The determinants of the contract of corruption:

Theory and Evidence

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Abstract:

The paper focuses on the determinants of the contract of corruption which sees the contraposition of a public official and a private agent. The main idea is that the allocation of bargaining power between the bureaucrat and the private individual determines the emergence of two different types of contracts. Active corruption emerges when the bargaining power is in the hands of bureaucrat. Passive corruption when it is in the hands of firm. This leads in turn to different levels of bribes. The theory is put at a test with Italian data on corruption. The data tend to confirm theory's predictions.

Keywords: active corruption, passive corruption, bargaining power, government expenditure, public debt.
JEL codes: C33, D73, H72, H75.

1. Introduction

Corruption is a major issue in poor as well as in rich countries. Indeed, empirical evidence shows that corruption is pervasive and well rooted in the public sector activities in the vast majority of countries. More to this, though it is negatively affected by economic growth, corruption is not a negligible phenomenon even in rich countries. This is a major source of concern given that corruption can have significant detrimental effects on social welfare and economic growth. By distorting resource allocation, corruption may indeed cause serious inefficiencies in capital accumulation and lead to sub-optimal equlibria. But what are the real causes of corruption? What are the main factors driving public officials towards a corrupt behaviour? To these days, a vast literature has attempted to answer these questions following very different routes. Yet, not surprisingly, a definite and exhaustive answer has not been provided. It is not surprising because corruption, more than other social questions, is an extremely complex and multifaceted phenomenon. It is difficult to define it. It is difficult to measure it. It is even more difficult to identify its real nature. As Tanzi (1998) argued, corruption can be endogenous and eradicated in the system to such a degree that it is extremely difficult identifying its determinants. There is not only uncertainty regarding the direction of causality between corruption and its determinants but also uncertainty regarding the mutual influence of these determinants among themselves.

Given that corruption is in its essence public sector corruption, political factors have been considered to be one of the main factors shaping the roots of bribery. Indeed, even if the electoral systems, the degree of political competition, the form of government are not a direct cause of corruption, they are the frames within which policy decisions are taken and which nourish the opportunities for rent-seeking activities. To this extent, many empirical studies have highlighted the crucial role played by a democratic form of government in containing the spread of the phenomenon[1]. But not all democracies are the same. Persson et al. (2003), for example, have found a positive relationship between the *proportional voting system* and the level of corruption: unlike a *majority voting system*, a lower degree of accountability could induce politicians into more opportunistic behavior. Bardhan and Yang (2004) argue on the opposite, that excessive political competition by reducing the likelihood of re-election may increase incentives towards rent-seeking behaviour.

The political system, as anticipated, is just one factor explain corruption. The proof is that many countries with very similar political-institutional systems display very different level of public sector corruption. Hence, other factors are at play. Some empirical studies (Mauro, 1995; La Porta *et* al., 1999; Alesina *et* al., 2003) have, for example, found that in countries with a high index of ethno-linguistic fractionalization the perception of corruption is greater. But also social capital, social norms, organizations and institutions as well as the level of public wages and the degree of trust and compliance play a crucial role in determining public officials' opportunistic behavior (Haque, N.U. and Sahay, R. 1996; Van Rijckeghem, C. and Weder B.,1997; Acemoglu D. and Verdier T., 2000; Blackburn et al., 2006). Putnam (1993), for example, shows that the effectiveness of regional governments in Italy is reduced where the measures of *civic virtues* are lower. And then there are economic factors. As suggested by Glaeser et al. (2004), higher levels of per capita income, higher education levels, civic engagement and closer political interest should lead to lower corruption by engineering in the system greater propensity and a greater ability to monitor public officials and to report and dismiss them in case of unlawful conduct.

[1] See, among others, Paldam (2003).

This describes only the surface of the research up to date on the roots of corruption which is deep and broad. Yet, despite such efforts the literature has missed an important feature of the bribing activity. Corruption is a "contract" through which senior public officials receive a payment in exchange for a favourable decision on a specific matter. And, as in every agreement, the outcome of the contract depends, among other factors, on the bargaining power of each counterparty involved. Hence, for example if the public official has relatively more power, the bribe tends to be higher and the benefits to the private agent will be lower. The opposite occurs when is the private agent who has more bargaining power. These two circumstances can lead to two completely different contracts and sets of results. The corollary is that corruption may strongly depend on the allocation of the bargaining power and on the factors which affect such allocation. Given these premises, one can argue that we can have at least two extreme forms of corruption. In the first, it is the bureaucrat who has all the bargaining power and can set the level of bribe and the main features of the "unlawful exchange". We can refer to this as *active corruption* because it is the bureaucrat who can "demand" and set the bribe. In the second, it is the private individual, or firm, who has all the bargaining power and can set the terms of the contract. We can refer to this as *passive corruption* since it is the private agent who sets the terms of the contract and "supply" the bribe. By no chance, in some legal systems (for example in Italy) the legislator distinguishes between concussion (active corruption) and general corruption (passive corruption).

Whether we have active or passive corruption may depend on many factors: the nature of the public goods, the size of the public contract, the competitiveness in the market between firms and between bureaucrats and so on. On these premises we investigate the determinants of the bargaining power in the contract of corruption and the effect on aggregate corruption when these factors change. To this extent we build a simple benchmark model of an economy populated by representative agents (firms) who produce goods which can be purchased by the government and used as public goods. Bureaucrats work for government in procuring the public good. They can ask for a bribe (active corruption, concussion) or being object of bribery (passive corruption, bribery). The bargaining process between bureaucrats and firms delivers a "corruption contract" and determines implicitly the level of aggregate corruption in the economy. The main idea is that whether we have active corruption or passive corruption depends on the nature of the public goods supplied and on the degree of competition in the market. The supply of goods which require specific technical features makes more difficult for the bureaucrat to find alternative supplier and this increases firms bargaining power. Analogously, in oligopolistic market firms have more bargaining power and the contract entails a lower level of bribe payment.

The idea that it is mainly government attendance in the economic activities to create space for illegal rents is deeply rooted in the literature (Mauro, 1997). However, the research has investigated the issue on a different direction. The prevailing idea is that the more the system of laws and regulations is cumbersome, farraginous and opaque and the greater is the degree of discretion of public officials (Blackburn *et al*. 2009 among others).

Also the nature of public goods has been found to be a crucial determinant of corruption for different reasons. As suggested by Clements et al (1995), for example, government subsidies to industry may increase the incidence of unlawful behavior since these gives the opportunity to bureaucrats to facilitate enterprises not in title to this form of aid.

In our model bureaucrats' choice to ask for a bribe to firms (active corruption) and firms' choice to offer a bribe to bureaucrats (passive corruption) depend, among other

things, on the relative wage of public officials. For very low levels of wage, both active and passive corruption are maximum. The opposite occurs for very low levels of wage. For intermediate levels of wage the level of corruption in the economy and its composition may greatly differ depending on the allocation of the bargaining power[2].

We put our theory at a test. By using Italian data on active and passive corruption we investigate whether the variables we believe approximate the bargaining power affect active and passive corruption in the direction we have predicted. We use as a proxy of bargaining power the government expenditure in its *components* (healthcare, education, defence and welfare) and in its *categories* (current and capital). The idea is that, for the supply of government goods with low technical content, such as education (both current and capital), the bargaining power is in the hands of bureaucrat and this should affect positively active corruption. The opposite should occur for the supply of public goods in other sectors. In this way, it's the different nature of public good provided which determines a different allocation of bargaining power between public and private agent and, hence, the prevalence of a specific corruption regime. We also use public debt on GDP as an indicator of the allocation of bargaining power. Higher debt should be associated to more passive corruption. The results confirm our theory.

The paper is structure as follows. Section 2 presents a simple benchmark model of active and passive corruption. Section 3 presents the empirical estimates. Section 4 concludes.

2. A Simple Model

Let us consider an economy in which a public good needs to be procured. Government assigns public officials (Bureaucrats) the task of procuring this good which is market produced by a given number of firms. The interaction between the bureaucrat and each firm occurs through a procurement contract. This contract can either entail some form of corruption or not. Corruption, which is ultimately a component of the contract between the public official and the firm, results in some form of benefit accruing to firm and a bribe accruing to the bureaucrat. As in any standard form of contract, the size of the benefit and of the bribe depends, among other factors, on a different allocation of the bargaining power between the two counterparties. That is, the higher is the bargaining power of the bureaucrat, the larger will be the bribe. And, symmetrically, the lower is bureaucrat's bargaining power the lower will be the bribe and, therefore, the higher will be firm's private benefit. Hence, the contract between the bureaucrat and the firm and the related nature of corruption depends on the distribution of bargaining power between the two parties. In order to simplify matter, we will consider two extreme cases. In the first the bargaining power is (mainly) in the hands of the bureaucrat. This is equivalent of assuming that the bureaucrat is able to approach the firm and ask for a bribe. We will label this case as "active corruption" or concussion, because the bureaucrat assumes an active role in the contract. In the second case, the bargaining power is in the hands of the firm. When this occurs it is the firm which can approach the bureaucrat and offer a bribe. We will label this as "passive corruption". The two contracts lead to two different sets of results.

