Corruption, Political Accountability, and Decentralization in Developing Countries

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Abstract

Does decentralization reduce corruption in developing countries? What can explain the decentralization success or failure in combating corruption in these economies? Using cross-country information we show that the negative effect of decentralization on corruption found in the literature is absent for developing countries. A Similar result is obtained for political accountability, i.e. decentralization improves it in developed but not in developing economies. We build a simple imperfect information model of corruption and political accountability to study whether these results can be explained for the existence of powerful local elites. We show that the relative increment of the elites' power in some jurisdictions, the combination of a low level of income with a large between-jurisdictions income inequality, and the transfers' design may explain why decentralization has not been decisive to reduce the level of corruption in developing countries.

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1. INTRODUCTION

The relationship between corruption and federalism has received especial attention in the discussion about the potential benefits of fiscal and political decentralization. The main question to this respect is whether decentralization promotes good governance and persuades politicians against corruption. Based on both theoretical results and empirical evidence, there is a common agreement that decentralization reduces the level of corruption. Nevertheless, this is not the common perception in developing countries. Does decentralization reduce corruption in developing countries? What explains the success or failure of decentralization in combating corruption in these economies? This paper deals with these questions.

There are several arguments supporting the idea that decentralization reduces the level of corruption. These arguments are based on at least two theories: Competitive jurisdictions, and political accountability. First, jurisdictional competition discourages local governments from establishing distortionary policies that might drive away factors of production to less interventionist jurisdictions (Brenna and Buchanan (1980), Shleifer and Vishny (1993)). A typical example of this situation is when people "vote with their feet", i.e. when citizens who disapprove a political pack of measures in a jurisdiction migrate to another jurisdiction.

Second, political decentralization allows for a more direct political accountability (Seabright (1996)). The idea behind this thesis is that decentralization grants the citizens of each region with the power to decide directly whether to re-elect a government or not, whereas centralization ensures that regions no longer have the same power in the re-election decision. Thus, good performance is directly rewarded with re-election whereas under centralization the accountability mechanism is more indirect.

On the other hand, some authors (e.g. Prud'homme (1995), Tanzi (1995)) have claimed that decentralization is accompanied by more corruption. At lower levels of government politicians are likely to be more subject to pressing demands from local interest groups. Also mayors usually have more discretion in spending than national politicians. Finally local press and citizens groups may be less professional and more easily bought than the national press or civic organizations.

Although most of the empirical results have supported the hypothesis that decentralization reduces corruption, there is not a general agreement. Most of these studies have used some broadly accepted index of perceived corruption as endogenous variable, but differ mainly in both the definition and the measure of decentralization. For instance, Treisman (2000), using a cross-section of countries and including a dummy variable to capture federal states, finds that corruption is more common in federalist countries[1]. Conversely, Fisman and Gatti (2002) using the sub-national share of total government spending as a measure of decentralization and a different sample of countries, show that more decentralization implies less corruption. In an actualization of

[1] The definition of a federal state implies the following characteristics: "(1) [at least] two levels of government rule the same land and people, (2) each level has at least one area of action in which it is autonomous, and (3) there is some guarantee (even through merely an statement in the constitution) of the autonomy of each government in its own sphere".

his previous work Treisman (2002), using different measures (types) of decentralization and quality of government (perceived corruption indexes, effectiveness of public good service, infrastructure provision, and basic education services), finds both positive and negative links between these two variables. More recently, Mocan (2004) using corruption micro-information and the same definition of decentralization than Treisman (2000), shows that a federal government structure is associated with a reduction in the corruption propensity.

Surprisingly, the empirical literature has not studied whether the negative effect of decentralization on the level of corruption is present in both developing and developed countries. Since the reasons for decentralization's encouragement of good governance fail systematically in developing counties, this issue remains as an important unexplored question. For instance, jurisdictional competition requires the existence of well-behaved common markets and that is not the rule in developing countries. Moreover, mobility is often constrained by poor information and weak factor markets of labor, land, and capital. In this respect Litvack et al. (1998) says: "…in small municipalities and rural areas it is often unrealistic to expect a family to sell their land, learn on employment opportunities in other jurisdictions, physically move to a new area, and borrow money in a new locality where they are unknown".

A more problematic issue, from the point of view of this paper, has to do with the weakness of the political system. Although in most of these countries popular election systems are established, powerful elites make difficult a broadly based local participation in elections. This state of affairs obscures political accountability through elections, and makes developing countries more vulnerable to corrupt bureaucracies.

Section 2 presents some suggestive evidence about the interaction among decentralization, accountability and corruption. Using the same sample, data set, and specification used by Fisman and Gatti (2002) I show that the negative effect of fiscal decentralization on corruption in developed countries does not hold any more in developing economies. I present also some evidence about the effect that fiscal decentralization has on the level of political accountability. Similar to the case of corruption, the evidence suggests that decentralization improves accountability in developed countries but does not have any effect in developing countries.

In the rest of the paper I formalize the idea that the lack of success of decentralization in developing countries can be explained by the existence of powerful local elites that get private benefits from corruption and, in order to obtain it, are able to affect negatively the degree of political accountability. As in Bardhan (1997), we understand corruption as the use of public office (or resources) for private gains. By political accountability we mean the capacity of citizens to detect the corrupt incumbent and to remove her from office. It is important to note that this concept differs from the Seabright's definition of accountability, which refers to the probability that the welfare of a region can determine the re-election of the government.

In sections 3 and 4 I develop and analyse a simple incomplete information model of corruption and political accountability in a decentralized system with retrospective voters. The game involves the jurisdiction's voters who decide whether to re-elect or

not the incumbent, the respective incumbent, a local elite that demands corruption from the office, and an organized local group interested in good governance that is called the accountability sector (it includes civic associations, independent non-influenced media, and central government's control offices). The asymmetry in the model arises from the incumbent's type (corrupt or not-corrupt), which is unknown. At the election time citizens cannot observe the incumbent's type but only a signal from the accountability sector about it.

In our framework, the accountability group does not play in any strategic way but just invests all its resources - which depend positively on the jurisdiction's income - in supervising the incumbent performance. By doing so, they increase the probability of detecting the incumbent in corruption. Nevertheless, the elite has also the capacity of affecting the political process and its outcome through the same probability of detection. By doing so the elite not only induces a corrupt incumbent to accept its corruption demand, but also to increase the amount of resources that the latter is willing to allocate to this activity. There are two ways in which elite can affect this probability. First, we assume that the elite's economic power *per se* makes it more difficult to detect any corruption agreement between the incumbent and the elite. One can think that elite has some monopsonistic power in the jurisdiction's labor market, which makes it less likely that someone reports a corruption case. Second, the elite can invest directly some resources in order to make the incumbent's detection less likely. For instance, it can spend money in bribing other public workers involved, falsifying some documents, altering the account books, and so on.

When the incumbent is corrupt, at equilibrium both the level of political accountability and corruption are simultaneously determined by the local elite's power, the jurisdiction's income, the incumbent's office spoils ("ego-rents"), and the incumbent's share in corruption – i.e. the proportion that incumbent reserve to herself from the resources allocated to corruption.

The model predicts the following effects. First, when the jurisdiction's income increases the level of corruption goes down and the accountability level increases, if and only if the accountability sector grows relatively more than the locally generated taxes. This is so not only because the accountability group's productivity goes up but also because the potential resources that can be spent in corruption rise when the jurisdiction's income increases. This result can be used to analyse how central (or between-jurisdictions) transfers affect corruption. Thus, when the transfer design does not involve any improvement in the productivity of the accountability sector corruption will increase.

Second, office spoils affect corruption negatively, but in order to affect political accountability positively a large enough increment is required. Third, the elite's power affects positively corruption and negatively the accountability level. Finally, when the incumbent's share takes "rational" values (i.e. it is not larger than ½) and it increases then the level of corruption also increases.

The model has the advantage that can be easily extrapolated to any federal level. In section 5 we consider the centralization case, i.e. where there are several local elites distributed across the federation and each of them demands corruption from a central

bureaucrat. Then the main point is how the parameters of the model change between each federal level and how these changes affect both the degree of political accountability and the intensity of corruption. In section 6 we compare the outcomes when the fiscal and political system goes from centralization to decentralization. We claim that the relative increment in the power of some local elites at the jurisdictional level, the combination of a low level of income with a large between-jurisdiction income inequality, and the transfer's design have not allowed decentralization to increase the political accountability and so to reduce the level of corruption in the developing countries. The paper ends with the main conclusions.

2. SOME EMPIRICAL FACTS

Decentralization and corruption

As I have already discussed above, most of the empirical evidence has supported the hypothesis that decentralization reduces corruption. For the purpose of this paper, there is still one open issue that has not been studied in the literature. It has to do with whether the dissuasive effect of decentralization on corruption is systematically present in both developing and developed countries. In this section I present some empirical evidence about this issue.

