognitive patterns on which constraints on elites' power are grounded. On the other level, it makes more difficult the comprehension of the available information on the elite's behaviour which is a prerequisite of accountability.

[3] In this paper we highlight the relational nature of accountability defined as a relationship between the elites and the citizenry when the first is obliged to inform the latter about its "actions and decisions, to justify them, and to suffer punishment in the case of eventual misconduct" (Schedler et al., 1999, p. 17).

Our approach does not necessarily impinge on an explicit will of the elite to exclude ordinary people from the state. In countries in which the language of the colonizers was kept as the official language because of its neutrality with respect to competing local languages and ethnic groups, such as India, the barrier between those who have command of the foreign language and those who do not still exist and limits the access of the latter to government services and political participation.

In what follows, we further explain how the official language shape the relationship between the elites and the citizenry at both cognitive and communicative level.

2.1 Language and cognitive institutions

To better understand the link between cognition and accountability, we refer to the strand of literature investigating how cognitive schemas[4] substantiate institutions. These studies suggest that institutions, defined as "the rules of the game of a society" consisting of "formal and informal constraints constructed to order interpersonal relationships" (Denzau and North, 1994, p. 4), are shared cognitive structures. In other words, these rules are shared social constructs through which individuals interpret their interactions with the external environment. By defining the individual's interpretation of the world, these social mechanisms set up the basis for decision-making. They provide individuals with information by linking outcomes to decisions (Greif & Mokyr, 2017).

Kets & Sandroni (2021) formalise these intuitions in a formal theory explaining the impact of cognitive factors on economic outcomes. To define the role played by cognition in individuals' decision-making process, the authors point out that, before the individual's decision, players undergo an introspective process where they think about the other players' behaviour to choose their actions. Furthermore, to highlight the importance of shared cognitive factors, the authors argue that culture is relevant in the process.[5] The lack of a shared cultural background impairs

[4] There are various definitions of cognition in the literature depending on the specific context. We define it on a general level as the mental processes involved in gaining knowledge and comprehension. These cognitive processes include thinking, knowing, remembering, judging, and problem-solving (APA Dictionary of Psychology. Cognition. American Psychological Association. 2018). Consequently, we defined cognitive schemas or patterns as those templates that the human mind uses in cognitive activities. In other words, they are frameworks that help to organize and interpret information. Schemas are essential in cognition because they allow us to take shortcuts in interpreting the vast amount of information that is available in our environment.

[5] Kets and Sandroni (2021) define culture as cognition. Accordingly, as supported in sociology (DiMaggio, 1997) and anthropology (D'antrade, 1995), people sharing the same culture have the same cognitive patterns and they are more likely to agree on what is salient to them.

players' ability to form expectations about others' behaviour.[6] "When cultural distance is large, an action that is culturally salient for a group is almost completely uninformative of whether is salient for the other group" (Kets & Sandroni, 2021, p. 293).

Grounding on this literature, we argue that accountable institutions are based on shared cognitive rules entailing the set of constraints on the elites' use of power. Referring to the rules, citizens can make sense of their relationship with the elites. The firsts intuitively understand what is expected of the latter and, when appealing to some constraints, they are aware of the consequences of their appeals. In contrast, when cognitive rules are foreign to people's background, they are completely uninformative about the principles the elites abide to. Following both Greif & Mokir (2017) and Kets & Sandroni (2021), we argue that the lack of a common cognitive background produces a knowledge gap. In this gap, the use of accountable institutions is impaired; people are not able to form expectations about the elites' behaviour.

Furthermore, we add to the literature on cognitive institutions pointing out that the use of official language is the key factor in the creation of a shared cognitive framework between the elite and the citizenry.[7] Conversely, through the use of a distant official language, the former imposes formal constraints on their power that the latter is not able to understand and use. Even if the constitution grants accountable institutions, the fact that they are mediated in a language that is distant from the people's idioms, makes them ineffective. To support the link between language and cognition we refer to a well-known strand of literature that dates back to Whorf (1956) and Sapir (1970). According to these studies,[8] the use of a language reproduces the interpretation of the world conveyed by the culture expressed in that idiom. Language, therefore, contributes to the formation of cognitive categories that define a person's sense of self and how people should behave.

[6] Kets and Sandroni (2021) grounds on the theory of mind in psychology (Apperly, 2010) stating that people form expectations about the others' behaviour reflecting on their own behaviour.

[7] This idea is parially conveyed by Denzau and North (1994, pp. 3-4) suggesting that "individuals with different learning experiences (both cultural and environmental) will have different theories (models, ideologies) to interpret their environment".

[8] Hill & Mannheim (1992) pointed out that grammatical categories implicitly reinforce specific cognitive categories. By conducting experiments on multilingual individuals, Nisbet (2003) shows that the same question in different languages produces different outcomes, arguing that each language reflects a specific interpretation of the world. Kashima & Kashima (1995) empirically test the correlation between the global characteristics of cultures and the languages used in those cultures. They found that the rules correlated to pronoun dropping are correlated with a high level of individualism, suggesting that some grammatical rules act as a constraint on self-other relations.

2.2 Language and communication

Linking linguistic distance to accountability, we argue that the inability to speak the official language prevents the citizenry from understanding relevant information to hold the elite accountable. Information is a key element in the answerability dimension of accountability.[9] The oversight of the elites depends on the quality and the quantity of information shared on their actions (Williams, 2015).[10] However, when citizens do not understand the official language, they are prevented from comprehending this information.[11] Furthermore, the choice to use a language that is very distant from the idiom(s) spoken by the laypeople makes also learning that language much more difficult. As a result, the citizens' inability to understand the state language acts as a wall in their communication with the state. They lack the necessary requirement in their struggle to monitor the behaviour of the ruling elite.

Several studies have already highlighted that language acts as a barrier to the comprehension of important information and the success of public initiatives. First, language is crucial to the success of many health programs and individual health outcomes. Previous literature shows that if people do not understand the language of medical professionals, they lack the means to properly follow medical instructions (Djité, 2008; Gomes, 2014). Second, education outcomes are also influenced by the choice of the language of instruction. Evidence from multiple studies shows that when children are taught in a language they do not frequently use at home or with their relatives and friends, they are less able to understand what they study (Laitin et al., 2019; Kerwin & Thornton, 2018).

It is noteworthy that difficulties in comprehension are at their greatest when the language is completely foreign to the users. As argued by Laitin & Ramachandran (2016), the process of understanding what is expressed in a language is much more difficult than it would be if the chosen channel of communication was less remote. Idioms with the same historical origins share a large part of their vocabulary and grammatical structures (Ginsburgh & Weber, 2020). For the same reason, learning a distant language is much more time-consuming and costly than studying a closer one. As a consequence, in some former colonies which adopted the colonizer's

[9] Accountability mainly consists in two dimensions: answerability and enforcement (Schedler et al., 1999). The first refers to the control of government through reliable information, while the latter involves rewarding good behaviour and punishing undesired actions (Goetz, 2008).
[10] Williams (2015) argued that transparency is *per se* a constraint on the elites.
[11] Translation is a possibility but is extremely costly compared to direct communication (Melitz, 2008).

language as the state idiom, the majority of the population is not able to properly speak this language.[12]

2.3 Other related literature

So far we mentioned the studies that help us to build our argument. This paper, however, is more generally related to the literature on ethnolinguistic fractionalization and identity economics. We share with these studies a common interest in group diversity but we differ with them in the way we think about this diversity.

The literature on ethnolinguistic fractionalization claims that diversification along linguistic and ethnic lines within a state severely impairs public good provision, social comity and economic growth (e.g., Easterly & Levine, 1997; Fearon, 2003; Alesina et al., 2003; Alesina & La Ferrara, 2005, Desmet et al., 2012). In these studies, group identity is marked by different traits, among which language is the easiest to identify (Fearon, 2003). We disagree on the interpretation of an idiom as just one of the most distinguishing features of a social group. Conversely, delving into the literature in linguistic and psychology, we highlight the active role played by language in social interactions. Due to this role, the official language has been purposely used by the elites to prevent the establishment of an accountable relationship between the elites and the citizenry.

Furthermore, in the literature on ethnolinguistic fractionalization, diversification is identified within the population (horizontal diversity). In horizontally diverse societies, several groups have to cooperate to build a peaceful and prosperous state despite their differences. This study, however, focuses on the vertical type of diversity.[13] In a vertically diverse society where the use of a foreign official language creates a cognitive and communicative rift between the elites and the citizenry, the latter does not have the means to monitor the firsts.

Second, the literature on identity economics, pioneered by the study of Akerlof & Kranton (2000, 2011), mainly investigates how the identification in a group enters the utility function and influences individual's behaviour (Shayo, 2009; Akerlof, 2017; Collier, 2020). This paper, however, is more about culture than identity. According to the literature in psychology, shared

[12] Albaugh (2014) reports that in Sub-Saharan African countries, on average, only 18.7% of the population can speak the official language, with a minimum of 4.5% in Niger and 5% in Guinea.
[13] See section 4 to see the differences between the indexes adopted in the literature on ethnolinguistic fractionalization and the index we use.

cultural patterns work as coordination and communication functions (Zou et al., 2009) while the main function of identity is to differentiate oneself (often positively) from other groups (Tajfel & Turner, 1986).

3. Historical background

We cannot talk about language differences and the distance between common citizens and the elite, without mentioning colonization. This phenomenon was one of the main causes of the linguistic separation between the people and the elite and still operates in many countries. Colonial governments coopted educated indigenous people to translate and help run the local government, and chose small, educated elites they were able to control and tie to the interests of the colonial state. In addition, colonial governments had little interest in mass education since it was expensive, reduced revenues and potentially fostered rebellion. If education was encouraged, government officials primarily backed a practical variety, such as carpentry, masonry, and horticulture (Kelly, 2000a; 2000c; Sundkler & Steed, 2000; Manning, 1998; Furley & Watson, 1978).

For example, in Vietnam, the French colonial governments closed down indigenous schools, pressured the Japanese government to prevent the Vietnamese from acquiring education in Japan, and educated only as many Vietnamese after primary school as the colonial government could hire and control (Kelly, 2000a; 2000c). The French focused education on practical skills (particularly farming) and did not provide the Vietnamese with skills that would let them compete with French settlers for senior positions in the colonial administration. Throughout Africa, the French educated only a small elite, which was purposely trained to be separate from other Africans in language and culture (Kelly, 2000b; 2000d; Grier, 1999). Similarly, the Italians, Portuguese, and Spanish also educated only a small portion of the non-European population in their colonies (Isichei, 1995).

A similar approach was adopted by the United Kingdom. The British made little effort to educate colonial subjects since they tried to run their colonies as cheaply as possible (Ferguson, 2002). Slave owners and those who used unskilled and forced labor were especially averse to education, often even refusing to teach slaves how to read (Blouet, 1990). For example, before 1813, the British East India Company schools in India trained a total of only a few hundred students, almost exclusively elite Muslims and Hindus from the highest castes, and lower-caste Hindus were explicitly excluded from company schools (Ingham, 1956).