[2] As you can see hereinafter, for intermediate levels of public wage in the active corruption regime the decision of each bureaucrat to be corrupt mainly depends on the choice of the other bureaucrats and in the passive corruption regime the decision of each firm to be corruptor mainly depends on the choice of the other firms.

We will now design the procurement contract which entails Active Corruption and, soon after, the procurement contract which entails Passive Corruption.

2.1 A contract with Active Corruption

Several factors could explain the bargaining power in the hands of the bureaucrat. For example, active corruption could emerge where there is a large number of firms which can potentially supply the public good, or when the bureaucrat in charge of securing the public contract has a lot of power and there are few other fellow bureaucrats who could supply similar goods or, finally, in the presence of a standardised good whose production does not involve special skills or specific technologies.. In order to detect these instances, we will assume that the government needs to supply two kind of public goods. The government nominates z_1 bureaucrats to procure the first good, G_1, which does not require specific technology to be produced. A large number of firms, n, produce this good either for the government or for the private sector. The second good, G_2, instead requires specific technological skills to be produced. Only $m<n$ firms can produce this good. The number of bureaucrats in charge of procuring G_2 is z_2.

In procuring public good G_1, each bureaucrat has a relative higher bargaining power. Each bureaucrat has a competence on a limited number of firms and by assuming that $z_1 < n$, he will approach $h = n / z_1$ firms.

Firms can produce this good for the market and obtain a price q, or they can supply this good to the government. By paying a bribe b, firms can obtain a higher price, $\hat{q}$[3]. The higher price is due to the surcharge applied by bureaucrat to the government in the public procurement. Hence firm's expected profit is

$$u_F = \begin{cases} q & if\ b = 0 \\ \hat{q} - b & if\ b > 0 \end{cases} \tag{1}$$

Bureaucrat approach a firm and may ask or not for a bribe. We let μ to be the fraction of corrupt bureaucrats procuring good G_1. Each firm will accept the public contract only if the expected profit is no less than what it is possible to obtain by supplying goods to the market. Hence firm's participation constraint is

$$\hat{q} - b \geq q \tag{2}$$

The latter implicitly define the maximum level of bribe each firm is willing to accept is

$$b = \hat{q} - q \tag{3}$$

A bureaucrat who chooses to be corrupt with probability p escapes prosecution and retains the wage w_B plus the bribe. With probability 1-p he is caught. In this case, the corrupt bureaucrat will not get any salary and the bribe is confiscated by the government. Hence,

[3] We are assuming that the production costs don't change, depending on whether the firm sells the good to government or on the private sector. Furthermore we can see to these sell prices, q and $\hat{q}$, as per unit of good firm revenues.In this way, a different amount of public good provided by firms does not change our theoretical results. This reasoning is effective also for the passive corruption regime.

recalling that each bureaucrat has competence on an equal number of firms, h, the expected utility of a bureaucrat is

$$u_H = \begin{cases} w_B & if\ b = 0 \\ p(w_B + hb) & if\ b > 0 \end{cases} \tag{4}$$

It is straightforward to verify that it is optimal to be corrupt if

$$p(w_B + hb) \geq w_B \tag{5}$$

which implies that a necessary condition for corruption to occur is

$$b \geq \frac{(1-p)w_B}{ph} \tag{6}$$

The latter implicitly define the minimum level of bribe below which there is no corruption:

$$\tilde{b} = \frac{(1-p)w_B}{ph} \tag{7}$$

Combining (3) and (6), we obtain a necessary condition for corruption to occur

$$\frac{ph(\hat{q}-q)}{1-p} \geq w_B \tag{8}$$

We assume that the $\hat{q}$ is a decreasing function of the share of bureaucrats who are corrupt, μ, $\hat{q} = \hat{q}(\mu)$ and $\hat{q}'(\mu) < 0$. One can argue that a fixed amount of resources is provided by the government in order to procure public goods. Since corruption can be financed on price surcharge, the more corrupt bureaucrats the less resources are available to finance more corruption.

If the bargaining power is in the hands of the bureaucrats, the bureaucrat will appraise all the extra-price , given by the difference between the higher price $\hat{q}$ and the market price, and the participation constraint of the firm, eq. (2), will be binding[4]. Hence the optimal level of bribe will be

$$b^* = \hat{q} - q \tag{9}$$

The equilibrium value of active corruption

We now determine the equilibrium value of active corruption. We will measure corruption as the number of corrupt bureaucrats in the economy. Since the penalty for corruption does not depend on how many firms the bureaucrat is extorting, a corrupt bureaucrat will ask for a bribe all firms under his supervision. Whether or not it is optimal for a bureaucrat to be corrupt, eq. (8), crucially depend on other bureaucrats choice. In fact, the higher price, $\hat{q} = \hat{q}(\mu)$, depends on the overall number of corrupt bureaucrats in the economy.

[4] In the active corruption regime, the only corruption's advantage for the firm is to sell an additional unit of its good to public sector. Furthermore, we are assuming that each firm does not face up to any penalty, because if it's caught, the judicial authority will prosecute just the private employee delegated by firm to interact with the bureaucrat. The latter assumption is applied also to the passive corruption regime.

Let $\hat{q}(0) = \hat{q}_0$ and $\hat{q}(1) = \hat{q}_1$ with $\hat{q}_0 > \hat{q}_1$. By recalling that $\mu \in [0,1]$, $\hat{q}_1$ is the minimum value of $\hat{q}$ and $\hat{q}_0$ is the maximum value of $\hat{q}$. If this is the case the equilibrium level of corruption is summarised by the following proposition:

Proposition 1:

Corruption is maximum, μ = 1 , i.e. all bureaucrats are corrupt and no one has incentive to deviate if $\frac{ph(\hat{q}_1 - q)}{1-p} = \hat{w}_B \geq w_B$.

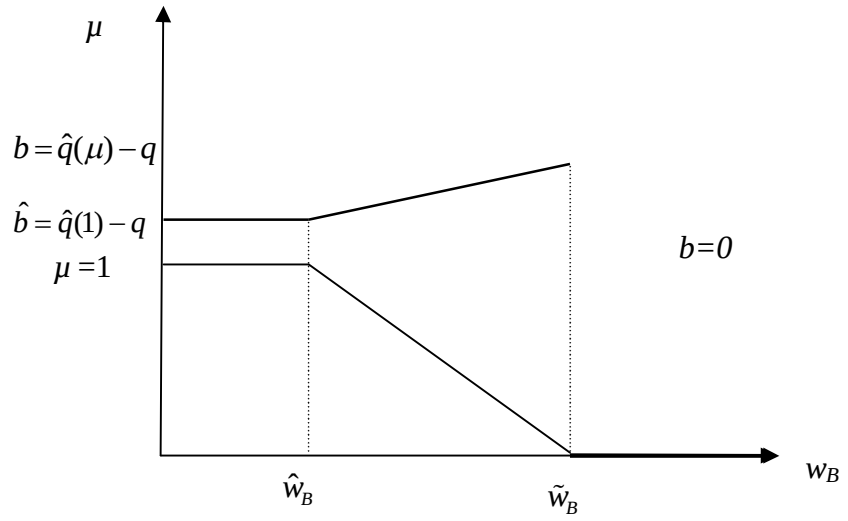
Corruption is minimum, μ = 0, i.e. all bureaucrats are not corrupt and no one has incentive to deviate if $\frac{ph(\hat{q}_0 - q)}{1-p} = \tilde{w}_B \leq w_B$.

Corruption is at an intermediate equilibrium level, $\mu = \mu^* \in]0,1[$, if $\frac{ph[\hat{q}(\mu^*) - q]}{1-p} = w_B$ where $\tilde{w}_B > w_B > \hat{w}_B$.

