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WHEN DOES GOVERNMENT DECENTRALIZATION AFFECT CORRUPTION?

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ABSTRACT

Are countries with more decentralized fiscal and spending powers characterized by a lower level of corruption? Do changes in the degree of decentralization of such powers affect the level of corruption? This paper innovates on the previous literature, which relies mainly on cross sections of countries, by analyzing a pool of 24 countries for the time interval 1995-2007. The answers are positive on both counts. The results appear robust to changes of the estimation techniques, of the indicators of fiscal decentralization and of a variety of controlling factors.

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1. Introduction

Are countries with more decentralized fiscal and spending powers characterized by a lower level of corruption? Do changes in the degree of decentralization of such powers affect the level of corruption? And, if this is the case, how long does it take? The empirical literature on the determinants of corruption and on the relationship between government decentralization and corruption has addressed the first question in part and in a rather unsatisfactory way. The second and third questions have not been addressed at all. The goal of this paper is to mark an improvement on all three counts.

Empirical studies of the determinants of corruption, including the degree of administrative and fiscal decentralization of government, are generally based on cross country regressions (Fan *et al.*, 2009; Arikan, 2004; Bjedov *et al.*, 2010; Treisman, 2007, 2000; Bardhan and Mokherjee, 2005; Kunicová and Rose-Ackermann, 2005; Fjeldstad, 2003; Fisman and Gatti, 2002; De Mello and Barenstein, 2001; Huther and Shah, 1998), if not on case studies (Jin *et al.*, 2005; Zhuravskaja, 2000; Montinola *et al.* 1995). For a variety of reasons, including data limitations, the time series dimension of the link between decentralization and corruption has never been examined so far². Cross section regressions rely on the implicit assumption that countries are on their steady state equilibria for both the level of corruption and the vertical distribution of government competencies. This is far from reality: many countries, within and outside the OECD group, are undergoing important processes of decentralization of their power to tax and spend, some precisely to improve accountability and reduce corruption in the public sector (OECD, 2010; Eskeland *et al.*, 2003; Rodden, 2003; Stegarescu, 2005). Furthermore, various indices of corruption, notably Transparency

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² Enikolopov and Zuravskaya (2007) consider a pooled regression of public goods provision and a cross country analysis on an indicator of corruption. It is not clear to what extent the two dependent variables capture the same phenomenon.

International's CPI denote cardinal and ordinal changes of the countries' degrees of corruption during the time interval they cover, i.e., from 1995 onwards. Graph 1 and graph 2 report the mean and the standard deviations of the CPI and of the share of subcentral expenditures over the total for 28 countries for the 1995-2007 time interval; the standard deviations, in particular, reveal that the changes in these two series are quantitatively important. Hence, averaging out data about decentralization and corruption into a single observation for each country not only involves a loss of information, but also leads to incorrect statistical inferences. The availability of time series for both the indicators of corruption and of government decentralization makes it now possible to examine the dynamics of the relationship between the two.

Graph 1 and 2 about here

The consideration of the time series dimension enables also to answer the second question, namely, whether countries that have decentralized the government functions have also experienced changes in their degree of corruption, other things being equal, and with which delay. The recent empirical literature on the nexus between decentralization and government growth has evidenced that the immediate effects of a decentralization reform can be quite different from their long run, equilibrium ones (Rodden, 2003; Ashworth *et al.*, 2011, 2010). In the short run, decentralizing the power to tax and spend to lower government units may involve greater institutional uncertainty, overlaps of government functions and higher information costs that might lead to higher spending, contrary to what the Leviathan hypothesis predicts (Brennan and Buchanan, 1980). In time, however, the fine tuning of the reform, a higher flux of information and the processes of tax and yardstick competition between jurisdictions can indeed prune down the growth of government. A similar dynamics might also characterize the relationship between government decentralization and corruption. In such a case, the effects after one year might be quantitatively and qualitatively

different from those at three, five or more years. Discovering the dynamics of the relationship is not only heuristically interesting, but holds important consequences also for policy reform.

Another contribution that the literature on decentralization and corruption can draw from that on decentralization and government growth is the idea that decentralization can improve the agency problems that generate both government overspending and corruption, provided that it is conducted simultaneously on the revenue and the spending side of the budget (Ashworth *et al.*, 2011; Rodden, 2003). The most recent contributions to the decentralization and corruption literature consider each side of the budget alternatively. Concentrating only on one side while neglecting the other biases the analysis of the impact of decentralization on corruption. If the theoretical presupposition is that overgrazing in taxation breeds corruption (Keen and Kotsogiannis, 2002; Berkowitz and Li, 2000), the larger the size of the common pool, the higher should be the level of corruption. Grant financing of local expenditures in a highly centralized country, where local spending is a small percentage of GDP or of total revenues, has consequences for corruption altogether different than in a highly decentralized country, where most of government spending is decided locally. While it is indeed relevant to verify the effects of alternative ways to finance subnational government spending, it is also important to consider, at the same time, the degree of expenditure decentralization.

We bring evidence to bear on these two questions by examining a sample of 24 countries for the 1995-2007 time interval. The empirical models are specified to combine the contributions derived from the literature on decentralization and corruption with those on decentralization and public sector size. To anticipate the results, the analysis finds that countries with more decentralized fiscal and spending powers are also characterized by lower levels of corruption. Consideration of the time series dimension of the data reveals that it is fiscal, rather than administrative decentralization to play the most important role in the reduction of malfeasance. Furthermore, changes in the degree of fiscal decentralization begin

to show an impact on the level of corruption with a three years lag. In the OECD subsample the effect is driven mainly by the reduction of soft budget constraints in lower levels of government, while in the non OECD countries improvements in education appears to be the most relevant determinant.

