Società italiana di economia pubblica
XXI CONFERENZA

PUBLIC CHOICE E POLITICAL ECONOMY
I fondamenti positivi della teoria di finanza pubblica

Pavia, Università, 24-25 settembre 2009

CORRUPTION AND GROWTH: EVIDENCE FROM ITALIAN REGIONS

NADIA FIORINO E EMMA GALLI

Corruption and Growth: Evidence from Italian Regions

Nadia Fiorino
Università degli Studi L'Aquila
Dipartimento di Sistemi e Istituzioni per l'Economia
nadia.fiorino@univaq.it

and

Emma Galli
Università degli Studi di Roma "La Sapienza"
Dipartimento di Teoria Economica e Metodi Quantitativi per le Scelte Politiche
e.galli@dte.uniroma1.it

Abstract

This paper investigates the effects of corruption on economic growth in the Italian regions by considering the role that political fragmentation and civicness played in the relationship. Unlike previous empirical studies, we find evidence of non linearity between corruption and growth after controlling for several economic variables. Our results show that a growth-maximizing level of corruption exists so that corruption seems to be beneficial for economic growth at low levels of incidence and negative at high levels of incidence.

JEL classification: D73; H10

Keywords: Corruption; Growth

1. Introduction

The impact of bureaucratic corruption on the level of economic development of different countries has been a topic of debate over the last decades. There are several ways corruption may reduce economic growth. Corruption may act as a tax and reduce the incentive to invest A government official controls the offer of a service against private demand and can restrict it in many ways by denying permission or delaying its release. Bribes are then the extra-price charged by bureaucrats to private customers, and they arise like rents. As a consequence the allocation of resources can be distorted mainly in terms of reduction of private investment and human capital formation (Myrdal, 1989; Shleifer and Vishny, 1993). The empirical literature has supported the existence of a linear and negative correlation between the level of corruption and the average rate of per capita income growth. Mauro (1995), Hall and Jones (1999) and La Porta et al. (1999) identifies a significant negative relationship between economic development and corruption. Furthermore a number of contributions have focused on specific aspects that questions the basic results of the empirical literature. Tanzi and Davoodi (1998), Mauro (1998) and Gupta et al. (2001) for example show that corruption is harmful for growth because it distorts the composition of government expenditure towards less productive activities. Ehrlich and Lui (1999) develop a endogeneous growth model that analyzes the effect of corruption on economic growth focusing on the political regime. They predict that the balanced growth in a democracy (or competitive regime) and in an autocracy (or monopolistic regime) is the outcome of an interplay between accumulation of human capital (socially productive) which engenders growth and accumulation of political capital (socially unproductive) which mainly assures bureaucratic power and potential corruption. A relationship between corruption and growth is empirically found only in democratic regimes.

Another set of theories (Klitgaard, 1988; Acemoglu and Verdier, 1998) suggests the possibility of a positive growth-maximizing level of corruption, thus challenging the notion of a linear negative relationship between corruption and growth. Corruption can be beneficial for growth at low levels of incidence since it allows to bypass burdensome regulations.

More recently, Méndez and Sepulveda (2006) investigate these non-linearities focusing on three major aspects: a) the impact of the type of political regime on economic growth; b) the existence of a positive growth-maximizing level of corruption and c) the link between corruption, size of government and growth. They distinguish between 'free' countries and 'not-free' countries and include a quadratic term for corruption to test the non linearity hypothesis as well as a measure of government expenditures to capture its interaction with corruption. Their findings show that in 'free' countries corruption results beneficial for economic growth at low levels of incidence and harmful at high levels of incidence. This relationship is not modified by the size of government.

To our knowledge there is only one empirical contribution on the link between economic growth and corruption in the Italian regions by Del Monte and Papagni (2001) for the period 1963-1991. They provide a theoretical explanation and an empirical test of the hypothesis that corruption has a relevant adverse impact on the efficiency of the public sector measured by investments in infrastructures. Their results show that a) the efficiency of public expenditure is lower in regions where corruption is higher and b) corruption negatively impacts on the economic growth of the Italian regions.

The major shortcoming of Del Monte and Papagni (2001) lies however in the lack of a complete regional data set for all the variables they use as determinants of the economic growth in the overall period. To face this severe problem they resort to a mix of national and regional measures that weakens the completeness and homogeneity of the data set.