Later, however, Protestant missionaries allowed the British to service their colonies cheaply. In areas with high missionary influence, the British government tried to shape education to its own interests, establishing financial incentives for missionaries who educated a few students more intensely, using the English language and adopting a utilitarian, government-imposed curriculum. Additionally, the colonial government encouraged missionaries involved in mass education to focus on practical skills (Furley and Watson, 1978; Ingham, 1956). The main consequence of this system was the creation of a small elite and a broader pool of English-speaking laborers who had the skills required by British companies and planters, carpenters, bricklayers, etc.

The legacy of colonialism can be seen in today's institutions. For instance, the relationship between the elite and the people in Africa can be described through the lens of "neo-patrimonial politics" (Chabal & Daloz, 1999). African politics works through the distribution of the resources of the state (power, status, wealth, access to markets, etc.) via informal, personal patron-client networks, rather than the formal, impersonal channels of the Weberian legal-rational state. For political elites, power thus becomes a winner-take-all struggle for control of the legally recognized state and its resources. This power struggle permeates all levels of society and often leads to short-termism, rather than long-term developmental planning.

4. Measuring linguistic distance

4.1 An index for linguistic distance

To measure the distance between the language spoken by the different linguistic groups within a country and the official language, we use the Average Linguistic distance from the Official Language (ADOL) indicator put forward by Laitin & Ramachandran (2016). This measure is based on a cladistic definition of linguistic distance as shown by the Ethnologue linguist tree (Eberhard et al., 2019). Tree diagrams classify the structural relationship between languages using nodes, which represent the evolution points of the development and differentiation of languages. Previous literature, like Fearon & Laitin (1999), Fearon & Laitin (2000), Laitin (2000), and Fearon (2003), uses the linguistic tree to produce noisy measures of the distance

between cultural groups that speak different languages. To better understand the idea behind linguistic trees, Figure 2 shows the (simplified) Proto-Indo-European Language Tree.[14]

[Figure 2 approximately here]

Consider Bengali, a language spoken in India and Bangladesh, as our languages of reference. Bengali has only one node in common with English, because both are Indo-European languages. In contrast, Bengali has five nodes in common with Hindi. Both languages belong to the Indic area of the Indo-Iranian segment of Indo-European languages. Finally, Bengali has two nodes in common with Kurdish, for example, being both Indo-Iranian languages and it has no nodes in common with non-Indo-European languages, like Hungarian, which is a Uralic language. To conclude, the linguistic tree shows that closer languages, with more nodes in common, have a similar evolution and languages without nodes in common developed separately.

To construct their measure of the linguistic distance, Laitin & Ramadrachan (2016) used the procedure developed by Fearon (2003). Formally, the linguistic distance between two languages is calculated as:

$$d_{ij} = 1 - \left(\frac{no.of\ common\ nodes\ between\ i\ and\ j}{\frac{1}{2}(no.of\ nodes\ for\ language\ i + no.of\ nodes\ for\ language\ j)} \right)^{\lambda} \quad (1)$$

Here, d_{ij} is equal to one when the difference between two languages is maximal i.e. there are no common nodes between the two languages. Conversely, the difference is minimal the lower the measure and the higher the number of common nodes. Additionally, following Fearon (2003) and others, we select a value for λ equal to 0.5.

Laitin & Ramachandran (2016) calculated the measure in Eq. (1) for every language existing in a country with respect to the official language. They then combined the distances with the different shares in population in each country. The *Average distance from the official language* (ADOL) for any country *i* is calculated as follows:

[14] Due to space constraints, the linguistic tree is a simplified version of the tree used in this paper and of the Ethnologue tree.

$$ADOL_i = \sum_{j=1}^{n} P_{ij} d_{jo} \quad (2)$$

where n represents the number of linguistic groups in the country, P_{ij} is the population share of the group j in country i. Finally, d_{jo} measures the distance of the language of group j from the official language o.

Figure 3 plots the values of ADOL across the world. The Figure shows a clear concentration of high values in Africa and most former colonies, such as India, with lower values in Asia and still lower in Europe, the home of the colonial powers. The level is also low in Latin and North America, which were also colonized, but where native languages were almost wiped out by colonization, unlike in Africa.

[Figure 3 approximately here]

4.2 ADOL and linguistic fractionalization

This measure is different from the indices of linguistic fragmentation in the literature (e.g. Alesina et al., 2003; Desmet et al., 2009; Esteban et al., 2012; Greenberg, 1956), focused more on linguistic heterogeneity within the total population. These indices stress the differences over the population ("horizontal") and not the differences between the different segments of the population and the elite. Haiti is a good example of the distinction between the language spoken by the majority of the population and the official language (Liu & Pizzi, 2016). In this country, the official language is French, although the French-speaking group is only 4% of the population. Simply referring to the largest group can help to understand the "horizontal" dynamics but not "vertical fragmentation".

The concept of "vertical fragmentation" is close to that of linguistic disenfranchisement elaborated by Ginsburgh & Weber (2005; 2011). This notion refers to the introduction of "ideologies and structures which are used to legitimate, effectuate, and reproduce unequal division of power and resources (both material and non-material) between groups defined on the basis of language" (Skutnabb-Kangas & Phillipson, 1989: 455). Indices of linguistic disenfranchisement account for multilingualism measuring the distance between the languages spoken by an agent and the core languages of a state, while ADOL does not. However, ADOL

shares with the notion of linguistic disenfranchisement the idea that denying an individual's linguistic rights negatively affects its political and economic opportunities within a society.

ADOL and indices of linguistic fragmentation capture quite different phenomena. The former is concerned with the top-down relationship between the elite and the people, the latter with the ethnic composition of the population as a whole. There may be circumstances in which the two features reproduce the same dynamics, but at the same time, they can represent different forces at work. For example, Argentina has low values of both ADOL and linguistic fractionalization, since Spanish is spoken by the vast majority of people and is also the official language. In contrast, Chad has high values of both indices, since it has two official languages (French and Modern Standard Arabic) and over 120 indigenous languages. A vernacular version of Arabic, Chadian Arabic, is a *lingua franca* and the language of commerce, spoken by 40-60% of the population. The two official languages have fewer speakers than Chadian Arabic. French is widely spoken in the main cities and by most men in the south of the country. Most schooling is in French (Ethnologue). Conversely, Angola has low linguistic fractionalization and high ADOL since Portuguese is the only official language and 46 other languages are spoken in the country, mostly Bantu languages. Six languages have an institutional status: Portuguese, Chokwe, Kikongo, Kimbundu, Oshiwambo and Umbundu (Ethnologue). The opposite case is represented by Lesotho, where the Constitution establishes two official languages (Sesotho and English). Sesotho is the first language of more than 90 percent of the population and is widely used as a medium of communication, while English is reserved for official interactions. Minorities speak Zulu, Phuthi, and Xhosa (Baker & Prys Jones, 1998).

5. Data

This paper uses a cross-country cross-section sample. Data are collected at the country level from multiple sources, generating a novel dataset.

5.1 Fiscal Capacity

Following the previous literature, including Besley & Persson (2009) and Dincecco & Prado (2012), we use a classical measure of fiscal capacity, which is the overall amount of taxes divided by the GDP at the country level (per 100).[15] The source of these data is the UN-WIDER

[15] We also implement the analysis using a different measure of fiscal capacity, the ratio between income tax and GDP at the country level (per 100). More details in Section 7.1.

Government revenue dataset.[16] We use an average measure between 1995 and 2017 at the country level. To understand the distribution of the index across different countries, the values of the variable across the world are shown in Figure 4.

[Figure 4 approximately here]

Figure 4 matches the theoretical results in the literature, for example in Besley & Persson (2009). On average, the richest states are better able to collect taxes than poor and developing countries, especially in Africa.

5.2 Accountability

The second fundamental variable in our analysis is accountability, which cannot be easily measured. We need to rely on an overall index based on expert evaluations. Following the literature, we use a variable of institutional quality at the country level put forward by the World Bank. This index belongs to the World Governance Indicators and it is called *Voice and Accountability*.[17] The variable measures: "[…] *perceptions of the extent to which 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*".[18] We averaged this index over 1995-2017 at the country level. This measure varies from -2.5 to +2.5. The minimum values are for countries with low or no level of accountability, such as dictatorships, and the higher values are for more accountable countries, such as democracies. In this case too, the index is plotted onto a World map, shown in Figure 5.

[Figure 5 approximately here]

Figure 5 shows that our variable works exactly as predicted by the previous literature. Higher values of the index are concentrated in more democratic countries, especially in Europe and other democracies, with maximum values in Scandinavian countries. Lower values are concentrated in Latin America, Asia and Africa.

[16] https://www.wider.unu.edu/project/government-revenue-dataset
[17] https://info.worldbank.org/governance/wgi/
[18] Source: World Bank (https://info.worldbank.org/governance/wgi/Home/Documents)

5.3 Other variables

Our models include a set of controls that could influence our results. We include three different types of controls. First, we include a set of variables about population and economic outcomes. To start with, we include a variable, in logarithmic form, for the size of the population in different countries, averaged between 1995 and 2017. Population is relevant because it influences important national characteristics such as government size or the technical ability of the central government to collect taxes, as suggested for example by Besley & Persson (2009) and Desmet et al. (2020). We also include in this group a set of economic variables. We control for the average GDP per capita (in log) over the years 1995-2017 (like Besley & Persson, 2009; Desmet et al., 2020), using the information provided by the IMF at the country level.[19] Following Desmet et al. (2020), we include a variable for the "potential role" of agriculture, the amount of arable land area (in log) in the country. Additionally, we compute a variable for the percentage of world oil reserves in the country, following Laitin & Ramachandran (2016), averaged between 1995 and 2017.

Second, we include a set of variables on the structure of the country. We include a set of variables about the history of the country, like the average number of years spent fighting external wars (e.g. Besley & Persson (2009)) and a dummy about the previous colonial history of the country, as suggested by Persson &Tabellini (2005).[20] Following the previous literature, we insert a group of different variables about the social structure of the country. First, we need to consider the ethnolinguistic diversity present in the countries. However, a simple measure of ethnolinguistic fractionalization (ELF) can be misleading because, as suggested by Laitin and Ramachandran (2016) and Desmet et al. (2009), the linguistic difference between different groups is relevant. As consequence, we choose a measure used by Esteban et al. (2012), called the Greenberg-Gini Index. This variable measures the ethnic difference present in the country and considers not only the ethnic fractionalization but also the distance of the different groups.[21] The index is structured as follows:

$$Greenberg - Gini\ Index = \sum_{i=1}^{m} \sum_{j=1}^{m} n_i n_j d_{ij} \quad (3)$$

[19] https://data.imf.org/?sk=388DFA60-1D26-4ADE-B505-05A558D9A42&sId=1479329132316.
[20] Given the limited number of observation and to save degrees of freedom, we opted for a dummy instead of the usual set of colonial origins.
[21] We implement the analysis also using another classical measure of the fractionalization, Index of ELF proposed by Fearon (2003). The results are presented in Section 7.3.