The rest of the paper is organized as follows. Section 2 provides a survey of the literature on decentralization and corruption and on the relevant contributions that can be drawn from the closely related literature on decentralization and government size. In section 3 we illustrate the empirical strategy and the specification of the model. The estimates of the relationship between decentralization of the powers to tax and spend and corruption, the first question posed in the introduction, are discussed in section 4. Section 5 presents the estimates of the effects of changes in fiscal decentralization on the level of corruption, i.e., the second question addressed in the paper, and explore the time lag of the correlation. The concluding remarks are in section 6.

2. Literature review

The link between government decentralization and corruption is the subject of a relatively recent, but rapidly expanding literature. Most theoretical and empirical contributions deal with the following question: is decentralization a useful institutional reform to reduce corruption, or does corruption increase as the political and administrative powers are shifted downward? The idea that centralization brings about high levels of rent-seeking, corruption and lack of accountability of government officials has motivated the trend toward greater decentralization that characterize many OECD and non OECD countries since the 1990s (OECD, 2010). Yet, whether this rationale is theoretically sound and factually correct is still a matter of debate.

Two are the main strands of thought on the relationship between decentralization and corruption. One emerges from the 'second generation' literature on federalism, which focuses on the incentives and accountability of government officials, rather than on the heterogeneity of the local preferences. Breton (1996), Weingast (1995), Bardhan and Mookherjee (2005) argue that decentralized systems may guarantee more accountable and 'honest' governance as a result of inter-jurisdictional competition, be it of the resource-flow type *à la* Tiebout (1956) or of the spillover type such as yardstick competition (Besley and Case, 1995; Brueckner, 2003). When bureaucrats compete to offer identical or substitute benefits to private agents, the 'price' of the service is drawn down to zero. The second line of thought is instead based on the idea that the many imperfections that plague the local provision of services may impede the realization of benefits from decentralization. Expanding the competencies of local governments in such a case may breed malfeasance (Prud'homme, 1995; Tanzi, 1996, 1998). Other explanations of a positive correlation between decentralization and corruption are that, when the relationship between citizens and government officials is closer and more frequent, the potential briber needs to affect only a limited segment of the government; this is all the more true if local bureaucrats are poorly trained and less efficient than those operating in the top notches of government. Finally, Franzese (2001) suggests that greater decentralization multiplies the governmental units about which each citizen must be informed; this worsens the agency relationship between citizen and elected officials and increases the room for malfeasance.

These rather contrasting theoretical predictions call for empirical analysis to solve the conundrum. The empirical literature on the issue consists basically in cross-country regressions and case-studies. Huther and Shah (1998), De Mello and Barenstein (2001), Fisman and Gatti (2002), and Arikian (2004) find that a larger subnational share of public expenditures is associated with lower perceived corruption. Measuring decentralization on

the revenue side, Enikolopov and Zhuravskaya (2007) find, instead, that this holds up in developing countries with older and fewer parties in government. Looking at political rather than fiscal indicators, Goldsmith (1999), Treisman (2002), and Kunicová and Rose-Ackerman (2005) report that a federal structure is associated with higher perceived corruption. More recently, however, Fan *et al.*, (2009) suggest that neither the (negative) expenditure decentralization effect nor the (positive) federalism effects are robust. The fiscal decentralization effect appears weakened after controlling for national characteristics, and the federal effect disappears when the number of countries in the sample is expanded. These strikingly dissimilar results may also be due to the different type of indicator of corruption adopted in Fan *et al.*, (2009), which is based on reported experiences rather than subjective perceptions. Treisman (2002) and Arikan (2004) have also examined whether smaller local government units are associated with less corruption because of more intense inter-jurisdictional competition, but obtained inconclusive results. Finally, examining the effect of the vertical structure of states, Treisman (2002) found that a larger number of administrative tiers is correlated with higher perceived corruption, in line with the idea of Franzese (2001). In this respect the fact that subnational governments were appointed or elected did not prove relevant.

Hence, the empirical literature does not allow to unanimously assigning a positive or negative sign to the partial derivative of corruption with respect to decentralization. The mixed evidence depends not only on the variety of samples and estimation techniques, but also, and we would say primarily, on the different definitions of decentralization and corruption that the various studies adopt. These two issues must be evaluated beforehand, to avoid the risk that the review of the various empirical contributions compares the incomparable.

Transparency International's annual corruption perception index (CPI) – and similar subjective measures provided by the World Bank – is the most widely used indicator of corruption has been mostly used in the empirical studies of corruption. The fact that the actual level of corruption is difficult to observe justifies the use of a corruption perception index. Other potential measures of corruption, like the number of prosecuted corruption-related cases in a country, may prove rather noisy; for example, a low arrest rate for bribery may indicate a low prevalence of corruption or, else, widespread corruption with no prevention efforts. Treisman (2007) and Fan *et al.*, (2009) instead rely on data coming from the “World Business Environment Survey” or WBES, that reports responses of businessmen and citizens in particular countries about their own (or close associates') concrete experiences with corrupt officials. Data are available for a cross country of 80 countries for the years 1999-2000 (one observation per biennium). Being based on reported experiences, this indicator should not be influenced by prejudices, word of mouth and the like, as in the case of the CPI. On the other hand, the WBES data may allegedly be affected by self or biased selection; not all businessmen who had to pay a bribe to obtain a contract may wish to report that, especially if such a practice is regular. It is hard to decide which of the two approaches provides the most reliable information. Fortunately, in the context of our sample, which, as we shall see, is determined by data limitations of the measures of fiscal decentralization, the choice of the CPI is quite straightforward. The correlation between the CPI and the WBES indices, for the countries and years where they overlap, is very high ($r = 0,73$, significant at the 5% level), so the availability of a time series dimension for the CPI, absent in the WBES data, dictates our choice.

