Political Competition, Electoral System and Corruption: the Italian case

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Abstract

Economic and political literature widely studied the effects of electoral system on corruption. But very little attention has been dedicated to the role of political competition in explaining this relationship. We hypothesize that the proportionality degree of the electoral system impacts political corruption directly and in a conditional way: through the degree of electoral competition among political parties. The estimation results, on a sample of the 20 Italian regions over 26 years, show that both the direct and the indirect effect matter in explaining corruption. As the electoral system becomes more proportional, corruption directly decrease. This beneficial effect is reinforced by an increase in political competition. If, otherwise, the proportionality degree of the electoral system decreases, direct and indirect effect push corruption in opposite directions. Our findings are robust to different estimation techniques and to other measures of proportionality.

JEL Classification: D72, C23, K42

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1. Introduction

Many theoretical and empirical papers in economic, social and political literature studied how corruption affects economic development. Authors concentrated mainly on the relationship between corruption and economic growth, finding opposite results. A system built on bribery for allocating licenses and government contracts may lead to an outcome in which the most efficient firms will be able to afford paying the highest bribes (Lui, 1985); thus corruption might be growth enhancing because it act as a lubricant in a rigid bureaucracy (Leff, 1964; Huntington, 1968). At the opposite, corruption emerges where there are rents and when public officials have wide discretion power; corruption can be thought as a kind of *government inefficiency*. In this light, a huge body of literature suggested that corruption slows economic growth discouraging economic agents to invest, reducing the quality of the public infrastructure and services, decreasing tax revenue and affecting the allocation of entrepreneurial skills (Bardhan, 1997; Mauro, 1995; Mauro, 1998).

Understanding causes of corruption is critical because of its implications for a country's growth and development. We will deal with one of the most - and probably the most – important *political* determinant of corruption: the *electoral system*.

Since the 1950, authors started to consider the role of electoral systems as a way of reducing corruption (Schumpeter, 1950): electoral systems, expression of a democratic environment, may reduce corruption through electoral races.

Theoretically economic literature gave ambiguous results. Persson and Tabellini (1999a,b; 2000) argue that majoritarian elections reduce rents because of an increase in the accountability of elected officials. Conversely, Myerson (1993) and Ferejohn (1986) showed that a proportional electoral system with a large district magnitude leads to lower incumbent rent because it rises smaller entry barriers for honest competitors. Thus, relative incentives to extract rents under different electoral formulas become an empirical question. The empirical literature on cross-countries data (Persson, Tabellini and Trebbi, 2003; Gagliarducci, Nannicini, Naticchioni, 2011) seems to confirm that countries with proportional systems have much more widespread corruption than countries with majoritarian representations.

But theoretical and empirical literature, in analysing the relationship between electoral rules and corruption, seems to ignore the role of *political competition* (i.e. the competition among political parties to obtain votes at elections in order to be represented within a committee). Indeed, electoral rules shape the political market structure by affecting political competition (Duverger's Law). Duverger (1954) asserted that a more proportional electoral system should incentivize the proliferation of political parties with manifesto policies closer to each other, promoting political

competition.[1] Very little attention has been dedicated on how political competition affects corrupt behaviour. Opposite impacts may be hypothesized. If political competition is interpreted as *accountability for incumbents* (Persson, et al. 1997), an intense political competition implies that the incumbent politicians have an incentive for good performances in order to be re-elected; the incentive to adopt corrupt behaviour is low. But, if the probability of a re-election becomes very low, politicians can act in a myopic way, maximizing rents during their remaining time in office (Bardhan and Yang, 2004).

Electoral rules, political competition and corruption belong to a complex web. In this work we argue that, beside a *direct* effect of electoral systems on corruption[2] (already investigated by the literature), there is an *indirect* effect: the proportionality degree of the electoral system may affect corruption through political competition. We test the theoretical hypothesis that the electoral system affects corruption through two channels: directly and indirectly, via *political competition*. The two effects may drive corruption to the same direction or to the opposite. The total effect of the proportionality degree of the electoral formula on corruption is, thus, the sum of the two effects.

We use the data on corruption crimes in public administration as dependent variable, the *Gallagher (dis)proportionality index* as a proxy for the proportionality degree of the electoral system, and the *normalized Herfindahl concentration index* to proxy political competitiveness among political parties. We grasp the indirect effect as above by an interaction variable between the Gallagher and the normalized Herfindahl index. The dynamic panel data analysis, over a sample of the 20 Italian regions in 26 years, showed that the indirect effect is significant: the way in which political competition affects corruption depends on the proportionality degree of the electoral system. That is, the direct effect of the proportionality degree of the electoral system on political corruption is negative: an increase in the proportionality implies a decrease in corruption; the bebeficial effect of political competition on corruption is higher under more proportional electoral rules. This means that, the theory and empirics on electoral system and political competition must be braided in order to drive their effects on corruption. Our findings are robust to different estimation techniques and to other measures of proportionality.

The paper is organized as follow. Section 2 summarizes the theoretical and empirical literature; section 3 describes the Italian scenario. Section 4 is about variables and the econometric specification; section 5 shows the results and section 6 presents the concluding remarks.

[1] The concept of political competition we are dealing with is different from that of "number of parties". As better explained in the following, the political competition refers to the distribution of votes in the hands of many or few political parties at the election and depends to the electoral outcomes.

[2] We are referring here to *political corruption*, that is, the conflict between voters and candidates which derives from the possibility that the latter, once in office, retain political rents, both for personal enrichment and campaign financing. Hereafter when we write corruption we mean political corruption.

2. Electoral rules and corruption: literature and hypothesis

In this paragraph we will clarify the web linking corruption, electoral system and political competition, summarizing the relative theoretical and empirical literature in order to emphasize the contribution of this work.

The principal agent theory disciplines the relationship between electoral rules and corrupt behaviour of politicians (Kunikova and Rose-Ackerman, 2005; Persson et al., 2003): politicians are the agent and voters are the principal. Because of the asymmetry of information in the principal-agent relationship, politicians have opportunities to extract rents, either for their personal use or to pay for costly campaigns. Of course, the probability to be re-elected by a corrupt politician is less than that of an honest one. Therefore, politicians face a trade-off between rent-seeking and appearing incorrupt and honest to their voters to be re-elected.