With n_i represents the population shares and d_{ij} represents the intergroup distance.[22] To further control we combine this measure with the linguistic polarization proposed by Esteban-Ray in Esteban & Ray (2011). The index is structured as follows:

$$Esteban - Ray\ Index = \sum_{i=1}^{m} \sum_{j=1}^{m} {n_i}^2 n_j d_{ij} \quad (4)$$

The two indices look very similar at first sight. The key difference is the use in Eq. (4) of the square of population shares that reinforces the role of population sizes.

Second, to further control for the linguistic structure of the different countries, we also insert an additional dummy variable about the presence of more than one language in the country. Third, we include a control variable about the contemporary structure of the state, more specifically if the state has a federal structure, as suggested by Persson & Tabellini (2005). Third, we insert a geographical variable in the form of the absolute latitude (in log) to consider the overall differences in geographical characteristics, as previously suggested by Persson & Tabellini (2005). The descriptive statistics for these variables are in Table 1.

[Table 1 approximately here]

6. Empirical analysis: Instrumental variable approach

6.1 IV results

The main empirical strategy in estimating the effect of accountability on fiscal capacity generally implemented is the OLS. However, the OLS strategy raises significant concerns about the validity of the causal relationship. First, the possible influence of omitted variables affecting both the main regressor and the dependent variable can seriously undermine the causal interpretation of the results. Examples are cultural variables or the type of media communication. Unfortunately, suitable controls for these variables are not always available.

Second, reverse causality, i.e. the impact of the dependent variable on the main regressor, may undermine the reliability of our conclusions. This is more unlikely, especially because we use the average measures, but a higher level of fiscal capacity could, for example, increase the

[22] The index can be found in the replication dataset for Estaban et al. (2012).

infrastructure, reputation, and quality of politicians and bureaucrats, raising the level of transparency and accountability.[23]

To solve the possible endogeneity problem and to ensure the causal interpretation of the results, an instrumental variable approach is commonly used. Here we consider accountability correlated with linguistic distance and use the measure proposed in Laitin & Ramachandran (2016), as presented in Section 4 as an instrument for accountability. Formally our approach is presented in the following equations:

$$A_i = \beta_0 + \beta_1 ADOL_i + \beta_2 X_i + \mu_i \quad (4)$$

$$FC_i = \delta_0 + \delta_1 \hat{A}_i + \delta_2 X_i + \varepsilon_i \quad (5)$$

where A_i is the proxy for accountability, instrumented by $ADOL_i$ the instrument. FC_i is the dependent variable, the average fiscal capacity and X_i represents a set of controls, as presented in section 5.3.

To be valid, an instrument must meet two requirements: a) correlation with the endogenous variable (relevance condition); b) exogeneity, i.e. no correlation with the error term (exclusion restriction). We believe that accountability and language are strongly intertwined. As argued in Section 2, language is a fundamental tool for the understanding and interaction of citizens, to hold the elites accountable. However, relevance alone is not enough for an instrument to be valid. A twofold argument supports the exogeneity of our instrument. First, ADOL is computed and measured before the other variables, at the beginning of the ’90s. This avoids concerns regarding reverse causality. Second, we consider our variable as a historical measure because languages and linguistic differences today are the result of lengthy historic processes, such as colonization, as noted in section 3. Using a variable that is highly correlated with our instrumented variable and related to past experience ensures the exogeneity of the instrument. Additionally, we carry out the *plausible exogeneity test*, based on Conley et al. (2012), which evaluates our results in the case of a small violation of the exogeneity assumption (for more details see Section 6.2).

We implement an IV regression following the 2SLS methodology. The results from the first stage (Panel A) and the second stage (Panel B) are presented in Table 2.

[23] For the sake of completeness and clarity, we implement the OLS regression and we report the findings in the Appendix A1. The results are in line with those producted by the IV.

[Table 2 approximately here]

The findings from the first-stage regressions in Panel A indicate a negative and significant relationship between the instrument (ADOL) and the instrumented variable for all specifications. Although all coefficients are negative and significant, there is some variation across the different specifications. In Table 2 Panel A the coefficient for specification (1) of the variable of interest, with no controls, is -0.937, while the coefficient for specification (12), which includes all the controls, is -0.694. In terms of magnitude, one standard deviation increase in ADOL is equivalent to a decrease of 0.36 standard deviation in the measure of accountability for specification (1) and a decrease of 0.28 standard deviation in the measure of accountability for specification (12). The F-statistics for testing the significance of the instrument are reported at the bottom to gauge the strength of the instrument. The instrument is very strong, with all the F-statistics above the value of 10 for testing for weak instruments. Additionally, the F-statistics are all above the critical 10% value for all specifications put forward by Stock & Yogo (2005), which is 16.38. The only exception is the specification (11) whose F-statistics is just below the critical 10% value in Stock & Yogo (2005) but above the critical 15% value, which is 8.96. Overall the F-statistics point to a strong instrument and these findings are in line with our main hypothesis for the instrument. Overall, an increase in the average linguistic distance leads to a decrease in the general level of accountability.

Other significant coefficients for all specifications in Panel A in our first stage include the dummy for the previous colony (negative) and the average percentage of oil reserves (negative). Some other coefficients are significant but not for all specifications, such as average population, negative and significant only for specifications (9) and (10), arable land area, positive and significant only for specification (4), and the dummy for multilanguage country, positive and significant only for specifications (8) and (9).

In Panel B, the findings for the second stage are presented and indicate that coefficients for our instrumented variable remain positive and statistically significant in all specifications. The size of coefficients varies across specifications, but not the sign and the significance level. For example, focusing on specification (1) with no controls, the coefficient of interest is 13.19 and highly significant. In terms of magnitude, one standard deviation increase in the instrumented variable is equivalent to an increase of 1.17 standard deviation in the ratio between total tax and GDP. Similarly, specification (12) shows a coefficient of 11.84 and one standard deviation increase in accountability is equivalent to an increase of 0.988 standard deviations in the ratio

between total tax and GDP. Overall, as the number of controls increases, the coefficients change, although not dramatically, and remain positive and highly significant. These findings show that an increase in accountability corresponds to an increase in fiscal capacity, as suggested by the theoretical models and in line with our hypothesis.

Another significant variable is the dummy for arable land area, which is always positive. Other significant variables include population, negative and significant only in specification (11), the average percentage of oil reserves, positive and significant only in specifications (8), (10) and (12), and average external conflict, negative and significant only in specifications (10), (11) and (12) and Esteban-Ray index negative and significant.

A possible concern over our instrument is the presence of countries that changed their official languages at some point. In our sample, only four countries changed their official language: Laos, Somalia, Sri Lanka and Sudan. Replicating the previous analysis excluding these countries from our sample, the results do not change.[24]

6.2 Sensitivity test: Conley test

As suggested in the previous Sections, the findings depend on the reliability of our instrument. While we argued that our identification strategy is likely to hold, in this Section, following Desmet et al. (2020), we challenge our findings allowing small violations of the exclusion restriction. Following the methodology of Conley et al. (2012), known as "*plausible exogeneity*", allows the instrument to have a direct impact on our outcome variable Y_i. Consider the following equation:

$$Y_i = \gamma_0 X_i + \gamma_1 WGI_i + \gamma_2 ADOL_i + \epsilon_i \quad (4)$$

where $ADOL_i$ is the instrument and WGI_i the instrumented variable. The exclusion restriction implies that $\gamma_2 = 0$. The Conley test[25] provides a procedure that allows inference even if γ_2 is not exactly zero. We follow the *local to zero approach* which also assumes that $\gamma_2 \sim \mathcal{N}(0, \delta^2)$.[26] Using this methodology, we obtain a 95% confidence interval for γ_1, our coefficient of interest. The results of the test are presented in Table 3.

[24] Findings available upon request.
[25] We implement the test using *plausexog* command on STATA by Clarke (2017).
[26] We implement plausible exogeneity also using the *Union of confidence intervals* methodology. The results are the same. Findings available upon request.

[Table 3 approximately here]

Table 3 presents the variation in confidence intervals for our instrumented variable according to different levels of violation of the exclusion restrictions for the different specifications of our model, based on Conley et al. (2012). The size of the allowed violation permitted depends on the chosen δ. While the significance of our coefficient decreases, Table 3 suggests that our instrument is robust to violation of the exclusion restrictions up to 60% for all specifications, although there are some changes in significance level.[27] This reinforces the findings of Table 2, which seem to be robust even in the presence of significant violations of the exclusion restrictions.

7. Robustness checks

In this Section, we replicate our results using different variables that represent the same phenomena, to evaluate the impact of our initial choice of variables. This section is structured as follows: we first replace our measure of fiscal capacity (Section 7.1), then our dependent variable (Section 7.2) and finally our control for ethnolinguistic fractionalization (Section 7.3).

7.1 Changing the measure of Fiscal Capacity

In the main analysis presented in Section 6, we use as a proxy for fiscal capacity one of the most used measure, the ratio between total taxes and GDP. The previous literature, such as Besley & Persson (2011), suggests another measure: the ratio between income tax and GDP (per 100). This variable is provided by the UN-WIDER *Government revenue dataset* and it is averaged between 1995 and 2017 at the country level. We replicate the main analysis presented in Section 5 with *Income Tax/GDP* as the dependent variable. The results from the first stage (Panel A) and the second stage (Panel B) are presented in Table 4.

[Table 4 approximately here]

In Panel A the results for ADOL are negative and highly significant and similar to those presented in Panel A in Table 2. Also in this case, the F-statistics in all specifications are above

[27] For specifications from (1) to (10) our instrument is robust for higher percentage of violation of the exclusion restrictions, as it is possible to see in Tables 3. However, we are conservative and decide to include in the comments only when the violation hold for all specifications.

the critical value of 10, suggesting a strong instrument. Additionally, the F-statistics are all above the critical 10% value for all specifications put forward by Stock & Yogo (2005), except for specification (11) whose F-statistics is still above the critical 15% value. Overall the F-statistics are in line with the previous results.

In Panel B, the findings for the second stage for our instrumented variable are positive and significant for all specifications. The results are in line with those presented in Table 2 although the size tends to be smaller, both in terms of coefficients and of magnitude (for example, when all variables are used, one standard deviation increase in accountability is equivalent to an increase of 0.81 standard deviations in the ratio between income tax and GDP. However, they have a lower variation across different specifications. Overall, these findings confirm the results presented in Table 2 and show that an increase in accountability corresponds to an increase in fiscal capacity.