The concept of decentralization is also disputed and needs to be clarified (Dafflon and Madiès, 2008). Fiscal decentralization focuses on many different aspects that pertain to subcentral governments, like: 1) the autonomy to decide expenditures on local services; 2) the

autonomy to set and collect taxes; 3) the share represented by grants received from higher level governments in the total revenues of the subcentral government; 3) the number government levels that characterize the country's public sector; 4) other dimensions of political decentralization, such as the creation of checks and balances between different governments either via horizontal competition, or vertically across different government levels (Treisman, 2002). Both common pool (Ostrom, 1990; Rodden, 2003) and public choice models (Brennan and Buchanan, 1980) argue that the effects of a move towards greater decentralization are conditional on the choice of the financial instruments, i.e., dimensions 1)-3), and chiefly grants versus the ability to raise taxes at the decentralized level (the so-called "own taxes"). Rodden (2003) finds that expenditure decentralization without corresponding local tax powers will neither engender the beneficial effects of tax competition, nor will it strengthen the agency relationship between local citizens and their representatives. The effect will in fact be quite the opposite, because decentralizing only expenditures breaks the link between taxes and benefits and turns the public sector's resources into a common pool that competing local governments will overgraze. To distinguish the effects of decentralization of both expenditures and revenues, empirical analysis must consider, together in the same model, the indicators of the degree of expenditure autonomy, of tax autonomy and of dependency on transfers from the central government (Ashworth *et al.*, 2011, 2010).

The dynamics of the relationship is another aspect raised by the literature on the nexus between federalism and government size, which may prove relevant also for the relation between decentralization and corruption. In the short run, the movement towards greater decentralization may create an institutional hybrid that enhances, rather than reduce, problems of electoral control of the government and therefore breeds corruption (Scharpf, 1988; Rodden and Rose-Ackermann, 1997; Bardhan and Mookherjee, 2000). Only when the countries reach their long run equilibria can decentralization be associated to lower government size and lower corruption.

The empirical literature on decentralization and corruption has been rather cavalier, if not neglectful with respect to these latter two points. International cross-country studies such as Goldsmith (1999), Kunicová (2002), Kunicová and Rose-Ackerman (2005) have equated decentralization to the federal structure of the country's government. Fisman and Gatti (2002) went a step further, by looking also at the share of the general government's budget that is spent locally. Fan *et al.*, (2009) have improved on this situation by considering various dimensions of fiscal and administrative decentralization, including the number of government units, the share of local taxes and the share of transfers to subcentral governments. All these fiscal indicators of decentralization are entered separately in the regression model and are averaged out, to fit into the cross sectional dimension of the indicator of corruption. This is highly unsatisfactory because, as we have seen, averaging out the time dimension of measures of fiscal decentralization involves a loss of information and potentially leads to incorrect statistical inferences. It is no accident that in cross sectional studies, such as Fan *et al.*, (2009), measures of administrative decentralization, such as the number of government units and the like, appear to be more strongly correlated with corruption, because they are more stable through time than indicators of fiscal decentralization. The problem is that measures of administrative decentralization are inherently imprecise, and probably not very meaningful, as similar structures of administrative decentralization have been shown to support a large variety of degrees of fiscal decentralization (Eskeland, Rodden and Littvack, 2003; OECD, 2010). Finally, all these studies consider measures of tax and expenditures decentralization alternatively. This is highly problematic, because grant financing of local expenditures in a highly centralized country, where local spending is a small percentage of GDP or of total revenues, has consequences for corruption altogether different than in a highly decentralized country, where most of government spending is decided locally. As Ashworth *et al.* (2011, 2010) show, it is important to simultaneously control for both tax and expenditure decentralization in

order to have a correct representation of the effects, on corruption as well as on other phenomena, of the decentralization process. They also propose a way to minimize problems of collinearity between the expenditure and the revenue sides of the budget.

In this ensuing analysis we try to introduce the contributions of the literature on decentralization and government size to improve our understanding of the link between fiscal decentralization and corruption.

3. *Empirics*

3.1. Empirical strategy. To answer to the questions posed at the beginning, namely: Are countries with more decentralized fiscal and spending powers characterized by a lower level of corruption? Do changes in the degree of decentralization of such powers affect the level of corruption? If so, with which delay? We estimate two variants of the same empirical model. For the first question, indicators of corruption and fiscal decentralization must be considered in levels, together with the (mostly time-invariant) vector of controls of the other determinants of corruption. For the second question, instead, which is directly related to variations in the degrees of decentralization and corruption, the same indicators must be considered in rates of change. Moreover the lag structure of the relationship must be progressively increased, to analyze how much time it takes for processes of decentralization to produce equilibrium changes in the level of corruption.

The structure and quality of the data is a conditioning factor for the empirical strategy. Data about corruption have not the same reliability as those on, say, GDP; they are based on surveys, are not subject to periodical revisions and are collected with annual and sometimes biannual frequency. Also the indicators of fiscal decentralization, as we shall see in section 3.2, raise some concerns, as they possibly overestimate the sub-central governments' actual

autonomy in fiscal decisions. Finally, the theoretical literature does not offer a model of the dynamics of the correlation between decentralization and corruption. These problems are well known in this literature and are by no means unique to the present analysis. We choose to deal with them upfront, by looking for robust structural correlations among the phenomena under scrutiny; in other words, the analysis will verify whether the results are sensitive to changes in the specification of the regression model, in the choice of the empirical series available to proxy a single theoretical variable, and in the estimation techniques adopted.

3.2. Data and model specification. The empirical analysis employs a panel of 24 countries between 1995 and 2007. Data availability for measures of fiscal decentralization determines the size of the cross section, while the CPI series sets the boundaries of the time interval. Overall we have 312 observations per variable, which should ensure enough degrees of freedom to achieve efficient estimates. The countries considered are Australia, Austria, Belgium, Bolivia, Canada, Chile, Denmark, Finland, France, Germany, Ireland, Israel, Italy, Luxemburg, the Netherlands, Norway, Romania, South Africa, Spain, Sweden, Switzerland, Thailand, the United Kingdom and the United States. The majority of them are developed countries, but about one third are either developing or non-OECD countries. An interesting feature of the panel is that it features a considerable variety of institutional systems, geographic locations and degrees of fiscal decentralization, which span through (nominally) federal and centralized countries. The time dimension should be long enough for a process of decentralization (or, conversely, centralization) to attain its long run equilibrium effects on the level of corruption.