The effects of electoral rules on political corruption have been explored according to the district magnitude (i.e. the number of seats in a district) and the electoral formula (i.e. how votes are translated into seats) dimensions. Looking at the *district size*, majoritarian system tends to have small districts (small district magnitude) increasing barriers to entry. Indeed, in a majoritarian system, where only one candidate is elected in each district, the incumbent, already well known in the constituency, is more likely to reach a relative majority and therefore, corruption will tend to be high since a well established party will be hard to remove from office at a low ideological cost; in a proportional system, large districts that appoint several candidates are more likely to appoint new candidates who get a minority of votes. Thus proportional electoral systems with a large district magnitude will raise smaller entry barriers, associated to stiffer competition, and will lead to smaller incumbent rent. (Myerson (1993), Ferejohn (1986)). We call it the "barrier to entry" effect.

On the other hand, referring to the *electoral formula*, in majoritarian representation, when voters vote for an individual candidate, there is a direct link between individual performance and reappointment; in fact, voters base the valuation of their representatives on their ability to represent the interests of the community. Of course, the incumbent faces strong incentives to perform well to maximize the probability of re-election. Instead, in proportional representation voters vote for a list of candidates drawn up by political parties, without expressing a preference for any particular candidate; therefore the incentive to corruption is higher than in a majoritarian system (Persson and Tabellini, 1999a,b; 2000). We call it the "accountability" effect.

Hence, the net effect of electoral systems on corruption is ambiguous: if the barriers to entry effect dominates the accountability effect, majoritarian systems will be more corrupt than proportional; otherwise, the reverse happens. The empirical works of Persson, Tabellini and Trebbi (2003), Gagliarducci, Nannicini, Naticchioni, (2011) and Kunicova and Rose Ackerman (2005) suggest that

countries with proportional systems have much more widespread corruption (compared to countries with majoritarian systems).

Chang and Golden (2007) find that, at cross-national as at national (Italian) level, open-list PR (which allows voters some mechanism to select individual candidates off party lists) is associated with greater corruption than closed-list (where candidate selection is controlled by the national party leadership) systems once the district magnitudes exceed a certain threshold.

A theoretical reason than runs against the cross-countries empirical results emerges looking at the effect of electoral system on government spending. Majoritarian rules target the redistribution programs towards a narrower constituency because politicians try to please *swing voters* in the marginal districts rather than in the population as a whole. This translates in an under provision of public good. By contrast, in the proportional elections a politician needs to please a large number of voters to win the elections, having a strong incentive to provide broad benefits to many voters, through public goods or broad redistributive programs (Persson and Tabellini,1999a; Lizzeri and Persico, 1998). In this light, some public officials could accept bribes in order to provide those types of expenditure otherwise underprovided. Therefore, corruption may be higher in majoritarian than in proportional representations.

The literature analysis confirms that the *direct* effect of electoral systems on political corruption depends on the weight of contrasting forces and it becomes an empirical fact.

Electoral systems are the primary institutional mechanism regulating *political competition.* The link between electoral rules and political market structure is well established in the literature. It is known as the Duverger's Law. By affecting party formation, different electoral rules induce different levels of electoral competition among political parties. The law states that plurality, winner-take-all election rules produce a two-party competitive system, while proportional representation tends to form multiparty systems defined by competition among several contending political organizations.

But, which is the link between party competition and corruption? Only marginal weight has been dedicated to this aspect. The degree of political competition among political parties at elections can be view as a characteristic of the mechanism of representation of political parties, such as the electoral system. According to the definitions that political literature proposed, political competition may affects political corruption. If we mean *accountability for incumbents* (Persson, et al. 1997), an intense political competition implies that the incumbent politician is more accountable for his actions in office; the incumbent has an incentive for good performances because, otherwise, he can be easily removed and replaced by the public, with challengers (Mulligan and Tsui, 2006). More precisely, if there is a lack of competition so that voters do not have many alternatives to choose from, and if re-election thus is very secure no matter how a politician performs, there is a high chance that he

engages in corrupt activities. Therefore, the incentive to adopt corrupt behaviour is lower when the degree of political competition is high.

We can justify the opposite direction of the link we are speaking about in two ways. First, even multiparty systems run risk to suffer from corruption when major parties politicize society and thus take control over important sectors of business and public life. Under such conditions, a change in government might indicate who is 'in' and who is 'out', but might no longer provide voters with an alternative (Della Porta and Vannucci, 1999). Second, an intense political competition may lead to a low probability of re-election (that is, the threat of dismissal for incumbents becomes too strong); in this case incumbents can act in a myopic way, maximizing rents during their remaining time in office (Bardhan and Yang, 2004). Even in this case, the net effect of political competition on corruption is ambiguous and depends on the weight of opposite strengths.

This is what we call the *indirect effect* of the electoral system on political corruption: the degree of proportionality of the electoral system shapes the degree of political competition among political parties which, in its turn, affects corruption. Direct and indirect effect may drive corruption in the same direction or in opposite. Precisely, one of the following matching hypotheses holds: 1) an increase in the proportionality of the electoral representation leads directly to a decrease in the accountability of the incumbent politicians and, via political competition, to an increase in the accountability, pushing corruption in opposite directions; 2) an increase in the proportionality of the electoral representation leads directly to a decrease in the accountability of the incumbent politicians and, via political competition, to a decrease in the probability of re-elections, increasing corruption; 3) an increase in the proportionality of the electoral representation leads directly to a decrease in the entry barriers for honest competitors and, via political competition, to an increase in the accountability, decreasing corruption; 4) an increase in the proportionality of the electoral representation leads directly to a decrease in the entry barriers for honest competitors and, via political competition, to a decrease in the probability of re-election, pushing corruption in opposite directions.

Table 1 in appendix summarizes the matching hypotheses.

3. The Italian scenario

We test the matching hypotheses exploiting the cross-region dimension in Italy over 26 years. As concerns both corruption and electoral rules the Italian scenario has peculiar characteristics.