The proof of the above proposition is the following. Let us begin by assuming that all bureaucrats choose to be corrupt, i.e. $\mu = 1$. This implies that the level of surcharge bureaucrats can impose on each contract is minimum, $\hat{q}(1) = \hat{q}_1$. Since by assumption the condition to be corrupt, eq. (8), is satisfied and $\frac{ph(\hat{q}_1 - q)}{1-p} \geq w_B$, no bureaucrat has incentive to deviate and not to be corrupt. Let us, now, assume that no bureaucrat is corrupt, i.e. $\mu = 0$. This implies that the amount of surcharge bureaucrats can potentially impose on each contract is maximum, $\hat{q}(0) = \hat{q}_0$. Since by assumption the condition to be corrupt, eq. (8), is not satisfied and $\frac{ph(\hat{q}_0 - q)}{1-p} < w_B$, no bureaucrat has incentive to deviate and to become corrupt. Finally, let us suppose that $\hat{q}(1) = \hat{q}_1$ and $\hat{q}(0) = \hat{q}_0$ are such that $\frac{ph(\hat{q}_1 - q)}{1-p} < w_B < \frac{ph(\hat{q}_0 - q)}{1-p}$. If this is the case, when all bureaucrats choose to be corrupt and $\mu = 1$, then the condition to be corrupt would be violated, $\frac{ph(\hat{q}_1 - q)}{1-p} < w_B$, and bureaucrats would deviate and choose to be honest. Similarly, if all bureaucrats choose not to be corrupt and $\mu = 0$, then the condition to be corrupt would hold, $\frac{ph(\hat{q}_0 - q)}{1-p} > w_B$, and bureaucrats would deviate and choose to become corrupt. This implies that neither total corruption, $\mu = 1$, nor complete honesty, $\mu = 0$, would be an equilibrium. Yet we can establish the existence of an equilibrium in the following way. Consider a level of corruption $\mu = \mu^* \in (0,1)$ such that $\frac{ph[\hat{q}(\mu^*) - q]}{1-p} = w_B$. If this is the case the level of corruption is such that the return from choosing to be corrupt equates the return from not being corrupt. This implies that each bureaucrat will be indifferent from being corrupt or not and randomise the choice. At the aggregate level the fraction of corrupt bureaucrats will be μ^* and the fraction not corrupt $1-\mu^*$ and $\frac{ph[\hat{q}(\mu^*) - q]}{1-p} = w_B$ so that no bureaucrat has incentive to deviate.

The results in proposition 1 are represented in Fig. 2.1.

Fig. 2.1 - The equilibrium value of active corruption



For very low level of bureaucrats' wage, $w_B < \hat{w}_B$, all bureaucrats are corrupt and the level of active corruption in the economy is maximum, $\mu = 1$. When this occurs the level of bribe each bureaucrat will impose is determined by eq. (9), $\hat{b} = b^* = \hat{q}_1 - q$. On the opposite, for very high level of bureaucrats' wage, $w_B > \tilde{w}_B$, all bureaucrats are honest and the level of active corruption in the economy is zero, $\mu = 0$. If this is the case the level of bribe is zero $b = 0$. For intermediate values of the wage, $\hat{w}_B < w_B < \tilde{w}_B$, the level of corruption in the economy is not constant and mainly depends on the other bureaucrats'choice. Starting from the threshold level of wage $w_B = \hat{w}_B$ which corresponds to the maximum level of corruption, $\mu = 1$, an increase in the wage rate would decrease corruption monotonically. Indeed, $\forall w_B \in (\hat{w}_B, \tilde{w}_B)$, the fraction of corruption is determined by $\frac{ph[\hat{q}(\mu^*) - q]}{1-p} = w_B$. The latter simply requires that as w_B increases, $\hat{q}(\mu^*)$ should increase as well, which in turn requires μ to decrease. In this case the level of bribe on each firm is increasing $b = b^* = \hat{q}(\mu) - q$ up to $\mu = 0$ when it jumps discontinuously to $b = 0$.

The intuition for the above results is the following. The rent a bureaucrat can extract from each firm $\hat{q}(\mu) - q$, the bribe, depends on the level of corruption and hence on other bureaucrats' choice. For a given average level of profit q, the higher is $\hat{q}(\mu)$ the higher is the incentive to become corrupt. Yet the optimal choice between active corruption and honesty depends on the wage rate as well. When the wage level is very low, $w_B < \hat{w}_B$, no matter what is other bureaucrats choice, the incentive to become corrupt is relatively so high that no one will choose to be honest. The opposite occurs for very high levels of the wage rate, $w_B > \tilde{w}_B$. In this case the incentive to become corrupt never compensates the expected loss of a high wage. For intermediate level of wage, $\hat{w}_B < w_B < \tilde{w}_B$, the rent that each bureaucrat can extract from bribing depends on the aggregate level of corruption. As discussed, equilibrium entails that each bureaucrat for a given wage, is indifferent between

active corruption and honesty, $\frac{ph[\hat{q}(\mu^*)-q]}{1-p}=w_B$. Of course, the higher is the wage, the higher is the expected cost of being detected. Hence, the higher is the wage the higher should be the bribe, $b=b^*=\hat{q}(\mu)-q$, to keep each bureaucrat indifferent in their choice.
We now turn in describing the emergence of passive corruption.

2.2 A contract with Passive Corruption

Government assigns z_2 bureaucrats the task of procuring public good G_2. Production of good G_2 requires specialised firms and only few, $m<n$ can supply this good. These assumptions attempt to capture the idea that the contract to procure good G_2 entails a shift in the bargaining power. We will assume indeed following our arguments that the bargaining power is in the hands of the firm. The firm will ask bureaucrat to be granted some benefit in exchange for a bribe.

By selling good G_2 on the private sector firms obtain a price Q. In supplying the same good to government and By bribing the bureaucrat firms can get a higher price , $\hat{Q}$. We assume, however, that the bribing activity involves some lobbying costs *I*. The lobbying cost is an increase and convex function of the fraction of firms active in lobbying: $I=I(\alpha)$ and $I'(\alpha)>0$, where $\alpha\in[0,1]$ is the fraction of firms lobbying. Each firm can contact one bureaucrat and only the bureaucrat that have been contacted can potentially be corrupt.
Hence, the expected profit of a firm is

$$u_F=\begin{cases}Q & if\ b=0\\ \hat{Q}-I(\alpha)-b & if\ b>0\end{cases} \tag{10}$$

Bureaucrats receive by the government the wage, w_B. A bureaucrat who is induced into a corrupt behaviour (passive corruption), will obtain along the wage the bribe, b. The corrupt bureaucrat will not be detected with probability p. With probability 1-p the bureaucrat is detected and the government will confiscate the bribe and the wage.
Hence, the expected utility of a bureaucrat is

$$u_H=\begin{cases}w_B & if\ b=0\\ p(w_B+b) & if\ b>0\end{cases} \tag{11}$$

The bureaucrat is willing to accept a bribe if $p(w_B+b)\geq w_B$ and hence if

$$b\geq(1-p)w_B \tag{12}$$

The latter implicitly determines the minimum bribe a bureaucrats is willing to accept

$$b=(1-p)w_B \tag{13}$$

Since the firm has all the bargaining power, it will extract all the surplus and the bribe will be set to the minimum. Therefore, $b = (1-p)w_B$ is also the optimal level of bribe as determined by firms. We now determine the equilibrium value of passive corruption.

The equilibrium value of passive corruption

Each firm decides whether to engage in lobbying and bribing activities only if the expected profit is high enough to compensate what the firm could get in the market by no bribing. That is firm will bribe only if

$$\hat{Q} - I(\alpha) - (1-p)w_B \geq Q \tag{14}$$

The latter clearly states that whether it is optimal to bribe depends, among other things, on the number of firms choosing to lobbying and bribing.
Let us define $I_0 = I(0) > 0$ the minimum value of the lobbying costs. This is the level of lobbying cost if no firm is lobbying. And let us define $I_1 = I(1) > I(\alpha) \quad \forall \alpha \in [0,1]$ the maximum value of the lobbying costs. This is the level of lobbying cost if all firms are lobbying. Given eq. (14) the equilibrium level of passive corruption is summarised by the following proposition:

Proposition 2:

Passive corruption is maximum, $\alpha = 1$, i.e. all bureaucrats are corrupt and no one has incentive to deviate if $\frac{\hat{Q} - Q - I_1}{1-p} = \hat{w}_B \geq w_B$.

Passive corruption is minimum, $\alpha = 0$, i.e. all bureaucrats are not corrupt and no one has incentive to deviate if $\frac{\hat{Q} - Q - I_0}{1-p} = \check{w}_B \leq w_B$.

Corruption is at an intermediate equilibrium level, $\alpha = \alpha^* \in [0,1]$, where $\frac{\hat{Q} - Q - I(\alpha^*)}{1-p} = w_B$ if $\check{w}_B > w_B > \hat{w}_B$.