Our baseline estimating equation combines the contributions from the literatures on decentralization and corruption with those on decentralization and public sector size.

Equation (1) lists the variables in their levels, i.e., the specification used to answer the first question.

$$\begin{aligned}
 CPI_{it} = & a_0 + a_1GRANTS_{it} + a_2OWNREV_{it} + a_3DECENTRALIZATION_{it} + \\
 & a_4TOTEXP_{it} + a_5GDPPC_{it} + a_6SCHOOL_{it} + a_7POP_{it} + a_8OPEN_{it} + a_9FUEL_{it} + \\
 & a_{10}POLITICS_{it} + a_{11}CULTURE_{it} + a_{12}EF_{it} + u_{it}
 \end{aligned} \tag{1}$$

where i denotes the country and t the year. On the other hand, in order to examine whether changes of the degree of fiscal decentralization produce changes of the level of corruption, we consider the following variant of equation (1), where the time varying variables pertaining to the correlation under investigation are entered as rates of change:

$$\begin{aligned}
 dCPI_{it} = & a_0 + a_1d\Lambda GRANTS_{it} + a_2d\Lambda OWNREV_{it} + a_3DECENTRALIZATION_{it} + \\
 & a_4TOTEXP_{it} + a_5GDPPC_{it} + a_6SCHOOL_{it} + a_7POP_{it} + a_8OPEN_{it} + a_9FUEL_{it} + \\
 & a_{10}POLITICS_{it} + a_{11}CULTURE_{it} + a_{12}EF_{it} + u_{it}
 \end{aligned} \tag{2}$$

where Λ denotes the lag structure and d is the rate of change indicator. The variables can be described as follows:

1) *CPI*, the dependent variable, is the corruption perception index provided by the Transparency International from 1995 to 2007. The ordering of the CPI goes from 0 (most corrupt) to 10 (least corrupt). We keep the index decreasing in its original form, an arrangement that must be kept in mind when interpreting the signs of the estimated coefficients.

2) *GRANTS* are revenues raised by the central government and transferred to sub-national governments (state-regional and local governments) over total revenues. Data come from GFS (various years). According to the common pool theory, the expected sign on this variable is negative, i.e., more grants imply more corruption.

3) *OWNREV* is revenue raised and retained by state, regional and local government units (mainly local taxes, user fees and interest income) over total revenues, from the GFS (various years). These data fail to distinguish between tax revenues that are legislated and collected locally from those that accrue to the sub-national governments through revenue-sharing schemes. This covariate may thus overestimate actual tax autonomy. Public choice and common pool theory predict a positive sign on the coefficient of *OWNREV*.

4) **DECENTRALIZATION** is a vector of dummy variables that capture the degree of decentralization of public expenditures (or, alternatively, revenues) when we control for the effects of fiscal decentralization on the spending (taxing) side of the budget. To construct these dummies we divide the percentage of total spending supplied (alternatively, of total revenues collected) by sub-central government levels in quartiles, ranging from very highly decentralized (highest quartile), to highly centralized spending (lowest quartile), with two middle categories reflecting medium decentralized and highly centralized. The variable equals 1 when the observation falls within that quartile and 0 otherwise. The qualitative structure of the variable minimizes collinearity with the other continuous fiscal covariates. The introduction of this variable is novel but important. The basic premise of our analysis has two themes: to what extent the spending is localized and how any local spending is financed using grants or own taxes. Having just *GRANTS* and *OWNREV* does not capture fiscal decentralization entirely, without adjusting for the underlying preferences for the government level at which spending is carried out. Furthermore, because there is no guarantee that *GRANTS* and *OWNREV* sum to unity, examining the type of expenditure preferences is a way of taking account of any missing revenues. While we expect a positive sign on the highly decentralized countries (highest quartile) and a negative one on the low decentralized dummy, the whole range of signs on the intermediate dummies is *a priori* undetermined.

5) *TOTEXP* is the total public expenditure as a percentage of the GDP. The benefits of corruption come from bureaucrats and politicians being able to divert public resources to private individuals. Thus, the larger the public sector, the greater the possibilities for corrupt endeavors (Tanzi, 1994; Glaeser and Shleifer, 2003; Adsera *et al.*, 2003). While corruption may exploit non fiscal tools, such as regulations and the distribution of rents, it is also true that there is generally a direct correlation between size of the public sector and number of regulations. Lacking continuous data about regulations or bureaucracy size, we concentrate on the amount of public spending. Considered alongside *GRANTS* and *OWNREV*, this variable has also the advantage of controlling to what extent the country's budget is balanced. A negative sign on this variable is expected.

5) *GDPPC* is per capita GDP in U.S. dollars, measured at purchasing power parity and taken from Penn World Tables mark 6.2 (hereafter, PWT). According to the so-called 'Lipset hypothesis' (Lipset, 1960), voters with higher income are expected to be both more willing and capable to monitor public employees and therefore to take action when the latter violate the law. A positive sign is expected.

6) *SCHOOL* is the secondary school enrollment for male and female population, from the Barro-Lee dataset. Again, the Lipset hypothesis (1960) states that education is a way to lead individuals towards a higher value of staying politically involved and to develop a channel towards closer monitoring (Glaser *et al.*, 2004). A positive sign is expected.

7) *POP*, the country population in millions of units, from the PWT, acts as a control for country size. If large countries exploit economies of scale in the provision of public services (Alesina and Wacziarg 1997) and have therefore a low ratio of public service outlets per population, individuals might revert to bribes "to get ahead of the queue". At the same time, larger countries might adopt more decentralized fiscal systems to better cater the diverse preferences of their citizens. Again, for a given level of decentralization, a larger population

implies a lower degree of satisfaction of individual preferences for public services, with greater incentives to resort to briberies. We expect that more populated countries be also more corrupt.