In order to be consistent with the available evidence that supports the existence of a negative relationship between decentralization and corruption, I am going to use the same sample, data set, corruption indicator, and definition of decentralization used by Fisman and Gatti (2002) (hereafter F&G)[2]. The decentralization index corresponds to the ratio between the total expenditure of subnational (state and local) government and the total spending by all government levels (state, local, and central). Correspondingly, the measure of corruption is the International Country Risk Guide (ICRG)'s corruption index. This index has been rescaled such that it lies between 0 and 1, where 0 indicates least corruption. The other variables included in the analysis are: per capita income, population, government size, and civil liberties. All the variables are averages for the period 1980-1995, except population where a geometric average is used. The exact definition of the complete set of variables is given in the appendix.

I work with the same basic specification used by F&G, which assumes that corruption is a function of fiscal decentralization, per capita income, population, public sector's size, and civil liberties. In order to test our hypothesis I allow for a different effect of decentralization in developed and developing countries. The results are reported in table 1. All the standard deviations of the parameters are robustly estimated.

[2] I have tried to collect the same information used by F&G to estimate the regressions presented in the Table 2 of their paper. However, there are three main differences: (1) Population is taken from Heston, Summers and Aten, Penn World Table Version 6.1, whereas F&G's source is World Development Bank Indicators. (2) For government size (total government expenditure divided by GDP) F&G use Barro (1991)'s information. When I use this source the country sample is reduced in a high proportion and is quite far from the F&G's sample. So I use government size from Heston et al., which additionally includes information for the whole period 1980-1995. (3) The GDP information used by F&G is in 1985 price and the used here is 1996 price.

Table 1
OLS cross country estimates. Dependent variable: corruption, ICRG index (1980-1995).

	(1) F&G estimation (a)	(2) My replica	(3)	(4)	(5)
			(2) plus effect for developing countries		
Decentralization Index (local and state share of total expenditure)	-0,42 (-2,97)	-0,52 (-3,36)	-0,67 (-3,65)***	-0,62 (-3,51)***	-0,69 (-4,01)***
(Developing country dummy) x (Decentralization Index) (b)			0,58 (2,45)**	0,36 (1,44)	0,45 (2,26)**
Log of GDP	-0,08 (-2,38)	-0,13 (-3,13)	-0,09 (-2,05)**	-0,12 (-2,87)***	-0,11 (-2,89)***
Civil Liberties	0,02 (1,47)	0,02 (1,08)	0,02 (1,17)	0,01 (0,67)	0,01 (0,48)
Log of population	0,011 (0,85)	0,03 (2,06)	0,02 (1,72)*	0,02 (1,48)	0,02 (1,49)
Government size	-1,07 (-3,33)	-0,48 (-2,08)	-0,46 (-1,95)**	-0,55 (-2,33)**	-0,54 (-2,30)**
R-squared	0,69	0,66	0,69	0,67	0,69
Test statistics for decentralization effect in developing countries equal to zero (P-value)			0,68	0,23	0,21
Number of obs.	55	56	56	56	56

t-statistics are in parentheses. Standard errors are robustly estimated. The corruption index is re-scaled to take values between 0 and 1 with 0=least corruption. All regressions are estimated with a constant term.
(a) Taken from Fisman and Gatti (2002), Table 2, column (1), pp. 332.
(b) The dummy for developing country changes in each column. Column (3): 1 if average GDP (1980-1995) < $6000, 0 otherwise; Column (4): 1 if average GDP (1980-1995) < $8000, 0 otherwise; Column (5): 1 if average GDP (1980-1995) < $10000, 0 otherwise.

Columns 1 and 2 present the F&G's estimation and my replica respectively. The discrepancies should be due to the data differences discussed in footnote 2. The rest of columns introduce the interactions between the dummy for developing countries and the decentralization index. Columns 3 thought 5 differ in the GDP level taking into the account to define developing country. It follows from the estimations that decentralization reduces corruption significantly in developing countries, but that effect is totally reversed in countries with low income. Formally, we cannot reject in any regression the hypothesis that the effect of decentralization over corruption is null in the developing countries. This result supports the idea that decentralization has not been useful to reduce corruption in these economies. The second interesting issue is that when we allow for differences between developing and developed countries, the decentralization effect becomes stronger in the former countries. Depending on the developing country definition it increases (in absolute terms) between 0.10 and 0.17 points.

Estimations in table 1 may suffer from some endogeneity problems. As F&G observe, corrupt central governments can affect the composition of public spending. Thus by keeping more rents in the centre, they can expand their rent extraction potential. Like in F&G, I employ the legal origin of the country to instrument for the decentralization index[3]. The idea is that Civil legal codes (like the French) encourage government centralization, whereas Common systems (like the British) have the opposite effect. Thus, our instrument is directly correlated with the centralization index and is expected to affect corruption only through this effect[4].

Table 2
IV cross-country estimates. Dependent variable: corruption, ICRG index (1980-1995).

	(1)	(2)	(3)
Decentralization Index (local and state share of total expenditure)	-1,10 (-3,73)***	-1,03 (-3,75)***	-0,96 (-3,86)***
(Developing country dummy) x (Decentralization Index) (a)	0,82 (3,31)***	0,54 (2,25)**	0,58 (2,98)***
Log of GDP	-0,04 (-0,99)	-0,09 (-2,12)**	-0,09 (-2,43)**
Civil Liberties	0,01 (0,63)	0,00 (0,01)	0,00 (0,03)
Log of population	0,04 (2,38)**	0,03 (2,08)**	0,03 (1,95)*
Government size	-0,41 (-1,59)	-0,55 (-2,22)**	-0,53 (-2,20)**
R-squared	0,66	0,65	0,68
P-value: Test statistics for decentralization effect in deve-loping countries equals to zero	0,24	0,09	0,11
P-value: F-test statistics for join significance of instruments in first stage regressions	0,00	0,00	0,00
P-value: Hausman test for consistency	0,71	0,97	0,99
Number of obs.	56	56	56

t-statistics are in parentheses. Standard errors are robustly estimated. Corruption index is re-scaled to take values between 0 and 1 with 0=least corruption. All regressions are estimated with a constant term.
(a) The dummy for developing country changes in each column. Column (1): 1 if average GDP (1980-1995) < $6000, 0 otherwise; Column (2): 1 if average GDP (1980-1995) < $8000, 0 otherwise; Column (3): 1 if average GDP (1980-1995) < $10000, 0 otherwise.

[3] There are five classifications: (1) English common Law; (2) Socialist laws; (3) French Commercial Code; (4) German Commercial Code; (5) Scandinavian Commercial Code. For more information see the appendix.
[4] For an extended discussion about the validity of this instrument see F&G (2002) pp. 337.

The IV estimations are reported in table 2. As before, we cannot reject the hypothesis that decentralization does not affect corruption in developing countries. Additionally, even though we cannot reject the hypothesis that the LS estimator is consistent, the effect of decentralization on corruption in developed countries estimated by IV is larger than the effect estimated by LS. After correcting for endogeneity our main conclusion remains the same, i.e. decentralization has an important effect in reducing corruption in developed countries, but this effect is not observed in less developed economies. What can explain this outcome? We shall come back to this question later on.

Decentralization and political accountability

Another issue that has received little attention in the empirical literature is whether decentralization really affects the degree of political accountability. There is very little evidence about this relationship. To our knowledge, only Huther and Shah (1998) have investigated this issue empirically. Using simple correlation estimations they have found a positive relationship between the degree of expenditure decentralization and some measures of governance quality such as political freedom, and political stability. Whenever accountability is one of the main mechanisms through which decentralization can improve good governance, in the rest of this section I present some embryonic evidence on this relationship.

In order to do so I use the same decentralization index used above, and the "Voice and Accountability" index constructed by the World Bank as a measure of political accountability. This index includes a number of indicators measuring various aspects of the political process, civil liberties, and political rights. The indicators measure the extent to which citizens of a country are able to participate in the selection of government and the independence of the media. The index is constructed in such a way that the score mean is zero and it lies between -2.5 and 2.5, where higher score corresponds to a better outcome. Thus, the index conveys no information about global trends in accountability, but about change in countries' relative position over time[5].

The index is only available for the period 1996- 2003. For our purposes, I am going to use the 1996 information, which is the nearest measure on hand to our time-sample. The country sample is constrained to the available information on decentralization's measure. The accountability index has been re-scaled to take values in the interval [0,1] where 1 means the highest accountability level.

At this time we do not have any theoretical model to deduce a structural form for political accountability[6]. Thus, following some of the ideas described in the introduction I am going to assume that accountability depends on the national per capita income and on the degree of (fiscal) decentralization. As above I shall allow for a different effect of decentralization on accountability between developed and developing countries. The results are reported in table 3, all the standard deviations of the parameters are robustly estimated.