7.2 Changing the measure of Accountability

Accountability is very difficult and complex to measure. To check whether our results depend on the chosen definition of accountability, we rerun our analysis using the measure of institutional quality of the Polity-IV dataset, called *xconst.* This variable quantifies the extent of institutionalized constraints on the decision-making powers of chief executives, averaged over 1995-2017.[28] This section presents the findings for our instrumental variable approach. The results for the first stage (Panel A) and the second stage (Panel B) of the IV model are presented in Table 5.

[Table 5 approximately here]

The results for the first stage, Panel A, are negative and highly significant for all specifications, in line with the results presented in Panel A of Table 2. In terms of magnitude, one standard deviation increase in ADOL is equivalent to a decrease of 0.32 standard deviation in *xconst* for specification (1) and a decrease of 0.27 standard deviation in *xconst* for specification (11).

[28] The variable has the following values: 1 - Unlimited Authority (there are no regular limitations on the executive's actions), 2 - Intermediate Category, 3 - Slight to Moderate Limitation on Executive Authority (There are some real but limited restraints on the executive), 4- Intermediate category, 5 - Substantial Limitations on Executive Authority (The executive has more effective authority than any accountability group but is subject to substantial constraints by them), 6 - Intermediate category, 7 - Executive Parity or Subordination (Accountability groups have effective authority equal to or greater than the executive in most areas of activity).

Analogously to the previous tables, the F-statistics in all specifications are above the critical value of 10. Additionally, the F-statistics for the majority of specifications are all above the critical 10% value for all specifications put forward by Stock & Yogo (2005). In this case there are two exceptions, specifications (9) and (11), but both are above the critical 15% value. Overall, the F-statistics point to a strong instrument and these findings are in line with those presented above.

In Panel B of Table 5, we present the results for the second stage of our analysis using *xconst*. All the coefficients for our instrumented variable are positive and highly significant for all specifications, in line with those presented in Panel B of Table 2. Compared to the results presented in Table 2, the findings in Table 5 Panel B seem to have a higher variation across specifications. Overall, these findings confirm the results presented in Table 2 and suggest that our results also hold for a different definition and measure of accountability.

7.3 Changing the measure of Fractionalization

In this section, we replicate our analysis changing the measure of fractionalization. As suggested above, ADOL is related but distinct from the idea of linguistic fractionalization. Following the example proposed by Laitin & Ramachandran (2016), we have inserted as control the Greenberg-Gini Index, which takes into account both the level of linguistic fractionalization in the country and the linguistic differences present in the country. Given the relevance of this variable in our analysis, it is possible to question if the choice of this specific index can undermine the validity of our analysis. We replicate the above analysis using the index of ethnic fractionalization proposed by Esteban et al. (2012) measured as the original population shares from Fearon (2003), where no intergroup distance is present. The index can be expressed as:

$$Fractionalization = \sum_{i=1}^{m} n_i \, (1 - n_i) \quad (6)$$

With n_i represents the population shares.[29] The results for the first stage (Panel A) and the second stage (Panel B) of the IV model are presented in Table 6.

[Table 6 approximately here]

[29] The index can be found in the replication dataset for Estaban et al. (2012). The fractionalization index, called *frac_fear* in the dataset, is correlated at 0.9 with the Fractionalization index proposed by Alesina et al. (2003).

The results for the first stage, Panel A, are negative and highly significant for all specifications, in line with the results presented above. The F-statistics in all specifications are above the critical value of 10, pointing to a strong instrument, with one exception, the specification (10), which is slightly below the 10 threshold (8.24). The F-statistics for all specifications are between the critical 10% value and the critical 15% value proposed by Stock & Yogo (2005). Overall, the F-statistics reinforce our idea that our instrument is strong enough for our analysis.

In Panel B we present the results and all the coefficients for our instrumented variable are positive and highly significant for all specifications, in line with the baseline results. Overall, these findings confirm the results presented in Table 2.

8. Conclusions

This paper analyzes a new transmission channel in the relationship between accountability and fiscal capacity in a cross-country sample. We use an average measure of linguistic distance from the official language called ADOL (Laitin & Ramachandran, 2016). The intuition behind this instrument is that if the official language is different from the language used every day by people, this creates a distance between the ruling elite and the people, which insulates the former from the latter, reducing accountability. The existence of an official language different from the everyday language is a lasting consequence of colonialism. We instrument our measure of accountability with ADOL and implement a 2SLS strategy. The results show a negative association between linguistic distance and accountability, and a positive relationship between accountability and fiscal capacity, which is also robust to a different definition of accountability, changes in the sample, and the plausibility of the instrument.

This complements previous channels described in the literature, in particular, ethnolinguistic fragmentation. This variable measures‘ horizontal fragmentation’ across groups in a given polity. Our instrument appraises ‘vertical fragmentation’, which represents the linguistic distance between a ruling group and the society.

This paper suffers from some limitations. First, the nature of the data makes it only possible to use a cross-section of countries, therefore leaving some unobservable confounding factors unmodelled. Second, we cannot exclude that some common factors may affect some of our variables, may reduce the credibility of our approach. However, we have shown that our instrument is still valid even after a large violation of exogeneity.

Further work may explore the relationship between language diversity and trust in the government at a subnational level, for example in Africa and India, possibly reducing the above-mentioned limitations.

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A1 Appendix: OLS approach

To be more complete in our analysis, we also compute the results from an OLS regression between fiscal capacity and accountability as presented in equation (3):

$$FC_i = \beta_0 + \beta_1 A_i + \beta_2 X_i + \varepsilon_i \qquad (3)$$

where FC_i is the dependent variable, the average fiscal capacity, A_i the proxy for accountability and X_i represents a set of controls as indicated in Section 5. The results are presented in Table A1.

[Table A1 approximately here]

The results in Table A1 show that the accountability index is positive and highly significant. In terms of magnitude, in specification (1) the increase of one standard deviation is equivalent to an increase of 0.66 standard deviations in the ratio between total tax and GDP. However, with an increase in the number of control variables, our coefficient of interest slowly decreases. Overall, it remains more or less stable. For example, in specification (11), which contains all the control variables, the increase of one standard deviation is equivalent to an increase of 0.5 standard deviations.

Table A1 also provides other interesting findings. In all specifications, the Table presents negative and significant for the variable about previous colony, positive and significant for the dummy for multilanguage country, arable land and absolute latitude. Moreover, average external conflict is positive and significant in specifications (10), (11) and (12) and population is negative and significant for specifications (4), (5), (6), (7), (8), (9), (10), (11) and (12). Esteban-Ray index is also negative and significant. The remaining variables are non-significant in all specifications. To sum up, the OLS strategy proves that accountability is positively related to fiscal capacity, even when other variables are included in the model.

Table and figures

Table 1: Summary Statistics

	count	mean	sd	min	max
Tax/GDP	147	20.07	11.04	0.8	46.18
Income tax/GDP	141	6.25	4.42	0.03	28.52
Voice Accountability	147	-0.17	0.98	-2.04	1.61
Xconst	146	4.92	1.89	1	7
ADOL	147	0.36	0.37	0	1
Arable land area	146	9.87	1.97	2.23	14.38
Population	147	16.32	1.44	13.44	21.01
GDP	147	14	2.99	7.31	22.36
External confl.	147	0.01	0.04	0	0.35
Oil resource	147	4.24	9.81	0	47.61
Previous colony	147	0.86	0.34	0	1
Multilanguage country	147	0.52	0.5	0	1
Greenberg-Gini Index	132	0.03	0.08	0	0.59
Absolute latitude	147	2.99	0.95	0	4.16
Esteban-Ray Index	132	0.05	0.06	0	0.25
Observations	147				

Notes: Tax/GDP, Income tax/GDP, Voice Accountability, Xconst, Population, GDP, External Conflict are average measures. Arable land area, GDP, Population, Absolute latitude are taken in logarithm. ADOL is the Average distance from the official language with delta equal to 0.5. The Greenberg-Gini Index and the Esteban-Ray Index have also a delta equal to 0.5.

Table 2: IV Regressions

Panel A: First stage reg.	Voice Accountability										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ADOL	-0.937***	-0.955***	-0.927***	-0.871***	-0.872***	-0.859***	-0.850***	-0.743***	-0.856***	-0.689***	-0.694***
	(0.176)	(0.177)	(0.179)	(0.169)	(0.172)	(0.169)	(0.168)	(0.171)	(0.168)	(0.178)	(0.178)
Population		-0.0501	0.00419	-0.0728	-0.0731	-0.105	-0.115	-0.152*	-0.178*	-0.14	-0.129
		(0.051)	(0.066)	(0.085)	(0.086)	(0.088)	(0.086)	(0.087)	(0.092)	(0.100)	(0.104)
GDP			-0.0425	-0.0347	-0.0349	-0.0288	-0.0261	-0.0212	-0.0226	-0.0169	-0.022
			(0.032)	(0.031)	(0.031)	(0.032)	(0.031)	(0.031)	(0.031)	(0.032)	(0.032)
Arable land area				0.0691	0.0644	0.0693	0.0688	0.0678	0.0603	0.0252	0.0274
				(0.048)	(0.049)	(0.047)	(0.048)	(0.050)	(0.054)	(0.059)	(0.059)
Oil resource				-0.0345***	-0.0358***	-0.0365***	-0.0334***	-0.0338***	-0.0356***	-0.0353***	-0.0344***
				(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
External confl.					1.327	0.409	-0.0358	0.412	1.567	1.355	1.353
					(1.395)	(1.465)	(1.408)	(1.567)	(1.091)	(1.184)	(1.125)
Federal						0.406	0.392	0.353	0.246	0.23	0.243
						(0.260)	(0.244)	(0.248)	(0.251)	(0.249)	(0.253)
Multilanguage country							0.345**	0.330**	0.208	0.202	0.207
							(0.141)	(0.139)	(0.132)	(0.132)	(0.132)
Previous colony								-0.528**	-0.431**	-0.369*	-0.360*
								(0.204)	(0.201)	(0.203)	(0.201)
Greenberg-Gini Index									-0.569	-0.699	-0.329
									(0.773)	(0.785)	(0.907)
Absolute latitude										0.131	0.125
										(0.080)	(0.081)
Esteban-Ray Index											-1.038
											(1.136)
Constant	0.167	0.991	0.689	1.278	1.329	1.678*	1.620*	2.590***	3.265***	2.420*	2.337*
	(0.119)	(0.844)	(0.874)	(0.957)	(0.960)	(0.991)	(0.957)	(0.979)	(1.094)	(1.287)	(1.304)
Panel B: IV	Tax/GDP										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Voice Accountability	13.19***	13.25***	13.23***	13.65***	13.64***	13.87***	13.85***	13.78***	13.77***	11.70***	11.84***
	(2.397)	(2.333)	(2.464)	(2.609)	(2.633)	(2.695)	(2.717)	(3.269)	(2.687)	(3.551)	(3.511)
Population		-0.141	-0.118	-1.71	-1.707	-1.354	-1.384	-1.411	-1.818	-1.782*	-1.529
		(0.629)	(0.808)	(1.085)	(1.080)	(1.117)	(1.134)	(1.127)	(1.173)	(1.060)	(1.075)
GDP			-0.0181	-0.0164	-0.014	-0.0482	-0.0415	-0.0407	0.0736	0.0874	-0.0222
			(0.441)	(0.434)	(0.435)	(0.436)	(0.437)	(0.432)	(0.447)	(0.391)	(0.423)
Arable land area				1.465**	1.538**	1.479*	1.479*	1.483**	1.940***	1.692**	1.738**
				(0.747)	(0.761)	(0.769)	(0.757)	(0.748)	(0.712)	(0.708)	(0.747)
Oil resource				0.181	0.2	0.214	0.221*	0.219	0.282**	0.211	0.237*
				(0.123)	(0.132)	(0.137)	(0.130)	(0.146)	(0.133)	(0.140)	(0.136)
External confl.					-20.23	-11.79	-12.99	-12.75	-32.81***	-31.81***	-32.06***
					(19.850)	(19.630)	(20.140)	(20.700)	(11.470)	(10.650)	(10.320)
Federal						-4.057	-4.086	-4.08	-2.523	-2.183	-1.926
						(2.949)	(2.933)	(2.944)	(2.761)	(2.470)	(2.460)
Multilanguage country							0.938	0.953	1.828	2.198	2.283
							(2.070)	(2.130)	(1.692)	(1.586)	(1.610)
Previous colony								-0.278	-1.144	-1.381	-1.132
								(3.166)	(2.520)	(2.303)	(2.268)
Greenberg-Gini Index									-1.163	-3.73	4.576
									(10.170)	(9.540)	(8.694)
Absolute latitude										1.389	1.244
										(1.182)	(1.134)
Esteban-Ray Index											-23.01*
											(12.810)
Constant	22.37***	24.68**	24.56**	35.39***	34.63***	30.31**	30.20**	30.82**	30.07*	27.86**	25.66*
	(0.972)	(10.150)	(10.410)	(11.590)	(11.640)	(12.290)	(12.270)	(13.970)	(15.410)	(13.390)	(13.200)
Observations	147	147	147	146	146	145	145	145	130	130	130
F-Stat	28.45	29.15	26.74	26.5	25.77	25.76	25.67	18.8	25.84	14.98	15.1
R2	0.174	0.169	0.17	0.168	0.175	0.157	0.161	0.168	0.392	0.518	0.519