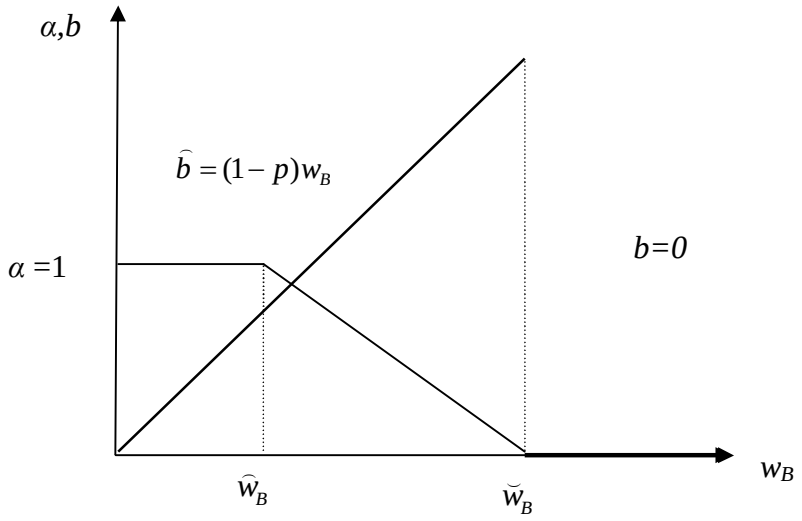
The proof of Proposition 2 follows similar arguments of the proof of Proposition 1. Let us start by assuming that all firms choose to bribe bureaucrats, i.e. $\alpha = 1$. The results is that the lobbying costs are maximum, $I(1) = I_1$, given that all firms contemporaneously try to get the best conditions for their public contracts. Since, by assumption for this level of lobbying cost it is optimal for each firm to bribe in order to obtain a better contract, i.e. even if the lobbying costs are at their maximum, the level of public wages is so low that $\frac{\hat{Q} - Q - I_1}{1-p} \geq w_B$ and eq. (14) is satisfied, no firm has incentive to deviate. Hence, bribing is a consistent optimal choice for all firms and $\alpha = 1$ is an equilibrium. On the opposite, let us assume that passive corruption is zero and no firm is bribing, i.e. $\alpha = 0$. This entails that the lobbying costs are at their minimum, $I(0) = I_0$. In this case even if the lobbying costs are at their minimum, the level of public wages is so high that all firms find no optimal to

bribe bureaucrats. Indeed, since by assumption eq. (14) is not satisfied and $\frac{\hat{Q}-Q-I_0}{1-p} < w_B$, no firm has incentive to deviate and to start bribing. It means that $\alpha = 0$ is also an equilibrium. Finally, let us assume that the maximum and the minimum lobbying costs are such that $\frac{\hat{Q}-Q-I_1}{1-p} < w_B < \frac{\hat{Q}-Q-I_0}{1-p}$. Then if all firms choose to bribe and $\alpha = 1$, the condition that bribing is optimal would be violated, $\frac{\hat{Q}-Q-I_1}{1-p} < w_B$. Firms f would find optimal to deviate and to choose to be honest. For similar reasons, if all firms choose not to bribe and $\alpha = 0$, then the condition in eq. (14) would hold, $\frac{\hat{Q}-Q-I_0}{1-p} > w_B$. Firms would deviate and choose to bribe bureaucrats. This implies that neither total corruption, $\alpha = 1$, nor absence of passive corruption, $\alpha = 0$, would be an equilibrium. Yet an equilibrium exists for that level of corruption, α^*, which leaves each firm indifferent between bribing and accessing a public contract with no bribe. Let us consider a level of passive corruption $\alpha = \alpha^* \in [0,1]$ such that $\frac{\hat{Q}-Q-I(\alpha^*)}{1-p} = w_B$. When this occurs the lobbying costs are such that the return from choosing to bribe and obtain a more rewarding contract equates the return from not bribing. This implies that each firm will be indifferent from bribing or not bribing. The equilibrium at aggregate level is sustained by the fact that the fraction of corruptor firms , α^*, will be such that $\frac{\hat{Q}-Q-I(\alpha^*)}{1-p} = w_B$ and no firm has incentive to deviate.

The results in proposition 2 are represented in Fig. 2.2

For low level of wage, $w_B < \bar{w}_B$, the bribe as determined by eq. (13) is so low that whatever is the cost of lobbying all firms find optimal to bribe, $\alpha = 1$. Passive corruption measured by the number of firms choosing to bribe is maximum and the bribe size is increasing in the wage rate, $\bar{b} = (1-p)w_B$. The extra profit each firm can obtain by bribing, $\hat{Q}-Q-I_1$, is constant and minimum but still so high, $\hat{Q}-Q-I_1 \geq w_B(1-p)$, that it is optimal to bribe. Once the wage rate pass the threshold level $w_B > \bar{w}_B$, the level of bribe required to induce bureaucrats into corruption increases to the extent that some of the firms, $1-\alpha^*$, will start to find optimal not to bribe. The extra profit each firm can obtain by bribing, $\hat{Q}-Q-I(\alpha^*)$, is increasing with the wage rate as more and more firms decide optimally not to bribe, $\hat{Q}-Q-I(\alpha^*) = w_B(1-p)$. As it is for active corruption, for very high level of bureaucrats' wage, $w_B > \bar{w}_B$, the bribing cost is so high that no matter how low it is the lobbying cost, no firm will find optimal to bribe. Passive corruption in the economy is zero, $\alpha = 0$ and so is the bribe $b = 0$. The extra profit each firm can obtain by bribing, $\hat{Q}-Q-I_0$, is constant and maximum but still the wage rate is so high that it is not optimal to induce bureaucrat into a corrupt behavior, $\hat{Q}-Q-I_0 < w_B(1-p)$.

Fig. 2.2 - The equilibrium value of passive corruption



We now turn in examining the level of Economywide Corruption

2.3 The equilibrium level of Economy wide Corruption

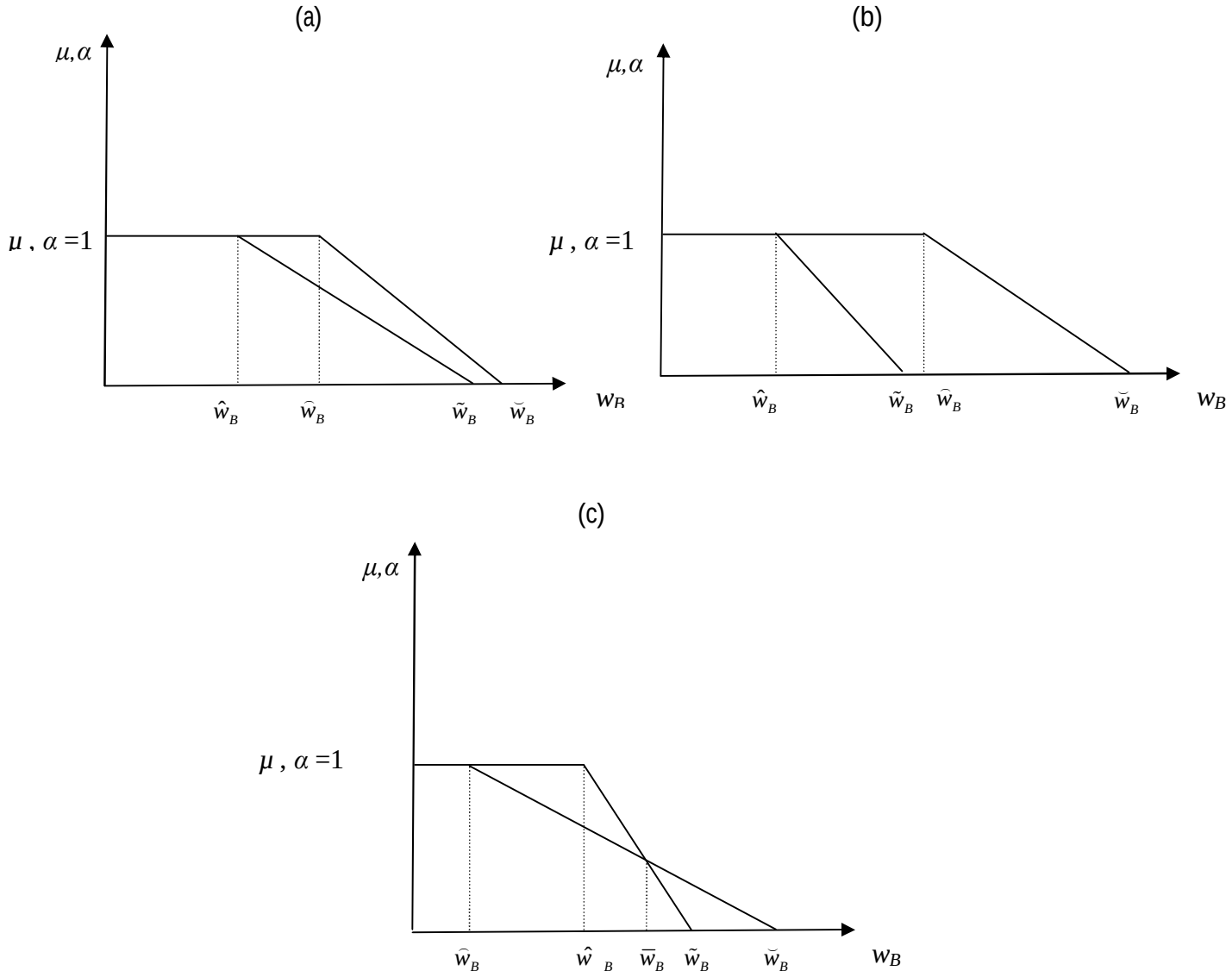
Provision of public goods G_1 and public goods G_2 entails the emergence of active and passive corruption. An external observer who does not distinguish between the two will observe an aggregate level of corruption in the economy which however is the results of the combination of the two types of corruption. How these types of corruption combine and how large is "aggregate" corruption depends on the threshold levels of wage. Indeed, as already argued, the level of bureaucrats' wage, all other factors constant, drives the optimal choice of bureaucrats in the provision of goods G_1 determining the level of active corruption, and drives firms optimal choice of whether bribing bureaucrats when supplying goods G_2 in order to obtain a more profitable contract. Hence, the interrelationship between $\hat{w}_B$, $\tilde{w}_B$, $\bar{w}_B$, $\breve{w}_B$ ultimately determines the possible corruption scenarios in the economy. Recalling that $\hat{w}_B < \tilde{w}_B$ and $\bar{w}_B < \breve{w}_B$, the model entails six possible cases which correspond to the all possible permutations of $\hat{w}_B$, $\tilde{w}_B$, $\bar{w}_B$, $\breve{w}_B$.