[5] For more details see Kaufmann, Kraay, and Zoido-Lobozón (1999), and Kaufmann, Kraay, and Mastruzzi (2004).
[6] Actually, the model developed in the following sections does it.

For the whole sample of countries, the overall effect of decentralization on accountability is positive but not very significantly. Nevertheless, when we allow for a different effect between countries with high and low level of income it turns out that decentralization has a significant positive effect on accountability. Conversely, this effect is completely absent in developing countries[7]. This evidence supports the idea that a higher degree of fiscal decentralization does not increase necessarily the level of political accountability in these economies.

Table 3
OLS cross country estimates. Dependent variable: voice and accountability index (1996).

	(1)	(2)	(3)	(4)
Decentralization Index (local and state share of total expen-diture)	0,16 (1,67)*	0,21 (1,98)**	0,26 (2,32)**	0,27 (2,43)**
(Developing country dummy) x (Decentralization Index) (a)		-0,18 (-0,77)	-0,28 (-1,83)*	-0,26 (-2,13)**
Log of GDP	0,14 (8,19)***	0,13 (5,82)***	0,12 (5,93)***	0,12 (6,04)***
R-squared	0,73	0,74	0,75	0,75
Test statistics for decentraliza-tion effect in developing coun-tries equal to zero (P-value)		0,88	0,92	0,93
Number of obs.	56	56	56	56

t-statistics are in parentheses. Standard errors are robustly estimated. Voice and accountability index is rescaled to take values between 0 and 1 with 1=highest accountability. All regressions are estimated with a constant term.
(a) The dummy for developing country changes in each column. Column (2): 1 if average GDP (1980-1995) < $6000, 0 otherwise; Column (3): 1 if average GDP (1980-1995) < $8000, 0 otherwise; Column (4): 1 if average GDP (1980-1995) < $10000, 0 otherwise.

Putting together the findings presented above we can infer that since decentralization does not improve political accountability in developing countries, its positive effect to persuade politicians against corruption is partially or totally reversed in these economies. The opposite conclusion is achieved for developed countries. The coming sections develop a formal model that can help to understand these facts.

3. CORRUPTION GAME WITH LOCAL ELITE

We start analysing an incomplete information model of political accountability and corruption in a single jurisdiction, i.e. when the federation is totally decentralized. The game is played by the jurisdiction's voters, their respective incumbent, one local elite, and an organized local group interested in good governance that is called the

[7] The hypothesis that the sum of the two parameters is zero cannot be rejected.

accountability group. In the game the local elite demands corruption from the incumbent (in form of public resources) in order to obtain private gains. The resources allocated by the incumbent in this activity are identified as corruption[8].

Incumbent

I use a retrospective voting model. At the beginning of the game there is an incumbent who is (exogenously) in office. This incumbent has an amount of resources $\tau(y)$ that should be invested in a public good z but might go to corruption r. τ are the locally generated taxes, which are assumed to be a positive function of the regional income y (i.e. $\tau' > 0$). The unit price of the public good is normalized to be one, such that the incumbent budget constraint is $\tau = z + r$.

The incumbent can be of two types $t \in \{c,n\}$, where c stands for "corrupt" and n for "non-corrupt", with $Pr(t = n) = \gamma$. An incumbent of type n receives an infinitely negative utility from corruption, thus she will reject always any corruption demand. An incumbent of type c receives a linear positive utility from corruption. For any unit of resources r that she allocates to corruption to serve the elite's demand, she will ask for herself an exogenous share $\beta \in (0,1)$. We shall refer to β as the incumbent's share. Thus, when incumbent accepts a level of corruption r, she will receive βr units of utility. The remaining $(1-\beta)r$ will go to the elite. Independently of her type, an incumbent gets spoils ("ego-rents") $S>0$ if she stays in office.

Accountability sector

In our framework *political accountability* is understood as the citizens' capacity to detect the incumbent in corruption and to remove her from the office. The aim of the accountability sector is to encourage good governance through improving political accountability. It is formed by civic associations, independent (non-influenced) media, and central government's control offices. At the beginning of the game, this sector is endowed with an amount of resources A that will be totally invested in supervising the incumbent's performance. We allow these resources to depend positively on the jurisdiction's income (y), then $A=A(y)$ with $A' > 0$.

We assume that the accountability group is not influenced by any of the other players, thus it only will transmit true information to the voters. Actually, its main task will be to send a signal to the citizens announcing whether the incumbent is corrupt or not. Notice that the accountability sector does not play strategically in the game; it just invests all its resources into accountability and then it makes an announcement about the incumbent's type.

Voters

Let $u(z)$ be the utility that voters receive from the public good supplied by the incumbent, with u strictly increasing. An incumbent of type n will provide a utility

[8] Like Bardhan (1997), we apply the term "corruption" to imply the use of public office for private gains

$u(\tau)$ to voters while an incumbent of type *c* will deliver $u(\tau - r)$. After observing the outcome, voters must choose between re-electing the incumbent and randomly electing a candidate from the opposition whose type will be *n* with probability γ. Nevertheless, we assume that voters are not able to observe directly their payoff at the time of elections, but only a signal from the accountability sector. If the incumbent's type is *n*, the accountability group will receive and send a signal *s=n*. However, if the incumbent is corrupt, they will receive and send a signal *s=c* with probability $\delta \in [0,1]$, and *s=n* with probability $1-\delta$.

The probability of detects the incumbent in corruption (δ) will be established endogenously in the model. We will define it formally later on. Notice that, since the accountability sector is only interested in accountability and it is captured by neither the incumbent nor the elite, voters will trust in its signal[9].

Elite

The elite demands corruption *r* from the jurisdiction's incumbent in order to produce some personal benefits. One can think about some specific project that affects directly and positively the elite's benefits: licences, public contracts, market interventions, etc[10]. When the incumbent accepts the corruption demand, the elite receives the fraction $1-\beta$ of *r*. With this amount of resources, it is going to produce $Q((1-\beta)r)$ benefits, where $Q' > 0$.

We assume the elite can influence the political process by affecting the probability of detecting the incumbent in corruption (δ). It can do it through two mechanisms. First, it can invest some resources *H* in order to make difficult the task of the accountability sector and thus to reduce δ. For instance, these resources may be spent in bribing other involved public workers, falsifying some documents, altering the account books, etc. Second, the elite has economic control over a proportion $\theta \in [0,1/2)$ of citizens, which makes it more difficult to detect the incumbent in corruption activities. One can think that the elite has some monopsonistic power in the jurisdiction's labor market and so it can induce these people to cover any signal of corruption. If this is the case the resources invested by the accountability group will be less productive as θ increases. We refer to θ as the elite's power.

We assume for simplicity that the elite does not face any cost when it demands corruption to the incumbent. This implies that when the incumbent's type is *n*, the elite won't face any penalty if it insinuates to the former a corruption agreement. Assuming a linear *Q(.)*, the elite's expected payoff will be $\pi = (1-\gamma)((1-\beta)r - H)$.

[9] This assumption avoids us to get into a complex signalling game.
[10] Notice that in some of these cases corruption may affect also positively the citizens' welfare. However, since our analysis is not about welfare but about corruption, we do not care on these external effects.

Detection probability and accountability level

Up to now there are three variables affecting the detection probability δ: A in a positive way; and H, and θ in a negative way. Additionally to these three effects, I shall allow for a moral hazard component, i.e. the more rent is allocated to corruption as a proportion of the local taxes, the easier it is for the accountability sector to find out the corruption. To simplify the algebra, while preserving sufficient richness of structure, we will assume:

$$\delta = (1-\theta)\frac{A}{A+H}\Psi(r/\tau) \qquad (1)$$

with $\Psi(0)=0$, $\Psi(1)=1$, $\Psi'(.)>0$, $\Psi''(.)>0$, $\Psi'(0)<\infty$, $\Psi''(0)=0$, and $\lim_{r\to\tau} \Psi'(.)=\infty$. The four first assumptions ensure that Ψ belongs to the interval $[0,1]$, and both the moral hazard probability and its marginal rate strictly increase in r/τ. The remaining are technical assumptions. Keep in mind that τ is a function of y, so ultimately $\Psi(.)$ is also a function of y. Furthermore, notice that whenever $\tau>0$, then $r/\tau = 0$ if and only if $r=0$, and $r/\tau = 1$ if and only if $r=\tau$.