Our paper will address this issue of the persistent income differentials that characterize the Italian regions by building a data set with all regional economic and institutional variables. The analysis will mainly focus on two questions: is there any evidence of a positive growth-maximizing level of corruption in Italy? Is the impact of corruption on growth modified by the size of the government?

The following section provides a detailed description of the data. Section 3 presents the empirical analysis and discusses the results. The last section provides some conclusions.

2. *Description of variables and data*

Generally the empirical studies on corruption and growth estimate cross-sectional regressions where the average rate of economic growth is the dependent variable and a standard list of regressors such as the initial level of income per-capita (1980), the rate of population growth, the secondary school enrollment ratio, the ratio of investment to GDP are included as independent variables. We will investigate the effects of corruption on growth by adding to this typical growth framework institutional variables such as political fragmentation and civicness that show a great degree of variation across the Italian regions.

We then average the annual real income per capita growth rates, the annual population growth rates, the secondary school enrollment rates, the share of real government expenditures of GDP. Since greater government size creates a potential for corruption by creating more resources to be stolen and more rules to be exploited or subverted (Tanzi, 1994; Glaeser and Shleifer, 2003), we also test this hypothesis by using an interactive term (public expenditures multiplied by corruption). We then exclude from our list of regressors the investment ratio as part of the empirical literature on economic growth does since it can be a likely source of endogeneity.

Even though the institutions as well as the legal system are in the Italian regions, social and cultural factors are quite different. We measure social capital generated from the horizontal networks among individuals through their participation to voluntary organizations in order to test whether the degree of civicness, trust and legal culture of the population has a role in the economic growth of the regions (Putnam, 1993).

Political fragmentation may increase the distribution of rents among politicians and possibly engenders a higher level of corruption that hinder economic growth. Political fragmentation is measured by using the Herfindhal index for concentration (Persson, Tabellini and Trebbi, 2003) that is built by using the seats of the majority supporting the regional government with respect to the overall legislature and ranges from 0 (a legislature in which each legislator belongs to a different party) to 1 (when all members belong to the same party). The use of this variable is also suggested by a recent change of the regional electoral system occurred in 1995. The mechanism by which the members of the regional Council are elected switched from a pure proportional representation to a mixed one. A top-up number of seats for the winning coalition is also introduced, so that the absolute majority of the legislators will be held by the coalition linked to the regional list that has obtained the relative majority of the votes. Furthermore, the law reduced the tenure length of the Council from five to two years if the relationship of confidence between the Council and the Cabinet breaks down during the first two years. This reform was completed in 1999 when it was established that the President of the regional Cabinet is elected by universal and direct suffrage.

The pivotal variable in our empirical model is corruption. Following Rose-Ackerman (1975) and Glaeser and Saks (2006), we define corruption as crimes by public officials for personal gain; then we measure corruption as the number of regional government officials prosecuted for corrupt practices relative to the population over the 1980-2002 period. These

prosecution levels capture the extent to which prosecutors charge and accuse public officials for misconduct in each of the twenty regions. The crimes that we consider are based on the Libro II, titolo II (crimes against the Public Administration) of the Italian Criminal Law as reported in the Annals of Judicial Statistics of the ISTAT (various issues). We believe that these data on prosecutions are more reliable than those from *Casellario Giudiziale* on convincted corruption crimes because they are able to capture part of the hidden corruption shelved by corrupt judges.

Generally, cross-countries studies on corruption rely on opinion surveys resulting in the Corruption Perceptions Index (CPI) produced by Transparency International or similar measures[1]. According to Transparency International, the Corruption Perceptions Index (CPI) is an index of 'perceived corruption'[2]. Such index is constructed from a number of individual surveys of businessmen or local populations of the relevant countries, as well as from several ratings compiled by staff of economic risk analysis firms on the basis of reports from country experts. While measures like the CPI contain valuable information, they suffer of a few shortcomings: first, the meaning of corruption is subjective and can vary greatly from one country to the other one; furthermore, the types of the corrupt activities could be substantially different in each country making comparative analyses even more difficult. In addition, they are computed on country's basis and this a fortiori supports our choice of an alternative measure of corruption.