These cases and the threshold values ultimately depend on the parameters values in the model and on the specific shape of the surcharge function $\hat{q} = \hat{q}(\mu)$ and the lobbying cost function, $I = I(\alpha)$. Yet we can restrict to only three case if we introduce a plausible restriction on the parameters. More specifically, we will assume that the lobbying costs are negligible when very few firms operate. Equivalently, we are assuming that for very high level of bureaucrat's wage, active corruption tends to dominate passive corruption. This goes in accordance with intuition and evidence. In other words, we assume that I_0 is such that

$$ph(\hat{q}_0 - q) < \hat{Q} - Q - I_0 \qquad (15)$$

which imply that $\hat{w}_B < \breve{w}_B$. If this is the case then we have three possible cases which are depicted in Fig 2.3 (a), 2.3 (b) and 2.3 (c).

Fig. 2.3 - The equilibrium level of Economy wide Corruption



In all instances for very low level of wage, corruption is maximum, α = 1 and μ = 1. The opposite happens for very high levels of wage, α = 0 and μ = 0. For intermediate values of wage, both the level of active and passive corruption decreases, yet the contribution of each type to total corruption depends on the parameters value. The first and second case are similar (Fig 2.3a and 2.3b). In these frameworks, as wage increases both active and passive corruption decrease but passive corruption always contributes more to total corruption for high levels of wages. Case three, however, shows that it is possible that active corruption contributes to corruption more even if the level of wage is relatively high. This occurs for values of wage between $\bar{w}_B$ and $\bar{\bar{w}}_B$.

3. The Evidence

3.1 Estimation strategy and methodology

Now we put our theory at a test. The main objective is to assess empirically whether a different distribution of bargaining power in the corruption agreement contributes differently to active and passive corruption. To this end, we identify two variables which we believe might reflect a different allocation of the bargaining power and we test the impact of these on some measurement of active and passive corruption. We hence use two different econometric specifications in which we regress the measures of active and passive corruption in turn, along a costant set of other control variables, on these two variables. We employ judicial Italian data on corruption which allow to distinguish between *concussione* (active corruption) according to which provision of law the bureaucrat is punished because he *forces* or *induces* somebody to pay a bribe and *corruzione* (passive corruption). In the latter case, instead, according to the Italian penal code, the bureaucrat is punished because it *only receive* a bribe. More specifically we specify an *Autoregressive Distributed Lag* (ADL) model of the type

$$Y_{jt} = \beta_0 + \sum_{i=1}^{n} \beta_i Y_{jt-1} + \sum_{i=1}^{m} d_i X_{jt-1} + f_i + u_{jt} \qquad (16)$$

where j and t refer respectively to the twenty Italian regions and time (1991-2010)[5]; f_i are region-specific unobserved effects; u_{jt} is the error term; the dependent variable $\boldsymbol{Y}$ is given, alternatively, by active, passive corruption and total corruption (an aggregate of the two).

This specification is well suited to describe processes of variables whose actual values strongly depend on their own past values (Del Monte and Papagni, 2007). In concrete, we employ an ADL (1,1). We believe that the one lag choice for the dependent variable, in our case, best describes the persistence of corruption through time. Again, we use one year lag for the independent variables, because the denunciations for these crimes, usually, refer to corruptive activities happened a year before the report of the crime to the Judicial Authority.

Furthermore, the judicial Italian data should display a significant spatial homogeneity in the sense that we should expect no large systematic differences among regions about the relationship between corruption offenses reported and those actually committed. This statement could be confirmed in two way. Firstly, Del Monte e Papagni (2007) do not find any significant relationship between similar data on corruptive crimes reported and an index of judicial efficiency at regional level based on the average length of judicial processes. Second, by comparing the judicial data on the corruptive crimes reported and the index of corruption perceived (10-CPI) we find a similar trend for the time span considered here (see figure 3.1).

Moreover, in order to take into account time specific effects, such as the wide anti-corruption campaign so called *Mani Pulite* (Clean Hands), conducted in the early 90s in Italy, we include in all regressions a calendar year dummy. In fact, as it shown in figure 3.2, this judicial compaign could affect the propensity to report corruptive crimes and, therefore, the reliability of the judicial data on the corruptive crimes reported. $\boldsymbol{X}$ is instead a vector of explanatory variables which includes one at time of the two variables detecting

[5] The second specification only is based on data from 1998 to 2010.

the bargaining power and a constant set of control variables which the literature is usual to identify as determinants of corruption.

The first variable which we believe might detect a different allocation of bargaining power is given by the *components of government expenditure* (healthcare, education, defence and welfare) and/or by the *categories of government expenditure* (current and capital). Mauro (1998) identified different effects of corruption on government spending depending on which component and which category was considered. We expect that the provision of public goods and services with high technological content should affect passive corruption more than active corruption. The idea is that the provision of these goods require more specialized firms with more market power and more bargaining power towards bureaucrat. On the contrary, we should find greater impact of public goods which have less standardized technological content on active corruption because they will give the bureaucrat the possibility to discharge a firm when a firm does not respond to its requests. In other word, we believe that a different *nature of public good* could determine a different allocation of bargaining power between the two counterpart of corruption contract.

The second variable we believe might detect the allocation of bargaining power is the level of *local government debt*. The latter is indeed a proxy for the *reliability* of the public sector. The larger is government debt the lower will be the bureaucrats bargaining power.
In fact, like in any standard contract between lender and borrower, when the leverage of borrower increase the power of the lender increases This imply that we should expect that local government debt should affect positively passive corruption and negatively active corruption.

Other control variables include measurement of social capital, economic development, political competition, the level of education and the degree of mafia infiltration in the public sector.

In order to capture the effect that *social norms* on corruption we include among the regressors the percentage of *Absenteeism* in national elections or, limited to the second specification, the *Volunteering*. We consider the first variable to be endogenous since in the presence of high levels of corruption, the electorate is discouraged by evidence of wrongdoing in the political system and could be induced to refrain from exercising their right to vote. In order to control for the level of economic development we use a measure of *Economic backwardness* given by the share of agriculture in the total GDP. We use also as alternative measure the *real per capita GDP*. We also include in the regressions an index of *Political competition*. Political competition is considered indeed a major determinant of corruption. We measure political concentration through a *normalized Herfindahl-Hirshman Index* (HHI*) that takes into account both the number of parties and the percentage of votes obtained by each of them, at regional level, in the elections for the Senate[6]. Following the literature which consider also the degree of education to be a determinant of corruption we include a measure of Schooling.

We also include a measure of the penetration in the public economy of criminal organizations, *Mafia dissolution*. We indeed control also for the *number of municipal councils dissolved for mafia infiltration*[7]. We believe that the contacts of mafia with governments, both at a central and local levels, may affect the level of corruption. Not only. The presence of Mafia and criminal organization can distort the determinants of active and passive corruption. In fact where mafia is strong the incidence of active bribery could be lower since the bureaucrat cannot dictate the "rules of the game".

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[6] More details on the methodology for calculating the normalized index will be provided hereinafter.

[7] The main criminal organizations recognized as "mafia" in Italy are: *Camorra*, *'Ndrangheta*, *Sacra Corona Unita* and *Mafia*.

In order to control for possible endogeneity and to take care of problems of heteroskedasticity and autocorrelation we employ a dynamic panel estimation. More specifically, we use a System - Generalized Method of Moments (GMM) estimator, an approach developed by Blundell and Bond (1998) and outlined in Arellano and Bover (1995). We test the validity of the instruments by applying two specification tests. Firstly, we use the Hansen (1982) J-test of over-identifying restrictions in order to examine the exogeneity of the instruments. The second test is the Arellano and Bond (1991) test for serial correlation of the disturbances up to second order.