As we discussed earlier, in our framework *political accountability* is the ability of citizens (and accountability group) to detect the incumbent in corruption and remove her from office. One can be tempted to associate this concept directly with the detection probability. However, δ may not represent accurately this concept because of the moral hazard component. Consider the following situation. Imagine there is a variable that affects negatively the level of corruption and so $\Psi(.)$, but at the same time affects positively the other part of δ, i.e. $(1-\theta)(A/(A+H))$. When the first effect over $\Psi(.)$ dominates the second effect the final result is a reduction in δ. If we do no make any distinction between the level of accountability and the detection probability we conclude that the former also decreases. However, since in the new situation either elite has less influence over δ (via H, or θ) or the accountability sector is more effective or both (it is so whenever $(1-\theta)(A/(A+H))$ has increased), this conclusion is wrong.

Thus, we remove from δ the moral hazard probability in order to get what we call the degree of political accountability δ_a:

$$\delta_a = (1-\theta)\frac{A}{A+H} \qquad (2)$$

Game and Equilibrium

To keep the framework as simple as possible we assume that incumbent type *c* does not extract rents without the elite participation. It allows us to concentrate on the corruption generated from the elite intervention. With the accountability group investing A in accountability, the timing of the game is as follows:

1. Given θ, the elite offers a contract $\langle H, r \rangle$ to the incumbent.
2. The incumbent decides whether to accept (*Y*) or reject (*N*) the contract.
3. The citizens observe the accountability sector signal and vote for the incumbent or for other candidate of unknown type.

The equilibrium of the game has two components. The first is the game between the elite and the incumbent, which determines the level of both corruption and political accountability. The second is the equilibrium in the election game, which establishes whether the incumbent is re-elected or not. To model the equilibrium in the corruption market, I focus on perfect Bayesian equilibrium restricted to pure-strategy equilibria in which citizens always vote for their preferred candidate. The complete description of the equilibrium strategies and proofs of the following propositions are in the appendix. Here I state the equilibrium conditions when there is a positive level of corruption.

Proposition 1. When incumbent is of type *c*, at equilibrium the incumbent always accepts the contract (with positive corruption) offered by the elite. The equilibrium contract $\langle \hat{H}, \hat{r} \rangle$ satisfies the following conditions:

$$(1-\beta) = \frac{(1-\theta)AS}{\beta}\left(\frac{\Psi'(.)\hat{r}/\tau - \Psi(.)}{\hat{r}^2}\right) \qquad (3)$$

$$\hat{H} = A\left(\frac{(1-\theta)}{\beta}\frac{\Psi(.)}{\hat{r}}S - 1\right) \qquad (4)$$

Equation 3 sets implicitly the equilibrium level of corruption $\hat{r}$. This happens at the point where the marginal income of corruption (*1-β*) equals to the marginal cost of corruption. Equation 4 sets the minimum level of *H* required by the incumbent to accept $\hat{r}$. At equilibrium the public good supply, the accountability level, and the detection probability are given respectively by:

$$\hat{z} = \tau - \hat{r} \qquad (5)$$

$$\hat{\delta}_a = (1-\theta)\frac{A}{A+\hat{H}} \qquad (6)$$

$$\hat{\delta} = \hat{\delta}_a \Psi(\hat{r}/\tau) \qquad (7)$$

Extension: J-elites

The model presented above can be easily extended to the case where there are *J>1* local elites demanding corruption from the incumbent. The complete description and equilibrium characterization of this extension is presented in the appendix. The framework keeps basically unchanged but now there are *J* elites, each on them endowed

with power θ_j. In the new game stages 2 and 3 remain the same, and at stage 1 each elite j offers simultaneously a contract $\langle H_j, r_j \rangle$ to the incumbent.

We show that equilibrium characterization of the *J*-elite game is exactly the same as the *1*-elite characterization. Thus, if we allow $\theta = \sum_{j=1}^{J} \theta_j$ to be equal in both cases (i.e. the elite's power θ of the *1*-elite game is split among the *J* local elites), then the level of accountability and corruption are the same in the two cases. This extension will be useful to "extrapolate" the model from the decentralized to the centralized case.

4. ANALYSIS

From now on we concentrate our attention on the sort of equilibria with positive corruption (described in proposition 1), i.e. those in which the incumbent is of type *c*. It allows us to analyse how the level of corruption, the detection probability, and the level of accountability are affected when the parameters of the model change. At equilibrium each of these three outcomes depends simultaneously on the jurisdiction income (y), the offices spoils (S), the elite's power (θ), and the incumbent's share (β).

Corruption

I begin analysing the level of corruption. Notice that equation 3 sets an implicit function of corruption in terms of y, S, θ, and β. In proposition 2 I state the effect that each of these factors has on the level of corruption.

Proposition 2. Assume that there is positive corruption in the jurisdiction (i.e. equilibrium is described by proposition 1), then the level of corruption (r):

a) Decreases as the jurisdiction income (y) increases if and only if $(1/\eta_1)\tau'/\tau < A'/A$, where $\eta_1 = \dfrac{\tau^2(1-\beta)\beta}{(1-\theta)AS\Psi''(.)} \in (0,1)$. Otherwise corruption increases.
b) Decreases as the office spoils increase (S).
c) Increases as the elite's power increases (θ).
d) Increases as β increases when $\beta<½$, and decreases as β increases if $\beta>½$.

The jurisdiction's income affects the level of corruption through two channels. On the one hand, when y increases the amount of resources invested by the accountability sector in its task also goes up. This influences corruption negatively (via the increase in the elite's marginal cost of corruption). On the other hand, the jurisdiction's generated taxes (τ) grow as y increases. Thus, for the same level of corruption, it produces a decrease in the ratio r/τ, which reduces the probability of detection (via the moral hazard probability), and encourages the demand for corruption. Since this occurs whereas the elite's marginal income keeps constant, the final effect on the level of corruption will depend on which of the two effects on the marginal cost dominates the other. When the marginal accountability rate (A'/A) increases proportionally more than

the marginal tax rate (τ'/τ) – exactly in proportion $1/\eta_1$ (i.e. $(1/\eta_1)\tau'/\tau < A'/A$), the corruption marginal cost increases and so the level of corruption decreases.

The result in proposition 2(a) has an important implication for the accountability sector success. This implies that when y increases, the resources invested in accountability must grow relatively faster than the generated taxes in order to get a reduction in the level of corruption. Surprisingly, this condition is more demanding when the elite's power is low, and the office spoils large[11].

This result can be also used to interpret the effect of any central (or between-jurisdiction) transfer in our framework. When there are transfers from the national to the jurisdictional level, the incumbent's budget is positively affected whereas the accountability sector's resources keep the same. In our framework it can be understood as an increase in τ'/τ, keeping constant A'/A. From proposition 2(a) it follows that under these circumstances the level of corruption increases. Thus, in order to assure a better allocation of these transfers, central government should use part of these resources to invest directly in improving accountability (i.e. investing in A).

Some authors have claimed that a high level of central transferences incentives corruption and affects negatively the fiscal performance in jurisdictions. This is so because local voters and local politicians receive fiscal or political benefits from grants programs without internalising their full cost (Rodden (2002)). I present here an alternative explanation for this phenomenon, i.e. since transfers only increase the potential resources to be invested in corruption but do not affect the resources invested in accountability, they may encourage corruption.

Results (b) and (c) in proposition 1 are quite intuitive. In both cases the marginal benefit of corruption keeps constant but the marginal cost changes. When the office spoils S go up, the marginal cost of corruption increases and then corruption decreases. Alternatively, a rise in the elite's power (θ) makes the accountability sector less efficient, reduces the marginal cost of corruption, and so corruption increases.

Statement (d) says that when β is small enough and it increases, then corruption goes up. It is direct that the elite's marginal income of corruption decreases as β increases. However, there is also a reduction in the marginal cost of corruption because the elite must invest now less in affecting accountability to incentive the incumbent's participation. If β is smaller than ½ then it will be still profitable for the elite to demand more corruption. Actually this case ($\beta<½$) is the most interesting whenever it may reflect properly what happens in the real world[12].

It results also interesting to see how the public good supply is affected in all these cases. From equation 5 it immediately follows that the public good supply increases whenever the corruption decreases. The opposite is true when corruption increases as result of a

[11] It follows from the fact that η_1 depends negatively on S, and positively on θ. So as η_1 decreases the condition becomes more demanding.

[12] Computations on this in Latin America show that the rate that officials ask for public contracts runs from 8% to 25%.

change in θ, S, or/and β. However, when the increment in corruption is due to an increase in the jurisdictions income, the public good's supply may go up or down depending on how much both the accountability marginal rate and the taxes marginal rate have been affected. It can be proved that when the increment in the former is too high relative to the latter, then the public good supply might decrease.

Detection probability

Now consider the detection probability. Proposition 3 states the results for the comparative statics.