The empirical literature studying the determinants of corruption points out that corruption is less spread in countries having a long tradition of democracy, political stability and a developed economic system. Even if all these factors are present in Italy, corruption represents a widely spread

and persistent phenomenon. Among possible explanations of the diffusion of corruption in Italy are[3] the rise of federalism, the increase in state intervention, the diffused system of political patronage (Golden, 2000). Moreover, Italy experienced a strong anti-corruption campaign (widely known as "Mani Pulite") which imposes itself to the collective attention in 1992 with the arrest of an important public official detected while receiving a bribe.[4] Mani Pulite shed light on a large system of corruption involving entrepreneurs, bureaucrats, judges and representative of all political parties.[5] During the period 1992-1994, 70 Italian district attorneys investigated on 12.000 persons and arrested 5.000 individuals; among those under investigation 1069 were politics.[6] A consequence of the anti-corruption campaign was that some political parties disappeared by the political scene as long as many representatives of the old political elite.

During the period of analysis (from 1980 to 2005) in Italy two changes of the national electoral law occured. Looking at the Senate (upper chamber) elections, Law 6 February 1948 no. 28 initiated a mixed electoral system where just one candidate was presented in each district, and she was elected only if she reached at least 65% of the votes. The 18 April 1993 referendum, switched the Italian national electoral system from a more proportional one to a more majoritarian one. For the Senate, 3/4 of the 315 seats are assigned using the majoritarian criterion and the remaining 1/4 using the proportional one. Law no. 270/2005, changed the Italian electoral system into proportional again. Conventional wisdom (Duverger's Law) suggests that in countries moving from a more proportional representation to a more majoritarian system we ought to observe: a reduction in the number of political parties, a drift towards the centre of the political landscape (Downs, 1957), less of an emphasis on coalition formation, enhanced stability. But in Italy, in contrast to expectations from received theory, electoral reform induced an increase in the number of parties and an increased emphasis on coalition formation (especially at local, provincial, and regional level).[7] We underline this aspect because the index measuring political competition we constructed is affected by the number of parties.

The direction of the relationship between electoral system, political competition and corruption must be empirically verified and it can change according to the scenario of the analysis; theoretical literature may only help in justifying the findings.

The reasons for choosing the Italian scenario were the following.

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[3] See Del Monte and Papagni (2007) for an exhaustive review of the causes and the consequences of corruption in Italy.

[4] Mario Chiesa, chairman of a public rest-home, was arrested on 02/17/1992 while receiving a bribe. The investigation started one year before.

[5] See Acconcia and Cantabene (2008) for an analysis of Mani Pulite.

[6] Source http://www.cronologia.it/storia/a1992a1.htm.

[7] This shows a weakness of the Duverger's Law, such as explained by Sartori (1994). He argues that surely the majoritarian system leads to a bipartisan inside a constituency, but if the political parties are different in every constituency, it is possible that, at national level, the number of parties become large.

1) The alternation of mixed electoral systems from 1980 to 2005, characterized by different degrees of proportionality, allowed us to think to measure the proportionality of the electoral system through an index which will assume different values according to the different proportionality degree of the electoral system. We constructed the Gallagher (dis)proportionality index and the Rae's index. They properly are *representation index*, but, as we will explain later, they are very good proxy for the proportionality degree of an electoral system.
2) The choice of Regional data within a country as opposed to that of cross-country data is also supported by technical reasons. One problem that arises in the interpretation of regressions based on cross-country data is that they are fragile to unobserved heterogeneity; countries differ greatly in levels of government efficiency, in many aspects of socio-economic life, in the effectiveness of economic policies. It may be more difficult, in regressions based on cross-country data, to analyze such differences with respect to regressions based on Regional data within the same country.
3) For the same reason in 1), we can construct a concentration index which proxies political competition among parties, that assumes various values in different elections.
4) The two political indexes we construct (see below) are based on the Senate electoral results on the regional basis. This allows to exploit a cross-sectional dimension, beside the time series dimension, in order to conduct a panel analysis. This technical reason goes beside social motivation. The political mechanism in Italy is characterized by the political patronage, called *clientelismo*, that allowed groups of citizens linked directly to politicians to reap high rewards through special laws (*leggine)* or through political appointments. We can strongly argue that the interaction between politicians and groups of citizens, which is the basis for corrupt behaviour, happens within the same region, that is, citizens of a region are willing to corrupt politicians elected in the same region. And so we justify the link among our measure of per capita corruption and political indexes, both at regional level.

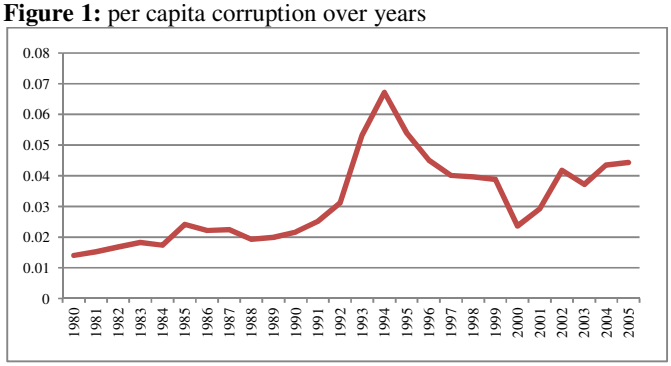
4. Variables and Econometric Specification

The aim of this work is to test both the direct and the indirect effect of the proportionality degree of the electoral system on political corruption. This study builds on the existing literature by verifying that the proportionality degree of the electoral system impacts political corruption also in a conditional way: through the degree of electoral competition among political parties.

Our measure of corruption (the dependent variable in the estimated equation, hereafter *corr*) is the number of corruption crimes prosecuted by judicial authorities (per capita), for each of the 20 Italian

Regions between 1980 and 2005;[8] the spatial distribution reflects the region where the crime was effectively committed. According to ISTAT embezzlement, misappropriation of yield to the damage of government, extortion and bribery agreements are crimes against public administration. So, we argue that *corr* is a good proxy of political corruption because of some desirable features. First, it refers to the number of recorded crimes so it overcomes the problem arising under the assumption of concurrence of charges, when an individual is recorded only for that crime which is punished harsher by the penal code. Moreover, it captures the different ways through which corruption may arise. Note that crimes recorded by ISTAT in this classification may be committed only by public officials and persons in charge of public offices who abuse of their discretionary power. Thus, *corr* represents a proxy for the diffusion of corruption in the public administration, which includes also political corruption. Figure 1 shows the per capita corruption from 1980 to 2005; for each year we calculate the mean over regions.