3.2 Data description

We use a panel of 20 Italian regions. The judicial data on corruption-related offenses are provided by the Italian National Institute of Statistics (Istat) and have been widely used in many empirical studies (Del Monte and Papagni, 2007; Acconcia and Cantabene, 2008; Fiorino and Galli 2010; Alfano et al., 2012). The Italian judicial system provides distinct data for *Concussione* (active corruption) (article 317 of the Italian Penal Code) and *Corruzione* (passive corruption) (an aggregate of articles 318-320 of the Italian Penal Code). Our variables are given by the total number of crimes reported, in a given year, for the offenses of Concussione and Corruzione per 100,000 inhabitants.

Data on government spending are provided by the Department of the General Accounting of the State of the Ministry of Economics and Finance and are given as a percentage of regional GDP. Measuring government spending per capita may cause distortions due to differences in population density. Indeed, the minimum provision of infrastructure (roads, hospitals, schools, etc.) referred to a region of low population density leads to overestimate the amount of public spending per capita. For similar reasons, the local government debt (provided by the Bank of Italy) is measured in terms of percentage of GDP.

The Database - Historic Archive of elections (Ministry of the Interior - Department for Internal and Territorial Affairs) - Senate of the Republic Regional supply data about political polls. Political competition is calculated by the normalized Herfindahl-Hirschman Index (HHI *) . In formal terms:

$$HHI^{*} = \frac{HHI - \frac{1}{n}}{1 - \frac{1}{n}} \tag{17}$$

where $HHI = \sum_{i=1}^{n} v_i^2$ is the Herfindahl-Hirshman index with v representing the share of votes, expressed as a percentage, that each political party has obtained with respect to the total valid votes; n is the number of political parties in a given poll. This normalized index varies between 0 (perfect competition with n parties of equal size) and 1 (absence of political competition).

3.3 Econometric results

Considering our first bargaining power proxy, the nature of public good provided, well detected by the various functional components of public spending, our econometric results are confirmed. However public spending on defense does not seem to have a

significant effect on total corruption or on passive and active corruption[8]. One plausible explanation could be just represented by the process of regionalization of national military spending which deliver unreliable results.

Our theoretical hypotheses are confirmed, instead considering the government expenditure for education and its different categories. In the table 3.1, in fact, if we consider total public spending for education, we find a positive and significant effect on active corruption (columns 1 and 2) and no significant effect on passive corruption (columns 3 and 4). Considering the different categories of government spending separately, we have the same results: current public expenditure in education only lead to an increase in the active corruption (columns 5 and 6), while there is no significant effect on the passive corruption (columns 7 and 8). As expected, the public provision of goods and services with low technological content, just like these provided to the education sector, shifts the bargaining power in the hands of the bureaucrat.

Even the public spending for welfare seems to display a different effect on the two types of corruption. Considering the total expenditure (table 3.2) we see a positive and significant effect at 1% level on active corruption (column 2) and a positive but not significant effect on passive corruption (column 4). Furthermore, we find that investments in welfare have no effect on passive corruption (column 8), while they lead to a large and significant increase in the active corruption (column 6). The current expenditure in welfare leads to an increase both of active corruption at 5% level of significance (column 6), and of the passive corruption at 1% level of significance (columns 8), however the effect on active corruption is greater than the effect on passive corruption

The effect of total expenditure for health care on total corruption (table 3.3) is unclear and no significant. Nevertheless, considering distinctly the active and passive corruption the picture becomes clearer. In fact, the government expenditure for healthcare result in a great and 5% significance level increase of active corruption (columns 4), while there is no significant effect on the passive corruption.

With regard to the last specification, the local government debt (table 3.4), our theoretical assumptions again are fully confirmed. Indeed, we find a clear difference between the effect exerted on the two different regimes of corruption. As we expected, the higher the debt and lower the bargaining power of the bureaucrat and, therefore, lower the incidence of active corruption. In columns (5) and (6), indeed, the coefficients of the debt GDP ratio are positive and significant at 1% levels, while we find no effect on the active corruption.

4. Conclusions

Corruption is a complex phenomenon and can take different forms. This work represents, to the best of our knowledge, a first attempt to understand the roots of the contract of corruption through the analysis of the bargaining power of the counterparties involved. Our empirical analysis shows that in Italy seems to prevail active corruption which is perfectly represented by the judicial data relating to *concussion*. This is not a good news. *Concussion*, in fact, may negatively affect the productivity of firms more than *corruption*, as it acts as a tax the amount of which is determined arbitrarily by the bureaucrat. This is especially true for small and medium-sized enterprises, which represent the backbone of Italian businesses. Furthermore, the functional components of government expenditure

[8] Results are available on request

here considered represent sectors of public intervention aimed to welfare and development of a society. For instance, a public spending in education is considered by literature the channel through which the public resources should ensure the accumulation of human capital which could promote, at least in the long run, the economic growth. The distorting effects of corruption are, likewise, particularly damaging on the public spending in welfare and healthcare. In this case, corruption might threaten the socio-economic equity, and increases inequality in the access to healthcare and social protection.
Understanding in which spheres of action of the Government prevails active bribery, can help the policy maker to plan and implement more effective anti-corruption policies. It can also provide legislative instruments that put more attention on the potential public counterpart of the contracts of corruption.

Finally, our empirical results highlight another aspect of the corruptive phenomenon in Italy. In the presence of a high level of local government debt the corruption power shifts in the hands of private counterpart.
In these circumstances, an anticorruption policy should pay more attention on the behavior of the private counterpart that interacts with heavily indebted local governments.

These reasoning are even more true in Italy, where corruption is a widespread phenomenon. According to estimates by *Corte dei Conti* (The Court of Auditors), indeed, each year corruption in Italy account to the equivalent of a hidden tax of 60 billion euro. But that's not all. In addition to this estimate, corruptive practices represent, likely, the main reason of the infrastructural gap between Italy and other countries that spend the same public monetary resources for the infrastructural facilities.

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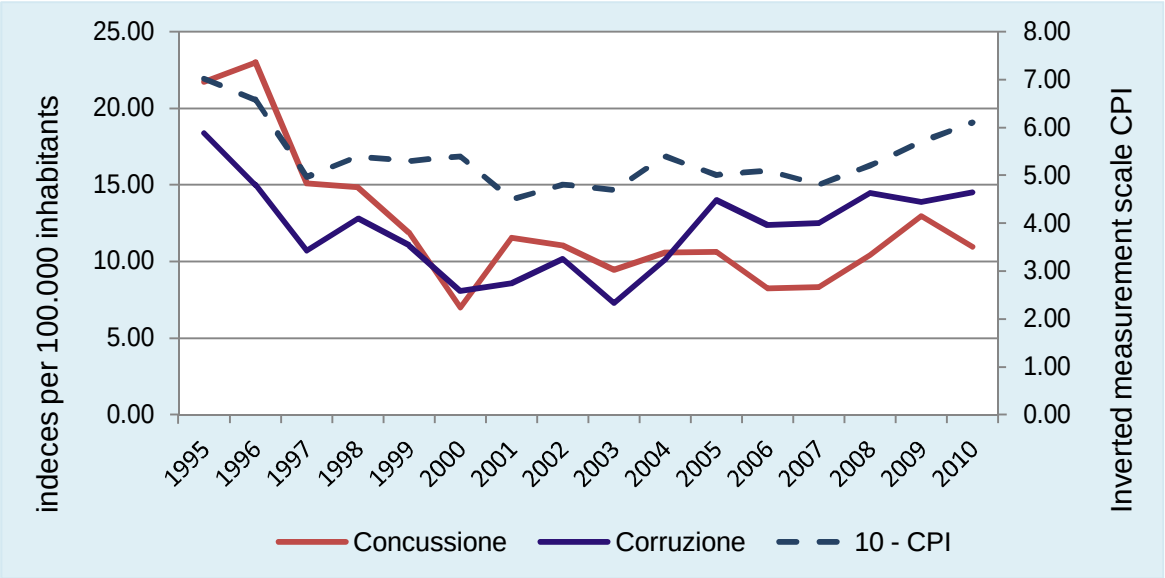
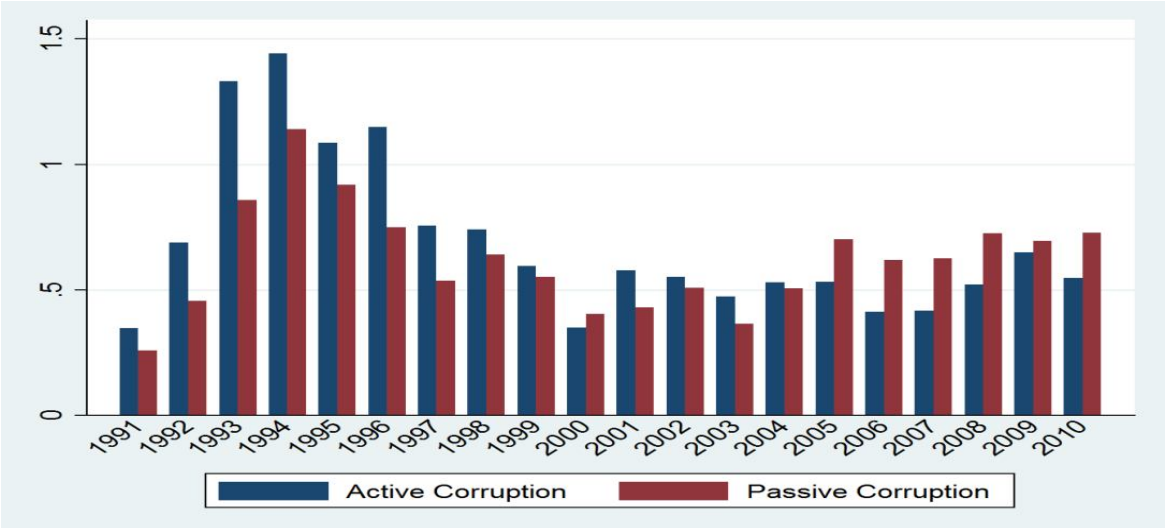
Appendix