Proposition 3. Assume that there is positive corruption in the jurisdiction (i.e. equilibrium is described by proposition 1). The probability of detecting the incumbent in corruption (δ):

a) Increases as the jurisdiction income (y) increases if and only if $(1/\eta_1)\tau'/\tau > A'/A$ (i.e. as the level of corruption increases); otherwise it decreases.
b) Increases as S decreases (i.e. as the level of corruption increases).
c) Increases as θ increases (i.e. as the level of corruption increases).
d) Increases as β increases if and only if $\Phi > -\beta(1-2\beta)$, where $\Phi = (1-\theta)\frac{AS}{\tau^2}\Psi''(.) - 2(1-\beta)\beta > 0$. Notice that if β<½ this condition holds (i.e. as the level of corruption increases).

We must be careful in the interpretation of results in proposition 3. Essentially, all these results say that the detection probability increases whenever the level of corruption increases and vice versa. This is so because the moral hazard component is always dominating the total effect over the detection probability. Thus whenever r increases, the moral hazard component goes up, and so the detection probability[13].

A direct way to see that the moral hazard probability dominates the final effect on δ is through the incumbent's participation constraint that the elite faces. At equilibrium this constraint implies $\hat{\delta} = \beta\hat{r}/S$ (See appendix, proof of proposition 3). Hence, keeping constant β and S the detection probability increases whenever the level of corruption increases. When the changes in corruption stem from a variation in S, the final effect is strengthened for it. When it stem from a variation in β, the final effect will depend, among other things, on the value of β.

Political Accountability

Equation 2 shows that apart of the direct effect of θ and y, the accountability level depends crucially on the elite's investment H. The results are stated in proposition 4.

[13] This assertion is true when the rise in r is not due to an increment in y (i.e. unambiguously r/τ increases). However, when r increases as result of an increment in y, the ratio r/τ does not necessarily increase and thus the final effect over the moral hazard component is ambiguous. As proposition 3 shows, even in this case the total effect on δ is also dominated by the change in r.

Proposition 4. Assume that there is positive corruption in the jurisdiction (i.e. equilibrium is described by proposition 1). The level of political accountability (δ_a):

a) Increases as the jurisdiction income (y) increases if and only if $(1/\eta_1 - \eta_2)\tau'/\tau < A'/A$, where $\eta_2 = \frac{\Phi}{\Psi''(.)(1-\beta)\beta}\frac{\tau}{r}\frac{1}{\eta_1} > 0$. Otherwise it decreases.
b) Can increase or decrease as S increases. Only when the effect of S over r is large enough it increases.
c) Decreases as θ increases.
d) Increases as β increases when $\beta>½$. When $\beta<½$ it increases only if the effect of β over r is small enough.

Statement (a) says that in order to observe an increment in accountability when the jurisdiction's income increases, the marginal accountability rate must grow at least $(1/\eta_1 - \eta_2)$ times the marginal tax rate. We cannot infer the sign of the term in parenthesis (see appendix) but since $\eta_2>0$ it follows that $1/\eta_1 > (1/\eta_1 - \eta_2)$. Thus the condition in proposition 4(a) is less demanding that the required condition to have a decrease in the corruption level (proposition 2(a)). It follows that an increment in accountability is not enough to observe a reduction of corruption. This happens when the level of accountability increases in a small proportion and the detection probability is still dominated by the moral hazard component.

For a clearer intuition of the remaining results let us analyse briefly equation 4. There are two forces affecting H as either S, or θ, or β change. One is the direct effect, and the other is the effect through r - more specifically through the term $\Psi(.)/r$. Notice that this ratio can be interpreted as the moral hazard probability per unit of corruption. It is easy to show that, keeping constant y and so τ, $\Psi(.)/r$ strictly increases in r[14]. Thus, when this ratio goes up (i.e. r increases) the elite will be willing to raise H in order to compensate the increment in the detection probability, and thus to obtain the extra corruption resources. The final effect over H will depend on the combination of the direct effect and the effect through $\Psi(.)/r$.

Through the direct effect H increases as S increases. In other words, when the office spoils are large, the elite must invest more in affecting accountability in order to get the same level of corruption. However, since office spoils affect negatively the level of corruption then $\Psi(.)/r$ and so H decreases as S go up. To observe a reduction in H and so an increment in the accountability level, it is necessary that the latter affect dominates the former. This implies a large enough impact of S over r (the appendix states the formal condition).

Even though the adjustment in H is ambiguous when the elite's power (θ) goes up (H decreases via the direct effect but increases since r increases), the direct effect is enough

[14] The result follows immediately from equation 3.

to reduce the accountability level. This result depends crucially on the assumption that the accountability level depends directly and negatively on θ.

Finally consider the effect of the incumbent's share (β) on δ_a. When β affects negatively corruption (i.e. $\beta>½$), the two forces reduce H and thus the level of accountability increases. However, when $\beta<½$, its effect over H is ambiguous (H decreases via the direct effect but increases since r increases). Hence in order to have an improvement in accountability it is required that corruption does not increase too much (the appendix states the formal condition).

Summing up, we have found the following results. First, when the jurisdiction's income increases, the level of corruption goes down and the accountability level increases if the accountability sector grows sufficiently above the locally generated taxes. Second, the office spoils affect negatively the level of corruption, but in order to affect positively the level of accountability a high enough impact over it is required. Third, the elite's power affects positively corruption and negatively the accountability level. Finally, when $\beta<½$ - which actually is the more interesting case - an increment in the incumbent's share increases the level of corruption but has an ambiguous effect on political accountability.

5. CORRUPTION UNDER CENTRALIZATION

So far the model presented in sections 3 describes how both corruption and accountability are determined under the presence of powerful economic local elites in a decentralized system. In order to extend our analysis to the case of centralization, we need to consider the situation in which each local elite demands corruption not to a local incumbent but to a central bureaucrat.

Using our baseline model, a centralized system may be thought as a framework in which there is one incumbent who receives corruption demands from several elites. The incumbent is now identified with an official of the central government, and the elites are distributed in some way across the different jurisdictions. This case has been already studied in the *J*-elite extension presented at the end of section 3 and developed in the appendix. Thus, we can use it in order to characterize the corruption and political accountability equilibrium under centralization.

There are three issues to take into the account when we extrapolate the *J*-elite model to the centralized case. The first one has to do with the interpretation of the elite's power. In the new context θ_j does not represent the percentage of people that elite controls as proportion of the jurisdiction's population, but as proportion of the federal population. In this way the total power θ will represent the proportion of total population controlled by the elites at the national level.

The second issue is that now all the variables and parameters of the model make reference to national measures. This implies that the relevant outputs must be understood as the national amount of corruption and the nationwide accountability

level. We must keep in mind this fact when we compare the outcomes that arise from the centralized and the decentralized system.

The last point has to do with the accountability sector. When the system goes from decentralization to centralization (or vice versa) we are implicitly assuming that the accountability sector is centralized (decentralized) at the same time. In other words, we are imposing that under centralization there is one national accountability sector supervising the central incumbent, whereas under decentralization there is one group in each jurisdiction doing the same task. In order to avoid any extra effect, we keep the accountability sector's characteristics unchanged between the two levels, i.e. both the jurisdiction and the national sector will use the same technology[15].

Keeping in mind the features discussed above, and the fact that the *J*-elites equilibrium characterization does not differ from the *1*-elite characterization, equation 3 and 6 can be used to describe the equilibrium level of corruption and accountability under centralization.

6. CENTRALIZATION VS. DECENTRALIZATION

The aim of this section is to evaluate how both corruption and political accountability change when a federation goes from centralization to decentralization. In order to compare jurisdictional and national variables it is required to redefine the level variables in the model in terms of per capita units. Accordingly consider that r, H, A, τ, and y are in per capita terms. Since S does not have any specific unit, it will still represent the office spoils. The rest of variables and parameters (δ, δ_a, θ, β) will keep in the same units.

Without loss of generality we assume that there is one elite in each j of the J jurisdictions. We use subscript N to index national variables. Hence, y_N corresponds to the national per capita (with respect to the national population) income, whereas y_j refers to the jurisdiction j per capita (with respect to the jurisdiction population) income. For equilibrium outputs we add a superscript C when those are defined under centralization, and D under decentralization.