Using prosecution rates as a measure for corruption bumps against the circumstance that in corrupt countries the judicial system is itself corrupt and fewer people will be charged with corrupt practices. We control for this problem of the existence of a general corruption spread

[1] For a general discussion on these indexes see Persson, Tabellini and Trebbi (2003); for a comparison of different corruption measures for Italy see Del Monte and Papagni (2001; 2007).

[2] This index is computed for 54 countries from 1980 to 2003 and is calculated as the simple average of a number of different surveys assessing each country's performance in a given year.

through the whole system, even though in Italy the judicial system is centralized and then relatively more isolated from local corruption.

However such a measure reflects only the 'revealed' corruption, most likely by leaving part of the phenomenon hidden. A first look of table 1a highlights this problem. The table shows the average per capita prosecutions for 1980-2002 per 100,000 inhabitants. As expected the Northern regions are less corrupt than the Center and Sourthern; however, the ranking is not completely in line with the 'common opinion' about the different extent of corruption in the Italian regions. As matter of fact, prosecutions for corrupt practices in the *Corte d'Appello* district of Reggio Calabria[3] in the last twenty years resulted in two convictions only. Nevertheless, similar conditions characterize other districts of Calabria as well as districts of other 'perceived' corrupt regions, like Sicily, Campania and Sardinia (Davigo and Mannozzi, 2007). To take into account the hidden corruption and avoid potential bias between official statistics and 'true' data, we consider the existing link between corruption and associative crimes (crimes *ex* art. 416 and 416 *bis* of the Italian Criminal Law). This implies that, as the so-called *Mani Pulite* (Clean Hands) criminal trials confirmed, corruption emerges not only as corrupt practices but also as associative crimes in the most 'perceived' corrupt regions. Then we construct a composite index annually computed per each region as per capita prosecutions multiplied for per capita associative crimes. Table 1b ranks this index from the least to the most corrupt regions. This ranking lines up reasonably well with our pre-conceived notions about the real distribution of corruption in Italy.

[table 1 about here]

[3] Reggio Calabria is one of the major town of Calabria.

Data sources. The GDP per capita is the ratio between the regional gross domestic product in real terms (1995 base = 100) and the regional population. Data on regional GDP and population are taken from Crenos (2004). Data on the regional secondary school enrollment for male and female population come from Crenos (2004). Data on the regional voluntary organizations come from the Italian Federation of Voluntary Organizations (FIVOL) and are available for the following years: 1985, 1990, 1997, 2001. Regional election's results, used to measure the Herfindhal index of political concentration, are from Istat (1990) and Ministero dell'Interno (various years).

Table 2 reports the summary statistics for the above variables.

[table 2 about here]

3. *Empirics*

Table 3 presents the results obtained in the OLS estimation of the cross section. Column (1) shows the results of the estimations of a restricted model that only include economic variables. All the variables that have been considered do not impact on the economic growth. Columns (2) and (3) present the results of a model that extend the list of the explanatory variables by including corruption and other institutional variable. In columns (2) and (3) we use alternatively the corruption measures described in the previous section; our results are the same in both regressions.The coefficient on corruption turn out not significantly different from zero. Among the economic variables, public expenditure is the only one that affects positively the economic growth. As expected the share of voluntary organization shows a positive effect on economic growth while political fragmentation a negative one.

The empirical model presented in Table 3 is not able to test the hypothesis that the impact of corruption on growth is non-linear. Therefore in order to address this question we include a quadratic term for corruption in our estimates. Table 4 replicates the results presented in Table 3.

As previously occurred, public expenditure significantly affects economic growth. While corruption does not turn out significant when the simple index is used (column 2), our estimates suggest the existence of a positive growth-maximizing level of corruption significantly greater than zero, with corruption beneficial or economic growth at low level of incidence and harmful at high level of incidence when we use the composite index. The coefficients on corruption and corruption squared seem to be robust to the inclusion of all institutional variables.