Fig. 3.1 - *Corruptive crimes reported and Corruption Perception Index (CPI)*



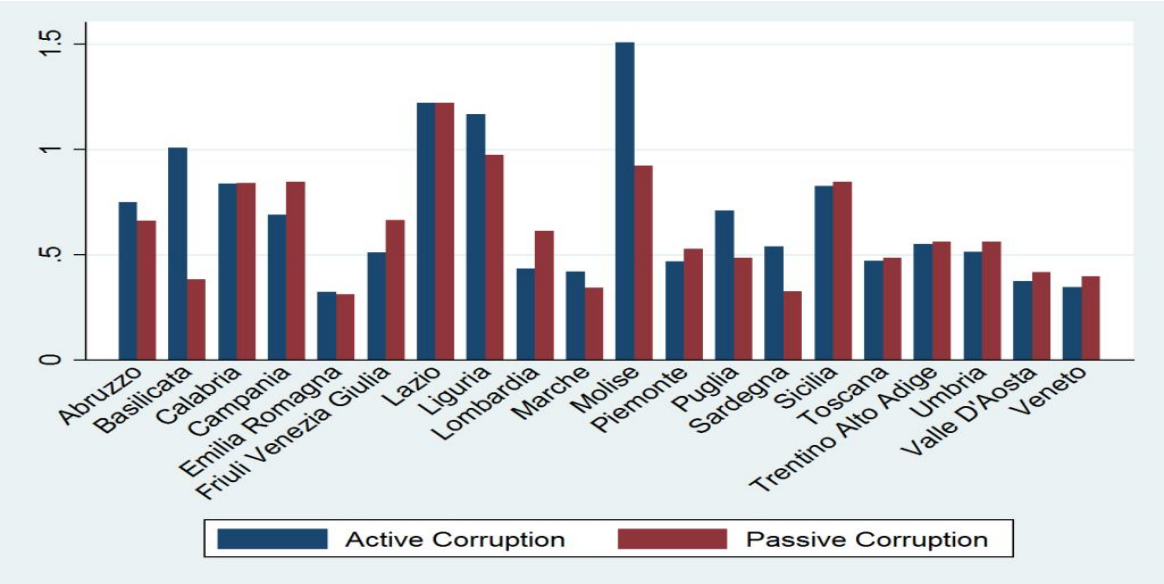
Source: elaboration of authors on ISTAT data related to corruptive crimes reported per 100,000 inhabitants (Annals of Judicial Statistics) and Transparency International data (CPI).

Fig. 3.2 - *Active corruption and Passive corruption (average by year)*



Source: elaboration of authors using ISTAT data related to corruptive crimes reported per 100,000 inhabitants (Annals of Judicial Statistics)

Fig. 3.3 - *Active corruption and Passive corruption (average by region)*



Source: elaboration of authors using ISTAT data related to corruptive crimes reported per 100,000 inhabitants (Annals of Judicial Statistics)

Table A - Summary statistics

Variables	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Total corruption	400	1.032482	0.9560453	0	10.92194
Active corruption	400	0.684948	0.622134	0	6.773549
Passive corruption	400	0.621155	0.4850033	0	3.432828
Mafia dissolution	400	0.013304	0.0434378	0	0.398136
Political Competition HHI*	400	0.19798	0.0727353	0.058821	0.340736
Schooling	400	87.29775	9.805189	59.6	105.2
Absenteeism	400	18.189	6.378088	4.45	33.75
Volunteering	300	11.16216	4.780097	4.421409	27.69608
GDP per capita	400	22662.57	5982.311	12275.48	33547.87
Economic backwardness	400	3.069875	1.492689	0.867028	7.932573
Total exp. education	400	3.307042	1.622646	0.043719	7.823878
Current exp. education	400	0.991101	0.9610306	0.008042	7.173353
Publ. inv. education	400	0.066722	0.0617483	0	0.404266
Total exp. welfare	400	0.713131	0.5184901	0.067218	2.978394
Current exp. welfare	400	0.991101	0.9610306	0.008042	7.173353
Publ. inv. welfare	400	0.017799	0.0584832	0	0.602543
Total exp. healthcare	400	2.176538	2.227373	0.010688	10.15349
Current exp. healthcare	400	2.037197	2.231043	0.007421	10.0452
Publ. inv. healthcare	400	0.133224	0.240036	0	3.700281
debt_gdp_ratio	260	5.949748	3.381057	1.15143	18.51932

Table 3.1 - Corruption and government expenditure in education

DEPENDENT VARIABLE:	ACTIVE CORRUPTION		PASSIVE CORRUPTION		ACTIVE CORRUPTION		PASSIVE CORRUPTION	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active corruption (t-1)	0.218***	0.213***			0.150*	0.254***		
	(0.0552)	(0.0536)			(0.0810)	(0.0881)		
Passive corruption (t-1)			0.342***	0.384***			0.351**	0.400***
			(0.0991)	(0.137)			(0.140)	(0.109)
Mafia dissolution (t-1)	-1.519	-3.759	1.429	-0.284	-1.463	3.416	-0.860	1.400
	(2.058)	(3.644)	(3.047)	(3.704)	(3.082)	(2.985)	(4.404)	(3.091)
Political competition HHI* (t-1)	-0.624	-0.500	0.0763	0.0609	0.252	0.553	1.012	0.844
	(0.492)	(0.492)	(0.623)	(0.395)	(0.707)	(1.043)	(1.308)	(0.937)
Schooling (t-1)	-0.00503	-0.0113	0.00433	-0.00784	6.26e-05	0.0164	0.00126	0.00152
	(0.00771)	(0.0117)	(0.00739)	(0.0107)	(0.00951)	(0.0118)	(0.0108)	(0.00618)
Absenteeism (t-1)	-0.0166	-0.0329*	-0.0557	-0.0126	-0.0938*	-0.0904	-0.117	-0.0631
	(0.0255)	(0.0185)	(0.0444)	(0.0180)	(0.0506)	(0.0640)	(0.0950)	(0.0389)
GDP per capita (t-1)	3.93e-05		-0.000178		-0.000105*		-0.000122**	
	(7.26e-05)		(0.000120)		(5.64e-05)		(5.96e-05)	
Economic backwardness (t-1)		-0.138		-0.0731		0.209		0.0983
		(0.129)		(0.111)		(0.209)		(0.118)
Total exp. education (t-1)	0.472**	0.420**	-0.319	0.101				
	(0.222)	(0.165)	(0.265)	(0.143)				
Current exp. education (t-1)					0.165***	0.235**	0.0727	0.121
					(0.0561)	(0.0973)	(0.0772)	(0.0811)
Publ. inv. education (t-1)					1.526	3.771	-2.920	0.510
					(1.850)	(2.626)	(2.739)	(1.867)
Observations	380	380	380	380	380	380	380	380
Number of groups	20	20	20	20	20	20	20	20
Number of instruments	19	17	19	17	16	19	16	19
Sargan-test (*p*-value)	0.019	0.007	0.067	0.337	0.021	0.192	0.066	0.151
Hansen *J*-test (*p*-value)	0.432	0.352	0.600	0.247	0.138	0.165	0.400	0.063
Endogenous variables Lag	2_3	2_3	2_3	2_3	2_2	2_3	2_2	2_3
AR(1) test (*p*-value)	0.033	0.031	0.013	0.017	0.022	0.017	0.012	0.012
AR(2) test (*p*-value)	0.273	0.263	0.919	0.835	0.397	0.371	0.314	0.839

Notes: All regressions contain calendar year dummies (results not reported); the time span is 1991-2010. All regressions based on Blundell and Bond System-GMM estimator.
In all regressions: constant term not reported; significant coefficients are indicated by *** (1% level), ** (5% level) and * (10% level); robust standard errors in parentheses.