Figure 1: per capita corruption over years

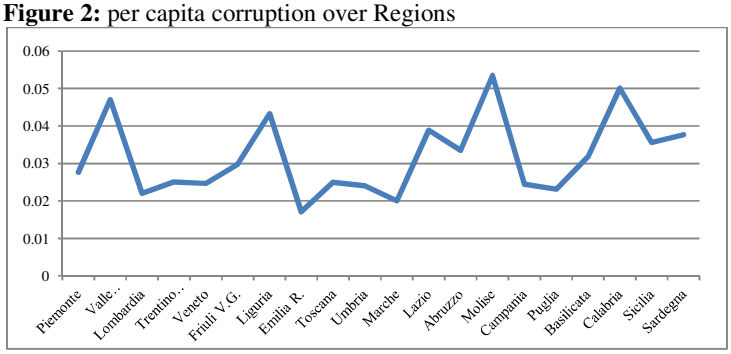


The picture shows an increase in the detected corruption crimes in the middle of 1990s, due to *Mani Pulite*. The use of this index to evaluate the dynamics of corruption may be criticize by saying that an increase in the number of crimes could be only an increase in willingness to report crimes or the reporting capacity of the police/judicial legal institutions may have improved. Del Monte and Papagni (2007) propose a solution to this problem by checking the correlation coefficient among our index of corruption crimes and the most widely used corruption index: the Transparency International annual index of perceived corruption. The correlation coefficient between these two indexes during the period 1995-2001 amounts to 0,70. The fact that the index of corruption we use has similar trends to that of Transparency International reassures us that the former captures the real phenomenon.

Figure 2 shows the per capita corruption over the Italian Regions.

[8] This number is based on Statutes no. 286 to 294 (ISTAT- Statistiche giudiziare penali).

Figure 2: per capita corruption over Regions



We can notice that the phenomenon is variable between regions and it is (in mean) higher in the South than in the Center-North (see Del Monte and Papagni, 2007).[9]

In order to test the direct effect of the electoral system on political corruption, we construct the Gallagher (1991) (dis)proportionality index. It properly measures the disproportionality of an electoral outcome. It is also called *Least Square Index* (*LSI* in the following) because it is the difference between the percentage of votes received and the percentage of seats a party gets in the resulting legislature. *Disproportionality* means the deviation of the parties' seat shares from their vote shares. Perfect proportionality is the situation in which each party receives exactly the same share of seats with the share of votes it receives. The electoral outcome determines how political parties will be represented within a Committee. This is why we can interpret the Gallagher index as showing the degree of voter representation (by political parties) within the Senate and it is a very good proxy for the degree of proportionality of an electoral system. In order to well understand the last statement (and the ratio of our choice of the proportionality index), we can briefly summarize the representation characteristic of an electoral system. The majoritarian system does not guarantee the representation of political minorities within Parliament; the proportional system guarantees the presence in Parliament of a plurality of political parties. In terms of proportionality degree of an electoral system, we can say that the electoral system that guarantees a greater representation of all political parties is a more proportional one while the less representative one is less proportional (see for example Persson and Tabellini, 2000). This is why we use a measure of the representativeness of political parties (as a way in which votes are transformed into seats) in a Committee as an index of the electoral system's degree of proportionality. The index can take values from 0 to 1 with 0 indicating perfect proportionality between seats and votes and 1 meaning that the only seat at stake goes to the winner (in which case the index equals the percentage of votes obtained by the defeated candidate).

The (dis)proportionality index is:

[9] We recall that Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia and Sardegna belong to the South; the rest of the regions belong to the Center-North.

$$LSI = \sqrt{\frac{1}{2}\sum_i (v_i - s_i)^2}$$

where v_i and s_i are respectively the share of votes and of seats of a single political party (i=1,....,n political parties) for the Senate elections from 1980 to 2006.[10]

In order to test the indirect effect of electoral system on corruption, we construct an interaction variable between the proportionality index described above and the normalized Herfindahl index of concentration of political parties at Senate elections. The concept of political competition we refer to is close to that of *electoral competition*: competition among parties and candidates *in elections* to obtain public support through votes of citizens (Bardhan and Yang, 2004). The votes market could be considered as a goods market, with politicians competing with each other to win the elections (Stigler, 1972). As for the goods market, a political party will tend to maximize share of legislative seats in order to increase its control over the government. Only if an *ex ante* political competition (the number of political parties competing to obtain votes) translates in an *ex post* political competition (the number of political parties represented within a committee) it may affect corruption: only elected politician can be engaged in corrupt behaviour. This allows us to measure political competition through an index of the concentration of votes in the hands of political parties at the elections, as well as for firms in an economic market. This index allows to take into account both the number of parties and their relative size and it has some desirable properties (Alfano and Baraldi, 2012).[11]

The **normalized Herfindahl index** is computed as (we called it *NHI* in the estimated equation):

$$NHI = \frac{(Herf - \frac{1}{n})}{1 - 1/n}$$

where n is the number of political parties at an election, and *Herf* is the Herfindahl index.[12] It ranges from 0 (theoretically perfect competition with n equally sized parties) to 1 (monopoly). The normalized Herfindahl index positively depends on both the Herfindahl index and the number of parties.[13]

Figure 2 shows both the *LSI* and the *NHI* for each Senate election from 1980 to 2006. Each value is the mean over regions.

[10] Senate election took place in 1979, 1983, 1987, 1992, 1994, 1996, 2001, 2006.

[11] Alfano and Baraldi (2012) provide a wide description of the properties of the normalized Herfindahl index which justify its choice with respect to the standard Herfindahl index.

[12] We recall that the Herfindahl index is $Herf = \sum_{i=1}^{N} v_i^2$ where v_i is the vote share of a single political party at each election from 1980 to 2006.

[13] The first derivative of the normalized Herfindahl index with respect to the number of parties is $\frac{\partial NHI}{\partial n} = \frac{Herf(\mathrm{n}-1)-(\mathrm{n}*Herf-1)}{(\mathrm{n}-1)^2} > 0$ if $Herf(\mathrm{n}-1) - (\mathrm{n} * Herf - 1) > 0$ which is always true because $Herf < 1$.