[table 3 and table 4 about here]

So far we have empirically supported the existence of a quadratic relationship between corruption and growth. Thus, ceteris paribus, the rate of growth of Italian regions seems to be high in the presence of a low but positive level of corruption. A theoretical explanations for these findings has been proposed by Klitgaard (1988) and Acemoglu and Verdier (1998). They argue that potentially the resources necessary to combat corruption become greater as the level of corruption decreases and then a low but positive level of corruption is optimal for the economy. This explanation implies that the amount of the government expenditures can have both positive and negative effects on the marginal cost of combating corruption and it would be difficult to say a priori which one of those effects dominates the other. Alternatively, Liew (1992) shows that at high levels of corruption only a massive injection of resources can reduce corruption, whereas for low levels of corruption any increase in resources will reduce it.

Finally, we also checked for the impact that the interaction between the size of the government measured as the share of government expenditure over GDP and corruption. Authors such as Mauro (1995, 1998) and Tanzi and Davoodi (1998) that reported a linear and negative correlation between corruption and growth, have also claimed that this result is partly due to the

interaction between corruption and public expenditure. Corruption alters the composition of government expenditures towards less productive activities and thus the greater the government expenditures, the greater the negative effects of corruption. Table 5 shows the results. Column (1) and column (2) use respectively the simple and composite corruption index; in both estimates corruption enters the equation linearly. Government expenditures, corruption as well as the interaction between these two variables lose significance. When a non linear specification is considered, public expenditure remains insignificant but the interaction term is positively related to economic growth. These findings support the Acemoglu and Verdier (1998) and Klitgaard (1988) argument according to which is the marginal cost of combating corruption and not the size of the government that directly determines the growth-maximizing level of corruption. The question regarding the links between the costs of combating corruption and the amount of government expenditures, however, goes beyond the scope of this paper and is left for future research.

[table 5 about here]

4. *Concluding remarks*

This paper investigates the effects of corruption on economic growth in the Italian regions by considering the role that political fragmentation and civicness played in the relationship. We also test the hypothesis of non linearity between corruption and growth as advanced by Acemoglu and Verdier (1998) and Klitgaard (1988). Our results show that a growth-maximizing level of corruption exists so that corruption seems to be beneficial for economic growth at low levels of incidence and negative at high levels of incidence. This finding remain unchanged under several specifications that include a variety of economic and institutional variables. The results also show

that the effects of corruption on economic growth are conditioned by other institutional factors such as political fragmentation, degree of civicness and by the size of government.

References

Acemoglu, D., Verdier, T. (1998). Property rights, corruption and the allocation of talent: a general equilibrium approach. *Economic Journal*, 108: 1381–1403.

Alesina, A., Roubini, N., Ozler, S., Swagel, P. (1996). Political instability and economic growth. *Journal of Economic Growth 1*: 189– 212.

Elrich, I., Lui, F. (1999). Bureaucratic corruption and endogenous economic growth. *Journal of Political Economy*, 107: s270– s293.

Davigo, P., Mannozzi, G. (2007). *La Corruzione in Italia. Percezione sociale e controllo penale*. Bari, Editori Laterza.

Del Monte, A., Papagni, E. (2001). Public Expenditure, Corruption and Economic Growth. The case of Italy. *European Journal of Political Economy*, 17: 1-16.

Del Monte, A. Papagni, E. (2007), The determinants of corruption in Italy: Regional panel data analysis. *European Journal of Political Economy* 23(2): 379-396.

De Soto, H.. (1989). *The Other Path: The Invisible Revolution in the Third World*. Harper and Row, New York.

Glaeser, E., Saks, R. E. (2006) Corruption in America. *Journal of Public Economics*. 90: 1053-1072.

Gupta, S., de Mello, L., Sharan, R. (2001). Corruption and military spending. *European Journal of Political Economy*, 17: 749– 777; (Reprinted in). Abed, G.T., Gupta, S. (Eds.), 2002. Governance, *Corruption, and Economic Performance*. International Monetary Fund, Washington, DC: 300– 332.

Hall, R.E., Jones, C. (1999). Why do some countries produce so much more output per worker than others? *Quarterly Journal of Economics*,114: 83–116.

Huntington, S.P. (1968). *Political Order in Changing Societies*. Yale University Press, New Haven, CT.

Klitgaard, R. (1988). *Controlling Corruption*. University of California Press, Berkeley.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., Vishny, R.W. (1999). The quality of government. *Journal of Economics, Law and Organization* 15, 1: 222-279.