As we know from the discussion in the previous section, the only thing that differs between the two systems is the respective set of parameters $\{A(y),\tau(y),S,\theta,\beta\}$. From equation 3 and 6, under centralization the per capita corruption and the political accountability can be written respectively as a function of:

$$\hat{r}_N^C = g_1\left(A_N(y_N),\tau_N(y_N),S_N,\theta_N,\beta_N\right)$$

[15] This implies that the centralized and decentralized accountability group do not differ in its productivity. In our framework one can easily introduce a parameter to take into the account, as some authors have suggested, possible differences in the accountability sector's productivity between the centralized and the decentralized system. In addition, one may introduce some across-jurisdictions positive externalities between the accountability groups. However, it complicates the analysis and does not add any interesting result for our purpose.

$$\hat{\delta}_a^C = g_2\left(A_N(y_N), \tau_N(y_N), S_N, \theta_N, \beta_N\right)$$

Alternatively, under decentralization the per capita corruption and political accountability level in jurisdiction *j* depend respectively on[16]:

$$\hat{r}_j^D = g_1\left(A_j(y_j), \tau_j(y_j), S_j, \theta_j, \beta_j\right)$$

$$\hat{\delta}_{aj}^D = g_2\left(A_j(y_j), \tau_j(y_j), S_j, \theta_j, \beta_j\right)$$

We can use results in propositions 2 and 4 to analyse the expected change in corruption and accountability when the system goes from centralization to decentralization. Notice that our analysis compares the national outcomes under centralization against the jurisdiction *j* outcomes under decentralization. Recovering national outcomes under decentralization is a question of average[17].

Per capita income

Let me start by analysing the changes in per capita income. This analysis makes sense when the federation has an important between-jurisdictions income inequality. This is the case in most developing economies. The jurisdiction *j*'s per capita income (y_j) may be higher, equal, or smaller than the national one (y_N). These changes may also affect both the marginal accountability rate (A'/A) and the marginal tax rate (τ'/τ) in a different proportion. In order to maintain the analysis as simple as possible, I'm going to use results (a) in proposition 2 and 4 in a general way. However, keep in mind that depending on the outcome under consideration (corruption or accountability) the

[16] For instance, from equation 3 the per capita corruption in the centralized system is implicitly given for:

$$(1-\beta_N) = \frac{(1-\theta_N)A_N S_N}{\beta_N}\left(\frac{\Psi(.)\left(\hat{r}_N^C/\tau_N\right) - \Psi(.)}{\left(\hat{r}_N^C\right)^2}\right)$$

where $\theta_N = \sum_j \theta_{jN}$, θ_{jN} corresponds to the proportion of the national population controlled by elite in jurisdiction j, $\Psi(.)$ is evaluated at $\hat{r}_N^C/\tau_N$, and both A_N and τ_N depend on y_N. Using equations 4 and 6 we can redefine $\hat{H}_N^C = \sum_j \hat{H}_{jN}^C$, and $\hat{\delta}_a^C$. Alternatively, the per capita corruption in each jurisdiction *j* under decentralization is implicitly defined by:

$$(1-\beta_j) = \frac{(1-\theta_j)A_j S_j}{\beta_j}\left(\frac{\Psi(.)\left(\hat{r}_j^D/\tau_j\right) - \Psi(.)}{\left(\hat{r}_j^D\right)^2}\right)$$

Similarly $\hat{H}_j^D$, and $\hat{\delta}_{aj}^D$ can be redefine using equation 4 and 6.

[17] To aggregate decentralized variables at national level we must average the jurisdiction variables using the respective population weight.

required proportionality between A'/A and τ'/τ to obtain a decrease or an increase in those changes.

The regions can be classified in five groups: (1) Jurisdictions where $y_j>y_N$, and A_j'/A_j grows proportionally more than τ_j'/τ_j; (2) Jurisdictions where $y_j>y_N$, but A_j'/A_j grows proportionally less than τ_j'/τ_j; (3) Jurisdictions where $y_j=y_N$, and so A_j'/A_j and τ_j'/τ_j equal to those under centralization; (4) Jurisdictions where $y_j<y_N$, and A_j'/A_j decreases proportionally less than τ_j'/τ_j; and (5) Jurisdictions where $y_j<y_N$, but A_j'/A_j decreases proportionally more than τ_j'/τ_j. Thus, per capita corruption goes down in those jurisdictions that belong to groups 1 and 4; decreases in those that belong to groups 2 and 5; and stays the same in those that are in group 3. The opposite will happen with the political accountability level.

One can claim that more of the jurisdiction in developing countries will end in groups 2, 3, 4, and 5. Group 1 conditions will be met only the biggest jurisdictions with a strong accountability sector, which are usually few in these countries. Even so, the final effect over the national per capita corruption when the economy goes from centralization to decentralization will depend on how the jurisdictions are distributed among these four groups. Independently of the final effect, our prediction is that corruption (accountability) will increase (decrease) in an important proportion of jurisdictions and only decrease (increase) in a few rich jurisdictions.

In the presence of significant between-jurisdictions income inequalities, the design of central or between-regions transfers plays an important role. As we mentioned in section 3, transfers affect positively the level of corruption when the accountability sector's resources keep constant. Since these inequalities are relatively larger in developing than in developed countries, and because most of the developing countries use intensively these transfers to finance the poorest (the majority of) jurisdictions, the final effect of decentralization in overall corruption may be positive. Thus, to avoid a re-escalation of corruption through the transfer system, its design must involve transfers to the accountability sector.

Elite's power

The power of the jurisdiction's elite can be higher, equal, or smaller than the power of the national elite when the system goes from centralization to decentralization. Again, the final effect will depend on the cross-jurisdictions distribution of power. To see that consider the example in table 4. There is a federation formed by 3 jurisdictions, each of them with population equal to 10. In each of the three cases depicted, the respective elite of the jurisdiction controls a different proportion of people, whereas at the national level they control always the same percentage of citizens (30%). Everything else constant, when the federation goes from centralization to decentralization corruption is expected to increase in jurisdiction 1 and 3 in case *I* (.4>.3); to increase only in jurisdiction 1 in cases *II*; and to stay the same in all the jurisdictions in case *III*. Political accountability will change in the opposite way.

Again, it is hard to make a prediction about the nationwide corruption under decentralization. Nevertheless, independently of the final effect there will be some regions where the increment in the elite power will generate an important increase in corruption.

Table 4
Elite's power distribution example

	Pop.	Controlled Pop. I	II	III	Power	Elite's power I	II	III
National	30	9	9	9	θ_N	0.3	0.3	0.3
j=1	10	4	4	3	θ_1	0.4	0.4	0.3
j=2	10	4	3	3	θ_2	0.4	0.3	0.3
j=3	10	1	2	3	θ_3	0.1	0.2	0.3

Office Spoils

Now consider the office spoils *S*. Office spoils in a jurisdiction are surely smaller than national ones everywhere around the world. However, it is not difficult to think that spoils at the jurisdictional level in developed countries are not too far from the national level, whereas this characteristic is only preserved in a few jurisdictions in developing countries[18]. Moreover, in the former economies one can expect a huge decrease of this variable in most of the jurisdictions. Using results in propositions 2 and 4, this implies an increase in the per capita corruption in every jurisdiction and so in the national average. The opposite will happen with political accountability.

Incumbent's share

I do not have any explicit expectation about the change of β when the economy goes from a centralized to a decentralized system. However, some authors (e.g. Tanzi (95)) have claimed that the rewards to local politicians are relatively smaller than those received for central bureaucrats, i.e. β is larger at the central than at the jurisdictional level. If this is the case and β has a "rational" value (i.e. $\beta<½$ in both cases), from our results it follows that everything else constant, corruption is expected to be smaller in every jurisdiction under decentralization. However, the effect on accountability is ambiguous.

The final effect that decentralization has on the nationwide corruption and accountability will depend on the combination of all these factors. Thus, it is quite difficult to make a clear prediction about it. Nevertheless, the evidence presented in section 2 suggests that the low level of income together with a large between jurisdiction income inequality, and the relative increment in the power of some elites at

[18] For instance, if spoils are related to the jurisdiction's economy activity then the high concentration of that in some few regions in developing countries can explain this difference.

the jurisdiction level, have not allowed decentralization to reduce the level of corruption.

7. CONCLUSIONS

There is a common agreement in both the theoretical and the empirical literature that decentralization reduces the level of corruption. We have shown in this paper that this is the case in developed countries where the mechanisms that allow decentralization to incentive good governance work properly. However, because these mechanisms usually fail in developing countries, it is not more the case for these economies.

The power of the local elites is one of the aspects that reduces political accountability and encourages bad governance. Thus, the implementation of policies that affect this power negatively can be useful to reduce corruption. For instance, if there is an important degree of monopsony in the labor market it may be required to promote industrial or agricultural competition, and to foster between-jurisdictions migration.

Although we emphasise the negative impact that local elites have on both the degree of political accountability and the level of corruption, there are other factors which have not allowed decentralization to work appropriately in developing countries. For instance, the combination of a low GDP and a high between jurisdiction income inequality, which intensify the use of transfers in order to finance the poorest regions, may promote corruption if the transfer system does not involve any improvement in the productivity of the accountability sector. Our theoretical results suggest that, in order to avoid corruption, any increase in the amount of transfers must be accompanied by a rise - at least as large as the rise in the transfers - in the amount of resources allocated to political accountability.