8) *OPEN* is the sum of exports and imports over GDP in percentage terms, from PWT. This variable tests the prediction that increasing trade interdependence improves the competitiveness and productivity of the economy, which should leave less room for corrupt practices. A positive sign is expected.

9) *FUEL* is the percentage of mineral fuels in manufacturing exports (WDI, World Bank, 2007). Ades and Di Tella (1999) found that high endowments of natural resources, inasmuch as they constitute a rent, increase corruption.

10) The vector **POLITICS** is composed of the following variables: *DEMOCRACY* is a multivariate qualitative variable that ranges from -10 to +10. These values are the sum of the country scores for democracy and autocracy for every year, with data drawn from the Polity IV database. Autocratic systems are characterized by the monopolization of power in the hands of small elite, with few or no constraints to prevent it from exercising its own interest. Because of that, a high level of corruption should prevail in the autocratic regimes. In contrast, democratic systems are characterized by diffuse authority, where the executive branches of government are balanced by an elected parliament and an independent judiciary, and where elections allow an alternation in power that should deter corruption. As alternatives, we use the Freedom House indexes of political rights (*PR*) and of civil liberties (*CL*), both also scaled from 0 to 10, where a higher score indicates a higher level of political rights and freedom. *SYSTEM*, in turn, is a multivariate dummy that takes the value of 0 when the government is presidential, 1 when presidents or prime ministers are elected by the assembly and 2 when the system is parliamentary. The values are from the World Bank Database of Political Institutions (hereafter, DPI). The aim of this variable is to control for the

effects of institutions on corruption. Persson and Tabellini (1999) and Persson *et al.* (2003) suggest the existence of a systematic link between corruption and political systems. Presidential systems are more accountable because voters seek consensus among individuals rather than among parties, which should restrict rent extraction. The sign on this variable is expected positive. *VETO* refers to the literature that links divided governments in presidential systems and fragmented governing coalitions in parliamentary systems to “wars of attrition” and budget deficits (Alesina and Drazen, 1991; Tsebelis, 2002). Political fragmentation generates stalemates in decisions, retard efficiency-enhancing economic reforms and, in the process, creates more room for malfeasance.

11) The vector **CULTURE** consists of a set of variables that capture the effectiveness of a legal system which is rooted not only in the formulations of laws but also in the ‘legal culture’, viz., the expectations and practices that inform the way laws get enforced. Different conceptions of the social role of law may imply dissimilar perceptions of the gravity of corruption. Especially in non OECD countries, the former British colonies appear to have a more developed legal culture (La Porta *et al.*, 1999; Treisman, 2000). To represent this effect we use the dummy *BRIT*, which takes the value 1 if the country is a former British colony, 0 otherwise, from Fan *et al.*, (2009). Legal culture has also been shown to be correlated with the protestant work ethic and with a common law legal system. We control for these phenomena with the variables *PROT*, the percentage of protestants in the population, from Barro and McCleary (2005); and *LEG*, a dummy variable that takes the value 1 if the country is characterized by a common law legal system, 0 otherwise, again from Fan *et al.*, (2009). With respect to all three variables we expect a negative sign.

12) Another set of studies on the determinants of corruption has focused on the effect of ethnic fragmentation on corruption (Mauro, 1995; Fearon and Laitin, 1996; Alesina *et al.*, 2002). If an area is worn out by ethnic divisions and leaders tend to allocate resources towards

groups of their own ethnicity, members of one ethnic group might continue to support a leader of their own group, even if he is known to be corrupt. To account for this effect, we use the variable *ETF*, which is the average of the five indices of ethnic fractionalization provided by LaPorta, Shleifer and Vishny (1999).

Finally, to verify the robustness of the estimated correlations, we have controlled for different specifications of fiscal decentralization. First, as we have seen, GFS data report the vertical distribution of own tax revenues, but do not identify the locus where tax decisions are actually made. A country may appear more decentralized than it actually is, insofar as subcentral governments can levy a considerable amount of tax revenues using tax instruments that the central government mandates and regulates. To overcome this problem, Stegarescu (2005) has collected data on subcentral tax autonomy for 18 OECD countries until 2001, by merging GFS data on own revenues with the OECD classification of the tax autonomy of subcentral governments. Specifically, we consider the Stegarescu's aggregate *RD1*, which include own non-tax and capital revenue and autonomous own taxes of subcentral governments that the OECD classifies up to the degree of autonomy *d1*, i.e., the subcentral government has some autonomy in deciding the base and/or the rate (OECD, 1999). Other non-autonomous revenues, such as revenue sharing schemes, are therefore excluded. We use this indicator *RD1* as an alternative to GFS data, although for a more limited sample period and a more homogeneous cross section. For the results on fiscal decentralization to be robust, the estimates coefficient for *RD1* should not be qualitatively different from those obtained using *OWNREV*.

We have also controlled whether expenditure decentralization, holding the vertical distribution of the power to tax constant, similarly affects the level of corruption. To this end we have used two variables from the GFS dataset, *CGEXP* and *SGEXP*, which represent, respectively, the share of total expenditures that pertain to the central and to the subcentral

government levels. Inasmuch as expenditure decentralization betters the satisfaction of individual preferences for public goods and services and improves the citizens-administrators agency relationship, corrupt practices should be less pervasive; we then expect a positive sign on *SGEXP* and a negative on *CGEXP*. When this specification is adopted we control for revenue decentralization by means of dummies drawn from the classification in quartiles of the variable *OWNREV*. Finally, we have also considered the variable *TIER*, i.e., the number of government levels that characterize the country's public sector. This variable captures the degree of administrative, rather than fiscal, decentralization of a country and plays an important explanatory role in the cross section analysis of from Fan *et al.*, (2009). We use it to check whether it is administrative rather than fiscal decentralization that affects corruption the most. Even more importantly, this variable allows us to verify whether adding the time dimension actually increases the explanatory power of this analysis with respect to the previous contributions, which relied on cross section models. Table 1 reports the descriptive statistics for all variables and Table 2 the table of the correlations among the covariates. As expected, there are some high values of correlation (e.g., between common law system and British legacy), that will likely force an alternative use of the covariates to avoid multicollinearity in the estimates.