Liew, L.H. (1992). Corruption as a form of insurance. *European Journal of Political Economy*, 8: 427– 443.

Mauro, P. (1995). Corruption and growth. *Quarterly Journal of Economics* 110: 681–712 (August).

Mauro, P., (1998). Corruption and the composition of government expenditure. *Journal of Public Economics* 69: 263– 279;Reprinted in Abed, G.T., Gupta, S. (Eds.), 2002. *Governance, Corruption, and Economic Performance*. International Monetary Fund, Washington DC: 225–244.

Méndez, F., Sepulveda, F.(2006). Corruption, growth and political regimes: Cross country evidence. *European Journal of Political Economy*, 22: 82-98.

Myrdal, G. (1989). *Corruption: its causes and effects. Political Corruption: A Handbook*. Transaction Books, New Brunswick N.J.

Nye, J.S. (1989). *Corruption and political development: a cost–benefit analysis. Political Corruption: A Handbook*. Transaction Books, New Brunswick N.J.: 963– 984.

Persson, T., Tabellini, G., Trebbi, F. (2003). Electoral rules and corruption. *Journal of European Economic Association*, 1: 958-989.

Putnam R. (1993). Making Democracy Work: Civic Traditions in Modern Italy, Princeton, N.J.: Princeton University Press.

Rose-Ackerman, S. (1975). The economics of corruption. *Journal of Public Economics* 4: 187–203 (February).

Tanzi, V., Davoodi, H. (1998). Corruption, Public Investment and Growth. In: Shibata, H., Ihiro, T. (Eds.), *The Welfare State, Public Investment and Growth*. Springer-Verlag, Tokyo: 41–60; Reprinted in Abed, G.T., Gupta, S. (Eds.), 2002. *Governance, Corruption, and Economic Performance*. International Monetary Fund, Washington DC: 280–299

Shleifer A., Vishny R.W. (1993). Corruption. *The Quarterly Journal of Economics*, 108: 599-617.

Table 1a - Regions with most and least prosecutions per capita (1980-2002)

	Average per capita prosecutions per 100,000 Pop.
Emilia Romagna	34
Lombardia	35
Veneto	38
Marche	39
Piemonte	42
Umbria	44
Puglia	48
Toscana	49
Basilicata	49
Campania	52
Abruzzo	58
Friuli Venezia Giulia	60
Sardegna	60
Sicilia	61
Calabria	63
Liguria	76
Molise	88
Lazio	96

Table 1b - Regions with most and least prosecutions and associative crimes per capita (1980-2002)

	Average per capita prosecutions and associative crimes per 100,000 Pop.
Marche	29
Lombardia	38
Veneto	38
Piemonte	39
Emilia Romagna	42
Toscana	47
Umbria	52
Abruzzo	65
Friuli Venezia Giulia	72
Basilicata	82
Molise	90
Puglia	98
Liguria	115
Lazio	130
Campania	153
Calabria	182
Sicilia	260
Sardegna	1377

Table 2 – Descriptive statistics

	Per capita GDP growth	Cr/Pop	Initial GDP	Share school attainment	Population	Public expenditure	(Cr/Pop)*(Ras/Pop)	Fragmentation	Voluntary Organization
Mean	-0.000320	0.000571	0.011580	0.046594	-142702.9	0.259496	1.59E-08	0.664054	0.000184
Median	-0.000398	0.000531	0.012335	0.047229	-393617.7	0.183620	8.23E-09	0.680278	0.000191
Maximum	0.003619	0.000965	0.016821	0.055959	8794174.	1.520503	1.38E-07	0.753967	0.000421
Minimum	-0.003535	0.000340	0.006756	0.037415	-8012993.	0.008613	2.88E-09	0.474870	4.97E-05
Std. Dev.	0.001936	0.000180	0.003168	0.005764	4005121.	0.316587	3.01E-08	0.066682	0.000106
Skewness	0.433297	0.743442	0.116655	0.117029	0.268686	3.561610	3.764606	-1.217487	0.708557
Kurtosis	2.592579	2.659866	1.751549	1.816955	2.837523	14.79845	15.79042	4.494830	2.648911
Jarque-Bera	0.725940	1.841827	1.277008	1.151383	0.249507	150.3720	174.3914	6.462865	1.687417
Probability	0.695607	0.398155	0.528082	0.562316	0.882714	0.000000	0.000000	0.039501	0.430112
Observations	19	19	19	19	19	19	19	19	19