Notes: Tax/GDP, Income tax/GDP, Voice Accountability, Population, GDP, External Conflict are average measures. Arable land area, GDP, Population, Absolute latitude are taken in logarithm. ADOL is the Average distance from the official language with delta equal to 0.5. The Greenberg-Gini Index and the Esteban-Ray Index have also a delta equal to 0.5.

Table 3: Conley Test: Local to zero approach

	Dep. var.: Tax/GDP										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A:	CI 2sigma=0%										
Voice Accountability	13.192***	13.245***	13.233***	13.652***	13.637***	13.874***	13.847***	13.781***	13.773***	11.697***	11.844***
	(2.397)	(2.333)	(2.464)	(2.609)	(2.633)	(2.695)	(2.717)	(3.269)	(2.687)	(3.551)	(3.551)
Lower bound (CI 2sigma=0%)	8.494	8.673	8.403	8.539	8.476	8.592	8.522	7.374	8.507	4.737	4.962
Upper bound (CI 2sigma=0%)	17.890	17.820	18.060	18.770	18.800	19.160	19.170	20.190	19.040	18.660	18.730
Panel B:	CI 2sigma=10%										
Voice Accountability	13.192***	13.245***	13.233***	13.652***	13.637***	13.874***	13.847***	13.781***	13.773***	11.697***	11.844***
	(2.498)	(2.433)	(2.565)	(2.717)	(2.740)	(2.802)	(2.825)	(3.387)	(2.795)	(3.678)	(3.638)
Lower bound (CI 2sigma=0%)	8.296	8.477	8.206	8.328	8.267	8.382	8.309	7.142	8.294	4.488	4.714
Upper bound (CI 2sigma=0%)	18.090	18.010	18.260	18.980	19.010	19.370	19.380	20.420	19.250	18.910	18.970
Panel C:	CI 2sigma=20%										
Voice Accountability	13.192***	13.245***	13.233***	13.652***	13.637***	13.874***	13.847***	13.781***	13.773***	11.697***	11.844***
	(2.779)	(2.711)	(2.846)	(3.017)	(3.037)	(3.102)	(3.129)	(3.720)	(3.097)	(4.034)	(3.993)
Lower bound (CI 2sigma=0%)	7.744	7.932	7.655	7.739	7.684	7.794	7.715	6.489	7.702	3.789	4.017
Upper bound (CI 2sigma=0%)	18.640	18.560	18.810	19.570	19.590	19.950	19.980	21.070	19.840	19.600	19.670
Panel D:	CI 2sigma=30%										
Voice Accountability	13.192***	13.245***	13.233***	13.652***	13.637***	13.874***	13.847***	13.781***	13.773***	11.697**	11.844***
	(3.194)	(3.120)	(3.260)	(3.460)	(3.477)	(3.546)	(3.578)	(4.217)	(3.544)	(4.567)	(4.524)
Lower bound (CI 2sigma=0%)	6.932	7.131	6.842	6.871	6.823	6.924	6.835	5.515	6.826	2.745	2.976
Upper bound (CI 2sigma=0%)	19.450	19.360	19.620	20.430	20.450	20.820	20.860	22.050	20.720	20.650	20.710
Panel E:	CI 2sigma=40%										
Voice Accountability	13.192***	13.245***	13.233***	13.652***	13.637***	13.874***	13.847***	13.781***	13.773***	11.697**	11.844**
	(3.697)	(3.615)	(3.765)	(3.998)	(4.012)	(4.087)	(4.125)	(4.828)	(4.089)	(5.222)	(5.177)
Lower bound (CI 2sigma=0%)	5.946	6.16	5.853	5.816	5.774	5.863	5.762	4.318	5.759	1.461	1.697
Upper bound (CI 2sigma=0%)	20.440	20.330	20.610	21.490	21.500	21.890	21.930	23.240	21.790	21.930	21.990
Panel F:	CI 2sigma=50%										
Voice Accountability	13.192***	13.245***	13.233***	13.652***	13.637***	13.874***	13.847***	13.781**	13.773***	11.697**	11.844**
	(4.257)	(4.166)	(4.329)	(4.599)	(4.610)	(4.692)	(4.737)	(5.514)	(4.697)	(5.960)	(5.911)
Lower bound (CI 2sigma=0%)	4.848	5.079	4.749	4.638	4.602	4.678	4.563	2.973	4.567	0.0154	0.259
Upper bound (CI 2sigma=0%)	21.530	21.410	21.720	22.670	22.670	23.070	23.130	24.590	22.980	23.380	23.430
Panel G:	CI 2sigma=60%										
Voice Accountability	13.192***	13.245***	13.233***	13.652***	13.637***	13.874***	13.847**	13.781**	13.773**	11.697*	11.844*
	(4.855)	(4.754)	(4.930)	(5.241)	(5.249)	(5.339)	(5.391)	(6.252)	(5.347)	(6.753)	(6.700)
Lower bound (CI 2sigma=0%)	3.677	3.927	3.569	3.381	3.35	3.409	3.281	1.527	3.293	-1.539	-1.288
Upper bound (CI 2sigma=0%)	22.710	22.560	22.900	23.920	23.920	24.340	24.410	26.030	24.250	24.930	24.970
Panel H:	CI 2sigma=70%										
Voice Accountability	13.192**	13.245**	13.233**	13.652**	13.637**	13.874**	13.847**	13.781**	13.773**	11.697	11.844
	(5.477)	(5.366)	(5.558)	(5.910)	(5.915)	(6.015)	(6.074)	(7.024)	(6.026)	(7.584)	(7.526)

Lower bound (CI 2sigma=0%)	2.456	2.727	2.338	2.07	2.043	2.085	1.943	0.0131	1.962	-3.167	-2.907
Upper bound (CI 2sigma=0%)	23.930	23.760	24.130	25.230	25.230	25.660	25.750	27.550	25.580	26.560	26.590
Panel I:	CI 2sigma=80%										
Voice Accountability	13.192**	13.245**	13.233**	13.652**	13.637**	13.874**	13.847**	13.781*	13.773**	11.697	11.844
	(6.118)	(5.996)	(6.204)	(6.598)	(6.602)	(6.711)	(6.777)	(7.821)	(6.724)	(8.442)	(8.379)
Lower bound (CI 2sigma=0%)	1.201	1.494	1.072	0.721	0.698	0.722	0.565	-1.549	0.594	-4.849	-4.579
Upper bound (CI 2sigma=0%)	25.180	25.000	25.390	26.580	26.580	27.030	27.130	29.110	26.950	28.240	28.270
Panel L:	CI 2sigma=90%										
Voice Accountability	13.192*	13.245**	13.233*	13.652*	13.637*	13.874*	13.847*	13.781	13.773*	11.697	11.844
	(6.771)	(6.637)	(6.863)	(7.300)	(7.302)	(7.421)	(7.494)	(8.636)	(7.437)	(9.319)	(9.251)
Lower bound (CI 2sigma=0%)	-0.0792	0.237	-0.219	-0.654	-0.674	-0.67	-0.841	-3.146	-0.803	-6.568	-6.288
Upper bound (CI 2sigma=0%)	26.460	26.250	26.680	27.960	27.950	28.420	28.530	30.710	28.350	29.960	29.980
Panel M:	CI 2sigma=100%										
Voice Accountability	13.192*	13.245*	13.233*	13.652*	13.637*	13.874*	13.847*	13.781	13.773*	11.697	11.844
	(7.433)	(7.288)	(7.532)	(8.012)	(8.012)	(8.141)	(8.222)	(9.464)	(8.160)	(10.210)	(10.137)
Lower bound (CI 2sigma=0%)	-1.377	-1.038	-1.53	-2.05	-2.067	-2.082	-2.268	-4.77	-2.221	-8.315	-8.025
Upper bound (CI 2sigma=0%)	27.760	27.530	27.990	29.350	29.340	29.830	29.960	32.330	29.770	31.710	31.710