Table 1 and 2 about here

4. Estimates of the relationship between decentralization and corruption

Table 3 reports the results of the various estimates of Equation (1), where all the variables are inserted in levels.

Table 3 about here

Model 1 proposes the estimates for the entire sample, via pooled EGLS with cross section weighted coefficients, to allow for cross sectional heteroskedasticity, and clustered standard errors, to avoid the risk of inflating the significance of the estimates in the absence of fixed effects. These cannot be introduced because most of the variables of the vectors *POLITICS* and *CULTURE* are time invariant. The results strongly support the view that the method of financing local expenditures matters for corruption. If decentralization is carried out on both sides of the budget, i.e., by increasing also the amount of taxes that are spent locally, corruption is low. Grant financing holds the opposite effect, but it is not statistically significant, at least in this specification. Importantly, controlling for the level of expenditure decentralization is also relevant, since corruption is low only if expenditure decentralization is carried out at a level well above the sample average, i.e., the 60%-80% and 80%-100% quartiles, and the latter even more than the former. Coming to the controlling factors, the dimension of the public sector is statistically insignificant, probably because of its collinearity with *GRANTS* and *OWNREV*; nor GDP per capita appears significant, possibly because what really drives the Lipset hypothesis is the level of education, which shows the expected positive sign. In particular, education was introduced at its initial value, to account for the very long lag with which it produces its effects. *POP* has the expected positive, “jump the queue” effect on corruption, while openness to international trade is negatively correlated, although only at the 10% level. Also the presence of natural resources, introduced at the beginning of sample value to better represent their characteristic of being an endowment, the degree of ethnic fractionalization, the share of protestant believers in the population, the degree of democracy of the country and the adoption of a presidential government system have the predicted signs, are significant and robust to changes of the covariates. The same cannot be said about British colonial legacy, the fact that the legal system is common law and the number of legislative veto players active in the country. As all these variables are highly

time invariant and capture correlated phenomena, multicollinearity conditions the precision of their estimates.

The exploitation of the time series dimension of our sample carries potential problems of endogeneity between some covariates and the degree of corruption. In particular, corruption may affect per capita income, total government expenditures, the exploitation of natural resources and the level of education. To account for that, model 2 presents the estimates of equation (1) via pooled IV-two stages EGLS, again with cross section weights and clustered standard errors. We have chosen this method instead of difference-GMM and system-GMM because several regressors in equation (1), especially the arguments of the **DECENTRALIZATION**, **CULTURE** and **POLITICS** vectors, are time-invariant. Since GMM estimators for panel data explicitly model individual effects, parameter estimates tend to be inflated because of the high degree of collinearity between the time-invariant variables and the fixed effects (Arellano and Bond 1991; Arellano and Bover, 1998; Blundell and Bond 1995). Thus, since unit heterogeneity is already captured by the time-invariant regressors, we used an instrumental variables approach and estimated the model by two-stage least squares. As it is current practice in the literature, we use the lagged value of the potential endogenous regressors as instruments; we have, however, departed from this practice in the case of *FUEL* and *SCHOOL*, which are likely to have a dynamically slow impact on the dependent variable. These variables have been instrumented with the second and third lagged value, the longer excursion that the time dimension of the dataset allows. The Sargan test fails to reject the null that the instruments are uncorrelated with the error term, while the Hausman test rejects the null that the instruments are jointly indistinguishable from 0. The instruments are hence both valid and informative. Under IV estimation, the results specifically related with the correlation between decentralization and corruption appear even more consistent with the theoretical predictions; *OWNREV* keeps its negative estimated coefficient, while *GRANT*

appears positively correlated with corruption and becomes statistically significant. Also the size of the public sector becomes statistically significant, supporting the view that more public spending generally multiplies the opportunities for malfeasance. Once more, this result is conditional on the government level where public spending is carried out, because expenditure decentralization, provided that it is accompanied by tax decentralization, confirms to be an effective constraint on corruption. The other controls maintain their signs and statistical significance; only the estimated coefficient of per capita GDP, once instrumented, becomes positive and acquires significance, at the cost of subtracting it to education – but both covariates were insisting on the Lipset hypothesis.

As a further control of the robustness of the correlation between fiscal decentralization and corruption, we have examined this relationship by looking at it ‘from the other side of the budget’; in other words, we have introduced the share of expenditures supplied by the central government and the subcentral governments as continuous variables, while controlling for tax decentralization by means of the usual dummies that identify the quartiles of medium, high and very high decentralization of own revenues. Again the estimation method is pooled IV-2SLS, with instruments both valid and informative. The results, reported in Model 3, confirm that local spending, controlling for tax decentralization, is correlated with low corruption, while the opposite is true for central government spending. The likely explanations for this effect are the better satisfaction of individual preferences and the improvements of the agency relationship between citizens and elected officials that decentralization brings about. These results are once more conditional on effective tax decentralization, as shown by the own revenue decentralization dummies, which are all positive and become significant at the quartiles between 51% and 75% of the interval, where most of the decentralized countries are clustered. In this specification it would have been ideal to control for the size of the public sector by the share of tax revenues over GDP; yet, as

GFS has yet not published such data for the entire sample under investigation, we had to resort to the share of total expenditure. This, being collinear with *SGEXP* and *CGEXP*, presents the correct sign but is not significant. All the other variables basically show the same signs and levels of significance already found in the previous models, confirming the robustness of the results.