Figure 3: LSI and NHI

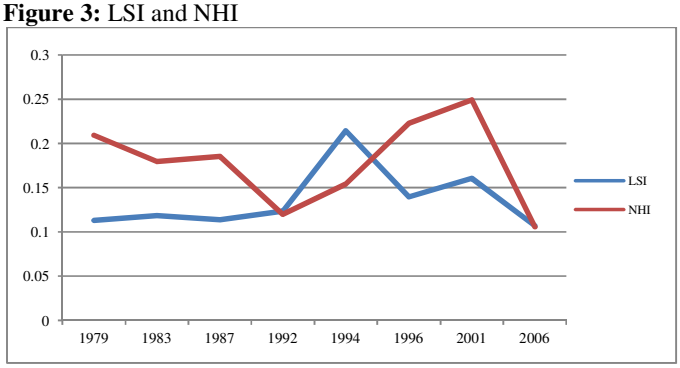


Figure 3 helps us in underlining the representative properties of the Gallagher index in order to justify its variation under the same electoral rule: it is based on the electoral outcome, which is different under the same electoral system. But it catches very well the variation of the proportionality degree of the electoral system due to the electoral reforms: the value of the *LSI*, indeed, increases after 1993 and then decreases again in 2006. Looking at the *NHI*, its trend was decreasing until 1994, then increasing until 2001, and decreasing again, showing how the proportionality degree of the electoral system affected the competitiveness among political parties.

This link is the core of our analysis and represents the source of what we called the *indirect effect* of electoral system on political corruption. We call the interaction variable capturing the *indirect effect* in the estimated equation *LSI*NHI*.

Table 2 in Appendix presents the descriptive statistics of the variables described above.

The estimated equation is

$$corr_{i,t} = \sum_{j=2}^{4} \beta_j \, LSIp_{i,t-j} + \sum_{j=2}^{4} \gamma_j \, NHI_{i,t-j} + \sum_{j=2}^{4} \delta_j \, (LSI * NHI)_{i,t-j} + \sum_{j=2}^{4} \varphi_j \, controls_{i,t-j} + \alpha_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

where α_i is a region specific effect, μ_t is a time-specific effect. It seems reasonable to conjecture both that corruption crimes perpetuated in a given year may be eventually detected contemporaneously or with lags, and that crimes committed at different times could be detected contemporaneously. Moreover, there is a lag between the beginning of the investigation and the conclusion of the penal action. Thus, the empirical model should allow for lags between the year the crime is committed and that of the sentence.[14] During the period considered, the average length of a trial for corruption crimes is about two years, for the Primo Grado degree of judgement.[15] Thus, we estimate a distributed lag model where corruption is regressed on the past values of regressors, with lags from 2 to 4 years. Besides the time dummies that are considered in all the specifications to take into account common shocks for a given year, the control variables are:

[14] One of the most popular trials against a political representative accused of corruption is that against Sergio Cusani. On 7/23/93 Cusani was arrested, the trial started on 10/13/93 and ended with a condemn on 4/28/94.

[15] ISTAT, Statistiche Giudiziarie Penali, various issues.

- the natural logarithm of GDP (*lngdp*) to control for the level of economic development (Persson, Tabellini and Trebbi, 2003).
- the rate of schooling (*school*) as the number of students registered in high schools over the population in class age 15-19 (Persson, Tabellini and Trebbi, 2003)
- regional public spending (over GDP), as *pubspend*, to take into account both economic development and the opportunities for illegal profits in public administration (Del Monte and Papagni, 2007)
- the natural logarithm of the population (*lnpop*) to control for the size of the region (Persson, Tabellini and Trebbi, 2003)
- the electoral participation (*particip*) to control for the social capital (Putnam, 1994)
- the number of women elected in the Senate (*women*) to control for the gender dimension of corruption (David Dollar et al., 1999).

The first four control variables are expression of the region's characteristics and are standard in the analysis of the determinants of corruption. We expect a negative sign for the per capita GDP. Economic development means more educated people: more educated people are less sensitive to corrupt behavior by politicians; therefore the sign of the rate of schooling is expected to be negative. Public intervention in the economy (proxied by regional public spending/GDP) is also an expression of economic development; in this light we expect a negative relationship between *pubspend* and corruption. On the other hand, the higher the opportunities for illegal profits in public administration the higher the probability of rent seeking by politicians; thus, the sign of the variable *pubspend* is expected to be positive. More words have to be spent for the last two controls. In his studies Putnam (1994) argues that the economy of Italian regions has been positively affected by the so called "social capital". Social capital "refers to the collective value of all social networks and the inclinations that arise from these networks to do things for each other". Social capital is a key component to building and maintaining democracy. Putnam's hypothesis is that the Italian regions have been able to reach and maintain higher level of output per capita by greater endowments of social capital. He believes that social capital can be measured by the amount of trust and "reciprocity" in a community or between individuals; in more detail, some measures of social capital can be the level of trust in government and the level of civic participation. For example, participation in voluntary associations as well as the degree of absenteeism at the elections is a good index of social capital, and it is believed that such participations have a positive effect on economic growth. Following Del Monte and Papagni (2007) there is a negative correlation between the intensity of associationism in Italian regions and the degree of absenteeism in political elections (seen as an inverse of the trust in political institutions); the authors estimate that the percentages of absenteeism

in Italian regions are significant determinants of corruption: in regions where the majority usually participates in national elections, there is lower diffusion of illegal behavior in public administration. From here the need to control for such a social capital; we do that through the variable *particip* which measures the percentage of voters at the Senate elections.

The gender dimensions of corruption focused on whether women are more or less corruptible than men, and whether the promotion of women in public life can be an effective anticorruption strategy. While the concept of women inherently possessing a higher level of integrity has been challenged, studies have confirmed that there is a link between higher representation of women in government and lower levels of corruption (David Dollar et al., 1999; Anne-Marie Goetz, 2009; Sung, Hung-En, 2003).

Table 3 in appendix shows the correlations among regressors.

5. Results

Given the distributed lags structure of the equation (1), we are interested in the *final* effect of each regressors on the dependent variable, that is, in the *long-run* effect. Therefore, we calculate the *long run multipliers* of each variable. The estimation of equation (1) by the fixed effect panel data technique showed autocorrelation problems because of the dynamic of corruption.[16] Indeed, previous empirical analyzes on corruption consider corruption as a dynamic phenomenon, where the past levels of corruption affect the present one (Aidt, 2003). Thus, we introduce in the estimated equation one lag of the dependent variable

$$corr_{i,t} = corr_{i,t-1} + \sum_{j=2}^{4} \beta_j \, regressors_{i,t-j} + \alpha_i + \mu_t + \varepsilon_{i,t} \quad (2)$$

Equation (2) now is a dynamic panel data model which we estimate by Arellano-Bond panel data estimation techniques.[17] Results are in columns (a) and (b) of table 4. Every estimated equation has robust standard errors. In column (a), beside the political variables we are interested in, we add just two economic development indicators (*lngdp* and *pubspend*); in column (b) we estimate equation (2) with all the controls described above. Notice that, adding all the control variables, the significance of some coefficients improves. The last raw of table 4 displays the p value of the Arellano–Bond test for second-order autocorrelation in the first-differenced residual; we do not reject the null hypothesis of no second-order autocorrelation. In case of robust standard errors, the distribution of the Sargan test is not known, therefore it cannot be computed.