Notes: CI stands for Confidence intervals. In Column (1) there are no additional controls present in the regression. Column (2) includes population (log). Column (3) includes controls for population (log) and the average GDP (log). Column (4) includes controls for population (log), the average GDP (log) and area arable land (log). Column (5) includes controls for population (log), the average GDP (log), the area arable land (log) and the average percentage of oil reserves. Column (6) includes controls for population (log) and the average GDP in logarithm, the area arable land (log), the average percentage of oil reserves and the average period in external wars. Column (7) includes controls for population (log) and the average GDP in logarithm, the area arable land (log), the average percentage of oil reserves, the average period in external wars and dummy for federal state. Column (8) includes controls for includes controls for population (log) and the average GDP in logarithm, the area arable land (log), the average percentage of oil reserves, the average period in external wars, dummy for federal state and dummy for multilanguage country. Column (9) includes controls for includes controls for population (log) and the average GDP in logarithm, the area arable land (log), the average percentage of oil reserves, the average period in external wars, dummy for federal state, dummy for multilanguage country and dummy for previous colonization. Column (10) includes controls for includes controls for population (log) and the average GDP in logarithm, the area arable land (log), the average percentage of oil reserves, the average period in external wars, dummy for federal state, dummy for multilanguage country, dummy for previous colonization and Greenberg-Gini Index. Column (11) includes controls for includes controls for population (log) and the average GDP in logarithm, the area arable land (log), the average percentage of oil reserves, the average period in external wars, dummy for federal state, dummy for multilanguage country, dummy for previous colonization, Greenberg-Gini Index and absolute latitude (log). Robust standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: IV Regressions

Panel A: First stage reg.	Voice Accountability										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ADOL	-0.897***	-0.912***	-0.897***	-0.941***	-0.941***	-0.929***	-0.906***	-0.817***	-0.949***	-0.650***	-0.650***
	(0.182)	(0.182)	(0.185)	(0.176)	(0.175)	(0.174)	(0.174)	(0.178)	(0.179)	(0.199)	(0.200)
Population		-0.0585	-0.0207	-0.081	-0.0806	-0.106	-0.123	-0.159*	-0.196**	-0.11	-0.11
		(0.052)	(0.067)	(0.087)	(0.088)	(0.090)	(0.089)	(0.089)	(0.097)	(0.109)	(0.111)
GDP			-0.0305	-0.0389	-0.039	-0.0326	-0.0274	-0.0222	-0.0172	-0.0133	-0.013
			(0.033)	(0.032)	(0.032)	(0.033)	(0.032)	(0.032)	(0.033)	(0.034)	(0.034)
Arable land area				0.0788	0.0789	0.0793	0.0815	0.0825	0.0845	0.0126	0.012
				(0.050)	(0.051)	(0.050)	(0.051)	(0.052)	(0.057)	(0.066)	(0.066)
Oil resource				-0.0419***	-0.0419***	-0.0419***	-0.0374***	-0.0372***	-0.0375***	-0.0399***	-0.040***
				(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.010)	(0.010)
External confl.					-0.0742	-0.967	-0.859	-0.658	0.83	0.768	0.77
					(2.800)	(2.928)	(2.574)	(3.008)	(2.215)	(2.112)	(2.126)
Federal						0.363	0.353	0.298	0.194	0.2	0.2
						(0.273)	(0.257)	(0.261)	(0.266)	(0.260)	(0.263)
Multilanguage country							0.328**	0.325**	0.211	0.181	0.181
							(0.146)	(0.144)	(0.139)	(0.137)	(0.137)
Previous colony								-0.475**	-0.372*	-0.27	-0.27
								(0.202)	(0.200)	(0.198)	(0.198)
Greenberg-Gini Index									-0.281	-0.512	-0.52
									(0.785)	(0.832)	(0.929)
Absolute latitude										0.232**	0.232**
										(0.089)	(0.090)
Esteban-Ray Index											0.02
											(1.173)
Constant	0.152	1.114	0.914	1.388	1.383	1.675	1.664*	2.560**	3.203***	1.6	1.6
	(0.120)	(0.847)	(0.879)	(0.963)	(0.982)	(1.015)	(0.979)	(0.999)	(1.143)	(1.377)	(1.387)
Panel B: IV	Income Tax/GDP										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Voice Accountability	3.816***	3.801***	3.840***	3.830***	3.860***	3.799***	3.699***	3.352***	3.769***	3.910***	3.934***
	(0.866)	(0.857)	(0.886)	(0.839)	(0.818)	(0.834)	(0.824)	(0.848)	(0.735)	(1.357)	(1.360)
Population		0.0511	-0.0365	-0.524	-0.568	-0.626*	-0.704**	-0.877**	-0.854**	-0.865**	-0.852**
		(0.174)	(0.240)	(0.348)	(0.351)	(0.348)	(0.350)	(0.367)	(0.413)	(0.418)	(0.422)
GDP			0.0725	0.0842	0.104	0.104	0.122	0.131	0.169	0.169	0.163
			(0.135)	(0.132)	(0.131)	(0.129)	(0.128)	(0.123)	(0.139)	(0.143)	(0.147)
Arable land area				0.416	0.395	0.398	0.414*	0.446*	0.534**	0.554**	0.561**
				(0.256)	(0.254)	(0.251)	(0.232)	(0.231)	(0.255)	(0.271)	(0.275)
Oil resource				0.0753	0.0787	0.0772	0.0914**	0.0792*	0.104**	0.11	0.113*
				(0.049)	(0.049)	(0.049)	(0.046)	(0.046)	(0.049)	(0.068)	(0.068)
External confl.					10.56	9.232	9.579	9.991	2.166	2.076	1.884
					(8.915)	(9.011)	(10.030)	(8.243)	(3.825)	(4.009)	(4.121)
Federal						0.639	0.634	0.561	0.738	0.708	0.723

						(0.821)	(0.800)	(0.837)	(0.800)	(0.838)	(0.835)
Multilanguage country							1.337**	1.440**	1.540***	1.523**	1.527**
							(0.604)	(0.600)	(0.578)	(0.616)	(0.617)
Previous colony								-1.684	-1.576	-1.569	-1.553
								(1.078)	(1.007)	(1.011)	(1.009)
Greenberg-Gini Index									0.707	0.85	1.429
									(2.412)	(2.603)	(2.806)
Absolute latitude										-0.104	-0.126
										(0.592)	(0.586)
Esteban-Ray Index											-1.576
											(4.546)
Constant	6.828***	5.989**	6.421**	9.884***	10.48***	11.31***	11.43***	15.18***	12.98**	13.24**	13.162**
	(0.341)	(2.885)	(3.039)	(3.484)	(3.572)	(3.654)	(3.693)	(4.597)	(5.223)	(5.378)	(5.396)
Observations	144	144	144	143	143	142	142	142	127	127	127
F-Stat	24.310	24.980	23.550	28.750	28.850	28.330	27.060	21.050	27.960	10.680	10.510
R2	0.396	0.398	0.396	0.429	0.433	0.434	0.463	0.499	0.546	0.539	0.538

Notes: robust standard errors in parenthesis. * p < 0.1, ** p < 0.05, *** p < 0.01. Income Tax/GDP, Voice Accountability, Population, GDP, External Conflict are average measures. Arable land area, GDP, Population, Absolute latitude are taken in logarithm. ADOL is the Average distance from the official language with delta equal to 0.5. The Greenberg-Gini Index has also a delta equal to 0.5.

Table 5: IV Regressions

Panel A: First stage reg.						Xconst					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ADOL	-1.627***	-1.633***	-1.617***	-1.487***	-1.490***	-1.448***	-1.438***	-1.324***	-1.473***	-1.289***	-1.289***
	(0.349)	(0.354)	(0.356)	(0.323)	(0.328)	(0.325)	(0.323)	(0.332)	(0.336)	(0.383)	(0.383)
Population		-0.0166	0.0165	-0.193	-0.194	-0.267	-0.286*	-0.324*	-0.388**	-0.346*	-0.345*
		(0.104)	(0.128)	(0.174)	(0.175)	(0.174)	(0.171)	(0.172)	(0.181)	(0.181)	(0.184)
GDP			-0.0262	-0.0085	-0.009	0.00186	0.00586	0.0112	-0.00449	0.00176	0.001
			(0.065)	(0.060)	(0.059)	(0.059)	(0.058)	(0.057)	(0.060)	(0.061)	(0.062)
Arable land area				0.188*	0.177	0.187*	0.186	0.185	0.186	0.148	0.148
				(0.110)	(0.114)	(0.111)	(0.115)	(0.115)	(0.127)	(0.122)	(0.122)
Oil resource				-0.0867***	-0.0899***	-0.0911***	-0.0857***	-0.0861***	-0.0851***	-0.0848***	-0.085***
				(0.014)	(0.013)	(0.013)	(0.013)	(0.013)	(0.015)	(0.014)	(0.014)
External confl.					3.255	1.28	0.499	0.967	2.509*	2.275	2.274
					(2.283)	(2.148)	(1.883)	(1.996)	(1.454)	(1.480)	(1.486)
Federal						0.901***	0.874***	0.835***	0.660**	0.642**	0.643**
						(0.276)	(0.272)	(0.283)	(0.273)	(0.270)	(0.275)
Multilanguage country							0.609**	0.593**	0.343	0.337	0.338
							(0.258)	(0.258)	(0.247)	(0.248)	(0.247)
Previous colony								-0.551*	-0.372	-0.304	-0.303
								(0.281)	(0.272)	(0.286)	(0.284)
Greenberg-Gini Index									-2.147	-2.292	-2.251
									(1.732)	(1.752)	(1.933)
Absolute latitude										0.144	0.143
										(0.157)	(0.157)
Esteban-Ray Index											-0.115
											(2.474)
Constant	5.513***	5.787***	5.607***	7.239***	7.366***	8.215***	8.135***	9.139***	10.69***	9.758***	9.749***
	(0.216)	(1.750)	(1.771)	(1.856)	(1.877)	(1.848)	(1.793)	(1.875)	(2.073)	(2.265)	(2.280)
Panel B: IV						Tax/GDP					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Xconst	7.469***	7.617***	7.480***	7.905***	7.892***	8.135***	8.127***	7.636***	7.934***	6.183***	6.318***
	(1.600)	(1.607)	(1.634)	(1.713)	(1.725)	(1.817)	(1.828)	(2.019)	(1.790)	(1.957)	(1.987)
Population		-0.629	-0.18	-1.151	-1.148	-0.613	-0.636	-1.013	-1.166	-1.259	-0.873
		(0.704)	(0.975)	(1.407)	(1.410)	(1.450)	(1.468)	(1.434)	(1.576)	(1.405)	(1.413)
GDP			-0.356	-0.402	-0.398	-0.441	-0.437	-0.401	-0.182	-0.103	-0.274
			(0.501)	(0.502)	(0.498)	(0.502)	(0.507)	(0.483)	(0.523)	(0.431)	(0.447)
Arable land area				0.901	1.002	0.903	0.904	0.988	1.282	1.066	1.121
				(0.983)	(1.006)	(1.025)	(1.017)	(0.981)	(1.105)	(0.989)	(1.103)
Oil resource				0.396**	0.423**	0.450**	0.455**	0.411**	0.467**	0.323*	0.365**
				(0.179)	(0.184)	(0.194)	(0.186)	(0.199)	(0.187)	(0.176)	(0.175)
External confl.					-27.86	-16.66	-17.54	-14.39	-31.12*	-30.01*	-30.394*
					(21.160)	(20.030)	(20.450)	(20.230)	(18.190)	(17.720)	(15.836)
Federal						-5.717	-5.741	-5.557	-4.349	-3.441	-3.104