Finally, most of the developing countries have moved from a centralized system to a decentralized system that assigns an important amount of decisions to small municipalities. In terms of our model this implies a dramatic reduction in the office spoils, which encourages corruption. In order to take advantages of the potential benefits of decentralization while persuading politicians against corruption, it may be useful to empower states' governments where the office spoils are not too far from the central ones.

APPENDIX: PROOF OF PROPOSITIONS

Proposition 1.

The equilibrium strategies are:

1. The elite offers a contract $\langle \hat{H}, \hat{r} \rangle$ to the incumbent that satisfies the following conditions:

$$(1-\beta) = \frac{(1-\theta)AS}{\beta}\left(\frac{\Psi'(.)\hat{r}/\tau - \Psi(.)}{\hat{r}^2}\right) \qquad (3)$$

$$\hat{H} = A\left(\frac{(1-\theta)}{\beta}\frac{\Psi(.)}{\hat{r}}S - 1\right) \qquad (4)$$

2. An incumbent of type *n* rejects the contract and an incumbent of type *c* accepts it.

3. Voters re-elect the incumbent if *s*=*n*; otherwise they do not re-elect the incumbent and vote for a challenger who is non-corrupt with probability γ.

Now I prove that the previous strategies characterize any pure-strategy perfect Bayesian equilibrium of the game. First consider the voters' behaviour, whose strategies are conditioned to the signal *s*. The voters' beliefs are given by:

$$\Pr(t=n) = \begin{cases} \dfrac{\gamma}{\gamma + (1-\gamma)(1-\delta)} & \text{if} \quad s = n \\ \\ 0 & \text{Otherwise} \end{cases}$$

To remove the incumbent from the office when *s*=*c* is a strictly dominant strategy. Now let's assume *s*=*n*. If in this case voters do not re-elect the incumbent and choose a challenger, the latter will be corrupt with probability γ. Nevertheless, since $\gamma/(\gamma + (1-\gamma)(1-\delta)) \geq \gamma$ for any $\delta \in [0,1]$, then to re-elect the incumbent is a strictly dominant strategy.

Now consider the incumbent's strategy. Since an incumbent of type *n* receives an infinitively negative utility from corruption she will reject (*N*) always any offer of the elite with positive corruption. Incumbent's type *c* payoff is $V(c,N) = S$ if she rejects the elite's contract, and $V(c,Y) = (1-\delta)(S + \beta r) - \delta\beta r$ if she accepts it. So she will accept any contract in which $V(c,Y) \geq V(c,N)$. This implies $\delta \leq \beta r/S$, which actually is the incumbent's participation constraint.

The elite maximizes its payoff $\pi = (1-\gamma)((1-\beta)r - H)$, subject to $\delta \le \beta r/S$ (Incumbent participation constraint), $H \ge 0$, and $0 < r < \tau$. The first constraint implies $H \ge A\left(\frac{(1-\theta)}{\beta}\frac{\Psi(r)}{r}S - 1\right)$. Since π strictly decreases in *H*, then the incumbent will choose $H = A\left(\frac{(1-\theta)}{\beta}\frac{\Psi(r)}{r}S - 1\right)$. This reduces the problem to the following programme:

$$\underset{r}{Max} \quad \pi = (1-\gamma)\left[(1-\beta)r - A\left(\frac{(1-\theta)}{\beta}\frac{\Psi(r/\tau)}{r}S - 1\right)\right]$$
$$s.t. \qquad 0 < r < \tau$$

Equation 3 characterizes the first order condition (FOC) of this programme. Notice that:

$$\lim_{r\to a} \frac{\partial \pi}{\partial r} = (1-\beta) - \frac{(1-\theta)}{\beta} AS \lim_{r\to a} \frac{\Psi'(.)r - \Psi(.)}{r^2}$$

where *a* is any constant. Using *L'Hopital*, and from the properties of Ψ, $\lim_{r\to 0} \frac{\Psi'(.)r - \Psi(.)}{r^2} = \frac{1}{2\tau^2}\lim_{r\to 0}\Psi''(.) = 0$. Thus $\lim_{r\to 0} \frac{\partial \pi}{\partial r} = (1-\beta) > 0$. From the characteristics of Ψ it follows also that $\lim_{r\to \tau} \frac{\partial \pi}{\partial r} = -\infty$. Then there exist at least one interior solution for *r*. The second order conditions (SOC) is given by:

$$\frac{\partial^2 \pi}{\partial r^2} = \frac{1}{r}\left(2\frac{(1-\theta)}{\beta} AS \frac{\Psi'(.)r/\tau - \Psi(.)}{r^2} - \frac{(1-\theta)}{\beta}\frac{AS}{\tau^2}\Psi''(.)\right) \quad (1A)$$

From the FOC the first term in the parenthesis of equation 1A equals to $2(1-\beta)$. It follows that at any maximum $2(1-\beta)\beta < (1-\theta)\Psi''(.)\, AS/\tau^2$.

Plugging the optimal corruption in the incumbent's participation constraint, we get $\hat{H} = max\left\{0, A\left(\frac{(1-\theta)}{\beta}\frac{\Psi(\hat{r}/\tau)}{\hat{r}}S - 1\right)\right\}$. I assume than the parameters are such that $\hat{H} > 0$. Thus the optimal level of *H* must satisfy equation 4. Notice that this implies that at equilibrium $\beta r < \Psi(.)(1-\theta)S$.

At equilibrium, the elite offers the contract $\langle \hat{H}, \hat{r} \rangle$ to the incumbent independently on its type, and an incumbent of type *c* accepts it always.

Proposition 2.

Equation 3 sets an implicit function of corruption in terms of the parameters of the model. Call:

$$L = (1-\beta)\beta r^2 - (1-\theta)AS\left(\Psi'(.)\, r/\tau - \Psi(.)\right) = 0$$

From the implicit theorem function it follows that $\frac{\partial r}{\partial l} = -\frac{\partial L/\partial l}{\partial L/\partial r}$, where $l=\{y,\ \theta,\ \beta,\ S\}$. Notice that $\partial L/\partial r = -r\left((1-\theta)(AS/\tau^2)\Psi''(.) - 2(1-\beta)\beta\right) = -r\Phi$, with:

$$\Phi = (1-\theta)\frac{AS}{\tau^2}\Psi''(.) - 2(1-\beta)\beta$$

From the SOC (see proof of proposition 1) we have that $\Phi > 0$, thus $\partial L/\partial r < 0$. We use it for the following computations.

Jurisdiction's income: Deriving L with respect to y, applying the implicit function theorem, and manipulating algebraically the expression we get:

$$\frac{\partial r}{\partial y} = \frac{(1-\theta)S}{r\Phi}\left(A(r^2/\tau^3)\Psi''(.)\tau' - A'(\Psi'(.)\, r/\tau - \Psi(.))\right)$$

Using equation 3 and reorganizing terms, we can write this derivative as:

$$\frac{\partial r}{\partial y} = \frac{r}{\Phi}\left((1-\theta)(1/\tau^2)\, AS\Psi''(.)\tau'/\tau - (1-\beta)\beta\, A'/A\right) \qquad (2A)$$

Calling $\eta_l = \frac{\tau^2(1-\beta)\beta}{(1-\theta)AS\Psi''(.)}$, statement (a) follows. Notice that from the SOC the denominator in η_l is higher than its numerator, thus $\eta_l \in (0,1)$.

Office Spoils: Deriving L with respect to S, applying the implicit function theorem, using equation 3, and reorganizing terms we get:

$$\frac{\partial r}{\partial S} = -\frac{(1-\beta)\beta}{\Phi}\frac{r}{S} < 0$$

Elite's power: Deriving L with respect to θ, applying the implicit function theorem, using equation 3, and reorganizing terms we get:

$$\frac{\partial r}{\partial \theta} = \frac{(1-\beta)\beta}{\Phi}\frac{r}{(1-\theta)} > 0$$

Incumbent's share: Deriving L with respect to β, applying the implicit function theorem, and reorganizing terms we get:

$$\frac{\partial r}{\partial \beta} = \frac{(1-2\beta)}{\Phi} r$$

Thus this derivative is positive if and only if $\beta<½$, and negative if and only if $\beta>½$.

Proposition 3.

There are two possibilities to analyse the effect of y, S, θ, and β on the detection probability. The first one is to analyse what's up with H when any of these exogenous change by using equation 4. With this information and the results in proposition 2 we can get the final effect on δ. However there is a simpler way to do it. Notice that from the incumbent's participation constraint (see proof of proposition 1), and equations 6 and 7 it follows that at equilibrium:

$$\hat{\delta} = (1-\theta)\frac{A}{A+\hat{H}}\Psi(.) = \beta\frac{\hat{r}}{S}$$

Then we can use the fact that at equilibrium $\hat{\delta} = \beta(\hat{r}/S)$ to see directly how y, S, θ, and β affect the detection probability. From here it follows:

Jurisdiction's income: $\frac{\partial \delta}{\partial y} = \frac{\beta}{S}\frac{\partial r}{\partial y}$, then $sign(\partial\delta/\partial y) = sign(\partial r/\partial y)$.