Looking at every lags of all the regressors, some of them are significant and other are not significant.

[16] We performed, but we do not show, the autocorrelation test after the fixed effect estimation of equation (1).
[17] See Arellano and Bond (1991).

In order to calculate and interpret the long-run multipliers, we carry out the Wald test that lags are jointly significantly different from zero. We show the chi^2 distribution of the test and the p-value in table 5 in appendix. The null hypothesis of the Wald test is that lags are jointly equal to zero; for every regressor (but *lnpop*) at least at 10% we reject the null.[18] Therefore we compute the long-run multipliers of explanatory variables. Given a general dynamic structure of a model like

$$Y_t = \alpha_t + \gamma Y_{t-1} + \sum_{i=0}^{n} \beta_i X_{t-i}$$

the long-run multiplier is given by

$$LRM = \frac{\sum_{i=0}^{n} \beta_i}{1-\gamma}$$

Based on the estimated lag coefficients, table 6 in appendix shows the *long-run multipliers* for equation (b).[19]

Looking at the direct effect of electoral systems on political corruption, from table 6 emerges that the LRM coefficient of the variable *LSI* is positive; recalling that it is a *disproportionality* index, the more the proportionality degree of the electoral system the less the level of per capita corruption. The result of this "within country" analysis is opposite with respect to the cross-countries empirical results (Person, Tabellini, Trebbi, 2003): the barrier to entry effect dominates the accountability effect. But, considering the Italian political system, an increase in *political stability*, due to an increase in the proportionality degree of the electoral rule, can be a more satisfactory interpretation of the positive effect of *LSI* on political corruption. It is in the *ratio* of electoral engineering that less proportional electoral systems, while promoting cohesive government which is able to implement its policies without the need of partners, lack in the representativeness (of the minorities within the parliament or the Committee) and responsiveness of the government to any change in popular opinion during its term in office. This is known as *political instability*.[20] This kind of instability reduces in more proportional regimes characterized by greater political fragmentation which guarantee a wide representation of minorities. Inspired by Treisman (2000) corruption is higher where political instability is greater, therefore, corruption is lower in more proportional electoral systems, as our findings showed. This happens because in countries with a weak party system and a high level of party fluctuation, politicians and parties might face the prospect of losing power after just one term in office, independently of how they perform. Consequently, they might be more likely to use their offices to maximize personal profit for party leaders and to channel as many benefits as

[18] We did not perform the Wald test of the variable *particip* because, in column (b) its lags coefficients are not significantly different from zero.
[19] The LRM for equation (a) are available upon request.
[20] Political instability means that successive majorities which govern are an expression of different political ideologies.

possible to supporters, family, and friends.[21] Moreover, political instability creates uncertainty with respect to future institutions and policymakers which, in turn, can incentive private agents and firms to corrupt politicians.

The LRM of the concentration index shows positive sign: an decrease in the index means an increase in political competitiveness among political parties which implies a decrease in political corruption. This sign is crucial in the interpretation of the interaction term *LSI***NHI* capturing the indirect effect of the proportionality degree of the electoral system on corruption, which is the core of the analysis. Its LRM coefficient is negative (see always equation (b) table 5) and it can be interpreted as

$$\frac{\partial corr}{\partial NHI} = 0.07 - 0.44 * LSI$$

that is, the effect of political concentration on corruption is a negative function of the disproportionality degree of the electoral system. If the electoral system is more proportional (the level of *LSI* is low) the value of the derivative $\frac{\partial corr}{\partial NHI}$ is greater than if the electoral system is less proportional. More precisely, there is a value of the *LSI* such that the $\frac{\partial corr}{\partial NHI} = 0$; this value is equal to 0.16. If the *LSI* is lower than 0.16, the $\frac{\partial corr}{\partial NHI} > 0$; if the *LSI* is greater than 0.16, the $\frac{\partial corr}{\partial NHI} < 0$.

This is a very interesting result. We are saying that under more proportional rules (the *LSI* lower than 0.16) an increase in political competition (i.e. a decrease in *NHI*) implies a decrease in political corruption, leading the direct and the indirect effect of the proportionality degree on corruption to the same direction: they are reducing corruption. On the other hand, if electoral system becomes less proportional (*LSI* increases up to 0.16), an increase in the *NHI* decreases corruption: the direct and the indirect effect go in opposite directions. Therefore, the final effect of the proportionality degree of the electoral system on corruption depends on *how* political competition changes as the proportionality degree of the electoral system changes. That is, if the change in political competition has the same sign of the change in the proportionality degree of the electoral formula (as hypothesized above) the indirect effect strengthens the direct one (in its beneficial effect on corruption) under more proportional rules and mitigates the direct effect on corruption under less proportional regimes. If the sign of the relationship diverges, the reverse happens. Thus, in order to draw conclusions, we perform a basic A-Bond regression of the *NHI* on the *LSI* (controlling for the size and the economic development of regions) which is shown in table 7 in appendix. For Italy,

[21] Treisman (2000) writes "A high degree of political stability will lengthen officials' time horizon, while a bureaucracy that offers long-term careers with chances of advancement will promise greater future benefit to a low-level bureaucrat than one in which jobs are more insecure and promotion less likely".

political competition positively depends on the proportionality degree of electoral systems; this dependence is strongly significant. To sum up, the beneficial effect of an increase in the proportionality degree of the electoral system on political corruption is reinforced by the increase in the political competition caused the former.