						(3.644)	(3.596)	(3.494)	(3.217)	(2.961)	(2.993)
Multilanguage country							0.697	0.894	1.901	2.415	2.555
							(2.462)	(2.370)	(2.019)	(1.703)	(1.725)
Previous colony								-3.423	-4.195*	-3.889*	-3.541
								(3.064)	(2.547)	(2.252)	(2.231)
Greenberg-Gini Index									8.505	2.714	15.052
									(12.870)	(10.480)	(10.080)
Absolute latitude										2.019	1.815
										(1.250)	(1.226)
Esteban-Ray Index											-34.070**
											(14.617)
Constant	-16.77**	-7.222	-8.884	-5.036	-6.027	-13.85	-13.87	-3.642	-10.28	-4.606	-8.534
	(7.882)	(13.720)	(13.700)	(16.490)	(16.820)	(18.700)	(18.720)	(22.300)	(24.110)	(21.100)	(20.997)
F-Stat	21.67	21.33	20.6	21.19	20.63	19.82	19.79	15.89	19.15	11.33	11.3
Observations	146.000	146.000	146.000	145.000	145.000	144.000	144.000	144.000	129.000	129.000	129.000
R2	-0.248	-0.279	-0.238	-0.237	-0.223	-0.272	-0.269	-0.15	0.0669	0.336	0.339

Notes: robust standard errors in parenthesis. * p < 0.1, ** p < 0.05, *** p < 0.01. Tax/GDP, Xconst, Population, GDP, External Conflict are average measures. Arable land area, GDP, Population, Absolute latitude are taken in logarithm. ADOL is the Average distance from the official language with delta equal to 0.5. The Greenberg-Gini Index has also a delta equal to 0.5.

Table 6: IV Regressions

Panel A: First stage reg.	Voice Accountability									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ADOL	-0.796***	-0.844***	-0.782***	-0.803***	-0.778***	-0.760***	-0.769***	-0.741***	-0.643***	-0.658***
	(0.237)	(0.240)	(0.245)	(0.242)	(0.243)	(0.232)	(0.232)	(0.230)	(0.224)	(0.226)
Fractionalization	-0.664	-0.604	-0.646	-0.464	-0.49	-0.517	-0.466	-0.309	-0.2	-0.132
	(0.439)	(0.441)	(0.443)	(0.431)	(0.432)	(0.417)	(0.409)	(0.399)	(0.424)	(0.427)
Population		-0.0768	-0.0146	-0.118	-0.115	-0.138	-0.139	-0.166*	-0.136	-0.126
		(0.056)	(0.074)	(0.094)	(0.094)	(0.096)	(0.095)	(0.096)	(0.102)	(0.103)
GDP			-0.0475	-0.0337	-0.0347	-0.0282	-0.0254	-0.0214	-0.015	-0.022
			(0.032)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.032)	(0.033)
Arable land area				0.084	0.0721	0.0749	0.0691	0.0658	0.0383	0.033
				(0.053)	(0.055)	(0.053)	(0.053)	(0.054)	(0.061)	(0.062)
Oil resource				-0.0324***	-0.0351***	-0.0358***	-0.0344***	-0.0352***	-0.0350***	-0.0340***
				(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
External confl.					2.156***	1.381	1.063	1.471	1.272	1.322
					(0.798)	(0.908)	(0.979)	(1.074)	(1.162)	(1.108)
Federal						0.318	0.311	0.273	0.247	0.257
						(0.244)	(0.236)	(0.241)	(0.243)	(0.247)
Multilanguage country							0.204	0.202	0.201	0.206
							(0.134)	(0.133)	(0.133)	(0.134)
Previous colony								-0.396**	-0.354*	-0.349*
								(0.198)	(0.199)	(0.197)
Absolute latitude									0.114	0.115
									(0.088)	(0.087)
Esteban-Ray Index										-1.179
										(1.045)
Constant	0.496***	1.750*	1.391	2.126**	2.201**	2.445**	2.350**	3.041***	2.286*	2.282*
	(0.169)	(0.906)	(0.968)	(1.027)	(1.029)	(1.061)	(1.027)	(1.043)	(1.242)	(1.242)
Panel B: IV	Tax/GDP									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Voice Accountability	8.211**	8.316***	8.043**	9.408***	9.801***	9.857***	9.993***	9.815**	8.182*	8.568**
	(3.194)	(3.050)	(3.362)	(3.417)	(3.591)	(3.807)	(3.710)	(3.866)	(4.216)	(4.006)
Fractionalization	-12.13**	-11.95**	-12.28**	-10.31**	-9.819*	-9.725*	-9.047	-8.368*	-7.519*	-6.268
	(5.413)	(5.226)	(5.435)	(5.048)	(5.294)	(5.658)	(5.516)	(4.994)	(4.347)	(4.157)
Population		-0.135	0.0766	-2.128**	-2.126**	-2.085**	-2.078**	-2.236**	-2.139**	-1.897**
		(0.470)	(0.613)	(0.898)	(0.919)	(0.978)	(0.966)	(0.959)	(0.920)	(0.921)
GDP			-0.177	-0.124	-0.0981	-0.104	-0.0679	-0.0527	-0.00835	-0.131
			(0.394)	(0.372)	(0.382)	(0.374)	(0.373)	(0.362)	(0.322)	(0.358)
Arable land area				2.107***	2.222***	2.215***	2.136***	2.133***	1.900***	1.793***
				(0.603)	(0.637)	(0.646)	(0.601)	(0.592)	(0.588)	(0.612)
Oil resource				0.0854	0.132	0.135	0.157	0.147	0.0919	0.121

				(0.130)	(0.146)	(0.156)	(0.146)	(0.154)	(0.158)	(0.149)
External confl.					-26.69**	-25.68**	-29.59***	-27.41**	-27.46**	-27.086***
					(11.710)	(10.000)	(9.637)	(11.000)	(11.170)	(10.314)
Federal						-0.48	-0.595	-0.729	-0.603	-0.521
						(2.724)	(2.648)	(2.557)	(2.347)	(2.317)
Multilanguage country							2.384*	2.414*	2.733**	2.737**
							(1.392)	(1.377)	(1.338)	(1.356)
Previous colony								-1.933	-2.059	-1.827
								(2.242)	(2.100)	(2.070)
Absolute latitude									1.41	1.381
									(1.004)	(0.974)
Esteban-Ray Index										-20.44*
										(11.341)
Constant	25.84***	27.99***	27.13***	40.53***	38.78***	38.26***	36.81***	40.61***	36.23***	35.28***
	(2.163)	(8.413)	(8.082)	(10.010)	(10.480)	(12.130)	(11.670)	(13.450)	(12.110)	(11.796)
F-Stat	11.24	12.41	10.17	11.04	10.22	10.74	11.02	10.38	8.24	8.461
Observations	132.000	132.000	132.000	131.000	131.000	130.000	130.000	130.000	130.000	130.000
R2	0.576	0.575	0.58	0.596	0.594	0.586	0.592	0.602	0.654	0.654

Notes: robust standard errors in parenthesis. * p < 0.1, ** p < 0.05, *** p < 0.01. Income tax/GDP, Xconst, Population, GDP, External Conflict are average measures. Arable land area, GDP, Population, Absolute latitude are taken in logarithm. ADOL is the Average distance from the official language with delta equal to 0.5. The Fractionalization is the index of ethnic fractionalization proposed by Esteban et al. (2012).

Table A1: OLS Regressions

	Tax/GDP										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Voice Accountability	7.437***	7.419***	7.296***	6.666***	6.696***	6.662***	6.247***	5.588***	6.982***	5.955***	5.856***
	(0.785)	(0.788)	(0.802)	(0.897)	(0.905)	(0.929)	(0.946)	(0.936)	(0.907)	(0.933)	(0.905)
Population		(0.299)	0.153	-1.894**	-1.891**	-1.837**	-1.975**	-2.512***	-2.755***	-2.206**	-1.915**
		(0.480)	(0.617)	(0.854)	(0.857)	(0.883)	(0.879)	(0.799)	(0.900)	(0.925)	(0.943)
GDP			(0.361)	(0.355)	(0.351)	(0.350)	(0.337)	(0.287)	(0.200)	(0.033)	(0.174)
			(0.315)	(0.295)	(0.296)	(0.297)	(0.302)	(0.302)	(0.323)	(0.301)	(0.313)
Arable land area				1.898***	1.937***	1.935***	1.956***	1.996***	2.107***	1.490**	1.537**
				(0.604)	(0.619)	(0.621)	(0.562)	(0.545)	(0.572)	(0.633)	(0.712)
Oil resource				(0.074)	(0.062)	(0.064)	(0.047)	(0.071)	0.012	(0.003)	0.018
				(0.079)	(0.082)	(0.083)	(0.082)	(0.086)	(0.097)	(0.104)	(0.103)
External confl.					(11.360)	(10.450)	(15.050)	(9.649)	-18.47*	-23.56*	-23.46**
					(8.997)	(9.513)	(10.890)	(10.820)	(10.680)	(12.600)	(11.070)
Federal						(0.504)	(0.463)	(0.723)	(0.388)	(0.733)	(0.346)
						(2.253)	(2.161)	(2.071)	(2.067)	(1.929)	(1.909)
Multilanguage country							3.649**	3.696***	3.402**	3.401***	3.565***
							(1.403)	(1.341)	(1.309)	(1.200)	(1.182)
Previous colony								-6.176***	-5.676***	-3.902**	-3.716**
								(2.033)	(1.981)	(1.864)	(1.840)
Greenberg-Gini Index									(8.317)	(10.210)	(0.266)
									(6.320)	(6.349)	(7.131)
Absolute latitude										2.977***	2.875***
										(0.830)	(0.811)
Esteban-Ray Index											-28.43**
											(11.420)
Constant	21.37***	26.25***	23.90***	38.68***	38.24***	37.43***	37.29***	50.26***	51.17***	35.80***	33.47***
	(0.669)	(7.836)	(8.002)	(8.614)	(8.683)	(9.131)	(9.177)	(8.965)	(10.370)	(10.830)	(10.700)
Observations	147	147	147	146	146	145	145	145	130	130	130
R2	0.433	0.434	0.44	0.486	0.487	0.482	0.507	0.538	0.613	0.661	0.674

Notes: robust standard errors in parenthesis. * p < 0.1, ** p < 0.05, *** p < 0.01. Tax/GDP, Voice Accountability, Population, GDP, External Conflict are average measures. Arable land area, GDP, Population, Absolute latitude are taken in logarithm. ADOL is the Average distance from the official language with delta equal to 0.5. The Greenberg-Gini Index has also a delta equal to 0.5.