Next, we deal with the concerns about the accuracy with which GFS data proxy actual tax autonomy via *OWNREV*. The alternative indicator provided by Stegarescu (2005) covers only 18 OECD countries for the 1999-2001 period. The much more limited time dimension does not allow using the lagged values of potentially endogenous covariates as instruments. We thus resorted to an EGLS estimator as in model 1, which still provided results qualitatively in line with the IV estimates of model 2. Furthermore, to preserve degrees of freedom, model 4 estimates a more parsimonious specification of equation (1), using the *RD1* variable instead of *OWNREV*. Model 4 again confirms the pattern of relationships between fiscal decentralization and corruption: grant financing of decentralization is correlated with corrupt practices, while tax financing, here autonomously decided by subcentral governments, is associated with low levels of corruption. Also expenditure decentralization confirms to be correlated with low levels of corruption, but in this specification, where the sample of countries is more homogeneous and the definition of tax autonomy more precise, the effect of expenditure decentralization appears more evident. The significance of the control variables reflects the greater homogeneity of the OECD sample: the number of veto players, the government system and the protestant work ethic show the expected signs; other covariates, related to the colonial past, the enjoyment of civil and political rights and the degree of democracy do not attain any significance level, even when considered in isolation. For the sake of parsimony, they were excluded from Model 4.

Finally, we have considered a proxy for administrative decentralization, *TIERS*, used in Fan *et al.*, (2009), where it carried the highest explanatory power among the decentralization variables. Its inclusion together with the indicators of fiscal decentralization allows to verify which of the two processes of decentralization, i.e., administrative or financial, is mostly correlated with corruption. It also provides a test of whether the consideration of the time series dimension actually augments our understanding of the link between decentralization and corruption. Model 5 reports the results of the IV estimates, with the results of the Sargan and Hausman again in line with those for model 2 and 4; its specification basically replicates that of model 2, with the addition of *TIERS*. While this variable is not significant, *OWNREV* maintain its sign and significance. *GRANT* remains positive but loses significance, possibly because countries with many government levels also rely more heavily on transfers. The expenditure decentralization dummies are all highly significant, and the other controls remain basically unchanged. These results indicate that the neglect of the time series dimension in the data does not only produce a loss of information, but also leads to incorrect results. Model 5 also shows that it is fiscal decentralization that matters in the relationship with corruption, rather than political and administrative decentralization.

All in all, this series of estimates allows answering “yes” to the first question, namely, countries with more decentralized fiscal and spending powers are also characterized by low levels of corruption. Interestingly, when the time series dimension of the data is considered, as the present study does, fiscal decentralization appear to carry the highest explanatory potential with respect to corruption. With that in mind, we now further exploit the time series dimension to try to answer to the second and third question, namely: do changes in the degree of decentralization of such powers produce changes in the level of corruption? And with which delay?

5. *Estimates of the relationship between changes in decentralization and corruption*

The choices of the rate of change operator d and of the lag structure Λ play an important role in the estimates of equation (2). In the absence of a theory that describes the dynamics of the relationship between decentralization and corruption, we proceed in two steps. First, we take the average of the annual rates of change over three years ($d=3$), and the lag structure $\Lambda=1$. This seems to us a reasonable time frame for a decentralization reform to produce its effects on corruption; if decentralization reduces corruption via increased government accountability, at least one round of elections must take place in the time span in which the correlation is considered. Two subsequent three years averages include a maximum time span of six years and a minimum of four, which generally includes one to two electoral rounds. At the same time, this specification leaves a time dimension sufficient for pooled regression analysis (four time intervals); it is actually the same dynamic structure adopted in studies of the effects of decentralization reforms on the changes in the composition of government spending (Kappeler and Vällilä, 2008). Under this specification, the 2006-2007 average change in the degree of perceived corruption for country i is regressed on the average change in the indicators of fiscal decentralization of the period 2002-2004, and so on, backward wise. The analysis thus aims at uncovering whether changes in the degree of decentralization have induced any variation in the country's level of corruption after three years³. Secondly, we verify whether the results thus obtained are stable and can be considered as an equilibrium. To this end, we increase the lag structure to five years; by doing so, we examine whether the correlation found in three years persists over a longer time span. If this

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³ We have also tried a specification in first differences, i.e., with a one year lag, but the results were not very satisfactory. Quite plausibly, one year is too short a period for decentralization reforms to affect the level of corruption: if decentralization reduces corruption by increasing accountability, a one year lag is too short a period to include at least one electoral round. The results with $d=1$, $\Lambda=1$ were not reported to avoid overloading the paper, but are available upon request.

is the case, the correlation appears stable and can be legitimately interpreted as identifying an equilibrium condition. The relatively short overall time series (twelve years) offered by the CPI makes it impossible to distinguish short run from long run correlations by means of panel cointegration analysis or vector correction models. To concentrate the analysis on the dynamics of the relationship between decentralization and corruption, we introduce only the continuous variables measuring these phenomena, namely, *CPI*, *GRANT* and *OWNREV*, in rates of change. All other variables are entered in levels. By that we concentrate on the effects of decentralization processes on changes of the perceived level of corruption; we also avoid the implication, not supported by previous empirical studies, that changes in any of the remaining controls have an immediate impact on corruption. Since the choice of the lag structure removes any potential problem of endogeneity, we estimate all models via pooled EGLS, always with cross section weighted coefficients and clustered standard errors. Table 4 reports the results for the three years lag.

Table 4 about here

Model 6 can be considered the baseline model, as it includes all the countries and the largest number of covariates. The main result is that changes in *GRANTS* are not significant, while variations in *OWNREV* do reduce corruption, always keeping the level of expenditure decentralization constant. Reforms that reduce situations of common pool and make subcentral governments bear the financial and political costs of their expenditure decisions appear the most effective tool to reduce corruption. The other continuous variables keep the expected signs but, predictably, most of the variables entered in levels and the time invariant covariates loose statistical significance in this 'dynamic' specification. Among the controls, the level of democracy carries the highest explanatory power.