Office Spoils: $\frac{\partial \delta}{\partial S} = \frac{\beta r}{S^2}\left(\frac{\partial r}{\partial S}S - r\right) < 0$, since $\partial r/\partial S < 0$.

Elite's power: $\frac{\partial \delta}{\partial \theta} = \frac{\beta}{S}\frac{\partial r}{\partial \theta} > 0$, since $\partial r/\partial \theta > 0$.

Incumbent's share: $\frac{\partial \delta}{\partial \beta} = \frac{1}{S}\left(r + \beta\frac{\partial r}{\partial \beta}\right) = \frac{r}{S}\left(1 + \frac{\beta(1-2\beta)}{\Phi}\right)$. Thus $\partial\delta/\delta\beta > 0$ if and only if $\Phi > -\beta(1-2\beta)$ (keep in mind that Φ depends also on β). Notice that when $\beta<½$ this condition holds.

Proposition 4.

We apply same strategy used in proof of proposition 3. Notice that from equation 6 and 2A it follows:

$$\hat{\delta}_a = \frac{\beta}{S}\frac{\hat{r}}{\Psi(.)} \qquad (3A)$$

So I use 3A to get the following results.

Jurisdiction's income: Deriving 3A with respect to y, manipulating algebraically the expression, and using equation 3 we get:

$$\frac{\partial \delta_a}{\partial y} = \frac{\beta}{\Psi(.)^2 S}\left(-\frac{\partial r}{\partial y}\frac{(1-\beta)\beta r^2}{(1-\theta)AS} + \Psi'(.)(r/\tau)^2 \tau' \right) \qquad (4A)$$

The sign of this derivative depends on the sign of the term in parenthesis. Notice that if $\partial r/\partial y < 0$ then 4A is positive. However, when $\partial r/\partial y > 0$ its sign is ambiguous. The sufficient condition to have $\partial \delta_a / \partial y > 0$ is:

$$\frac{\partial r}{\partial y} < \frac{(1-\theta)AS}{(1-\beta)\beta\tau^2}\Psi'(.)\tau'$$

Using equation 2A and reorganizing terms we can rewrite this condition as:

$$\left(\frac{1}{\eta_1} - \eta_2\right)\frac{\tau'}{\tau} < \frac{A'}{A}$$

where $\eta_2 = \frac{\Phi}{\Psi''(.)(1-\beta)\beta}\frac{\tau}{r}\frac{1}{\eta_1} > 0$. Otherwise the derivative in 4A is negative.

Office Spoils: Deriving 3A with respect to β, manipulating algebraically the expression, and using equation 3 we get:

$$\frac{\partial \delta_a}{\partial \beta} = -\frac{\beta r}{S\Psi(.)}\left(\frac{1}{S} + \frac{\partial r}{\partial S}\eta_3\right) \qquad (5A)$$

where $\eta_3 = \frac{(1-\beta)\beta r}{(1-\theta)AS\Psi(.)}$. Notice that $\eta_3 \in (0,1)$. It is so because of at equilibrium $H>0$, which implies $\beta r < \Psi(.)(1-\theta)S < \Psi(.)(1-\theta)AS$ (see proof or proposition 1). Since $\partial r/\partial S < 0$, the sign of 5A depends on the sign of the term in parenthesis. It follows that $\partial \delta_a / \partial S > 0$ if and only if $|\partial r/\partial S| > 1/(\eta_3 S)$.

Elite's power: Deriving 3A with respect to θ, manipulating algebraically the expression, and using equation 3 we get:

$$\frac{\partial \delta_a}{\partial \theta} = -\eta_3 \frac{\beta}{\Psi(.)S}\frac{\partial r}{\partial \theta} < 0$$

Incumbent's share: Deriving 3A with respect to β, manipulating algebraically the expression, and using equation 3 we get:

$$\frac{\partial \delta_a}{\partial \beta} = \frac{r}{\Psi(.)S}\left(1 - \frac{\partial r}{\partial \beta}\beta\eta_3\right) \qquad (6A)$$

It is direct that when β>½, then $\partial r/\partial\beta < 0$ and so $\partial\delta_a/\partial\beta > 0$. However, when β<½ the sign of 6A is ambiguous. The sufficient condition to have $\partial\delta_a/\partial\beta > 0$ is $\partial r/\partial\beta < 1/\beta\eta_2$; otherwise expression in 6A is negative.

APPENDIX: THE J-ELITES' GAME

Assume that there are *J>1* elites demanding corruption to the jurisdiction's incumbent, each on them indexed by *j* and endowed with economic power θ_j. In the new game the detection probability is given for:

$$\delta = \left(1 - \sum_j \theta_j\right)\frac{A}{A + \sum_j H_j}\Psi\left(\sum_j r_j / \tau\right)$$

The timing of the game is now the following:

1. Each elite *j* offers simultaneously a contract $\langle H_j, r_j \rangle$ to the incumbent.
2. The incumbent decides if she accepts (*Y*) or rejects (*N*) each contract.
3. The citizens observe the challenger signal and vote for the incumbent or for other candidate of unknown type.

The citizens' strategies keep unchanged; and an incumbent of type *c* will accept all the contracts if $\delta \le \beta\sum_j r_j / S$. Taking as given the corruption demand of the other elites, each elite *j* maximizes:

$$\underset{r_j}{Max} \quad \pi_j = (1-\beta)r_j - A\left(\frac{(1-\theta)}{\beta}\frac{\Psi\left(\left(r_j + \sum_{i\neq j} r_i\right)/\tau\right)}{r_j + \sum_{i\neq j} r_i}S - 1\right) + \sum_{i\neq j} H_i$$

$$s.t. \qquad 0 < \sum_j r_j < \tau \text{ and } H_j \ge 0 \quad \forall j.$$

where $\theta = \sum_j \theta_j$. Letting $\hat{r} = \sum_j \hat{r}_j$ and $\hat{H} = \sum_j \hat{H}_j$, at equilibrium corruption must satisfy:

$$(1-\beta) = \frac{(1-\theta)AS}{\beta}\left(\frac{\Psi'(.)\hat{r}/\tau - \Psi(.)}{\hat{r}^2}\right) \qquad (7A)$$

Since this condition is exactly the same on in equation 3, corruption has the same characterization in both the *1*-elite and the *J*-elite case. It follows that $\hat{H}$ must satisfy

also equation 4. Thus, if θ is the same in the *1*-elite and the *J*-elite cases (i.e. the elite's power θ of the *1*-elite game is split among the *J* local elites) both the level of corruption and the degree of political accountability will be also the same.

APPENDIX: DATA SET DESCRIPTION

Accountability Index: Originally ranking from 0 to 6, with 6 indicating lower corruption. Rescaled from 0 to 1, with 0 indicating lower corruption. Source: International Country Risk Guide. Taken from Fisman and Gatti (2002).

Corruption Index: Voice and Accountability index. The index has mean zero and lies between -2.5 and 2.5, where higher score corresponds to a better outcome. The Voice and Accountability index includes a linear combination of different variables with different sources. These variables correspond to country qualification on: Orderly political transfer of government, quality of legal system, civil liberties (freedom of speech, of assembly and demonstration of religion, equal opportunity, excessive government intervention), political rights (free and fair elections, representative legislative, free vote, political parties, no dominant group, respect for minorities), free press (laws and practice, independence, and violations), military in politics, democratic accountability (Responsiveness of the government to its people, free and fair elections), and business informed on policy rules and with voice to express its concern over changes in laws or policies. Source: The World Bank.

Decentralization: Total expenditure of subnational (state, and local) government over total spending by all levels (state, local, and central) of government. Source: *Government Finance Statistics*, International Monetary Found. Taken from Fisman and Gatti (2002).

GDP: Real GDP per capita in constant dollars, chain series, expressed in international price, base 1996. Source: Heston, Summers, and Aten, Penn World Table Version 6.1.

Civil Liberties: Gastil index of civil liberties. It takes values from 1 to 7, where 7 refers to the highest level of freedom. Source: Freedom House.

Population: Source: Heston, Summers, and Aten, Penn World Table Version 6.1.

Government Size: Total government expenditure divided by DGP. Source: Heston, Summers, and Aten, Penn World Table Version 6.1.

Legal Origin: Origin of a country's legal system. These dummy variables classify the legal origin in five groups: (1) English common Law; (2) Socialist laws; (3) French Commercial Code; (4) German Commercial Code; (5) Scandinavian Commercial Code. Source: La Porta, Lopez, Shleifer, Vishny (1999).

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