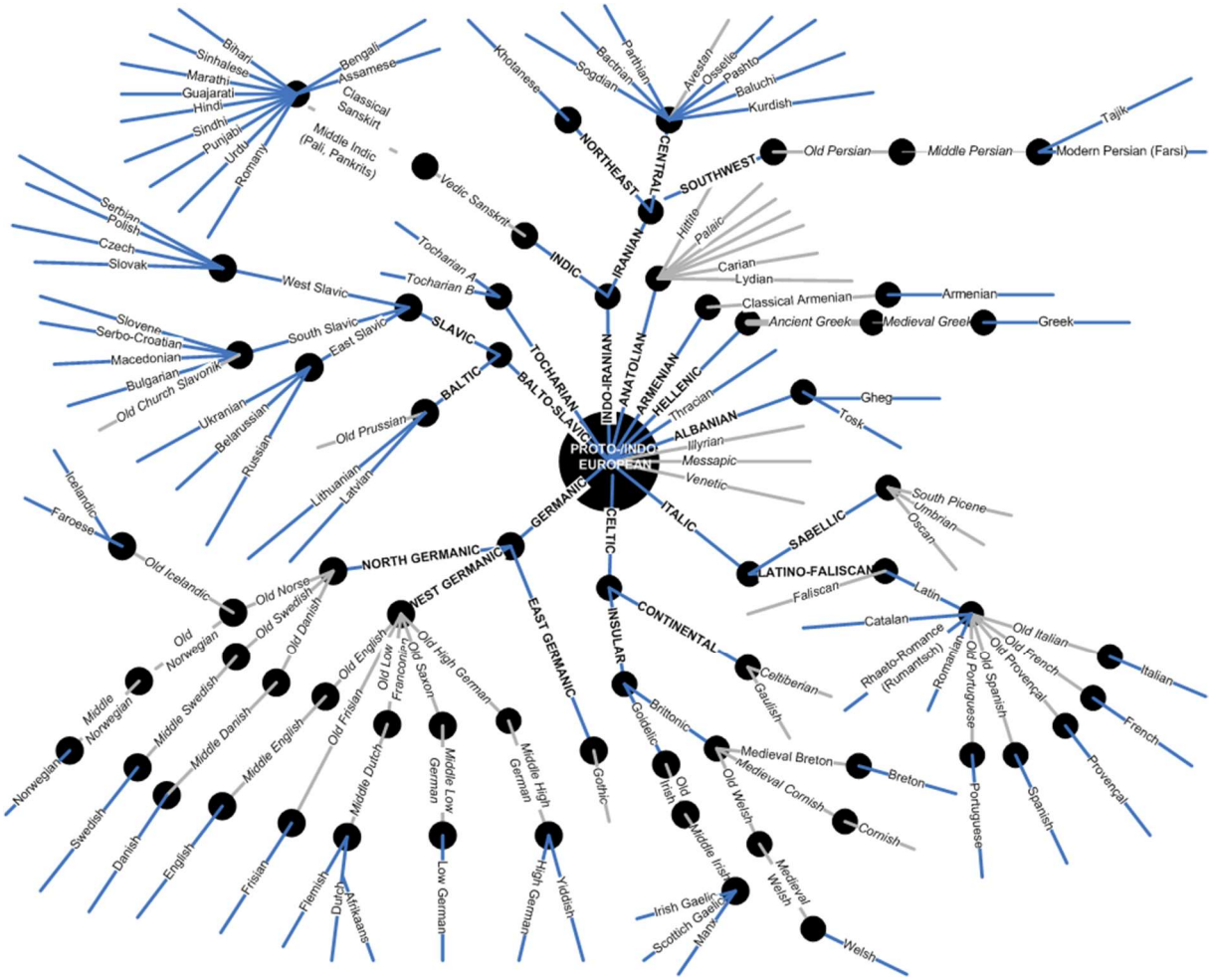

Figure 2: *The Proto-Indo-European Language Tree* (Source: Intersol, Inc. Translation and Localization[30])

[30] https://intersolinc.wordpress.com/2015/01/27/differences-and-similarities-between-the-tree-of-life-and-the-tree-of-languages/

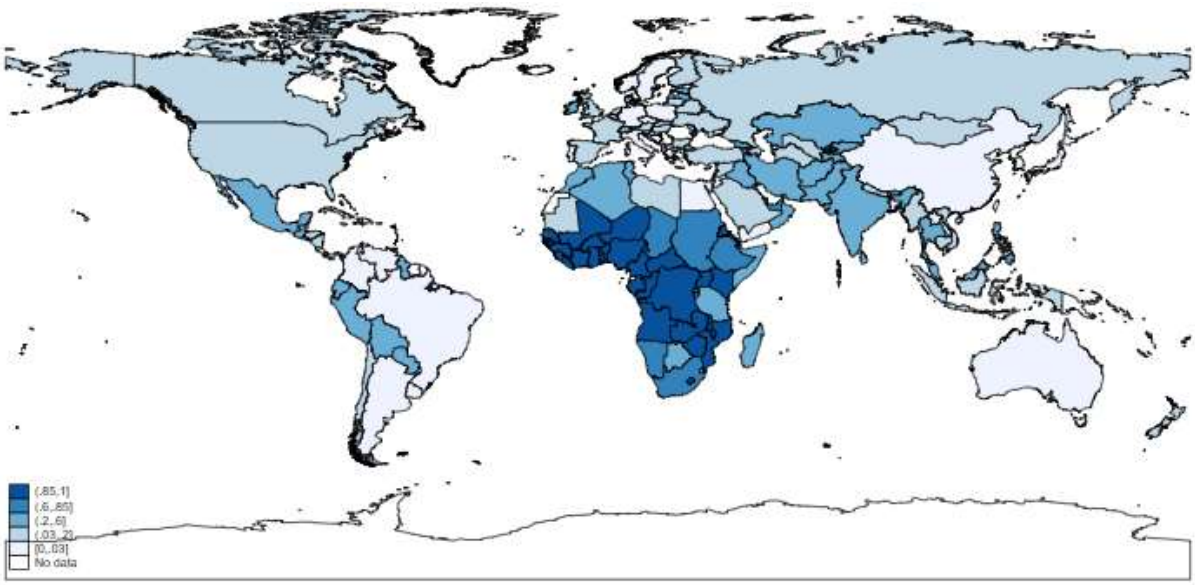

Figure 3: ADOL across the World

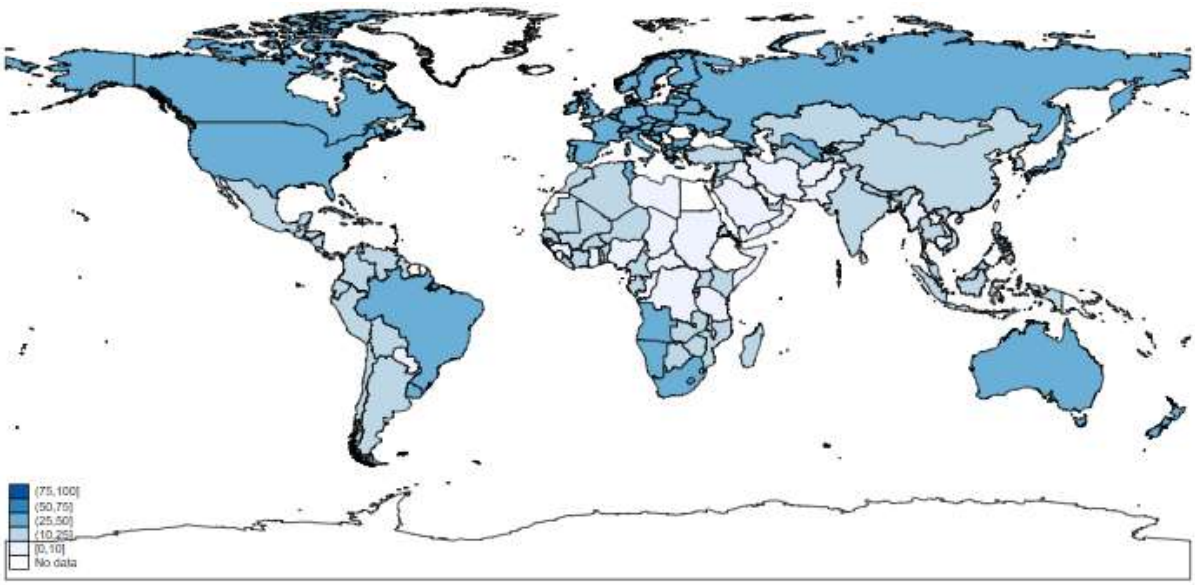

Figure 4: Fiscal Capacity across the World

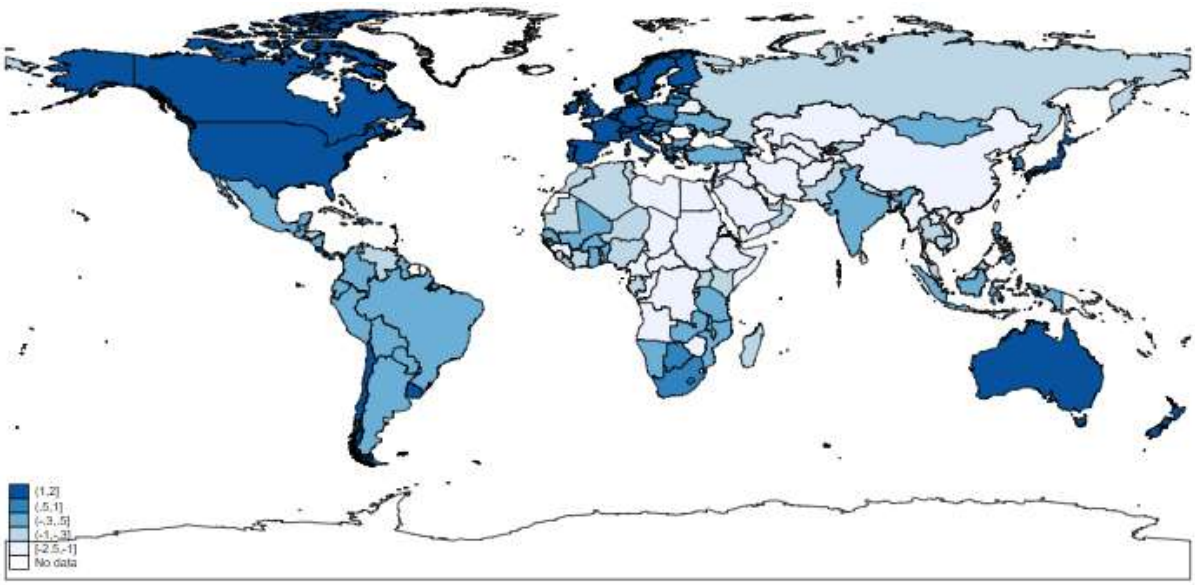

Figure 5: Accountability index across the World