Looking at the economic control variables, the natural log of the per capita GDP has the negative expected sign and *pubspend* has a negative sign also found by Del Monte and Papagni (2007) meaning that, in Italy, an higher level of government intervention in the economy leads to an higher level of transaction which are fertile ground for corrupt behaviour. The sign of *school* is positive but its magnitude is very low. The female participation within a Committee is confirmed to have a negative effect on corruption such as the regional size proxied by *lnpop*. We did not calculate the LRM of the variable *particip* because, in column (b) its lags coefficients are not significantly different from zero. *manipulite* is a dummy variable controlling for the anticorruption campaign started in 1992; it is not significant.

Robustness checks

We perform robustness checks of the analysis. The Arellano and Bond estimation technique treats the model as a system of equations (viz. one for each time period) developing a Generalized Method of Moments estimator that exploits the moment conditions for the equations in first differences. However, an important obstacle to using GMM is that the lagged values of the dependent variable may be only weak instruments in the differenced regression. This could lead to severe finite-sample bias, especially when the series is very persistent (see Blundell and Bond, 1998). Given this, we employ system GMM estimation (Arellano and Bover, 1995; Blundell and Bond, 1998). This method combines the moment conditions for the equations in first differences exploited in the difference GMM estimator with additional moment conditions for the equations in levels. The introduction of these additional moments increases the efficiency of the estimation. The result of the Blundell-Bond estimation of equation (2) is shown in column (c) of table 4. As we can see, the sign and the significant of the single coefficient (lag coefficient) maintains, then, as for the Arellano-Bond estimation, we calculate the LRM shown in table 5 (column (c)). The interpretation of the Gallagher's index and the normalized Herfindahl index remains the same: the direct and indirect effect of the electoral system matter in explain political corruption.

The second robustness check we made is about the (dis)proportionality index we used. In column (d) and (e) we run equation (2) using the oldest and one of the most used (dis)proportionality index: the Rae's index. It is calculated as

$$Rae = \frac{1}{n}\sum_i |v_i - s_i|$$

It sum the absolute difference between the vote percentages (v_i) and seat percentages (s_i) and the outcome is divided by the number of political parties (n)[22]. Equation (d) presents the Arellano-Bond estimation result and equation (e) the Blundell-Bond. In both cases the sign and the significance of political variables we are interested in does not change. The same holds for control variables.

6. Concluding remarks

We contribute to the literature on the analysis of electoral system and corruption by hypothesizing and testing that, beside a *direct* effect of the proportionality degree of electoral system on corruption, an *indirect* effect matters: political competition is a channel through which electoral system affects corruption. The Italian sample allows us to exploit an horizontal dimension (the regions) and a time series dimension (from 1980 to 2005). Italy represents a very interesting case study because of the diffusion of corruption and the changes in the electoral law which modified the proportionality degree of the electoral system. In order to take advantage of this latter, we need to a measure of such the proportionality degree; we choose the well accredited Gallagher (dis)proportionality index (*LSI*), constructed on the Senate electoral results. The degree of political competitiveness among political parties is measured by the normalized Herfindahl index of votes concentration in the hand of political parties, always at the Senate elections. Multiplying the two political indexes we create an interaction variable grasping what we called the *indirect* effect. Estimations showed that both the effects matter in explaining political corruption. The beneficial effect on corruption of an increase in the proportionality degree of the electoral system is reinforced by an increase in political competition (caused by it) only if the *LSI* is below a threshold; going up to that threshold, the effect of political competition on corruption inverted and direct and indirect effect drive corruption in opposite directions. The final effect depends on how political competition reacts to a change in the proportionality degree of electoral system. This last statement is fundamental in designing a proportionality degree of an electoral system through electoral Laws. In studying the impact of an electoral system on corruption, one cannot leave aside the analysis of how the degree of political competition follows the degree of proportionality of electoral system.

[22] The weakness of this index is that it is sensitive to the number of small parties.

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Appendix

Table 1 : Matching

Match 1			
Increase Proportionality		Decrease Accountability	Increase Corruption
Increase Proportionality	Increase PC	Increase Accountability	Decrease Corruption
Match 2			
Increase Proportionality		Decrease Accountability	Increase Corruption
Increase Proportionality	Increase PC	Decrease prob of re-elections	Increase Corruption
Match 3			
Increase Proportionality		Smaller barriers to entry for honest competitors	Decrease Corruption
Increase Proportionality	Increase PC	Increase Accountability	Decrease Corruption
Match 4			
Increase Proportionality		Smaller barriers to entry for honest competitors	Decrease Corruption
Increase Proportionality	Increase PC	Decrease prob of re-elections	Increase Corruption

Table 2: Statistics

Variable	Mean		Std. Dev.	Min	Max	Observations	
Per capita corruption	0.03	overall	0.02	0.001	0.26	N =	520
		between	0.01			n =	20
		within	0.02			T =	26
LSI	0.13	overall	0.1	0.02	0.51	N =	560
		between	0.09			n =	20
		within	0.04			T =	28
NHI	0.19	overall	0.06	0.06	0.34	N =	580
		between	0.03			n =	20
		within	0.06			T =	29

Table 3: Correlations

	LSI	*NHI*	*lngdp*	*pubspend*	*school*	*women*	*lnpop*	*particip*
LSI	1							
NHI	0.1116	1						
lngdp	0.2561	0.0629	1					
pubspend	0.0785	-0.0934	-0.7972	1				
school	0.1570	0.3344	0.4341	-0.1817	1			
women	-0.2982	0.0971	0.2865	-0.4554	0.1541	1		
lnpop	-0.7463	0.0107	-0.0874	-0.2779	-0.0481	0.5808	1	
particip	-0.2578	-0.2042	0.3961	-0.6270	-0.3691	0.2436	0.1997	1