Table 3 – OLS results
Dependent variable: per capita GDP growth

	(1)	*(2)*	*(3)*
		(Cr/Pop)	*(Cr/Pop)*(Ras/Pop)*
Initial GDP (1980)	0.0901	0.0429	-0.0542
	(0.428)	(0.753)	(0.8070)
Share school	-0.0426	0.04918	0.0646
attainment	(0.141)	(0.162)	(0.1637)
Population	-7.88E-11	1.16E-10	1.22E-10
	(0.426)	(0.421)	(0.4231
Public expenditure	0.002	0.0019	0.0023
	(0.011)	(0.085)	(0.0026)
Corruption		0.67876	-11444.78
		(0.787)	(0.4961)
Voluntary		13.3568	16.882
organizations		(0.009)	(0.0441)
Fragmentation		-0.0097	-0.00934
		(0.031)	(0.0093)
Obs.	19	19	19
Adj.R^2	0.19	0.52	0.52
F	1.182762	2.131518	2.199236
	(0.034)	(0.10)	(0.10)

Notes: *p-value* in parenthesis.

Table 4 – OLS results
Dependent variable: per capita GDP growth

	(1)	*(2)*	*(3)*
		(Cr/Pop)	*(Cr/Pop)*(Ras/Pop)*
Initial GDP (1980)	0.09019	0.02545	0.07137
	(0.428)	(0.880)	(0.720)
Share school	-0.04257	0.03241	0.01889
attainment	(0.141)	(0.650)	(0.640)
Population	-7.88E-11	1.19E-10	7.38E-11
	(0.426)	(0.416)	(0.527)
Public expenditure	0.00234	0.00241	0.00187
	(0.011)	(0.126)	(0.003)
Corruption		4.26425	169309.5
		(0.774)	(0.023)
$Corruption^2$		-3180.38	-1.21E+12
		(0.788)	(0.011)
Voluntary		13.49281	15.2822
organizations		(0.010)	(0.043)
Fragmentation		-0.00982	-0.01001
		(0.035)	(0.016)
Obs.	19	19	19
$Adj.R^2$	0.19	0.52	0.66
F	1.182762	1.689119	3.003982
	(0.034)	(0.002)	(0.005)

Notes: *p-value* in parenthesis.

Table 5 – OLS results
Dependent variable: per capita GDP growth

	(1)	*(2)*	*(3)*	*(4)*
	(Cr/Pop)	*(Cr/Pop)*(Ras/Pop)*	*(Cr/Pop)*	*(Cr/Pop)*(Ras/Pop)*
Initial GDP (1980)	0.05186	-0.2215	0.034	-0.0907
	(0.763)	(0.34)	(0.865)	(0.585)
Share school attainment	0.05641	0.1541	0.0397	0.1052
	(0.365)	(0.076)	(0.644)	(0.071)
Population	1.18E-10	1.30E-10	1.21E-	8.24E-11
	(0.431)	(0.326)	10	(0.399)
			(0.4264)	
Public expenditure	0.0008	-0.0058	0.0012	-0.0058
	(0.9256)	(0.372)	(0.885)	(0.207)
Corruption	1.0413	-61573.9	4.5878	117680.1
	(0.806)	(0.159)	(0.778)	(0.068)
$Corruption^2$			-3151.29	-1.19E+12
			(0.799)	(0.0017)
Voluntary	13.692	28.018	13.821	25.930
organizations	(0.016)	(0.028)	(0.018)	(0.010)
Fragmentation	-0.0105	-0.0132	-0.0106	-0.0137
	(0.186)	(0.021)	(0.194)	(0.011)
Public	1.20E-05	6.7855	1.18E-	6.4675
expenditure*Corruption	(0.869)	(0.199)	05	(0.089)
			(0.874)	
Obs.	19	19	19	19
Adj.R^2	0.52	0.59	0.52	0.71
F	1.682495	2.2215	1.3496	3.102
	(0.22)	(0.10)	(0.322)	(0.048)

Notes: *p-value* in parenthesis.