Table 3.2 - Corruption and government expenditure in welfare

DEPENDENT VARIABLE:	ACTIVE CORRUPTION		PASSIVE CORRUPTION		ACTIVE CORRUPTION		PASSIVE CORRUPTION	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Active corruption (t-1)	0.303***	0.335***			0.244**	0.347***		
	(0.0825)	(0.0930)			(0.106)	(0.109)		
Passive corruption (t-1)			0.290**	0.380***			0.327**	0.354***
			(0.130)	(0.111)			(0.155)	(0.120)
Mafia dissolution (t-1)	2.169	4.388	2.236	4.265**	-6.708	-5.515	0.861	2.871
	(3.160)	(3.079)	(1.935)	(2.079)	(5.116)	(6.574)	(3.271)	(2.903)
Political competition HHI* (t-1)	-0.249	0.152	0.148	0.503	0.0199	0.515	0.485	0.551
	(0.418)	(0.442)	(0.534)	(0.600)	(0.625)	(0.623)	(0.468)	(0.623)
Schooling (t-1)	0.00774	0.0130	-0.000543	0.00503	-0.00741	-0.0272	-0.00461	0.00398
	(0.0110)	(0.00915)	(0.00957)	(0.00624)	(0.0133)	(0.0194)	(0.0137)	(0.0160)
Absenteeism (t-1)	-0.0430*	-0.0474	-0.0618	-0.0437*	-0.0580	-0.0189	-0.0808	-0.0390**
	(0.0229)	(0.0300)	(0.0434)	(0.0230)	(0.0536)	(0.0236)	(0.0569)	(0.0169)
GDP per capita(t-1)	-5.43e-05		-9.52e-05		-9.79e-05		-0.000116	
	(4.25e-05)		(6.70e-05)		(0.000101)		(8.34e-05)	
Economic backwardness (t-1)		0.0173		-0.00916		-0.168		-0.0941
		(0.0799)		(0.0515)		(0.130)		(0.0967)
Total exp. welfare (t-1)	0.412	0.679***	-0.294	0.284				
	(0.284)	(0.261)	(0.324)	(0.230)				
Current exp. welfare (t-1)					0.346	0.749**	-0.220	0.498***
					(0.437)	(0.310)	(0.482)	(0.173)
Publ. inv. welfare (t-1)					6.482	14.59*	3.393	5.132
					(7.834)	(8.160)	(5.606)	(5.076)
Observations	380	380	380	380	380	380	380	380
Number of groups	20	20	20	20	20	20	20	20
Number of instruments	19	17	19	17	16	19	16	19
Sargan-test (*p*-value)	0.007	0.004	0.036	0.146	0.021	0.260	0.117	0.294
Hansen *J*-test (*p*-value)	0.140	0.575	0.109	0.196	0.171	0.755	0.116	0.460
Endogenous variables Lag	2_3	2_3	2_3	2_3	2_2	2_3	2_2	2_3
AR(1) test (*p*-value)	0.023	0.019	0.009	0.012	0.015	0.086	0.013	0.015
AR(2) test (*p*-value)	0.260	0.323	0.566	0.922	0.225	0.112	0.810	0.784

Notes: All regressions contain calendar year dummies (results not reported); the time span is 1991-2010. All regressions based on Blundell and Bond System-GMM estimator.
In all regressions: constant term not reported; significant coefficients are indicated by *** (1% level), ** (5% level) and * (10% level); robust standard errors in parentheses.

Tab. 3.3 - Corruption and government expenditure in healthcare

DEPENDENT VARIABLE:	TOTAL CORRUPTION		ACTIVE CORRUPTION		PASSIVE CORRUPTION	
	(1)	(2)	(3)	(4)	(5)	(6)
Total corruption (t-1)	0.480***	0.532***				
	(0.0280)	(0.0380)				
Active corruption (t-1)			0.290***	0.404***		
			(0.0806)	(0.0943)		
Passive corruption (t-1)					0.268***	0.395***
					(0.0995)	(0.0771)
Mafia dissolution (t-1)	-0.311	1.542	1.508	3.810*	2.342	2.307
	(5.543)	(6.963)	(2.207)	(2.294)	(2.725)	(2.021)
Political competition HHI* (t-1)	-1.147*	-0.659	-0.769	-0.514	0.161	0.117
	(0.615)	(0.521)	(0.475)	(0.521)	(0.634)	(0.560)
Schooling (t-1)	0.000429	0.00490	0.00636	0.00870	-0.000204	0.000790
	(0.0130)	(0.0106)	(0.0118)	(0.00635)	(0.00815)	(0.00594)
Absenteeism (t-1)	-0.0119	-0.0200	-0.0234	-0.0143	-0.0454	-0.0227
	(0.0378)	(0.0380)	(0.0260)	(0.0299)	(0.0413)	(0.0247)
GDP per capita (t-1)	-9.19e-05***		-8.68e-05**		-7.50e-05**	
	(3.35e-05)		(3.64e-05)		(3.71e-05)	
Economic backwardness (t-1)		0.0607		-0.00482		-0.00787
		(0.0683)		(0.0632)		(0.0527)
Total exp. healthcare (t-1)	-0.0399	0.0123	0.0680	0.116**	-0.0463	0.0329
	(0.0632)	(0.0830)	(0.0483)	(0.0568)	(0.0351)	(0.0731)
Observations	380	380	380	380	380	380
Number of groups	20	20	20	20	20	20
Number of instruments	19	17	19	17	19	17
Sargan-test (*p*-value)	0.013	0.002	0.005	0.000	0.008	0.003
Hansen *J*-test (*p*-value)	0.174	0.182	0.306	0.145	0.230	0.119
Endogenous variables Lag	2_3	2_3	2_3	2_3	2_3	2_3
AR(1) test (*p*-value)	0.047	0.038	0.031	0.028	0.014	0.024
AR(2) test (*p*-value)	0.780	0.791	0.415	0.367	0.719	0.989

Notes: All regressions contain calendar year dummies (results not reported); the time span is 1991-2010. All regressions based on Blundell and Bond System-GMM estimator.
In all regressions: constant term not reported; significant coefficients are indicated by *** (1% level), ** (5% level) and * (10% level); robust standard errors in parentheses.

Table 3.4 - Corruption and local public debt

DEPENDENT VARIABLE:	TOTAL CORRUPTION		ACTIVE CORRUPTION		PASSIVE CORRUPTION	
	(1)	(2)	(3)	(4)	(5)	(6)
Total corruption (t-1)	0.483***	0.381***				
	(0.0596)	(0.0790)				
Active corruption (t-1)			0.150**	0.147		
			(0.0724)	(0.0900)		
Passive corruption (t-1)					0.405***	0.412***
					(0.104)	(0.146)
Mafia dissolution (t-1)	4.797	-1.215	-0.291	-0.280	0.974	-0.556
	(8.374)	(2.172)	(1.187)	(0.592)	(3.079)	(1.838)
Political competition HHI* (t-1)	-0.843	0.414	0.00545	0.466	0.0445	0.263
	(0.866)	(0.380)	(0.384)	(0.309)	(0.327)	(0.210)
Schooling (t-1)	0.0282	-0.000194	-0.00272	-0.00397	0.00132	-0.00804
	(0.0316)	(0.0180)	(0.0129)	(0.00728)	(0.00781)	(0.00605)
Absenteeism (t-1)	0.137**		0.0108		0.0315	
	(0.0641)		(0.0260)		(0.0214)	
Volunteering (t-1)		-0.0170		-0.0330**		-0.00477
		(0.0230)		(0.0162)		(0.0211)
GDP per capita (t-1)	0.000184	1.92e-06	-5.80e-05	-1.24e-05	4.70e-05*	-8.10e-06
	(0.000133)	(5.69e-05)	(6.37e-05)	(2.18e-05)	(2.85e-05)	(3.75e-05)
Debt GDP ratio (t-1)	0.00222	0.0439*	0.0208	0.0189	0.0447***	0.0514***
	(0.0470)	(0.0259)	(0.0220)	(0.0120)	(0.0156)	(0.0135)
Observations	240	220	240	220	240	220
Number of groups	20	20	20	20	20	20
Number of instruments	18	18	18	18	18	18
Sargan-test (*p*-value)	0.211	0.146	0.005	0.007	0.019	0.036
Hansen *J*-test (*p*-value)	0.376	0.170	0.210	0.191	0.534	0.786
Endogenous variables Lag	2_3	2_3	2_3	2_3	2_3	2_3
AR(1) test (*p*-value)	0.195	0.289	0.038	0.112	0.013	0.018
AR(2) test (*p*-value)	0.348	0.338	0.668	0.348	0.032	0.040

Notes: All regressions contain calendar year dummies (results not reported); the time span is 1998-2010. All regressions based on Blundell and Bond System-GMM estimator.
In all regressions: constant term not reported; significant coefficients are indicated by *** (1% level), ** (5% level) and * (10% level); robust standard errors in parentheses.