Table 4: Estimations

	LSI			Rae	
	A-Bond	**A-Bond**	**B-Bond**	**A-Bond**	**B-Bond**
	(a)	**(b)**	**(c)**	**(d)**	**(e)**
corr (-1)	0.3100*	0.2975**	0.3013**	0.3030**	0.3068**
	(1.83)	(2.06)	(2.46)	(2.07)	(2.45)
LSI (-2)	0.1283*	0.1351*	0.1227*	0.2930**	0.2504*
	(1.69)	(1.86)	(1.73)	(2.17)	(1.90)
LSI (-3)	-0.1709***	-0.1748***	-0.1737***	-0.3843**	-0.3988***
	(-2.58)	(-2.57)	(-2.70)	(-2.53)	(-2.77)
LSI (-4)	0.1272*	0.1191	0.0984	0.2230	0.2009
	(1.67)	(1.54)	(1.24)	(1.52)	(1.36)
NHI (-2)	0.0758**	0.0841***	0.0658**	0.0823**	0.0602*
	(2.45)	(2.67)	(2.23)	(2.26)	(1.83)
NHI (-3)	-0.0459	-0.0549	-0.0404	-0.0874	-0.0808
	(-1.07)	(-1.35)	(-0.95)	(-1.53)	(-1.39)
NHI (-4)	0.0456	0.0238	0.0199	0.0325	0.0256
	(0.98)	(0.48)	(0.34)	(0.74)	(0.52)
*LSI*NHI (-2)*	-0.3544**	-0.4023*	-0.3877*	-0.7519**	-0.7213**
	(-1.96)	(-1.95)	(-1.92)	(-2.10)	(-2.17)
*LSI*NHI (-3)*	0.3245**	0.3338***	0.2397**	0.8695**	0.7427**
	(2.45)	(2.62)	(1.97)	(2.22)	(1.85)
*LSI*NHI (-4)*	-0.2951	-0.2400	-0.2083	-0.4311	-0.3681
	(-0.96)	(-0.77)	(-0.62)	(-0.88)	(-0.68)
lngdp (-2)	-0.0638	-0.2329**	-0.0623	-0.2373**	-0.0528
	(-0.61)	(-2.21)	(-0.81)	(-2.32)	(-0.72)
lngdp (-3)	0.0278	0.2410**	0.2048*	0.2406*	0.1995*
	(0.18)	(1.96)	(1.94)	(1.95)	(1.89)
lngdp (-4)	-0.1806*	-0.2196*	-0.1501	-0.2197*	-0.1456
	(-1.71)	(-1.86)	(-1.23)	(-1.83)	(-1.14)
pubspend (-2)	-0.5698	-1.0239**	-0.5089*	-1.0356***	-0.4718*
	(-1.53)	(-2.53)	(-1.77)	(-2.62)	(-1.71)
pubspend (-3)	0.2917	0.9562*	0.8060*	0.9551*	0.7913
	(0.50)	(1.80)	(1.65)	(1.75)	(1.56)
pubspend (-4)	-0.4813	-0.6729**	-0.5059*	-0.6387*	-0.4556
	(-1.25)	(-2.03)	(-1.70)	(-1.77)	(-1.34)
school (-2)		0.0011*	0.0014*	0.0011*	0.0014*
		(1.85)	(1.95)	(1.76)	(1.95)
school (-3)		0.0021	0.0023	0.0022	0.0024
		(1.29)	(1.41)	(1.35)	(1.47)
school (-4)		-0.0029*	-0.0036**	-0.0029*	-0.0036**
		(-1.80)	(-2.14)	(-1.76)	(-2.07)
women (-2)		-0.0118**	-0.0089**	-0.0139**	-0.0110**
		(-2.32)	(-1.96)	(-2.32)	(-1.98)
women (-3)		0.0064*	0.0058	0.0111**	0.0111**
		(1.75)	(1.59)	(2.08)	(2.07)
women (-4)		0.0025	0.0032	0.0003	0.0005
		(0.80)	(0.76)	(0.08)	(0.11)
lnpop (-2)		-0.6290**	-0.4931*	-0.6426**	-0.5056*
		(-2.32)	(-1.82)	(-2.23)	(-1.86)
lnpop (-3)		1.1392*	1.1170*	1.1195*	1.0975*
		(1.91)	(1.81)	(1.87)	(1.77)
lnpop (-4)		-0.6391	-0.6343	-0.6079	-0.5994
		(-1.64)	(-1.50)	(-1.57)	(-1.44)
particip (-2)		0.0004	0.0008	0.0004	0.0008
		(0.32)	(0.52)	(0.29)	(0.57)
particip (-3)		0.0006	-0.0000	0.0006	-0.0000
		(0.42)	(-0.01)	(0.42)	(-0.02)
particip (-4)		-0.0017	-0.0031**	-0.0015	-0.0029*
		(-1.31)	(-2.09)	(-1.10)	(-1.84)
manipulite		-0.0049	0.0185*	-0.0087	0.0160
		(-0.34)	(1.96)	(-0.54)	(1.53)
N. obs.	420	420	440	420	440
p-value 2nd order autocorrelation	0.1332	0.1878	0.2323	0.1593	0.2135

Notes. The definitions and data sources of the variables are in the appendix. All regressions contain calendar year dummies (results not reported); the time span is 1980-2005. The dependent variable is *corr*. A-Bond is the Arellano-Bond estimator, B-Bond is the Blundell-Bond estimator. Standardized normal z-test values are in parentheses; robust standard errors. Significant coefficients are indicated by * (10% level), ** (5% level) and *** (1% level).

Table 5: Wald test

LSI	$Chi^2(3) = 6.7$ [p-value = 0.07]
NHI	$Chi^2(3) = 6.7$ [p-value = 0.08]
LSI NHI*	$Chi^2(3) = 8.9$ [p-value = 0.03]
lngdp	$Chi^2(3) = 11.7$ [p-value = 0.00]
pubspend	$Chi^2(3) = 10.9$ [p-value = 0.01]
school	$Chi^2(3) = 6.4$ [p-value = 0.09]
women	$Chi^2(3) = 6.6$ [p-value = 0.08]
lnpop	$Chi^2(3) = 5.04$ [p-value = 0.16]

Table 6: long-run multipliers

	(b)	(c)
LSI	0.113025	0.106045
NHI	0.075445	0.071745
*LSI*NHI*	-0.43915	-0.38717
lngdp	-0.30107	-0.34443
pubspend	-1.05423	-1.18065
school	0.000427	0.000572
women	-0.00413	-0.00472
lnpop	-0.18349	-0.21409

Table 7: basic regression of *NHI* on *LSI*

Dep. Var. *NHI*	A-Bond
NHI(-1)	0.6*** (10.6)
LSI	0.26*** (2.6)
lngdp	-0.35** (-2.5)
lnpop	-0.47 (-1.46)
N. obs.	520
p-value 2nd order autocorrelation	0.5

All regressions contain calendar year dummies (results not reported). The dependent variable is *NHI*. A-Bond is the Arellano-Bond estimator. Standardized normal z-test values are in parentheses; robust standard errors. Significant coefficients are indicated by * (10% level), ** (5% level) and *** (1% level).