The analysis of the determinants of changes inherently lends itself to policy advices that can be contingent on the sample chosen. Because of that, we disaggregate the analysis

between OECD and non OECD countries. Model 7 reports the estimates for the OECD subsample. Neither the level, nor the evolution of education seems to play a role, possibly because of the already high schooling levels in these countries. Predictably, the level of democracy is not significant, while the number of veto players is, with the expected negative sign. On the other hand, in the non-OECD sample (model 8), changes in the vertical distribution of taxing powers seem to play no role in the reduction of corruption, as they never turn out significant. Expenditure decentralization instead seems to matter more, particularly at high levels of decentralization (between 51% and 100%). This may be evidence that in these countries briberies take place mostly at the central government level. Furthermore, improvements in education seem to be a more effective policy to combat corruption, inasmuch as they enhance citizens' participation to, and control of the activities of, the public sector. Given the altogether different levels of education in the OECD and non OECD samples, the opposing results on the covariate *SCHOOL* reinforce the overall plausibility of the estimates.

As we did in the estimates of equation (1), model 9 controls for the robustness of the results by looking at the impact on corruption of a process of expenditure decentralization, holding tax decentralization constant. Consistently with what already found in the estimates on the levels, decentralizing expenditures decreases corruption, while their centralization shows a positive correlation, although it fails just short of being statistically significant. The comparison of models 9 and 11 suggests that the effects of expenditure decentralization originate entirely from the non OECD sample. This effect is conditional on an effective decentralization of the power to tax. In this respect, the results reported in model 10 and 11 indicate that this is especially relevant in the non OECD countries. Interestingly, in that same sample, also an increase of the size of the public sector is correlated with an increase in corruption. Higher per capita income growth never reduces corruption, suggesting that,

barring other circumstances, what distinguishes corruption in the OECD and non OECD countries is the level of sophistication with which such practices are carried out. This interpretation is corroborated by the evidence that education holds the predicted corruption-limiting effect only in the non-OECD sample. These results call for a closer investigation of the Lipset hypothesis. Finally, the number of veto players facilitates corrupt practices only in the OECD countries, while the reduction in corruption that higher levels of democracy bring about is concentrated in the non-OECD sample. All other covariates, especially those with little time variation, were always highly insignificant and therefore were not reported.

Next, to verify if these results are stable and identify equilibrium conditions, we increase the lag structure to five years. The reduction of the dimension of the panel requires the use of even more parsimonious specifications; we have therefore concentrated only on fiscal decentralization viewed from the point of view of taxation (model 12) and expenditure (model 13), without disaggregating between OECD and non OECD samples. Table 5 reports the results.

Table 5 about here

The results of model 12 confirm those found with a three years lag specification; the decreasing effect of corruption associated with the decentralization of the power to tax found after three years remains there also after five years. If anything, the corruption enhancing effects of grant financing becomes more evident in the estimates, as the positive coefficient on $d(GRANT)$ at $d=5$, $\lambda=1$ becomes statistically significant. The other results remain by and large unchanged. The estimates therefore suggest that the negative correlations found in the three years lags is a stable equilibrium. As for expenditure decentralization, holding revenue decentralization constant (model 13), the results are also satisfactory and in line with those found at $\lambda=3$. The five year lag of the covariates $CGEXP$ and $SGEXP$ have the correct signs

and, again, only that on *SGEXP* is statistically significant. Also the perspective of expenditure decentralization confirms that the results identify a stable equilibrium.

All in all, the estimates of equation (2) show that variations in the degree of fiscal decentralization indeed produce changes the level of corruption. For the OECD countries in particular the greatest gains in terms of repression of malfeasance derive from the imposition of harder budget constraints on local governments, i.e., from a reduction of grant financing of local spending programs and a progressive decentralization of the power to tax. If this condition is met, a further constraint on corrupt practices appears to derive from decentralization of spending programs, possibly because of improvements in the agency relationship between voters and elected officials and/or a better satisfaction of heterogeneous preferences for public goods and services, which reduces the incentives for individuals to resort to bribery to obtain what they want. In the non-OECD sample the policy implications become less clear cut, but the same suggestion to decentralize expenditures and taxes seems to apply. Yet, improvements in the level of education appear to play the most important malfeasance reduction role in these countries. These results remain stable when the lag structure is stretched to five years, and can thus be considered as stable equilibria.

6. *Conclusion*

This paper innovates on the literature about the link between decentralization and corruption because it is the first to examine the time dimension in which this relationship unfurls; the existing literature instead relies on cross section analyses. The consideration of this dimension, for the countries where it is available, yields estimates that are both more informative and more satisfactory methodologically for the empirical analysis. Most of all, the empirical model becomes more coherent with observed reality, as it does not require the

hypothesis that variables are observed at equilibrium conditions that cross section models instead engender. This assumption is at odds with the decentralization reforms that many countries are implementing, ostensibly to reduce corruption.

The empirical analysis has found a robust correlation between high decentralization and low levels of corruption; furthermore, an increase in the degree of fiscal decentralization produces a stable reduction of corruption after three years. This result appears stable, as it is also found in a five year lag specification. The combination of these outcomes appears to identify an equilibrium and can therefore serve as a basis for policy advice. In particular, the estimates indicate that, in the OECD countries, improvements in the quality of governance can be expected mostly from the reduction of situations of common pool and soft budget constraints in subcentral government levels. In non OECD countries, instead, improvements in the level of education represent a more decisive force to reduce corruption. In all cases, what matters is the degree of fiscal, rather than administrative, decentralization, another new evidence produced by the consideration of the time series dimension of the data. An expansion of the number of countries for which time series data about fiscal decentralization are available appears the next step to make in order to deepen our understanding of the relationship between decentralization and corruption.

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